

REVISED SYLLABUS W.E.F.01ST JULY, 2005

**T.Y.B.TEXT. (TPE) SEMESTER-I**

SR. NO.	COMMITTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
5.1	TT/MMTT/TPE/TC	TEXTILE ELECTRONICS-II	3	---	---	2	100	---	---	50	150
5.2	TPE	YARN MANUFACTURING MACHINERY-III	4	---	---	2	100	50	---	---	150
5.3	TPE	FABRIC MANUFACTURING MACHINERY-III	4	---	---	2	100	50	---	---	150
<b>5.4</b>	<b>* TPE</b>	<b>* AMBIENT CONDITIONS IN TEXTILE MILLS</b>	<b>3</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>100</b>	<b>25</b>	<b>---</b>	<b>---</b>	<b>125</b>
<b>5.5</b>	<b>* TPE</b>	<b>* TEXTILE TESTING</b>	<b>4</b>	<b>---</b>	<b>---</b>	<b>3</b>	<b>100</b>	<b>25</b>	<b>---</b>	<b>50</b>	<b>175</b>
5.6	TPE	METALLURGY	3	---	---	---	100	---	---	---	100
5.7	TT/MMTT/TPE/TC	INPLANT TRAINING-I	---	---	---	---	---	50	---	---	50
			21	---	---	9	600	200	---	100	900
L =LECTURES T =TUTORIALS DR=DRAWING PR=PRACTICALS			TP=THEORY PAPER TW=TERM WORK OE=ORAL EXAMINATION PE=PRACTICAL XAMINATION								

## THIRD YEAR B.TEXT. - SEMESTER - I

### 5.1 TEXTILE ELECTRONICS-II (TT/MMTT/TPE/TC)

Lectures	-	3 hrs/week.
Practicals	-	2 hrs/week.
Theory Paper	-	100 marks.
Practical Exam.	-	50 marks.
Subject Total	-	150 marks.

1) **Digital Electronics and Number System :-**

Difference between digital and analog, digital gates, working, truth table & Boolean equation, with examples from TTL family.

Digital Circuits :- Introduction to multiplexers, Demultiplexers, Encoders, decoders, Flip Flop – R-S, D & J – K, Registers Latches, binary counter, buffers, Tri state devices, memories – RAM, ROM, EPROM.

Introduction to Number systems :- Decimal, Binary, hexadecimal, conversion of numbers from one system to other. Binary arithmetic – addition, subtraction, two's complement representation.

2) **8085 Microprocessor :-**

Introduction to microprocessor, features of 8085, Architecture of 8085 – Register section, ALU, Timing & Control etc. Demultiplexing of address data bus. Generation of control signals, Example of microprocessor based system, 8085 machine cycles and bus timing. Memory interfacing to 8085.

3) **Programming of 8085 :-**

Instruction classification, instruction and data formats, addressing modes, complete instruction set, assembly language programming , Execution of programs, programming with looping, counting & indexing techniques. Time delay's & counters.

4) **Stacks and Subroutine :-**

Stack, subroutine, call & Return instructions advanced subroutine concepts.

5) **Interfacing Input / output devices :-**

Basic interfacing concept, interfacing output displays, interfacing input devices, difference between peripheral Input/output memory mapped Input/out.

**6) Interrupts :-**

Concept of interrupts, software & hardware interrupts, Description of interrupt process, vectored interrupts, programming using interrupts.

**7) Interfacing of peripherals & other I/O devices :-**

8255 PPI interfacing & programming, interfacing of keyboard (matrix) & display, interfacing of thumbwheel switches, stepper motor, D/A & A/D converters, Relays etc.

**8) Introduction to Microcontroller:-**

Introduction to microcontroller, Block diagram of microcontroller, Difference between microprocessor and microcontroller, Features of 8051 microcontroller, Introduction to PLC & its applications.

**9) Applications of Microprocessor in Textiles :-**

Use of Microprocessor / Microcontroller in Sizing Machine, Jet dyeing machine, advanced looms, Spinning machines, Ring data System, Auto levelers, On-line monitoring systems, Evenness tester.

**LIST OF EXPERIMENTS**

- 1) Study of basic gates.
- 2) Study of flip flops
- 3) Assembly language programmes ( 6 to 8)
- 4) Interfacing of 8255 in simple I / O & BSR mode.
- 5) Interfacing of Seven segment display.
- 6) Interfacing of keyboard.
- 7) Interfacing of stepper motor.
- 8) Interfacing of D/A converter.
- 9) Interfacing of A/D converter.
- 10) Interfacing of thumbwheel.

## **REFERENCE BOOKS**

- 1) Digital Principles and applications by Malvino & leach.
- 2) Microprocessor Architecture, Programming and applications with 8085 by Ramesh Gaonkar.
- 3) Microprocessor & Digital system by Douglas Hall.
- 4) Fundamentals of microprocessors & microcomputers by B. Ram.
- 5) The 8051 Microcontroller Architecture, Programming and Applications by Kenneth J, Ayala.
- 6) Machine manuals of USTER, LOPHE, PREMIER

### **THIRD YEAR B. TEXT - SEMESTER-I**

#### **5.7 INPLANT TRAINING - I (TT/MMTT/TPE/TC)**

Duration	:	4 Weeks
Term Work	:	50 Marks

- 1) As a part of curriculum, students are required to undergo an Inplant training for the period of Four Weeks, after the completion of second semester of Second Year B. Text.
- 2) During this period, students are required to study the machinery, industrial practices & the other relevant data, information as per the guidelines given by the Institute.
- 3) The students are required to submit a Inplant Training Report on the basis of above training.
- 4) Term work marks are assigned on the basis of students performance in the viva – voce, conducted by Internal Examiner immediately after inplant training. A viva-voce will be conducted in the first semester of Third Year B. Text.
- 5) If the performance of the student is found to be unsatisfactory, his terms will not be granted.

### THIRD YEAR B. TEXT - SEMESTER-I

#### 5.2 YARN MANUFACTURING MACHINERY - III (TPE)

Lectures	:	4 Hrs / Week
Practicals	:	2 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

##### 1. Ring Spinning:-

1. Revision of basic principle of working of a ring frame, passage of cotton, calculations regarding draft, twist and production.
2. Drafting: - Evolution of design of drafting systems at ring frame. Study of design and working of modern top weighting system with respect to arrangement of rollers, roller weighting system, fibre control, process and cradles. Concept of e-drafting.
3. Ring and Traveller: - Basic principle, design developments in ring and traveller, ring and traveller specifications and their application for different count ranges, traveller burning and its reasons, maintenance of rings and travellers. Ring traveller interaction and spinning performance.
4. Spindles and Bobbins: - Design developments in ring frame spindles and bolsters. Study of types of bobbins used in ring spinning. Design specifications of spindles and rings and their suitability for counts being spun. Maintenance of spindles and bolsters. Optimum package size for ring spinning.
5. Drives: - Types of drives used for ring frame. Design developments in variable speed drive. Developments in drive to spindles.
6. Defects in ringframe production their reasons and remedy
7. Spinning balloon theory and factors affecting the tension
8. Latest Ringframes, Compact spinning & Lycra attachment.

## **2. Yarn Doubling & Folding:-**

- a) Objects of yarn doubling & folding, Basic concepts in twisting. Study of ring doubler and limitations of ring doubler.
- b) Study of Constructional details, study of two for one twister, construction, working of different devices.
- c) New developments in TFO twisting, Power consumption & noise level of TFO.
- d) Twist setting of yarns.

## **3. Technology of Fibres other than Cotton :-**

- a) Production of manmade fibres namely viscose, polyester, acrylic.
- b) Silk & wool technology.

## **4. Blend Spinning:-**

Spinning of man-made fibres and blends with cotton on cotton system. Fibre characteristics and spinnability. Fibre properties and end uses, objectives of blending.

Measures of blending, blend migration, Tinting, Selection of blend constituents, Mechanics of blending. Blending techniques. Modifications of cotton spinning machinery for processing man-made fibres. Spinning of dyed fibres. Common faults in blended and 100% man-made staple yarns. Twist setting, winding and doubling. Properties of blended yarns. Blending of man-made fibre with wool and natural fibres.

Future machinery options for blend spinning. Processing of blends on Rotor and other spinning systems. Maintenance Hints while processing blends.

## **LIST OF EXPERIMENTS**

- 1) Study of conventional ring frame, passage gearing calculations.
- 2) Study of modern ring frame, passage gearing calculations.
- 3) Study of tools & gauges required on ring frame.

- 4) Measurement of various parameters related to spinning geometry.
- 5) Study of ring doubler passage, gearing & calculations.
- 6) Study of rotor spinning machine, constructional details & passage.
- 7) Study of building mechanism on ring frame.
- 8) Ring frame settings, spindle gauging, lappet guide settings, spindle trueing
- 9) Study of TFO, passage gearing, calculations.
- 10) Study of suction systems working on ring spinning & rotor spinning.
- 11) Study of data & interfaced systems on ring & rotor spinning.
- 12) Industrial visit to study modern ring spinning, doubling & rotor spinning.

### **REFERENCE BOOKS**

- 1) Fundamentals of Spinning – P. Lord / C. A. Lawarance
- 2) Technology of Cotton Spinning – J. Janakiram
- 3) Trade Literature & Bulletins of Rieter LMW, Marzoli
- 4) NCUTE Pilot programmers in spinning.
- 5) SITRA Focus series.
- 6) Elements of ring frame & doublings by A. R. Kahre.
- 7) Manual of Textile Technology – Short Staple Series.
- 8) Vol IV A Practical Guide to Ring Spinning – W. Klein
- 9) Blend Spinning – K.R. Salhotra.
- 10) Two for one Twister technology & Technique for spun yarns by H. S. Kulkarni & HVS Murty.
- 11) Advances in Spinning – S. M. Ishtiaque

**THIRD YEAR B. TEXT. - SEMESTER-I**

**5.3 FABRIC MANUFACTURING MACHINERY-III (TPE)**

Lectures	:	4 Hrs / Week
Practicals	:	2 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

1. **Air Jet weft Insertion:** - Machines for air jet weaving, Introduction, overview of weft insertion elements, insertion main nozzles designs, relay nozzle designs, configurations, Loom settings, Air supply & energy consumption, Air flow in nozzles & guide channel, performance of yarns in air jet insertion, Optimisation of settings, Weft stops & breaks, application of air jet weaving, functional characteristics & features of modern air jet weaving machines, (Dornier, Smit, Picanol, Sulzer) Quality of Air, maintenance of machines.
2. **Water Jet Weft Insertion:-** Introduction, Design, Requirements, Picking mechanism, weft insertion elements, loom settings, features of water jet looms, applications of water jet weft insertion system. Comparison with air jet, maintenance.
3. **Multiphase Weaving:-** Introduction, Classification, Methods to form warp wise and weft wise sheds, methods of picking, methods of beat up, limitations of multiphase weaving, applications, features of modern multiphase weaving machines e.g. M 8300, maintenance.
4. **Circular Weaving:-** Introduction, Classification as per number of shuttles, shedding, picking, beating, cloth collection, supply of warp yarn, stop motions for warp & weft, productivity, Maintenance,.
5. **Triaxial Weaving:** - Introduction, Properties of triaxial woven fabrics, applications, weaving equipment for triaxial weaving.
6. **Narrow Fabric Weaving:-**

- a. Preparation – Machines & processes for assembling warps, various warping processes used, weft preparation.
  - b. Technology of narrow fabric weaving – Machine construction, Shuttle looms, needle looms, warp feed systems from beams, creel, for elastomeric yarns, shedding, weft insertion systems, take up.
  - c. Micro electronics in Narrow Fabric Weaving – Fundamentals, computer aided patterning systems, Acquisition of production data & monitoring equipment.
  - d. Application of weaves in narrow fabric weaving.
  - e. Maintenance aspects.
7. **Manufacture of Labels:** - Introduction, labels with woven selvedge & cut selvedge.
8. **Braiding:** - Introduction, classification (rounds & flat braids), applications, raw material used for braids, machines used for braiding (drive, yarn supply, Braiding technology, take up.)

#### **LIST OF EXPERIMENTS**

1. Overhauling of Sulzer picking motion.
2. Study of style change process on projectile (Sulzer) Machine.
3. Study of let-off motions of all shuttle less weaving machines & operations of looms.
4. Study of control panel of Dornier weaving machine and fabric production with changed parameters.
5. Study of control panel of SMIT Air Jet weaving machine and fabric production with changed parameters.
6. Study of Dobby CAD software
7. CAD software application – Creation of weaves
8. CAD software application – Creation of weaves.
9. Study of style change on Dornier
10. Study of style change on Airjet Smit
11. Study of sample weaving equipment
12. Visit to rapier weaving unit.

## **REFERENCE BOOKS**

1. Handbook of weaving – Sabit Adanur.
2. Modern preparation and weaving machinery – A Ormerod
3. Shuttleless weaving machine – Svaty.
4. Shuttleless Looms – J. J. Vincent
5. Shuttleless weaving machine – O. Talavasele, V. Svaty
6. Narrow Fabric Weaving - Sauer Lander Verlag
7. Narrow Fabric Group Conference – Textile Institute
8. Braiding and Braiding Machinery – W. A. Douglass

**THIRD YEAR B. TEXT. - SEMESTER-I**

**5.4 AMBIENT CONDITIONS IN TEXTILES MILLS (TPE)**

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term work	:	25 Marks
Subject Total	:	125 Marks

1) Thermodynamics -

Laws of thermodynamics applied to refrigeration. Introduction of basic terms – specific volume, density, specific weight, energy, internal energy, flow energy work, specific heat, sensible heat, latent heat, entropy, enthalpy, difference between gas and vapour, COP, ton of refrigeration.

2) Refrigeration -

Air refrigeration system – reversed carnot cycle as most efficient refrigerators. Bell column cycle, advantages, disadvantages of air refrigeration.

Simple Vapour compression refrigeration system – T.S., H.S. P-H diagrams comparison with air compression system, Coefficient of performance.

3) Refrigerants -

Properties of ideal refrigerants, classification of refrigerants, difference between primary & secondary refrigerant, comparison of refrigerants – Air, NH<sub>3</sub>, R-11, R-12, selection of refrigerants.

4) Equipments used in refrigeration and air conditioning working principle & applications of hermetically sealed compressor, condenser, evaporator, fans, blowers, air washers, filters, heaters, heat pumps, grills, registers, humidifiers & dehumidifiers used in textile A/C plant.

5) Comfort -

Factors affecting comfort, thermal exchange of human body with environment, heat disorders, comfort chart.

6) Psychrometry -

Psychrometric terms, Dalton's law of partial pressure, psychrometric relations, psychrometric chart, psychrometric processes – sensible heating & cooling, cooling with dehumidification, heating with humidification, humidification by steam injection, adiabatic chemical dehumidification, adiabatic mixing of air streams, bypass factor of heating and cooling coil, efficiency of heating & cooling coil, efficiency of humidifier, sensible heat factor.

7) Airconditioning systems -

Summer air conditioning, Winter air conditioning, modern year round air conditioning, ambient conditions required in various departments of textile mill and controlling ambient conditions.

8) Air distribution systems -

Recirculated air, conditioned air, duct work, use of friction loss chart, rectangular equivalent of round duct, Duct systems, principle of duct sizing, different air distribution systems.

9) Design of Air conditioning system – Design hints for practical design of air conditioning & humidification plant.

Ventilation and air changes required for various departments of textile mill. Calculations of heat load, cooling coil capacity, humidifier capacity, heating coil capacity.

**TERM WORK :-**

Term work based on above syllabus

## **REFERENCE BOOKS**

- 1) Refrigeration & Air conditioning – C.P. Arora
- 2) Refrigeration & Air conditioning – R.S. Khurmi
- 3) Refrigeration & Air conditioning – Arora, Domkundwar
- 4) Air conditioning in Textile mills - S.P. Patel (ATIRA)

**THIRD YEAR B. TEXT - SEMESTER-I**

**5.5 TEXTILE TESTING (TPE)**

Lectures	:	4 Hrs / Week
Practicals	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Practical Exam	:	50 Marks
Subject Total	:	175 Marks

**A) FIBRE TESTING:-**

**1) Fibre Length**

Technical significance, fibre length measurement - comb sorter, fibro graph.

**2) Fibre Fineness**

Terms & definitions, technical significance of fibre fineness, measurement of fineness, Microscopic method, gravimetric method, ATIRA - airflow method,

**3) Maturity of Cotton**

Technical significance, measurement of maturity – causticaire method, polarised light method, differential dyeing and microscopic method

**4) Neps**

Definition, importance, testing of nep in card web, testing of nep in yarns.

**5) Introduction to testing of colour and trash in fibre.**

**6) Study of Modern Fibre Testing Instruments like HVI & AFIS.**

**B) YARN TESTING:-**

**1) Linear Density of Yarn**

Count of yarn number, yarn numbering systems, measurement of yarn number.

## **2) Twist & Twist Measurement**

Definition, Twist direction, amount of twist, TM / TF, Effect of twist on yarn and fabric properties, twist & yarn strength, measurement of twist in single & double yarn – Twist contraction method, Take Up Twist Tester.

## **3) Yarn Evenness**

Importance, classification of variation, expression of irregularity, basic irregularity, index of irregularity, addition of irregularities, measurement of yarn irregularities – visual examination, cutting & weighting method, Groove & shoe principle, Evenness tester – Uster Tester, Analysis of spectrogram, causes of irregularity, Auto leveller for online control of irregularity.

## **4) Testing of other yarn properties like imperfections, classimat faults, yarn friction.**

## **5) Yarn Hairiness Testing**

Importance, causes & reduction of Hairiness, Measurement of Hairiness

## **C) FABRIC TESTING:-**

- 1) Fabric Dimensions – Measurement of fabric length, width & thickness.
- 2) Fabric weight, threads per inch.
- 3) Crimp of yarn & fabric, effect of crimp, measurement of crimp.
- 4) Fabric Cover.
- 5) Air permeability – Definitions, measurement & factors affecting air permeability.
- 6) Water permeability – Definitions, measurement, wetting time test, spray test, drop penetration test, bundesmann tester, static head test.
- 7) Fabric stiffness, Handle & Drape – Shirley stiffness tester, Heart loop test, Drapemeter.

- 8) Crease resistance & Crease recovery, measurement of crease recovery.
- 9) Serviceability, wear & abrasion resistance, definition, testing of Abrasion Resistance, Martindale Abrasion tester, BFT Abrasion Tester.
- 10) Pilling of fabric – Importance, testing of pilling properties of fabric.

## **D) TENSILE STRENGTH TESTING OF TEXTILE MATERIALS**

### **1) Tensile Strength**

Introduction, terminology, stress strain curve & its importance, factors affecting tensile properties.

### **2) Measurement of Fibre Strength**

Single fibre strength, Instron, Bundle Strength, Stelometer & Pressley Method.

### **3) Measurement of Yarn Strength**

Pendulum lever principle, inclined plane principle, strain gauze transducer principle, single thread strength tester, lea strength tester, Instron Tester, Ballastic Tester.

### **4) Measurement of Fabric strength**

Cut strip test, Raveled strip test, Grab test, tearing strength testing, Ballastic strength testing, bursting strength testing.

## **LIST OF EXPERIMENTS**

1. Determination of Fibre Parameters on HVI
2. Identification of Textile Fibres by Microscopy Method.
3. Determination of Yarn Number.
4. Determination of Twist in Single & Double Yarn.
5. Yarn Evenness Testing.
6. Determination of Single Yarn Strength.
7. Determination of Lea Strength.
8. Ballastic Strength of Yarn & Fabric.
9. Fabric Strip Strength Test.
10. Fabric Tearing Strength

11. Fabric Abrasion.
12. Fabric Stiffness

### **REFERENCE BOOKS**

1. Textile Testing by Angappan & Gopalkrishnan.
2. Physical Testing of Textiles by J.E. Booth.
3. Manuals of HVI, AFIS
4. Textile Testing by Skinkle.
5. Handbook of Indian Standards.
6. Physical properties of Textile Fibre by J.W.S. Hearle & Morton.

**THIRD YEAR B. TEXT. - SEMESTER-I**

**5.6 METALLURGY (TPE)**

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

**1) Metal & Alloy System:-**

a) Metals, Crystal structures, strength of crystals, allotropy, solid solution systems, phase and phase rules, structural constituents, cooling curve, lever arm principle.

b) Equilibrium Diagram :-

Solid solution type and eutectic type solution, introductory information with diagrams and common alloys on it. Peritectic type in shorts with diagrams & common alloys.

c) Metallographic testing :-

Sampling, mounting, polishing, etching, microscopic examination. Macro examination of Metals.

**2) Study of phase Diagrams:-**

a) Iron –carbon equilibrium diagram, Equilibrium diagrams such as Cu-Zn, Cu-Sn, Al-Cu, (Only Aluminium rich portion) Equilibrium diagrams & their important engineering applications. (Imp. Alloys only with diagrams.)

**3) Compositions :-**

Properties and Applications of ferrous & non ferrous metals and alloys, selection of metals for common Application

A) Plain carbon steel    B) Alloy steels, Stainless steels tool steel. Heat resistant steels. High strength structural steels. C) CI- Grey, white, Malleable, SG iron, Meahanite, d) wrought Iron. E) Brasses    F) Bronzes    G) Bearing metals    H) Aluminium & Nickel alloys.

**4) Specifications :-**

IS, BS, ASTM, SAE, DIN, ISO, Selection of Materials based on applications in Textiles like Torsion bar, Seizer blade, machine frames, yarn guides, knitting needles, spinning rings, Gears, cams etc.

**5) Powder Metallurgy :-**

Introductory aspects of manufacturing techniques and applications such as electric contacts, Bearings, Filters, Cutting tools Friction materials, Sintered Iron bushes.

**6) Heat Treatment :-**

Introduction to phase transformation, principles of Heat treatments and their common engineering applications. Heat treatment process, - furnace used, atmospheric conditions. Controls, Annealing, Normalising, Hardening, Tampering, Sub zero treatment, Surface hardening, Case hardening of steels, heat treatment defects and remedies.

**7) Precipitation hardening :-**

Principle and process in short, important applications in Ferrous and non ferrous industry. Such as

Al – 4%Cu, Cu – 2%Be, 17 – 7pH Alloy,

**8) Metallurgy of Joining :-**

**9) Surface treatments:-**

Pickling, Hard chrome plating, Phosphate coating, calorizing, zinc coating & galvanizing, Aluminizing and related modern surface improvement techniques.

**10) Introduction to Composites:-**

Metal Matrix composites, Polymer Matrix Composites, Fibre Reinforced Composites & new developed composites related to textile industries.

**REFERENCE BOOKS**

- 1) Physical Metallurgy and Heat Treatment - Lakhtin.
- 2) Heat Treatment of metals and alloys – zakharov.

- 3) Engineering Metallurgy Part I and II – Higgins.
- 4) Introduction to physical metallurgy – Avner.
- 5) Physical Metallurgy for Engineers – Clark and Varney.
- 6) Material Science & Metallurgy – Dr.V.D. Kodgire.
- 7) Physical Metallurgy – Vijendra Singh.

**T.Y.B.TEXT. (TPE) SEMESTER-II**

SR. NO.	COMMITTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
6.1	TT/MMTT/TPE/TC	ADVANCED COMPUTER PROGRAMMING	3	---	---	2	100	50	---	50	200
6.2	TPE	TRIBOLOGY	3	---	---	---	100	---	---	---	100
6.3	TPE	THEORY OF TEXTILE MACHINES-I	3	---	---	---	100	---	---	---	100
6.4	TPE	ENGINEERING DESIGN OF TEXTILE MACHINES-I	3	---	---	2	100	50	---	50	200
6.5	TPE	YARN MANUFACTURING MACHINERY-IV	4	---	---	3	100	50	---	---	150
6.6	TPE	FABRIC MANUFACTURING MACHINERY-IV	4	---	---	3	100	50	---	---	150
			20	---	---	10	600	200	---	100	900
L =LECTURES T =TUTORIALS DR=DRAWING PR=PRACTICALS			TP=THEORY PAPER TW=TERM WORK OE=ORAL EXAMINATION PE=PRACTICAL XAMINATION								

## THIRD YEAR B. TEXT - SEMESTER-II

### **6.1 ADVANCED COMPUTER PROGRAMMING (TT/MMTTT/TPE/TC)**

Lectures	-	3 hrs/week.
Practicals	-	2 hrs/week.
Theory Paper	-	100 marks.
Term Work	-	50 Marks
Practical Exam.	-	50 marks.
Subject Total	-	200 marks.

#### **1. Introduction to Windows:**

Managing windows, working with disks, folders and files, finding lost files, creating backups, shortcut keys, installing and removing programmes, printing in windows, printer setting, fonts, installing fonts.

#### **2. Networking Concepts:**

Introduction to network, use of computer networks, network topologies, network types – LAN, MAN, WAN, network hardware components – cables, connectors, NIC, Hub, Switch etc. Network operating system, client/server architecture, Internet and its applications.

#### **3. Database Management:**

Introduction to database, records, Relational database management systems, structural query languages (SQL), SQL commands – Select, Insert, update, delete, joins – inner join, outer join, equijoin.

#### **4. Visual Basic Fundamentals:**

Introduction, projects in visual basic, project explorer, setting project options, Visual Basic code – understanding procedures, subroutines, functions, comments, code window & its features, controlling program flow, conditional branching, loops.

#### **5. Visual Basic Data Types:**

Data types in visual basic, - byte, Integer, long, single, double, currency, Boolean, data, string, object, variant, declaring variables, variable scope &

life time, data conversion, arrays, constants, user defined data types.

**6. Designing User Interface:**

Forms, form properties, form events, loading, unloading, showing & hiding forms controls in visual Basic – label, buttons, text box, list, dropdown selection list, checkbox, option button, timer control, setting tab order, manus in visual basic.

**7. Dialogs:**

Introduction, message box, input box, common dialog.

**8. Programming Database Access :**

Introduction, Record set object – definition, properties, methods & events, records, working with record set in code, visual basic data control, Introduction to ADO.

**LIST OF EXPERIMENTS**

1. Study of Windows 98 operating system.
2. Working with Start Button, Desktop, Explorer, Control Panel.
3. Study of network System with commands from Novell Network.
4. Creating databases, tables using Ms-access.
5. Working with SQL Commands like Select, Insert, Update, Delete, etc.
6. Creating simple form in Visual Basic.
7. Writing applications in Visual Basic using multiple forms, various controls (like radio button, list etc.) and database application using data control for
  - ◆ Finding mean, SD, CV% of yarn strength testing machine
  - ◆ Finding twist & its SD, mean & CV%
  - ◆ To calculate production of winding m/c, warping m/c, sizing m/c, looms, (Weaving Machine.), blow room, card, speed frame, ring frame etc (Spinning Machine).
  - ◆ Finding % exhaustion of dye bath.

- ◆ Finding correlation between whiteness & strength.
- ◆ Finding at add on of finish.

## **REFERENCE BOOKS**

1. Windows 95 for busy people – Ron Mansfield (Tata McGraw-Hill Edition)
2. Computer Guide to Networking – Peter Norton (Techmedia publication)
3. Computer Networks (Third Edition)
4. SQL for professional – Swapna Kishore, Rajesh Naik (Tata McGraw-Hill editon)
5. Guide to Visual Basic 6 – Peter Norton (Techmedia Publication)
6. Beginning Visual Basic 6 – Peter Wright (WROX Publication)

## **THIRD YEAR B. TEXT - SEMESTER-II**

### **6.2 TRIBOLOGY (TPE)**

Lectures	-	3 hrs/week.
Theory Paper	-	100 marks.
Sub. Total	-	100 marks

- 1) Basic concept of lubrication –  
Definition of Tribology, meaning of lubrication, friction, liquid lubrication, hydrodynamic lubrication, boundry lubrication, hydrostatic lubrication, Dry or solid lubrication etc.
  - 2) Choice of Lubricant Type -  
Problem related to lubricant selection, basic types, selection criterion, choice for particular component.
  - 3) Selection of Lubricating Oils :-  
Important properties, classification, visocisty, boundry lubrication, oil stability, contamination, Compatibility etc. Synthetic oils, natural oils, emulsions.
  - 4) Study of Greases :-  
Nature & composition of grease, grease manufacturing, mechanism of action of grease, properties of grease, advantages & disadvantages, selection and application, methods of application. Anti-seizes & anti scuffing compounds.
  - 5) Solid Lubrication :-  
Mechanism of solid lubrication, advantages & disadvantages MoS<sub>2</sub>, PTFE, Nylons, Acetals, metals, composites etc. selection of solid lubricants.
- 1) Gas Lubrication :-  
Principles of gas bearings, properties of gas, advantages and disadvantages, examples of gas bearing use.

- 7) Oil Feed Systems :-  
Advantages of oil feed, various systems like total loss system, oil mist system, wick & pad etc. Problems of oil changing, selection of right system.
- 8) Lubricant Testing and Specifications :-  
Object, functional, chemical, physical tests. Standards & specification, precision of tests.
- 9) Lubricant Monitoring :-  
Objects of lubricant monitoring, SOAP, Partical Test and ferrography, oil monitoring by lab. Testing, spot tests. Testing of grease. Failure investigation.
- 10) Oil Conservation, Lubricant Handling & Storage -  
Handling of used oil, disposal of emulsions and contaminated oils, laundering, refining & reuse. Care in lubricant handling, storage & applications.

#### **REFERENCE BOOKS**

- 1) Lubrication – by A.R. Lansdown.
- 2) Recent Advances in Tribology – Proceeding of X National Conference on Industrial Tribology, 1983.
- 3) Maintenance Management Vol.4, - IMME Publication.
- 4) Basic Lubrication Theory – by Alastair Cameron.

## **THIRD YEAR B.TEXT. - SEMESTER - II**

### **6.3 THEORY OF TEXTILE MACHINES-I (TPE)**

Lectures	-	3 hrs/week.
Theory Paper	-	100 marks.
Sub. Total	-	100 marks

1) Mechanisms – Introduction – Link, Kinematic pair, kinematic chain, mechanism, inversion. Study of four bar mechanism, single slider crank mechanism, double slider crank mechanisms and their inversions.

Straight Line Mechanisms – Pentograph, scott Russel mechanism, peaucellier mechanism, Herts' mechanism, Intermittent motion mechanisms – ratchet & pawl mechanism and Geneva mechanism.

Examples from textile machines – Straight-line motion mechanisms in rapier loom, crank and rack operated straight line motion, planetary straight-line motion and radial cam operated motion, screw traversing motion for rapier movement.

2) Velocity and Acceleration in Mechanisms -

Relative velocity method, velocity diagram for different mechanism, acceleration diagrams for various mechanisms coriolis component of acceleration, kleins construction for slider crank mechanism, application of velocity of acceleration diagrams to sley motion.

3) Cams – Types of cams and followers, profile of cam for given characteristics

of follower, specified contour cams, tangent and circular arc type cams. Spring force on follower torque on cam shaft. Conjugate cam. Application of cams & cam mechanisms in Textile Machines.

4) Transmission of Motion and Power -

Belt drives – flat, vee and rope belts. Length of belt, velocity ratio, slip, creep, initial tension in belt, limiting tension ratio, centrifugal tension, power transmission, condition for maximum power transmission.

5) Friction -

- Introduction – types – laws of friction.
- Friction in pivot bearings Power lost in friction coil friction – application in yarn tensioning devices, let off motion, yarn friction meters.
- 6) Study of Roller weighing system and drafting systems -  
Roller weighing in spinning mechanism of drafting systems.
  - 7) Study of higher speed rings, spindles and travelers -
  - 8) Study of yarn tension in spinning.

### **REFERENCE BOOKS**

- 1) Theory of Machines – Dr. R.K. Bansal.
- 2) Theory of Machines – Ballancy
- 3) Mechanics of Textile Machines – Hunton
- 4) Textile Mechanisms – Grosberg
- 5) Book of Paper of NCUTE Programme.
- 6) Theory of Machines – Thomas Bevan
- 7) Theory of Machines – R.S. Khurmi

## THIRD YEAR B.TEXT. - SEMESTER - II

### 6.4 ENGINEERING DESIGN OF TEXTILE MACHINES-I (TPE)

Lectures	-	3 hrs/week.
Practicals	-	2 hrs/week.
Theory Paper	-	100 marks.
Term Work	-	50 marks
Oral Exam.	-	50 marks.
Subject Total	-	200 marks.

- 1) Introduction to machine design and selection of engineering materials -  
Concept of machine design, general design procedure properties of engineering materials related to design Manufacturing considerations in design.
- 2) Principal stresses and strains – Normal stress, tangential stress, principal stresses and planes. Principal strains, Theories of failure.
- 3) Design of shaft -  
Subjected to axial stress, bending stresses, torsional stresses and their combination, ASME code for shaft design, material selection for shaft.
- 4) Design of keys and couplings -  
Muff coupling, rigid flanged coupling and flexible coupling.  
Types of keys and their design.
- 5) Design of springs -  
Selection of spring material, types of springs, design of tension, compression, leaf, spiral springs.
- 6) Design of joints -  
Design of eccentrically loaded bolted riveted and welded joints.  
Effect of gasket, washers in bolted joints. Bolts of uniform strength.
- 7) Design of pulleys and flywheel -  
Design of flat belt and veebelt pulleys selection of pulleys. Flywheel design.

- 8) Seals - Types of seals used in reciprocating and rotary motions failure of seals.
- 9) Introduction to computer aided drafting.

### **EXPERIMENTS**

Minimum six design problems based on above syllabus and minimum two assignments based on computer aided drafting.

### **REFERENCE BOOKS**

1. Machine Design – R.K. Jain
2. Machine Design – V.B. Bhandari
3. Machine Design – R.S. Khurmi
4. Theory and problems of machine design – Hal. Holoneces & Langhmaian, (Schaum Series)

## THIRD YEAR B.TEXT. - SEMESTER - II

### 6.5 YARN MANUFACTURING MACHINERY-IV (TPE)

Lectures	-	4 hrs/week.
Practicals	-	3 hrs/week.
Theory Paper	-	100 Marks.
Term Work	-	50 Marks
Subject Total	-	150 Marks.

#### **A. Rotor Spinning Technology:-**

- 1) Limitation of ring spinning system. drafting & stages involved in opened spinning – developments of twisting elements in opened spinning.
- 2) Study of design developments in Shivery Delivery section, Fibre separation and transportation, Fibre deposition and twist insertion, Design aspects of rotor.
- 3) Developments in rotor drives.
- 4) Yarns monitoring in rotor spinning.
- 5) Automation in Rotor Spinning Machine.
- 6) Structure and properties and applications of rotor yarns.
- 7) Technological developments in spinning and processing of rotor spun yarns, effect of trash in sliver, improved cleaning at rotor, production of fine rotor yarns, rotor spinning of man made and leand, speciality yarns on rotor spinning machines, post spinning processing.

#### **B. New Spinning Technology**

##### ▪ Friction Spinning :-

Operating- principle, Classification, Advantages and limitations of friction spinning. Dref-II process and Dref-III process. Operating principles. Specification of machines. Raw Material - Requirements. Yam Properties and applications. Economics. Research in friction spinning, Future Prospectus .

##### Air - Jet Spinning :-

Operating Principle, Raw material requirements, Advantages, limitations, Specifications, Inter relationship in spinning technologies, Economics. Yarn properties and applications , Research in air - jet spinning , Single & Twin Jet Systems , Principle of vortex spinning- Constructional Details Advantages & limitations of air - jet spinning, Murata Twin Spinners Future Prospectus .

Other Spinning Technology :-

Working principle & advances of these technology –

Cover Spinning, Twistless Spinning Process, Self –Twisting Spinning, Electrostatic spinning, Other New Spinning Methods,

### **C) Texturising**

Draw backs of flat filament yarn, scientific principle in twist texturising, Classification and characteristics of textured yarns.

**Falst Twist Process:-** Introduction, Methods of production of stretched and modified stretched yarns by conventional methods.

**Draw Texturising:** - Draw Texturising, sequential (False twist process) and simultaneous draw texturising, Study of simultaneous draw texturising process.

**Draw Texturising Machine:-** Machine profiles, Twisting devices – Various friction twisting units, heaters, cooling devices, coning oil application, process variables, Quality of draw textured yarns. Technological developments in draw – texturising technology.

**Air Jet Texturising:-** Principle, Air-jet texturising machine, air jets, wetting systems, stabilizing devices, process variables in air texturising, Quality of air textured yarns, blending of filaments yarn in air texturising.

**Other Texturising Methods:-** Stuffer box crimping, Edge Crimping, Knit-de-knit, Gear crimping, Chemical texturising.

### **LIST OF EXPERIMENTS**

- 1) Application of tools & gauges used in spinning mills Part- I.
- 2) Application of tools & gauges used in spinning mills Part-II
- 3) Spinning of sample yarn : Part –I.
- 4) Spinning of sample yarn : Part-II.
  - a) Selection of material for proposed count.
  - b) Preparation of organization chart, process parameters.
  - c) Processing the material from Blowroom to Ringspinning.
  - d) Testing of material before and after each step of processing.
  - e) Calculations at different stages.
- 5) Study of Air Jet spinning – Constructional details& passage of materials – driving arrangement and calculation.
- 6) Manufacture of Siro yarn/wrap yarn/core yarn and comparison with ring spun yarn.
- 7) To analyze the effect of various process parameters on quality of rotor spun yarn.
- 8) To analyze the effect of various process parameters on quality of Air Jet yarn.
- 9) To study the comparative effect of double yarn manufactured from SIRO & TFO method.
- 10) Study of Air Covering Machine – Constructional details& passage of materials –driving arrangement and calculation
- 11) Mill visit to study the various process parameters in blend spinning

### **REFERENCE BOOKS**

- 1) The Textile Institute Manual of Textile Technology – Short staple spinning Series Vol.V – New Spinning System by W. Klein.
- 2) Trade Literature of Trutzschler, Rieter, Marzoli, cheery Hara, Toyoda, Holligsworth etc.
- 3) Textile Progress Vol.3, No.2 – A Critical Appreciation of Recent Developments – Yarn Production and Properties by W. Nuttler.

- 4) The Economics of Science and Technology of yarn production – Vol.-I & II
- 5) Spinning in 70s by P.R. Lord.
- 6) Textile progress vol. 10 No.2 – The Production and properties of staple fibre, Yarns made by Recently developed Techniques by L. Hunter.
- 7) Air jet spinning – Textile Progress, Textile Institute Publication.
- 8) Hand Book of Yarn Production by P. R. Lord
- 9) Spun Yarn Technology by [Carl A. Lawrence](#)
- 10) Vol V New Spinning Systems – H. Stalder
- 11) Open end Spinning – R. Nield
- 12) Textile Progress on open end spinning – C. A. Lawrence

## **THIRD YEAR B.TEXT. - SEMESTER - II**

### **6.6 FABRIC MANUFACTURING MACHINERY -IV (TPE)**

Lectures	-	4 hrs/week.
Practicals	-	3 hrs/week.
Theory Paper	-	100 marks.
Term Work	-	50 marks
Subject Total	-	150 marks.

### **WEFT KNITTING**

1. Basic structure of warp & weft knitted fabric. Comparison with woven fabric with respect to production and properties.
2. Passage of yarn through circular weft knitting machine. Study of elements of knitting machines such as :
  - a) Creel – Construction, types, capacity and their suitability.
  - b) Yarn feeding – Need, construction, drive, types of positive and negative feeders, stop motions, indicators, tensioners etc.
  - c) Loop forming mechanism – Knitting cycle, types of needles and their comparison. Study of essential elements of loop forming such as cylinder, sinker, cam, dial, yarn guide.
  - d) Take down motion – Spreader, Nip roller, cloth roller, Drive mechanism and its types, capacity. Machine and material monitoring systems.
3. Study of weft knitted structures :-

Principle stitches such as knit, Tuck, miss and their representation types. Types of knitted fabrics such as single jersey, double jersey and their derivatives like interlock, Rib and purl etc. manufacturing process of above fabrics. Conditions for the use of delayed & synchronized timing. Pattern analysis method, Needle order, Cam order. Pattern structures with one, two, three & four needle types(S/J-crossmiss, lapique, longitudinal tuck stripes,plain pique .Rib – milano,half milano,cardian,half cardian,double cardian,swiss and French pique.

Interlock- pique, texi pique, pintuck, interlock super roma, bourrelet ). Concept of colour Jacquards structures.

4. Relative Technology (Relanit) on circular knitting machines.
5. Needle Controls – Cams, Control sinkers, machine memory.
6. Patterning Equipments – For fleecy fabrics, plush fabrics, stripers, Loop transfer.
7. Study of weft knitted fabric defects and their remedies, yarn quality requirements.
8. Circular weft knitting machine production calculations, fabric weight and Tightness factor. Knitted fabric relaxation concept.

### **FLAT KNITTING:-**

1. Basic elements & their functions of flat knitting machine. Hand and machine operated flat knitting machines & their knitting actions.
2. Machine operation for various stiches such as Miss, Tuck, Transfer, drop stitch.
3. Design with and without needle selection, bed racking, new formed and transfer loop for hand and machine operated machines. Concept of seamless knitting.

### **Sox, Hand Gloves Knitting :-**

Basic machines for above items, working principles and types.

### **Warp Knitting :-**

1. Passage of yarn through warp knitting machine. Essential elements of warp knitting machine. Knitting cycle of Tricot and Raschel warp knitting machine. Study and representation of single and two guide bars structures.

2. Multi guide bar Tricot & Raschel machines. Weft insertion techniques, Terry technique, Sinker pile fabrics, full plate, cut press & miss press techniques.
3. Crochet machines – General principles old and new patterning devices.
4. Straight bar frame – Knitting elements and their operation through one complete cycle.
5. Methods for calculating runner ratios for each bar for different structures.

### **Non-wovens :-**

Definition, classification according to raw material and method of production. Comparison of productivity with other technologies. Raw material used, process flow for manufacturing various non-woven techniques, introduction to web forming and bonding methods.

### **Geo Textiles :-**

Definition, classification, Raw materials, functions and area of application.

### **LIST OF EXPERIMENTS**

1. Study of single jersey circular weft knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion, Production calculation.
2. Study of double jersey circular weft knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion, Production calculation.
3. Study of warp knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion, Production calculation..
4. Study of flat knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion, Production calculation..
5. Design setting on single jersey circular weft knitting machine- Machine operation, cam & needle arrangements, yarn feeding and take down setting.

6. Design setting on Double jersey circular weft knitting machine- Machine operation, cam & needle arrangements, yarn feeding and take down setting.
7. Design setting on warp knitting machine- Machine operation, pattern chain & guide arrangements, yarn feeding and take down setting.
8. Knitted fabric analysis.
9. Knitted fabric analysis.
10. Visit to knitting unit.
11. Study of needle loom technology and production of tape.
12. Study of Braiding machine technology and production of lace
13. Visit to circular loom unit.

#### **REFERENCE BOOKS**

1. Knitting Technology by Prof.D.B. Ajgaonkar.
2. Circular Knitting by Dr. Chandrashekhar Iyer.
3. Knitting Technology by Mr. D. Spenser.
4. Warp Knitting by Dr. S. Raz.
5. Flat Knitting by Dr. S. Raz.
6. Manual of Nonwoven by Dr. Radko Kríma.
7. Geo-textiles by N.W.M. John.