

REVISED SYLLABUS W.E.F.01ST JULY, 2006

S.Y.B.TEXT. (TT) SEMESTER-I

SR. NO.	COMMITTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
3.1	TT/MMTT/TPE/TC	TEXTILE ELECTRONICS -I	3	---	---	2	100	25	---	50	175
3.2	TT/MMTT/TPE/TC	TEXTILE MATHEMATICS-III	3	---	---	---	100	---	---	---	100
3.3	TT	TECHNOLOGY OF FIBRES OTHER THAN COTTON	3	---	---	---	100	---	---	---	100
3.4	TT	TEXTILE FIBRES & TESTING	4	---	---	3	100	25	---	50	175
3.5	TT	YARN FORMING TECHNOLOGY-I	4	---	---	2	100	25	---	---	125
3.6	TT	FABRIC FORMING TECHNOLOGY-I	4	---	---	2	100	25	---	---	125
			21	---	---	9	600	100	---	100	800
L =LECTURES T =TUTORIALS DR=DRAWING PR=PRACTICALS			TP=THEORY PAPER TW=TERM WORK OE=ORAL EXAMINATION PE=PRACTICAL XAMINATION								

SECOND YEAR B.TEXT. – SEMESTER - I

3.1 TEXTILE ELECTRONICS – I (TT/MMTT/TPE/TC)

Lecturers	:	3 hrs/week
Practical	:	2 hrs/week
Theory paper	:	100 marks
Term work	:	25 marks
Practical Exam.	:	50 marks
Subject Total	:	175 marks.

- 1) **Electronics Components :-** Introduction to Electronics, applications of electronics, electronics components, passive components, resistors, colour coding of resistors, variable resistors, capacitors, colour code used for capacitors, variable capacitors, inductors, active components.
- 2) **Semiconductors :-** Semiconductor materials, metals, insulators, semiconductors, intrinsic semiconductor, extrinsic semiconductors, p-n junction diode, junction theory, VI characteristics of p-n junction diode, use of diode in rectifiers, half wave rectifier, full wave rectifiers, performance of rectifiers, filters-shunt capacitor filter, series inductor filter, Π filter, LC filter, zener diode, zener regulator, diode specification.
- 3) **Transistor :-** Junction transistor structure, working of transistor, relation between different currents in a transistor, transistor amplifying action, transistor configurations, transistor characteristics (More emphasis CE configuration). Basic CE amplifier transistor data sheet, transistor testing.
- 4) **Feedback in Amplifier & Op-Amp. :-** Concept of feedback in amplifier, Types of feedback, voltage gain of a feedback amplifier advantages of negative feedback. Amplifier circuit with negative feedback.
Op-Amp :- Introduction, block diagram, symbol, ideal op-amp, open loop, op-amp configuration, op-amp with negative feedback, IC741-pinout & specifications. Applications.

5) **Power Semiconductor Devices and Applications :-** SCR construction, Principle of operation, two transistor analogy, turning ON & OFF of SCR, SCR characteristics.

Triac.-Construction, working & characteristics. Diac- construction, working & characteristics.

UJT - Construction, working & characteristics. UJT as Relaxation Oscillator. Application of SCR – SCR Converter, SCR in DC Motor speed control. Triac in AC power control.

6) **Optoelectronic Devices :-** Classification of optoelectronic devices, emitters, sensors, optocouplers, LED, photodiode, phototransistor, LDR, photo voltaic cell, application of optoelectronic devices in textile.

7) **Transducers :-** Transducer classification – Primary transducers, secondary transducers, electrical transducers active & passive transducers, analog & digital transducers, advantages of electrical transducer, Basic Requirements of a transducer.

Primary Transducers for pressure measurement – Diaphragm bourdon tube, Bellows.

Temperature Transducers – Resistance temperature Detector (RTD), Thermocouple thermistors.

Strain Measurement – Introduction, factor affecting strain measurement, types of strain gauge. Theory of operation of resistance strain gauge, types of electrical strain gauge, properties of strain gauge, materials for strain gauges, gauging techniques, applications. Variable inductance type transducers, linear variable differential transformers (LVDT), capacitive transducers, Piezo electric transducers.

Note :- Emphasis should be given on applications of above transducers in textile industry.

8. **Electromechanical Devices:-** Electromagnetic relay, Reed relay, Solenoid valve, Limit switches, Electromagnetic clutches.

LIST OF EXPERIMENTS :-

- 1) Forward & reverse bias characteristics of diode.
- 2) Full wave rectifier (with & without filter).
- 3) I/O characteristics of transistor in CE configuration.
- 4) Op-amp inverting & non-inverting amplifier.
- 5) UJT characteristics.
- 6) Study of AC power control using triac.
- 7) LDR characteristics.
- 8) Speed measurement using optical & magnetic pickups.
- 9) Study of RTD and thermister characteristics.
- 10) Study of strain gauge characteristics.
- 11) Study of LVDT characteristics.
- 12) Study of inductive & capacitive pickup.
- 13) Study of SCR characteristics.

REFERENCE BOOKS :-

1. Basic Electronics & Linear Circuits by N.N. Bhargava, D.C. Kulshreshtha TMH Pub.
2. Electronic Devices and Circuits by Allen Mottersshade, PHI Pub.
3. Modern Industrial Electronics by T.J. Maloney. Fourth Edition, Prentice Hall Pub.
4. Electrical & Electronics Measurements & Instrumentation by A.K. Sawhey, Dhanpat Ria & Sons Pub.
5. Instrumentation Devices & Systems by C.S. Rangan, G.R. Sharma, TMH Pub.
6. Electronics Components & Materials by Madhuri Joshi
7. Op-amp & Linear Integrated Circuits by Ramakant Gaykwad.
8. Thyristor & their Applications by Ramamurthi.

SECOND YEAR B.TEXT. – SEMESTER - I

3.2 TEXTILE MATHEMATICS-III (TT/MMTT/TPE/TC)

Lectures	:	3 hrs/week
Theory Paper	:	100 marks.
Subject Total	:	100 marks.

1) Differential equations of first order & first degree :

Method of Solution :-

Variable, separable, homogeneous, non homogeneous, exact, non exact, linear and non linear differential equations.

2) Linear differential equations of n^{th} order with constant coefficients :-

Solution $y = C.F. + P.I$

Methods to find C.F. and P.I.

Homogeneous linear differential equations with constant coefficients.

3) Analytical solid geometry :-

Introduction to three dimensional co-ordinate system & sphere.

4) Surfaces & Curves in the Space :-

Tangent plane, Normal line to the surfaces in the space, Normal plane, Osculating plane, Principal normal & binormal.

5) Testing of hypothesis :-

Introduction, Hypothesis, Statistic, Critical Region, Errors in testing, Level of Significance.

6) Large sample tests :-

Test for population mean, equality of population means population proportion & equality of population proportions.

7) Small sample tests :-

Test for population mean, equality of population means, population variance, equality of population variance. Test for goodness of fit and independence of attributes. Test for significance of population correlation co-efficient.

8) Estimation :-

Point Estimation, types, unbiased estimators of population mean and variance.
Interval Estimation, Confidence Interval for population mean based on normal and 't' and χ^2 distributions,

9) Statistical quality Control :-

Process Control : Control charts, X-chart, R-chart, C-chart, np-chart, P-chart.

Lot Control : AQL, LTPD, AOQ, AOQL, O.C. Curve, Single and Double sampling plans.

REFERENCE BOOKS :-

1. A Text Book of Applied Mathematics : by J.N. & P.N. Watarikar.
2. Higher Engineering Mathematics by B.S. Grewal.
3. A Text Book on Engineering Mathematics by Bali, Saxena & Iyengar.
4. Mathematical Statistics by J.Fruend.
5. Applied Statistics & Probability of Engineers by Montgomeri & Runger
6. Probability & Statistics for Engineers by Johnson.

SECOND YEAR B.TEXT. – SEMESTER - I

3.3 TECHNOLOGY OF FIBRES OTHER THAN COTTON (TT)

Lectures	:	3 hrs/week.
Theory Paper	:	100 marks.
Subject Total	:	100 marks.

1) **Wool :-**

- Historical and economical background of wool industries.
- Breeds of sheep
- Indian wool
- Morphology and properties of wool fibre
- Washing, shearing, classification / sorting / grading of wool
- Scouring, teasing and carbonizing.

Woolen yarn manufacturing :-

Willowing, blending, oiling, teasing, carding and spinning.

Worsted yarn manufacturing :-

- Preparing, backwashing, combing and spinning.

Weaving of woolen / worsted yarns :-

- Preparatory, weaving, Knitting & wool and felling of wool.

2) **Jute :-**

- Extraction of Jute fibres.
- Properties of Jute fibre.
- Manufacture of Jute yarn
- Blending of Jute fibre.
- Weaving of Jute yarns and applications.

3) **Flax :-**

- Extraction of Flax fibres.
- Properties of Flax fibre.
- Conversion of Flax fibres into yarn
- Weaving of Flax yarns and applications.

4) **Silk :-**

- Historical & economical background of silk.
- Silk worm host plants.
- Silk fibre properties
- Mulberry cultivation and cocoon production
- Chawoki rearing; young age and late age rearing of silk worms.

5) **Raw Silk Manufacturing –**

- Cocoon storing, cooking, brushing
- Charka reeling
- Cottage basin
- Filature reeling
- Properties of raw silk, Testing of raw silk

Spun silk. Yarn manufacturing :-

- Degumming, circular dressing, drawing & spinning, Blending opportunities, in silk

Weaving of silk yarns :-

- Value addition in silk industry silk project study.
- Study of wild silks.

6) **Long Vegetables fibres**

- Sisal, Pineapple leaf, banana & hemp.
- Study of properties, extraction methods.
- Blending opportunities and applications.

7) **Glass :-**

- Glass fibre characteristics,
- Manufacture of glass fibre / filament.
- Type of Textile grade glass and weaving of glass.
- Application of glass fibres / filament / fabrics.

REFERENCE BOOKS :-

- 1) Wool Hand Book vol. I & II by Warner Von Besgen.
- 2) Woollen Yarn Manufacturing Textile Progress Vol.15 No.12
- 3) Hand Book of Practical Sericulture by S.R. Ullal and M.N. Narsimayya.
- 4) Hand Book of Silk Technology by T.N. Sonwalkar.
- 5) Fibre Glass by J.Giltest Mahr & William P. R
- 6) Inorganic Fibres by C.Z. Cenol.
- 7) Asbestos by Cholees Z.
- 8) Pineapple Leaf Fibres Textile Progress Vol.24.
- 9) Long Vegetable Fibres Textile Progress Vol.4 No.4
- 10) Hand Book of Jute Vol.I, II & IV by T.C. Ranjan.
- 11) Silk Exports and Developments by T.D. Koshi.
- 12) Wool Printings and Dyeing Textile Progress Vol 12 No.3
- 13) Chemical Processing of Silk by M.L. Gulrajani.
- 14) Production , Processing and Marketing of Silk by Mahesh Nanawati.
- 15) Encyclopedia of Textiles.

SECOND YEAR B.TEXT. – SEMESTER - I

3.4 TEXTILE FIBRES & TESTING (TT)

Lectures	:	4 Hours / Week.
Practicals	:	3 Hours / Week.
Theory paper	:	100 Marks.
Term Work	:	25 Marks.
Practical Exam.:		50 Marks
Subject Total	:	175 Marks.

1. Sampling for determination of fibre properties -

Importance, general requirements – random sample, biased sample, numerical and length biased samples, - extent bias, avoidance of extent bias, sampling technique – Squaring method – cut square method, zoning techniques, dye sampling for wool, tong sampling method, core sampling of raw wool.

2. Longitudinal dimensions (Fibre length) -

Technical Significance of fibre length, frequency, weight and length distributions, length distribution and fibre diagrams, the staple length of cotton, crimp. Fibre length measurement - - oil plate method – comb sorter method, Balls sorter, scanning method, cutting and weighing method.

3. Transverse dimensions (Fineness & Maturity) -

Terms and definitions, fibre dimension relationship, - The technical significance of fibre fineness – Variation in fineness, measures of fineness, measurement of fineness - gravimetric method, Airflow method, vibroscope method.

The maturity of cotton, - Technical significance – measures of fibre maturity – methods measurement of fibre maturity – the causticaire method, polarised light method, differential dyeing method, microscopic method.

4. Fibre Density -

Introduction, definition, problems in measurement of fibre density, measurement of fibre density – density gradient column, Importance of fibre density.

5. Fibre strength - Introduction, terminology, stress-strain curve & its importance, factors influencing fibre strength, measurement of fibre strength. Single

fibre strength – Instron, Bundle strength – Stelometer & pressley method. Importance of fibre strength.

6. Moisture relations and testing –

Regain and moisture content – Measurement of atmospheric conditions – Control of testing room atmosphere, Regain – humidity relationships, Effects of regain on fibre properties.

The measurement of regain – correct invoice weight – moisture testing ovens – rapid drying oven – Drying by means of chemical ovens – Drying by hot air-currents – Drying by radio frequency wave – Regain measurement by methods based on resistance and capacitance principles.

7. Testing of Trash Content in fibres -

Classification of trash, Technical significance of trash, estimation of trash content in cotton.

8. Testing of colour and honey dew in cotton fibre.

9. Study of modern fibre testing instruments such as High Volume Instruments and AFIS.

10 Fibre Quality Index and its significance

11. Identification of fibres (Cotton, wool, silk, viscose, rayon, nylon, polyester & acrylic fibres) : solubility test, burning test, cross sectional & longitudinal views of fibres.

12. Neps – Definition – importance – testing of neps in card web – nepping potential – Nep testing in fibrous materials – Testing of neps in yarns.

LIST OF EXPERIMENTS :-

1. Determination of C.V. % of Roving and Sliver Samples.
2. Identification of Textile Fibres by Microscopy Method.
3. Fibre Maturity Measurement by Caustic Soda (NaOH) Method.
4. Comb Sorter (Fibre Length Measurement).
5. Fibre Fineness by Cut-Weight Method.
6. Fibre Length by using Grease Plate Method.
7. Measurement of crimp in man made staple fibres.

8. Measurement of fineness and maturity by airflow instrument.
9. Determination of Trash % in Fibre Sample using Trash Analyser.
10. Determination yarn Number and its variation.
11. Determination of Twist in Single and Double Yarn.
12. Determination of span length and uniformity ratio.

REFERENCE BOOKS :-

1. Textile Testing by Angappan & Gopalkrishnan.
2. Physical Testing of Textiles by J.E. Booth.
3. Manuals of HVI, AFIS
4. Manual of Spinning by P. Lord.
5. Textile Testing by Skinkle.
6. Handbook of Indian Standards.

SECOND YEAR B.TEXT. – SEMESTER - I

3.5 YARN FORMING TECHNOLOGY – I (TT)

Lectures	:	4 hrs/week
Practicals	:	2 hrs/week
Theory Paper	:	100 marks
Term Work	:	25 marks
Subject Total	:	125 marks

1. BLOW ROOM :

- A. Automatic Bale Openers – Concept of automatic bale opening – Principals of operation – advantages limitations and prerequisites – Developments in automatic bale openers. Detailed study of automatic bale openers used in the industry (LMW, Trumac, Rieter, Marzoli and others). General construction, driving arrangements, dimensions and specifications, types of bale lay down, settings and timings, power requirements, stop motions, safety arrangements, productions.
- B. Mild Openers – Concept and importance of mild opening – General design aspects of a mild opener – History and developments - Detailed Study of present day mild openers from various manufactures (LMW, TRUMAC, RIETER, MARZOLI & Others) – General construction, driving arrangement, dimensions and specifications, setting and timings, power requirements, stop motions, safety arrangements, production, online monitoring.
- C. Blenders – Importance of blending – Methods used for Blending of cotton in Blow room – History and Development of Mechanical Blenders – Detailed Study of present day blenders used in the industry - General construction, driving arrangement, dimensions and specifications, setting and timings, power requirements, stop motions, safety arrangements, production, online monitoring.
- D. Fine Openers – Concept and principle of operation, design features – History and Developments – Detailed Study of present day fine openers used in the industry (LMW, TRUMAC, RIETER, MARZOLI & Others) - General construction, driving arrangement, dimensions and specifications, setting and timings, power requirements, stop motions, safety arrangements, production, online monitoring.

- E. Material Transportation – Concept and Principle – Detailed Study of material transportation equipments used in Blow room.
- F. Safety control used in Blow room – Metal detectors – Heavy parts separator, smoke detectors.
- G. Study of Auxiliary equipments in Blow room – dedusters, contamination removers.
- H. Study of on line monitoring and controlling system used in blow room.
- I. Assessment of Performance of a Blow room – Intensity of opening, openness value, cleaning efficiency. Influence of action of blow room machine on cotton fibre quality – Factors affecting opening and cleaning at Blow room.

2. CARDING :

- A. Feed to Card – Principle and concept of chute feed to card. Advantages and limitations. Study of design details of different types of chute feeding systems available in the market.
- B. Revolving Flat Card – Detailed study of design developments in Take in zone, Cylinder Flat Carding Zone – Doffer Zone – Sliver formation – Study of cards used in the industry – General construction – Driving arrangement, production calculations, draft calculations, stop motions – on line monitoring – Tandem Cards.
- C. Carding Theory – Opening of fibre mass – Carding actions – Web formation and fibre configuration – Blending – Levelling action – Fibre breakage.
- D. Transfer efficiency of card – importance, concept, methods of finding transfer efficiency.
- E. Autolevellers at Card – Basic principles and concept – Types of autolevellers – Principle of working of autolevellers at Card – Setting of autolevellers.
- F. Card Clothing – History and Development – Metallic wire – Tooth geometry – Maintenance of Card Clothing – Card wire mounting.
- G. Assessment of performance of card – Cleaning efficiency, Nep removal efficiency, fibre breakage.

3. Centralised Waste collection System :

Design features, operating principles.

LIST OF EXPERIMENTS :-

1. Study of Bale Opening machine - Dimensions, Driving arrangement, calculations.
2. Study of Coarse cleaning machines. Dimension, Driving arrangement, calculations.
3. Study of Mixing machine. Dimension, Driving arrangement, calculations.
4. Study of Fine cleaning machine – Dimension, Driving arrangement , calculations.
5. Study of De-dusting machines – Dimension, Driving arrangement, calculations.
6. Study of chute feed system.
7. Study of constructional details of a card.
8. Driving arrangement and calculations of carding machine.
9. Settings of various parts of feed zone of carding.
10. Settings of various parts of carding zone in carding.
11. Demonstration of stripping, Grinding, wire mounting, etc. – Mill visit.
12. Study of change places on card.
13. Processing of Material on card and evaluating card performance.

REFERENCE BOOKS :-

- 1) The Textile Institute Publication –Manual of Textile Technology-Short Staple Spinning Series
Vol I-The Technology of short staple spinning by W.Klein
Vol II-A Practical Guide to opening and Carding by W.Klein.
- 2) The characteristics of Raw Cotton by P.Lord.The Textile Institute Publication, Manual of Cotton Spinning Vol II, Part-I.
- 3) Opening and cleaning by Shirley. The Textile Institute Publication, Manual of Cotton Spinning Vol II, Part II.
- 4) Cotton Ginning, Textile Progress, The Textile Institute publication.
- 5) Opening cleaning and picking by Dr.Zoltan, S.Szaloki, Institute of Textile Technology, Verginia.
- 6) Cotton opening and picking by G.R.Merril.
- 7) Fundamentals of Spun Yarn Technology, By Carl Lawrence.
- 8) Cotton Growing and marketing, J.S.Parmar, Tecoya Trend Publication.
- 9) Blow room and carding –Training program conducted by NCUTE, IIT Delhi.

- 10) Carding by F.Charanlay .The Textile Institute publication, Manual of cotton spinning series Vol-III.
- 11) Essential calculations of practical cotton spinning by T.K.Pattabhiraman.
- 12) Blow room, Carding, Draw frame-by Prof.A.R.Khare
- 13) Technology of cotton spinning by J.Janakiram.

SECOND YEAR B.TEXT. – SEMESTER - I

3.6 FABRIC FORMING TECHNOLOGY – I (TT)

Lectures	:	4 hrs./week.
Practicals	:	2 hrs./week.
Theory Paper	:	100 marks.
Term Work	:	25 marks.
Subject Total	:	125 marks

1) AUTOMATIC WEAVING :-

- a) Limitations of ordinary looms :- Production, efficiency, quality & allocation, objectives for developing automatic looms, scope for automation.
- b) Design features of automatic looms :- Drives, loom motions, accessories & other critical features of automatic looms.
- c) Weft feelers :- Construction working of side sweep (Cimmco & Ruti-B Type), electrical (Ruti-C Type) & electronic weft feelers, their merits, demerits & applications.
- d) Transfer mechanism :- Cimmco & Ruti-C transfer motion's working & construction, shuttle protector, temple & shuttle eye cutter. Requirement for successful transfer of pirn, reasons of stripping, bottoms & remedies. Shuttle changing mechanism & safety motion, its applications.
- e) Automatic let-off motion :- Principles and requirements of automatic let-off mechanism, types, construction & working of Cimmco, Ruti-B, Ruti-C type let-off motions.
- f) Warp stop motion :- Types, Construction and working of mechanical and electrical warp stop motion, Types of drop pins, specifications & applications.
- g) Centre weft fork :- Construction & working of Ruti-C type center weft fork motion & its advantages.
- h) Operator assisting motions :- Pick finding, heald leveling, light indicators, pick counters need, functions & use.
- i) Auto loom fabric defects, causes and remedies

2) **FABRIC STRUCTURE :-**

Study of following weaves (Design, draft & peg plan) & weave characteristics & weaving requirements.

- i) Stripe & check weave combination – selection of weaves, joining of weaves, firmness, classification & construction of designs.
- ii) Colour & weave effect.
- iii) Simple spot designs.
- iv) Backed fabrics – Warp, weft and wadding backed fabrics.
- v) Bedford words – Plain, twill, wadded, crepon cords,
- vi) Welt & Pique :- Plain, wadded & waved pique.
- vii) Figuring with extra threads :- Principles, extra warp, extra weft figuring, combination, limitation, extra thread effect & weaving.
- viii) Gauze & Leno :- Principles, basic sheds, Leno with flat steel doups & slotted doups, point draft or counter leno, simultaneous top & bottom douping, application of slotted doups & double slotted doups, easing & shaker motion concept, working & construction.
- ix) Double cloth :- Object, classification, self stitched doubled cloth, center stitched double cloths, interchanging double cloth, multiplayer fabrics.
Selection of face & back weaves, type of stitching points & their selection, wadded double cloth.

3) **AUTOMATIC WINDING :-**

- a) Classification of automatic winding machine P & Q winding, their application.
- b) Construction of automatic winding machines
 - i) Design features, i.e. yarn path (Creel, link presenter, booster, unwinding accelerator, pre cleaner, tensioners, waxing cradle etc.)
 - ii) Drive to drums, scroll details, super drums, braking etc.(Autoconer – 238,338,338 D, Savio Espero & Orion, Murata – 11C, 7-V.)
 - iii) Special features of all models, blowers, air consumption & power etc.
- c) Yarn Clearing :-
 - i) Technical background

- ii) Optimum clearing.
- iii) Uster classimat as a aid for yarn clearing.
- d) Electronic yarn clearers
 - i) Optical & capacitance, Lofe, TK 930F, TK 950H, Quantum-II etc.
 - ii) The capabilities of different yarn clearers.
 - iii) Detailed method of setting of optical & capacitance type clearer (for carded & combed yarns)w.r.t. N,DS, DL,LL,-D,-L,C, Cluster setting, splicer setting, extended splicer setting for various yarn counts and materials.
 - iv) Siro cuts.
 - v) Knot factor & clearing efficiency & its use as an aid to assess the performance of winding machines.
- e) Splicing :-
 - i) Types – mechanical & pneumatic, details of construction, parameters, their applications .
 - ii) Electronic checking of spliced joint.
 - iii) Splice quality assessment (strength, appearance, hairness)
 - iv) Maintenance of splicers.
- f) Study of various delivery packages.
- g) Package Quality :-
 - i) Details of package faults observed on automatic winding machines causes & remedies.
 - ii) Mechanism for anti patterning, maximum diameter of package, auto doffing & restarting.
- h) Technical requirements of winding process :-
 - i) Yarn unwinding
 - ii) Yarn take up
 - iii) Yarn tensioning
 - iv) Wound package requirements for warping, knitting & weaving.
- i) Calculations :- Efficiency, production & allocation.

4) MODERN WARPING :-

- a) Constructional details & features of modern warping machines. Such as Benninger, West Point, Sucker-Mullar, Tsdakoma & Karl with reference to design of creel, pre-tensioners, automatic adjustment of central control of tensioners.
- b) Types of re creeling – magazine , truck , chain creels , semi – auto & auto creels, creel – master, auto plan for colour patterns.
- c) Head Stock – i) Beam warping – Auto leasing, drive, brakes and automatic doffing & donning.
 - ii) Sectional warping – Auto leasing, drum traverse & cone angle adjustment, beam traverse & its adjustment.
 - iii) MIS systems & its use.

LISTOF EXPERIMENTS :-

1. Dismantling and resetting of under pick motion.
2. Dismantling and resetting of Cimmco & Ruti-C weft feeler motion.
3. Dismantling and resetting of Cimmco auto let-off motion.
4. Dismantling and resetting of pirn change motion.
5. Dismantling and resetting of clutch motion.
6. Study of Ruti-C loom –drive, centre weft fork, pick finding, take-up drive, back rest, multi pawl drive, shuttle construction, picking, loose reed etc.
7. Study of sectional warping drive – warping speed, beaming speed, reed & beam traverse speed, production and efficiency.
8. Study of Laxmi and Senmet pirn winding machine. – spindle speed, traverse speed, coils per double traverse, diameter control, production and efficiency.
9. Visit to Auto loom unit.
10. Fabric analysis – Extra warp, weft, Bedford, cord, pique, leno, double cloth, pile fabric.
11. Fabric analysis – Extra warp, weft, Bedford cord, pique, leno, double cloth, pile fabric.

12. Fabric analysis – Extra warp, weft, Bedford, cord, pique, leno, double cloth, pile fabric.
13. Visit to Autoconer unit.
14. Visit to Autoloom unit.

REFERENCE BOOKS :-

- 1) Principles of Weaving by Marks A.T.C. & Robinson.
- 2) Textile Colour & Design by Watson.
- 3) Weaving Machines, Materials & Methods by Prof. M.K. Talukdar, Prof.D.B. Ajgaonkar etc.
- 4) Textile Mathematics – Vol.-I & II by J.E. Booth.
- 5) Advanced Textile Design by Watson
- 6) Modern Preparation & Weaving Machines by A. Ormerod.

S.Y.B.TEXT. (TT) SEMESTER-II

SR. NO.	COMMITTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
4.1	TT/MMTT/TPE/TC	THERMAL AND AIR ENGINEERING	3	---	---	---	100	---	---	---	100
4.2	TT/MMTT/TPE/TC	TEXTILE MATHEMATICS-IV	3	---	---	---	100	---	---	---	100
4.3	TT	TESTING OF YARNS & FABRICS	3	---	---	2	100	25	---	50	175
4.4	TT/MMTT	CHEMICAL PROCESSING OF TEXTILES-I	3	---	---	2	100	25	---	---	125
4.5	TT	YARN FORMING TECHNOLOGY-II	4	---	---	2	100	25	---	50	175
4.6	TT	FABRIC FORMING TECHNOLOGY-II	4	---	---	2	100	25	---	50	175
4.7	TT/MMTT	TEXTILE DESIGN & COLOUR	---	---	2	---	---	50	---	---	50
			20	---	2	8	600	150	---	150	900

L =LECTURES
T =TUTORIALS
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TP=THEORY PAPER
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SECOND YEAR B.TEXT. – SEMESTER - II

4.1 THERMAL & AIR ENGINEERING (TT/MMTT/TPE/TC)

Lectures	:	3 hrs/week
Theory Paper	:	100 marks
Subject Total	:	100 marks

1. Introduction – Laws of Thermodynamics – Zeroth Law, First Law, Second law of Thermodynamics. Thermodynamic Process – constant volume, constant pressure, constant temperature, adiabatic, polytropic & throttling process with P-V & T- ϕ diagrams and numericals..

2. Air Standard Cycle – Introduction, Assumptions in thermodynamic cycles, Important terms used in thermodynamic cycles, efficiency of a cycle, Carnot cycle, Otto cycle, Diesel cycle, Dual combustion cycle on P-V and T- ϕ diagram and numericals.

3. Properties of Steam – Formation of steam at constant pressure – Enthalpy, Enthalpy of water, Enthalpy of evaporation, Enthalpy of dry saturated steam, Wet steam, Superheated steam, Specific volume of steam, Steam table, External work done during evaporation, Internal energy of steam, difference between Gas & Vapour. Measurement of dryness fraction – Throttling calorimeter, separating calorimeter, combined separating & throttling calorimeter, Use of steam in textiles – Sizing, Wet processing and numericals based on properties of steam & calorimeters.

4. Steam Boilers – Introduction, Classification of boilers, Study & construction of fire tube boilers such as Cochran boiler, Study & construction of water tube boiler such as Babcock & Wilcox boiler, equivalent evaporation, efficiency of boiler & numericals.

5. Study of boiler mountings & accessories – Safety valve – Dead weight safety valve, Lever safety valve, Spring loaded safety valve, Combined high pressure steam & low water safety valves, Water level indicator, Fusible plug, Steam pressure gauge, Feed check valve, Stop valve, Blow off cock, Accessories – Feed water pump, Injector, Economizer, Superheater.

6. Thermic Fluid Heating System – Introduction, Thermic heating system, Expansion & Deviation, Selection of Tanks, Requirements of Fluids, Deterioration of fluid, Consequences, Cleaning of the system.

7. Refrigeration – Units of refrigeration, C.O.P., Difference between heat engine, Refrigerator, heat pump. Air refrigerator working on reversed Carnot cycle on P-V & T- ϕ diagram, expression for C.O.P.

8. Air Conditioning – Introduction to air conditioning, psychrometric terms, Dalton's law of partial pressure, Psychrometric relations, Enthalpy of moist air, Thermodynamic wet bulb temperature, Psychrometric chart, Psychrometric processes, - Sensible heating & cooling, bypass factor of heating & cooling coil, Humidification & dehumidification, methods of humidification in textile industry, methods of dehumidification, sensible heat factor, cooling & dehumidification, cooling with adiabatic humidification by steam injection, Adiabatic chemical dehumidification, Adiabatic mixing of two air streams, Object of a/c & proper humidification in textile mills, Effect of moisture on textile fibres, Sling psychrometer, Humidistat.

9. Compressor – Classification, Reciprocating, Rotary vane compressor, Liquid ring compressor, Twin lobe compressor, Screw compressor, Centrifugal compressor, Axial flow compressor. Pumps – Reciprocating, Centrifugal & Radial (working and principle only).

10. Pneumatics –

(a) Pneumatic Circuits – Symbols of cylinder, control valves, check valves.

(b) Air treatment – Air filter and its symbol, Refrigerated dryer, Lubricators.

(c) Control valves – Poppet valve, Pilot operated check valve and spool valve. Symbol of every valve,

(d) Loop system in piping lay out, Pressure drop in pneumatic line.

(e) Examples of pneumatic circuits.

REFERENCE BOOKS :-

1. Elements of Heat Engines (Vol. I & II) by Patel, Karamchandani.
2. Refrigeration & Air conditioning by Arora & Domkundwar
3. Pneumatic Systems by Majumdar
4. Hydraulics & Pneumatics by Andrew & Parr
5. Hydraulic machines by Banga, Sharma.
6. Heat Transfer by S.P. Sukhatame.

SECOND YEAR B.TEXT. – SEMESTER - II

4.2 TEXTILE MATHEMATICS-IV (TT/MMTT/TPE/TC)

Lectures	:	3 hrs/week
Theory Paper	:	100 marks.
Subject Total	:	100 marks.

1. Laplace Transforms :-

Definition, transforms of standard functions, transforms of derivatives, integrals and periodic functions. Inverse Laplace transforms by partial fraction and convolution method.

2. Vector differentiation :-

Differentiation of vector valued function of scalar 't', gradient, divergence, curl, directional derivative. Solenoidal and irrotational vector fields.

3. Vector Integration :

Line, surface & volume integrals, Stoke's and Green's and Guass divergence theorem (without proof) and examples.

4. Projectiles :-

Motion of a body thrown horizontally in the air. Motion of a projectile, equation of path of projectile, Time of flight of a projectile on a horizontal plane, Horizontal range of a projectile velocity and direction of motion of projectile, Time of flight of a projectile on a inclined plane.

5. Analysis of Multivariate Data :-

Multiple and Partial correlation coefficients. Plane of regressions.

6. Analysis of Variances :-

Introduction, One-way Classification, Two-way Classification with and without repetition.

7. Design of Experiments :-

Introduction, Basic principles, Basic Designs (CRD, RBD & LSD).

8. Factorial Experiments :-

Introduction & types, 2^n factorial experiments, 2^2 & 2^3 factorial experiments.

REFERENCE BOOKS :-

1. A Text Book of Applied Mathematics : by J.N. & P.N. Wattikar.
2. Higher Engineering Mathematics : by B.S. Grewal.
3. A Text Book on Engineering Mathematics :by Bali, Saxena & Iyengar.
4. Mathematical Statistics : by J.Fruend.
5. Applied Statistics & Probability of Engineers : by Montgomeri & Runger
6. Probability & Statistics for Engineers : by Johnson.
7. Design and Analysis of Experiments : by Montgomeri.
8. A Text Book of Engineering Mechanics : by R.S. Kurmi.

SECOND YEAR B.TEXT. – SEMESTER - II

4.3 TESTING OF YARNS & FABRICS (TT)

Lectures	:	3 hrs/week
Practical	:	2 hrs/week
Theory Paper	:	100 marks
Term Work	:	25 marks.
Practical Exam.	:	50 marks.
Subject Total	:	175 marks

1. Linear density of yarn -
Count or yarn number Direct and indirect systems of yarn numbering –
Measurement of yarn number or count, Yarn count and yarn diameter.
2. Twist and Twist Measurement -
Definition – Twist direction – Amount of twist – Twist multiplier/Factor –
Function of twist in yarn structure – Twist and yarn strength – Effect of twist in yarn on
fabric properties – Measurement of twist in single and double yarns – Straightened fibre
method – continuous twist tester – Twist contraction method, twist to break test – Twist
measurement by microscope.
3. Yarn Strength –
 - a) Single thread strength - The effect of fibre properties on the yarn strength,
factors affecting the tensile properties & the results obtained from testing instruments.
Different principles of tensile testing of yarns – The pendulum lever principle, the
inclined plane principle, the strain gauge transducer principle, the machine working on
these principles. Comparison of Tensolab, Tensorapid, Instron.
 - b) Lea Strength - The lea CSP or Break factor & its significance –
Description of lea strength tester, comparison of lea & single thread test results, ballistic
test & its importance.
4. Evenness of Yarn – Classification of variation, Expression of irregularity, Basic
irregularity, index of irregularity. Addition of irregularities, Measurement of yarn
irregularities, visual examination, cutting & weighing method, electronic capacitance
principle, variation of thickness under compression, photoelectric testers, Analysis of

irregularity – V_L – B_L curves, spectrogram analysis, correlogram, causes of irregularity, interpretation of results of irregularity tests, effect of irregularity on the fabric behaviour. Imperfections & classimat faults, principle & working of uster classimat, Analysis of classimat faults, Hairiness in spun yarn, causes & reduction of Hairiness. Measurement of hairiness.

5. Sampling of Fabrics.
6. Dimensional characteristics - Length, width & thickness and their measurement, importance of thickness.
7. Threads/Unit length – EPI and PPI, count warp count, weft count, weight of fabric – weight per unit length, weight per unit area, warp & weft crimp, effect of crimp on the fabric properties, Measurement of crimp, fabric cover – cover factor.
8. Fabric Strength – Tensile strength testing – cut strip method, Grab test method, comparison between strip test & grab test, Tear strength testing – Measurement of tear strength – different methods of testing, ballistic test, bursting test & its measurement.
9. Fabric abrasion & Handle of fabric – Serviceability, wear, abrasion, testing of abrasion resistance, assessment of abrasion damage, the BFT abrasion testing machine, Martindale abrasion tester.
10. Pilling of fabrics
Pills, mechanism of pilling, factors responsible for pilling, effect of pilling, remedies ICI Pill Box Tester.
11. Fabric Stiffness, Handle & Drape –
Handle, drape, measurement of drape, stiffness, Shirley stiffness tester (cantilever test), Heart loop test.
12. Crease resistance & crease recovery, measurement of crease recovery.
13. Air permeability, water fabric relations – air permeability, air resistance, air porosity, SHIRLEY air permeability tester, water proofing & water repellency, wetting time test, spray test. Drop penetration test, the bundesmann testers water head tester.
14. Flammability – Flame retardancy, flame proofing and flame propagation, mechanism of flammability, measurement of flammability – concept of LOI.

LIST OF EXPERIMENTS :-

1. Fabric analysis.
2. Crimp & fabric thickness measurement.
3. Fabric strip strength test.
4. Fabric tearing strength.
5. Ballistic strength.
6. Fabric Bursting strength.
7. Fabric stiffness.
8. Fabric drape.
9. Crease recovery.
10. Fabric shearability & compressibility.
11. Fabric pilling.
12. Fabric abrasion.

REFERENCE BOOKS :-

1. Principles of Textile Testing by J.E. Booth.
2. Textile Testing Vol.I & II by Anagappan & Gopalkrishnan
3. Physical properties of Textile Fibre by J.W.S. Hearle & Morton.

SECOND YEAR B.TEXT. – SEMESTER - II

4.4 CHEMICAL PROCESSING OF TEXTILES – I (TT/MMTT)

Lectures	:	3 hrs/week
Practical	:	2 hrs/week
Theory Paper	:	100 marks
Term work	:	25 marks
Subject Total	:	125 marks

SIZING :-

- a) Introduction to sizing, object of sizing, different sizes for different fibres, size paste ingredients.
- b) Adhesive & their classification, study of Maize, Potato, TKP, CMC, PVA and thin boiling starches. Physical & chemical properties. Testing of adhesives like Identification of material, viscosity, keeping property, congelling.
- c) Function of softners and lubricants. Study of softners like mineral oil and plastisizers, vegetable tallow, mutton tallow, synthetic tallow. Testing of softners.
- d) Functions of antiseptics and weighting agents. Some inorganic and organic antiseptics used for sizing. Testing of weighting agent.
- e) Size recipe formulations for cotton, viscose, polyester & poly / cellulose blends. Testing of sized yarn & identification of sizes. Optimisation of size recipe.
- f) Introduction of pretreatments in wet processing. Importance of grey inspection. Introduction to shearing & cropping machines.
- g) Object of singeing. Gas singeing for woven and knitted fabrics. Introduction of indirect singeing methods.
- h) Object of desizing, Hydrolytic and oxidative methods of desizing.
- i) Object of scouring, scouring with alkali and solvents. Study of batch and continuous machines for scouring. Bleaching with hypo-chlorites, hydrogen peroxide and peractic acid for cotton, polyester an their blends.

Batches. Batchwise and continuous machines for bleaching. Bleaching of wool, silk nylon and acrylic.

- j) Object of mercerization, study of mercerization on structure of cellulose. Mercerization & machines used for yarn, woven and knit fabrics. Study to hot mercerization, liquid ammonia mercerization. Testing methods of evaluate the efficiency of mercerization. Production of mc/s.

LIST OF EXPERIMENTS :-

- 1) Identification by microscope.
- 2) Testing and analysis of adhesive.
- 3) Testing and analysis of softner purity.
- 4) Estimation of size % in gray fabric.
- 5) Desizing of cotton & Poly / cotton blend by different methods.
- 6) Scouring of cotton polyester and their blends.
- 7) Bleaching of woven and knitted fabrics.
- 8) Determination of mercerization efficiency by BAN method.
- 9) Degumming of silk.
- 10) Scouring and bleaching of wool.
- 11) Determination of whiteness, yellowness of bleached fabric by CCM.
- 12) Formulation of size recipee & testing the performance using single end sizing machines.
- 13) Study of adhesivity on fibres of different formulations.

REFERENCE BOOKS :-

1. Sizing by Prof.D.B. Ajgaonkar, M.K. Talukdar & V.R. Wadekar.
2. Chemical technology of fibrous materials by F. Sadov.
3. Chemical Processing of Polyester/Cellulosic blends by R.M.Mittal & S.S. Trivedi.
4. Chemical processing of synthetic & blends by K.V. Datye & A.A. Vaidya.
5. Mercerizing by J.T. Marsh.
6. Introduction to Textile bleaching by J.T. Marsh.
7. Bleaching, Dyeing & Chemical Technology of textile fibres by S.R. Trotman.
8. Technology of Bleaching by V.A. Shenai.

9. Warp Sizing by Paul V. Seydel.
10. Warping and Sizing by BTRA Silver Jubilee Monograph series.
11. Bleaching & Mercerizing by BTRA Silver Jubilee Monograph series.

SECOND YEAR B.TEXT. – SEMESTER - II

4.5 YARN FORMING TECHNOLOGY – II (TT)

Lectures	:	4 hrs/week
Practical	:	2 hrs/week
Theory Paper	:	100 marks
Term Work	:	25 marks
Practical	:	50 marks
Subject Total	:	175 marks

1. DRAW FRAME :

- A. Functions of draw-frame. Principles of drafting and doubling. Study of constructional details & design considerations of a drawframe. Calculations relating to speeds, drafts production etc.
- B. Principles of Roller drafting, design details of drafting system, design details of drafting system. Evolution of drafting systems at draw frame, (shirley 4/4 draftings, platts presser bar, whitin accu draft, Rieter polar drafting systems etc.) Developments in draw frame drafting.
- C. Suction at draw frame. Automatic can handling. Autolevelling at draw frame. On-line quality monitoring and control.
- D. Study of draw frames available in the market. Blending draw frames.
- E. Study of Maintenance aspects & design developments at draw frame, such as Rollers, Roller weightings, drafting systems, etc.
- F. Assessment of performance of drawframe. Defective production at draw frame, causes and remedies for the same. Norms for production, sliver quality, waste etc.

2. COMBER :-

COMBER PREPARATORY :

- A. Requirements of good lap – importance of number of passages, importance of good lap, linear density of lap, etc.
- B. Methods of comber lap preparation – Different sequences of comber lap preparation, study of sliver lap machine, ribbon lap machine, unilap machine. Developments in combing preparatory machines.
- C. Maintenance & Assessment of combing preparatory machines.

3. COMBING :

- A. Objects of combing process. Study of combing cycle.
- B. Constructional details of Comber- feeding, nipper assembly, cylinder and detaching rollers, cylinder needles, web and sliver transport, drafting and coiling at comber.
- C. Semi combing, normal combing, super combing and double combing. Forward and backward combing.
- D. Maintenance of comber. Index Cycle, Comber Settings.
- E. Assessment of performance of comber – Norms for production, speed. Combing efficiency, Fractionating efficiency of comber. Influence of combing operation on quality.
- F. Automatic and centralized noil extraction. Automatic materials handling. Stop motions in comber.
- G. Technical specifications of modern combers available in the world market.

4. SPEEDFRAME :-

- A. Objects of speed frame. Concept of drafting, twisting and winding process.
- B. Constructional aspects of Speedframe – Creel, Top arm apron drafting system, Spindle & Flyer assembly, Bobbin building at speed frame, stop motions.
- C. Study of mechanisms like – differential motion, swing motion, building mechanism, semi-automatic and automatic doffing, etc.
- D. Assessment of performance of Speedframe - Productivity and Quality norms of speed frame, Zero break concept, block creeling.
- E. Materials handling. Transport of bobbins to ring spinning machines.
- F. Maintenance of speed frame.
- G. Features of modern speed-frame machines available in the market.

LIST OF EXPERIMENTS :-

- 1) Driving arrangement and calculations of draw frame.
- 2) Study of roller settings on draw frame.
- 3) Driving arrangement & calculations of Sliver lap machine. Roller settings in Sliver lap machine.

- 4) Driving arrangement & calculations of Ribbon lap machine. Roller settings in Ribbon lap machine.
- 5) Study of constructional aspects, combing cycle & index chart of modern comber.
- 6) Driving arrangement & calculations in modern comber.
- 7) Comber setting.
- 8) Driving arrangement & calculations related to production, constants, draft twist etc. of modern speed frame.
- 9) Study of coils per inch of speed frame & differential gearing.
- 10) Study of building mechanism of speed frame.
- 11) Driving arrangement & calculations related to production, constants, draft twist etc. of modern ringframe.
- 12) Mill visit to study modern Drawframe, Comber, Speedframe, Ringframe.

REFERENCE BOOKS

1. The Textile Institute Publication –Manual of Textile Technology-Short Staple Spinning Series
 - Vol I-The Technology of short staple spinning by W.Klein
 - Vol III-A Practical training guide to Combing & Drawing by W.Klein
2. Practical guide to combing by W.Klein, Textile Institute publication Vol.3
3. Fundamentals of Spun Yarn Technology, By Carl Lawrence.
4. Essential calculations of practical cotton spinning by T.K.Pattabhiraman
5. Technology of cotton spinning by J.Janakiram.
6. Drawing, Combing and roving and speed frame by Zoltan, S.Szaloky, The Institute of Textile Technology, Verginia
7. Draw frame, combing and speed frame by J.H.Black; The Textile Institute publication, Manual of cotton spinning Vol-Iv part II.
8. Combing by Moor.
9. Spun Yarn Technology by Eric Oxtoby.
10. Elements of combing by A.R.Khare.
11. Cotton Drawing and Roving by G.R.Merril.
12. Manual of cotton spinning series, vol3, part 2 by J.Black et al Textile Institute Publication.

SECOND YEAR B.TEXT. – SEMESTER - II

4.6 FABRIC FORMING TECHNOLOGY – II (TT)

Lectures	:	4 hrs/week
Practical	:	2 hrs/week
Theory Paper	:	100 marks
Term Work	:	25 marks
Practical	:	50 marks
Subject Total	:	175 marks

1) SIZING :-

Study of modern sizing machine element.

- 1) Creel – construction, braking arrangement & positive drive.
- 2) Size Box – various size boxes, 1 nip 1 dip, 2 nip 2 dip, dressing rollers, Zell, Sucker, West point, Benninger, Tsudakoma size box constructions various roller constructional details.
- 3) Drying Cylinders – Heating arrangement, coating ,temperature & its control, pressure of steam, thermal performance of drying cylinders, steam traps & its types & importance.
- 4) Head Stock – Dry splitting, measuring motion, drag roller, comb & drive to weavers beam, pressuring device.
- 5) Control Systems- Importance, consequences of moisture, temperature, size level, on line size percentage, Stretch control systems.
- 6) Factors affecting size pick up & size add-on, migration.
- 7) Assessment of sizing performance – laboratory & practical methods.
- 8) Concept of single end sizing & various methods.
- 9) Concept of dyeing cum sizing.
- 10) Automation and MIS on modern machines.
- 11) Concept of recycling of sizes.
- 12) Calculations – Related to size concentration, size pick up, stretch, drying, count of warp production etc.

2) FABRIC STRUCTURE :-

- a) Study of following weave on weave characteristics & weaving requirements.

- 1) Warp pile – wire method, face to face weaving & terry pile.
 - 2) Introduction to tufted carpets.
 - 3) Weft pile – velveteens & velours
- b) Fabric Engineering :-
- 1) Peirce's yarn diameter formula & its limitations.
 - 2) Fabric cover & crimp factors.
 - 3) Cloth geometry of plain, twill weave.
 - 4) Practical application of cloth geometry & cover factor.
- c) Construction & Development of Jacquard Designs :-
- 1) Elements of Jacquards shedding – Double lift, Jacquard with single & double cylinder working, Jacquard sizes, Harness tie, Harness drawing – in, card cutting & card lacing.
 - 2) Harness & design calculation – Setting of harness, number of harness cords to each hook, casting out, size of repeat, count of design paper.
 - 3) Development of Jacquard Designs – Construction of square paper designs, Process of drafting a sketch design, drafting designs from woven fabrics.
 - 4) Development of figures – Prevention of long floats, bold & flat development, Development of large figures, use of warp & weft float, figure shading.
 - 5) Insertion of ground weavers.
 - 6) Factors influence woven designs.
- 3) SHUTTLELESS WEAVING :-**
- a) Limitations of shuttle loom with respect to weaving process, engineering aspects & environmental aspects.
 - b) Classification of shuttleless weaving machines.
 - c) Projectile weaving machine – History of shuttleless weaving machine ; Projectile machine models TWII To P7300 ; Machine drive, various motions timing, shedding Cam motion, Beat-up motion, limitations of shuttle loom picking motion; Projectile picking concept, picking motion, picking phases, Projectile acceleration & retardation, torsion rod details, Projectile preparation for picking, selvedge motion, Receiving unit , Selvedge weaves, Let-off motion (Mechanical & power), Take-up motion, their advantages in relation to shuttle loom motions,

specifications of projectiles & grippers for various applications, Machine speed, timings, power specifications for various widths, all auxiliary motions such as brake, clutch, oiling, cleaning, MIS, General electronic circuit, pick finding, Multi colour weft insertion, weft stop, warp stop, whip roller, weft brake etc. Fabric defects & remedies.

d) Ravier Weaving Machine -

Various ravier weaving machines such as Picanol, Smit, Somet, Vamatex, Dornier, Sulzer, Panther etc. Various machine models available of above make & their brief history.

Study of weft velocity curves for looms with different methods of weft insertion. Concept of Dewas & Gabler ravier systems, their comparison with other weft insertion systems from weft acceleration & retardation point. Study of effect of reed width on loom speed.

Principles of different single & double ravier weft insertion systems (Drive), their comparison. Study of ravier heads.

Smit ravier machine models, machine drive, Timings of various motions, cam shedding & beat up motion, Ravier motion drive details, Details of ravier tape, head, sely construction, guiding elements, Gripper openers, cutters, stroke adjustment. Selvedge forming elements & adjustments.

Let-off & take up motion (Mechanical & power), their adjustments for various pick density range, specifications of ravier & head for various applications. Specifications speed, power & machine timing for various widths.

All auxiliary motions such as brake, clutch oiling, cleaning, MIS, General electronic circuit, pick finding, multi colour weft insertion, weft-stop, warp stop, whip roller, weft brake etc.

Fabric defects & remedies, weft waste during selvedge formation.

Detailed study of Dornier ravier weaving machine on above line.

4) HIGH SPEED SHEDDING MECHANISMS :-

- 1) Limitations of Tappet shedding motion, positive cam shedding concept & need, Positive cam shedding motions, constructional & working details (Ruti-

C, Projectile, Rapier & Airjet), Adjustments essential during weave change and timing. Mounting possibilities, pitch of heald fineness.

- 2) Limitation of lever & cam negative dobbie, positive lever dobbie, positive rotary cam concept, Rotary mechanical & electronic control dobbie, mounting possibilities, pitch of heald frames, capacity, data transfer, adjustments during weave change, various models available in the markets.
- 3) Limitations of mechanical Jacquard, concept of electronic Jacquard, constructional & working details of electronic Jacquard, comparison between various Jacquard (Bonas, Staubli, Grosse) working principles, adjustment for various weaves, Jacquard capacity, mounting, suitability for various end uses, data transfer & management, Networking with looms.

LIST OF EXPERIMENTS :-

- 1) Dismantling and resetting of warp stop motion.
- 2) Study of shuttle change motion and silk loom features.
- 3) Loom operating – starting, stopping, knotting, & drawing –in & study of fabric defects.
- 4) General study of projectile machine and drive arrangements for various motions.
- 5) General study of flexible Rapier machine & drive arrangements for various motions.
- 6) General study of rigid Rapier machine & drive arrangements for various motions.
- 7) Study of positive cam motions of Sulzer & Ruti-C machine.
- 8) Study of Rotary mechanical & electronic dobbie.
- 9) Study of electronic jacquard motion.
- 10) Fabric analysis of advanced structures.
- 11) Fabric analysis of advanced structures.
- 12) Fabric analysis of advanced structures.
- 13) Visit to Jacquard unit.

REFERENCE BOOKS :-

- 1) The Technology of Warp Sizing by J.B. Smith.
- 2) Modern Preparation & Weaving by A. Ormerod.
- 3) Textile Maths Vol.III by J.E. Booth
- 4) Principles of weaving by Marks & Robbinson.
- 5) Weaving machines & methods by Dr. Talukdar, Prof. D.B. Ajgaonkar.
- 6) Sizing by Sydel.
- 7) Shuttleless weaving by Svaty.
- 8) Modern Methods of Weaving by Duxburng.
- 9) Hand Book of Weaving – Sulzer Publication.

SECOND YEAR B.TEXT. – SEMESTER - II

4.7 TEXTILE DESIGN AND COLOUR (TT/MMTT)

Draw. Practical:	2 hrs/week
Term work :	50 marks
Subject Total :	50 marks

LIST OF EXPERIMENTS :-

1. Units developments for textile design.
2. Colour modification chart.
3. Colour theory chart.
4. Textile design development with the help of designing principles.
5. Composition of all over textile design by following bases – (Any two assignments)
 - a. Sq. or Rectangle base
 - b. Drop base – half drop, full drop, 1/3 or 2/3 drop
 - c. Diamond base.
 - d. Ogce bse
 - e. Satin base.
6. Development of point paper design for dobby weaving (Any two).
 - a. Extra warp
 - b. Extra weft
 - c. Backed cloth
 - d. Double cloth
7. Development of point paper design for jacquard.
8. Basics of computer aided designing software for dobby.
9. Use of dobby software for designing.
10. Designing different colour patterns, motifs for dobby weaving.
11. Basics of computer aided designing software for jacquard.
12. Use of jacquard software for designing.
13. Designing different motifs, colour pattern for jacquard weaving.