

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI																	
TEACHING AND EXAMINATION SCHEME																	
COURSE NAME : DIPLOMA IN TEXTILE MANUFACTURES																	
COURSE CODE :TX																	
DURATION OF COURSE : SIX SEMESTERS/THREE YEARS									WITH EFFECT FROM 2008-09								
SEMESTER : THIRD									DURATION :16 WEEKS								
FULL TIME / PART TIME : FULL TIME									SCHEME - C								
SR. NO.	SUBJECT TITLE	SUBJECT CODE	TEACHING SCHEME			EXAMINATION SCHEME											
			TH	TU	PR	PAPER HRS	TH		TEST	TOTAL		PR		OR		TW	
							MAX	MIN		MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
1	Applied Statistics	9546	03	--	--	03	80	28	20	100	40	--	--	--	--	--	--
2	Yarn Manufacture-I	9547	04	--	02	03	80	28	20	100	40	--	--	25#	10	25@	10
3	Fabric Manufacture-I	9548	04	--	02	03	80	28	20	100	40	--	--	25#	10	25@	10
4	Textile Testing -II	9549	03	--	02	03	80	28	20	100	40	50#	20	--	--	25@	10
5	Textile Chemistry-II	9550	03	--	02	03	80	28	20	100	40	50@	20	--	--	--	--
6	Elements of Applied Mechanics & Electrical Engineering	--	02	--	02	--	--	--	--	--	--	--	--	--	--	50@	20
7	Professional Practice-III	--	--	--	05	--	--	--	--	--	--	--	--	--	--	50@	20
TOTAL			19	--	15	--	400	--	100	500	--	100	--	50	--	175	--
STUDENT CONTACT HOURS PER WEEK: 34 HRS.																	
THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.																	
@ - INTERNAL ASSESSMENT , # - EXTERNAL ASSESSMENT ,																	
TOTAL MARKS – 825																	
ABBREVIATIONS : TH – THEORY , TU – TUTORIAL , PR – PRACTICALS , OR –ORAL, TW – TERMWORK.																	
All Practical, Oral & Term work assessment are to be done as per the prevailing curriculum implementation & assessment norms.																	

COURSE NAME : TEXTILE MANUFACTURE AND TEXTILE TECHNOLOGY
COURSE CODE : TX
SEMESTER : THIRD
SUBJECT TITLE : APPLIED STATISTICS
SUBJECT CODE : 9546

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
03	--	--	03	80	20	--	--	--	100

RATIONALE

The diploma pass outs have to work in various departments in textile industries, such as the material testing or textile testing, production, maintenance etc. In these areas, they have to maintain the consistency of the output by maintaining its characteristics. In this process, frequent inspections have to be done. Such activities generate data, which is to be examined based on sample tests, and such samples should be so chosen that they represent the whole population of activities. We can manage such analysis and prediction with the help of statistics.

Besides such prediction about the total population, the diploma pass outs to predict change of one variable with the other. In real life situations there are many variables in the industries which affect the quality of outputs. Such as, quality of raw materials, condition of machines, motivation level of employees, working environment, etc. All such variables affect production. If these variables are quantified and linked with production. We can use mathematics to understand and solve such problems.

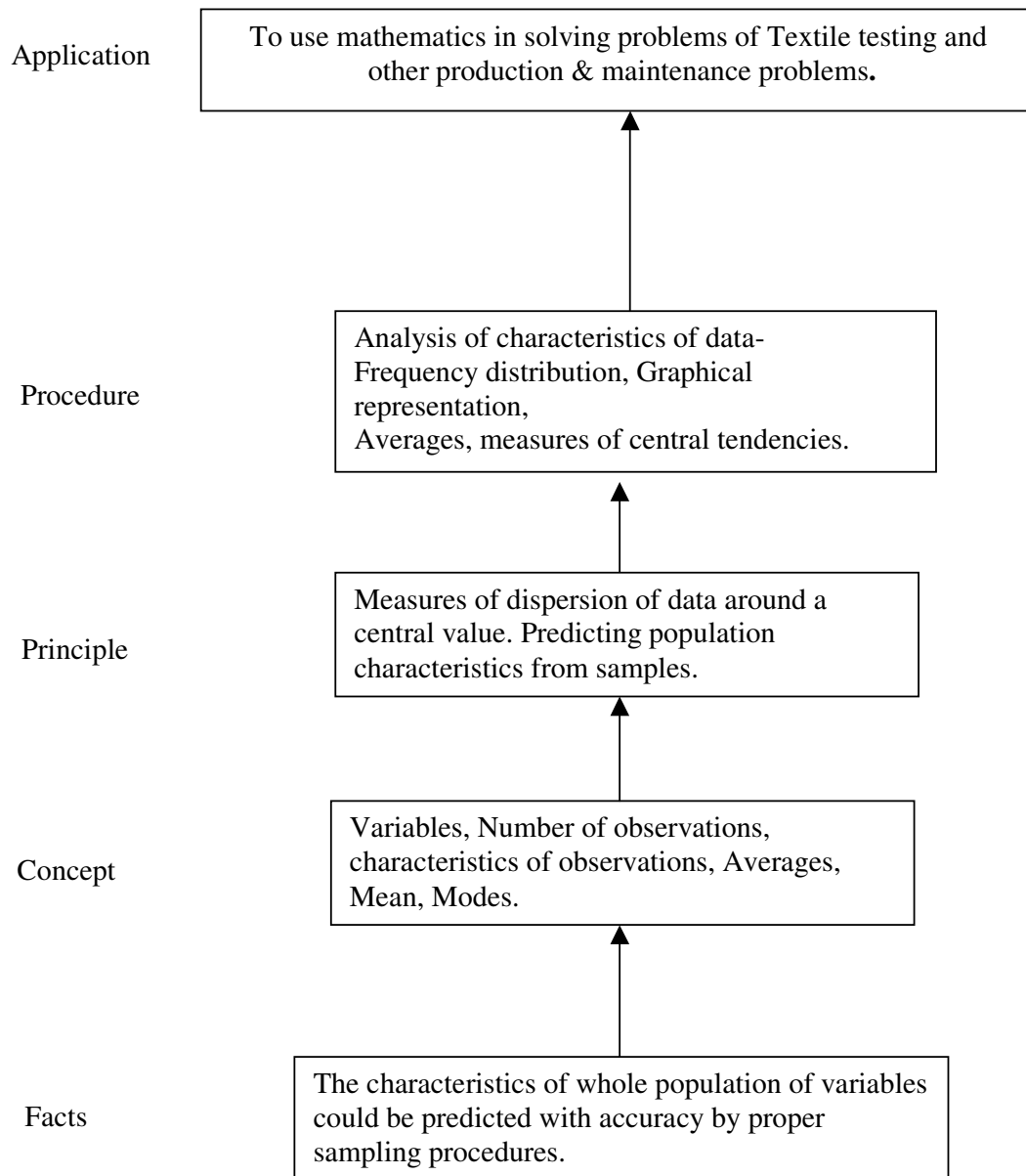
Thus this subject envelops the theory and practice of problems solving through statistics and mathematics.

Objectives:

The students will be able to

- 1: Give engineering bias to mathematical & statistical principles in engineering and technological problems
- 2: Furnish an engineer/Technologist with a powerful statistical tool
- 3: Provide a window through which a better vision towards engineering and technology can be cultivated
- 4: locate the exceptional and critical points in an engineering system and come to a valid conclusion.

Learning Structure of- Applied Statistics



Learning Structure of Applied Statistics

Detail Content

Chapter	Topic	Hours	Marks
1	Measures of Dispersion 1.1 Quartile derivation, Decile & Percentile 1.2 Mean deviation 1.3 Standard deviation 1.4 Variance and coefficient of variation, comparison of two sets of observations	08	12
2	Correlation 2.1 Introduction and Types of correlation Methods of studying correlation a) Scatter Diagram b) Karl Pearson's co-efficient of correlation c) Spearman's Rank correlation	10	16
3	Lines of Regression 1. Introduction 2. Lines of Regression a) X on Y b) Y on X 3. Relation between the coefficient of correlation and the regression coefficient	08	16
4	Quality Control 4.1 Introduction 4.2 Chance and assignable factor 4.3 Use of SQC 4.4 Quality Control Charts a) X-Charts(mean) b) Range Chart	12	20
5	Probability Distributions 5.1 Binomial distribution 5.2 Poisson Distribution 5.3 Normal distribution	10	16
Total		48	80

References:

Sr.No	Author	Title	Publication
1	G.V.Kumbhojkar	Statistical Technique	Phadke Prakashan, Kolhapur
2	J.N. Kapur & H.C.Saxena	Mathematical statistics	S.Chand Publication, New Delhi
3	S.C.Gupta & S.C.Kapur	Fundamentals & Mathematical Statistics	.Chand Publication, New Delhi
4	H.C.Saxena, H.C.Saxena	Examples in Statistics	ATMA Ram & Sons, Delhi 110006
5	Douglas Montgomery & George C. Runger	applied Statistics & Probability for Engineers	John Wiley & sons Inc.

COURSE NAME : TEXTILE MANUFACTURE AND TEXTILE TECHNOLOGY
COURSE CODE : TX
SEMESTER : THIRD
SUBJECT TITLE : YARN MANUFACTURING – I
SUBJECT CODE : 9547

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	--	02	03	80	20	--	25@	25@	150

RATIONALE:

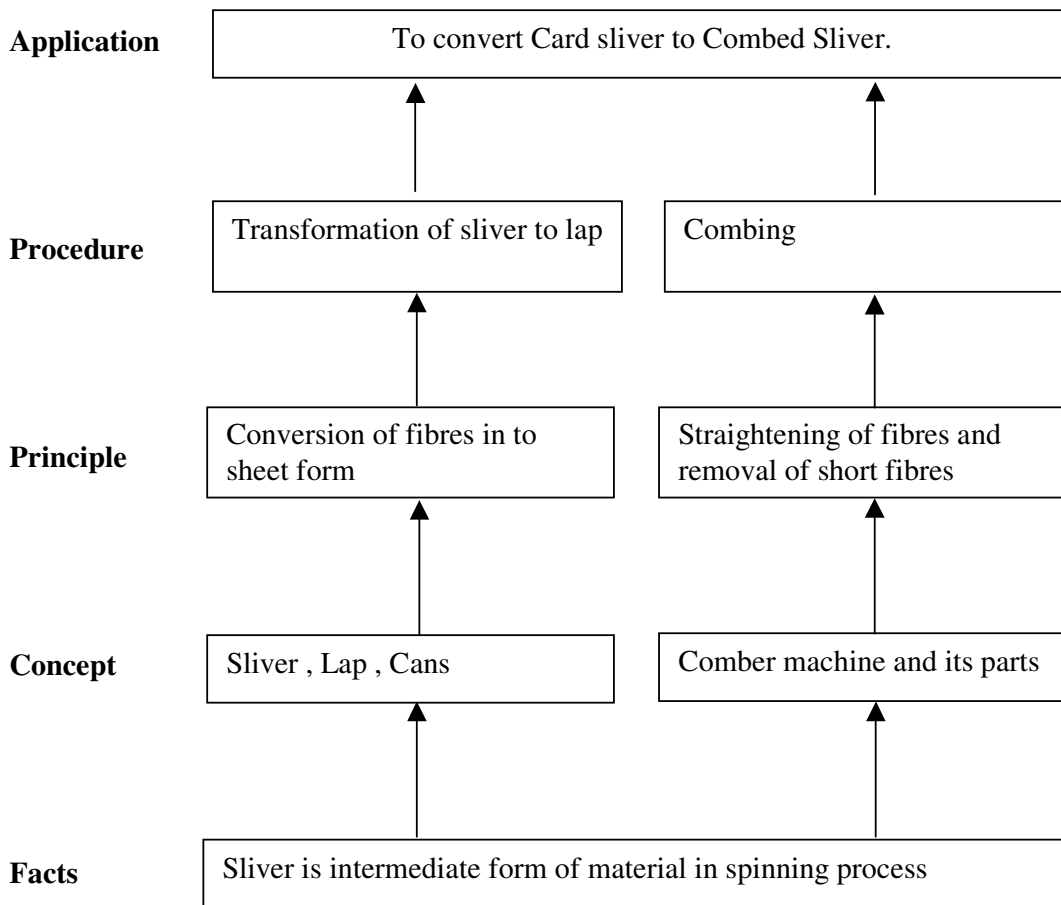
During first two semesters we have undergone into the detailed study of the preparatory part of the spinning process; in subject TT1 & TT2. In that Blow room, carding has been discussed.

In this third semester, Yarn Manufacturing I – is a continuation of the detailed study of spinning process. This subject covers further part of spinning process e.g. Draw frame and Combing process. It covers the study of principles and description of these processes and functions of all machines and its parts with related information and skills.

Objective:

1. The student will able to:
2. Understand drawing process.
3. Draw the sketch and gearing of drawing machine.
4. Describe the working of auto leveller.
5. Calculate production of Drawing Machine.
6. Understand Combing process.
7. Draw the sketch and gearing of Combing machine.
8. Describe the working of Comber preparatory and Comber.
9. Calculate production of Comber preparatory and Comber Machine.

Learning Structure:



Detailed Contents:

Chapter	Topic	Hours	Marks
1	<p>Study of drafting process and draw frame machine</p> <p>1.1 Purpose of blending, Evaluation of blending, sliver blending.</p> <p>1.2 Attenuation (Draft) ,the drafting operation, drafting force, stick slip in drafting process, fibre guidance, floating fibres, fibre friction fields, factors influencing friction fields, distribution of draft.</p> <p>1.3 Object of drawing process.</p> <p>1.4 Task of draw frame- Equalising, parallelising, Blending, Dust removal.</p> <p>1.5 Operating principal,</p> <p>1.6 Operating device-</p> <ol style="list-style-type: none"> 1. Creel 2. Drafting arrangement- requirements, factor affecting draft depending on fibre material, depending on drafting arrangement. 3. Elements of drafting arrangement in short staple spinning- bottom roller, top roller, maintenance of top roller , top roller pressure, stop motion 4. Forms of drafting arrangement used on draw frame 3/4, 3/3 4/3, 5/4, suction system for drafting arrangement. 5. coiling- delivery, condensing, sliver coiling, can changer <p>1.7 Roller weighting- spring and pneumatic.</p> <p>1.8 Monitoring and auto levelling- open loop control, closed loop control, Classification, monitoring device with self compensation, monitoring device with auto levelling system, combined evener draw frames, correction length, evening operation.</p> <p>1.9 Integrated monitoring system structure(sliver data)</p> <p>1.10 Blending draw frame.</p> <p>1.11 Calculations related to draft and production.</p> <p>1.12 Defects and remedies in draw frame.</p>	24	32
2	<p>Study of Comber lap preparation and comber</p> <p>2.1 Introduction – task of comber , types of application.</p> <p>2.2 Objects of silver lap, Ribbon Lap and super Lap.</p> <p>2.3 Study of construction and working of lap preparation machine- sliver lap, ribbon lap and super lap.</p> <p>2.4 Influencing of lap preparation on combing- parallelization of fibre in the sheet, sheet thickness, evenness of lap sheet, deposition of the hooks.</p> <p>2.5 Causes of defective production and their remedies.</p> <p>2.6 Calculation related to production & draft.</p> <p>2.7 Types of comber – Sequence of operation of rectilinear comber</p> <p>2.8 Technology of combing- parameters influencing the combing operation, influence of the combing on quality.</p> <p>2.9 Noil theory of Gegauff- forward feed backward feed.</p> <p>2.10 Influence of machine component and setting on combing.- Feed distance moved per cycle, type of feed ,the detachment setting, number of points on the comb, the depth of penetration of top comb, piecing.</p> <p>2.11 The comber- outline, description of function, the feed, nipper assembly, construction of nipper assembly, nipper movements.</p>	40	48

	2.12 The comb- cylinder comb, top comb, operations of comb 2.13 Take off of material- piecing, withdrawal of web and formation of sliver, sliver take off, drafting arrangement, coiling of sliver, waste removal 2.14 Study of gearing diagram of Comber machine & driving arrangement of all parts Study of important setting and its effects on working – step gauge, distance gauge, top comb settings combing cy 2.15 Cle of any comber. 2.16 Specification of modern comber 2.17 Calculation of Production, Noil Percentage and Draft. 2.18 Concept of fractionating efficiency. 2.19 Causes and remedies of defective production at Comber.		
	Total	64	80

Practical:

Skills to be developed:

Intellectual Skills:

- 1) Calculate the speeds of various machine parts in Drawing.
- 2) Calculate the production of various machine parts in Drawing.
- 3) Select various settings of drafting.
- 4) Select various speeds for Drawing machines and settings for particular mixing.
- 5) Calculate the speeds of various machine parts in Comber
- 6) Calculate the production of various machine parts in Comber.
- 7) Select various settings of Comber.
- 8) Select various speed and settings of comber for particular mixing.

Motor Skill:

1. Draw gearing diagram of Drawing, Comber preparatory and Comber machines.
2. Draw the sketches of Drawing, Comber preparatory and Comber Machines.
3. Measure the speed of Drawing, Comber preparatory and Comber machine components using tachometer.
4. Follow standard setting procedure for various Drawing, Comber preparatory and Comber machine components.

List of Practical

1. Passage of material through draw frame machine
2. Study of gearing diagram of the draw frame machine, calculations of speed of various parts, draft and production.
3. Study of drafting system, roller weighting, stop motions.
4. Roller setting and allowances.
5. Study of modern draw frame.
6. Study of Auto leveller at draw fram
7. Study of construction and working of Sliver lap including the passage of material, gearing diagram, calculation of speed, draft and production.
8. Study of construction and working of Ribbon Lap involving passage of material, gearing diagram, calculation of speed, draft and production.

9. Study of construction and working of Super Lap involving the passage of material , gearing diagram, calculation of speed, draft and production
10. Study of Comber parts, passage of cotton, driving arrangement and calculation of speeds, draft and production.
- 11 Setting on Comber – step gauge, top comb penetration & inclination, drafting roller settings and other important setting.
12. Study of any modern comber.

References

Sr. no.	Author	Title	Publication
1.	W. Klein	Technology of Short Staple Spinning Vol. I	The Textile Institute Manchester.
2.	W. Klein	The Practical Guide To Combing and Drawing Vol. 3	The Textile Institute Manchester.
3	W. S. Taggart.	Cotton Spinning Vol. II	Macmillan and Co. Ltd.
4	T. K. Pattabhiram	Essential Element of practical Cotton Spinning.	Somaiya Publication Pvt. Ltd. Mumbai.
5	T. K. Pattabhiram	Essential Facts in Cotton Spinning.	Somaiya Publication Pvt. Ltd. Mumbai.
6	A. R. Garde (Editor)	Spinning Tablet Series (9 numbers)	The Textile association , India.
7	Ed. By K. Ganesh, A. R. Garde	Cotton Spinning.	The Textile association , India.
8	R. Chattopadhyay, R. Rengasamy	Spinning- Drawing, Combing and Roving.	NCUTE, IIT Delhi
9	R. Chattopadhyay	Advances in Technology of Yarn Production.	NCUTE, IIT Delhi
10	K. R. Salhotra	Spinning of manmades and Blends on Cotton System	The Textile association, India.
11.	H V S Murthy	Introduction to Textile Fibres	The Textile association, India.
12	Foster	Principles of Roller Drafting	--

COURSE NAME : TEXTILE MANUFACTURE AND TEXTILE TECHNOLOGY
COURSE CODE : TX
SEMESTER : THIRD
SUBJECT TITLE : FABRIC MANUFACTURING – I
SUBJECT CODE : 9548

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	--	02	03	80	20	--	25@	25@	150

RATIONALE:

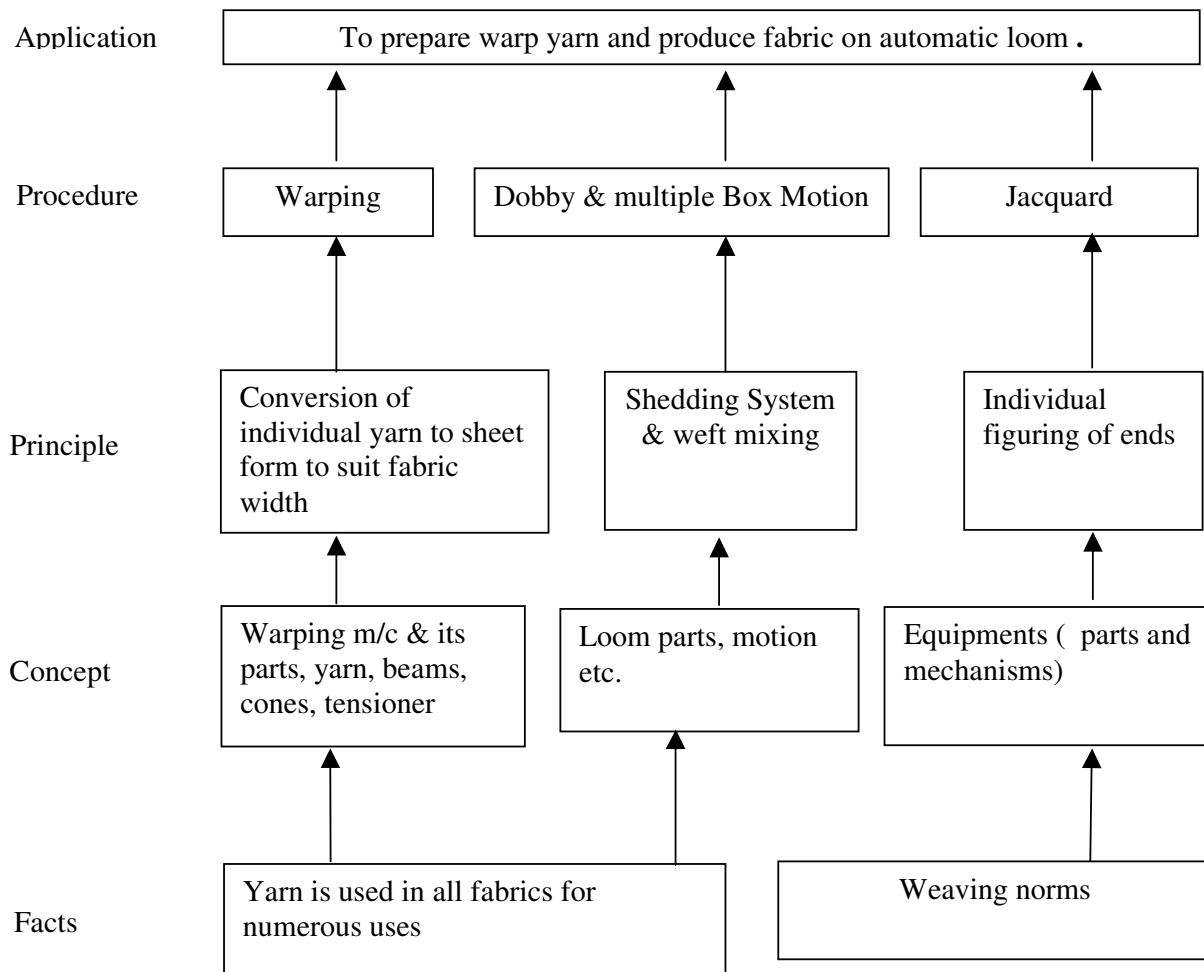
The textile manufacturing is done in various stages. In first year, we have experienced that this subject of fabric manufacture dealt with yarn preparation in winding and ordinary weaving on simple loom. In this second year, this subject deals with subsequent steps of yarn preparation and automatic weaving. These are essential stages in the fabric production. This subject intends to impart knowledge and skills in the area of important weaving process, i.e. warping, sizing operation and fabric production on automatic looms.

Objectives

The students will be able to

1. Identify warping process requirement.
2. Understand the warping process.
3. Use doobby drop box and jacquard for designing.

Learning Structure:



Detailed Contents

Chapter	Topic	Hours	Marks
1	<p>Warping</p> <p>1.1. Objects of warping, construction and working of spindle driven and drum driven beam warping machines, different types of creels used, their merits and demerits, tension devices, pre-tensioner, pneumatic tensioner, central control of tension.</p> <p>1.2. Sectional warping machine: object, preparation sections, calculation related to sections, section winding, beaming, leasing, creeling for colour patterns, description of colour master for creeling.</p> <p>1.3. Head stock details, spindle and drum drive, braking arrangements, comb, manual and automatic doffing of beam, system to give pressure on beam, stop motion on warping machine its working, types, its significance and effect on beam quality.</p> <p>1.4. Study of automation done in creels and creeling.</p> <p>1.5. Modern warping machines : salient features.</p> <p>1.6. Calculation of efficiency of warping machine.</p>	14	20
2	<p>Dobby</p> <p>2.1. Different type of shed forming mechanisms, types of doobby.</p> <p>2.2. Study of construction and working of double lift single jack (keighley doobby), and double jack (climax doobby), settings of climax doobby, methods of pegging for right and left hand doobby. Heald reversing motion on looms with doobby,</p> <p>2.3. Study of construction and working of cam doobby, method of heald selection on cam doobby,</p> <p>2.4. Study of paper pattern doobby, positive doobby, cross border doobby,</p> <p>Detailed study of rotary doobby used on modern weaving machines.</p>	18	24
3	<p>Multiple Box Motions</p> <p>Multiple box motion: object, study of construction and working of different types of multiple box motions such as circular, Cowburn and Peck drop box motion, Eccles drop box motion, pick-at-will mechanism, types of safety devices, card saving device on multiple box loom, and weft mixing with drop boxes, fabric defects and remedies on drop box looms</p>	14	16
4	<p>Jacquards</p> <ol style="list-style-type: none"> 1. Introduction to the ornamentation of the fabrics, its methods like woven and processed. 2. Introduction to the jacquard machine, object. 3. Study of single lift jacquard, principal parts of the jacquard machine, types of jacquards. 4. Study of the figuring capacities of jacquards. 5. Single lift single cylinder jacquard. 6. Double lift single cylinder jacquard. 7. Double lift, double cylinder jacquard. 8. Cross border jacquards, device to change the cylinder. 9. Types of sheds formed by different jacquards. 10. Open shed jacquards. 	18	20

	11. High speed electronic jacquards. 12. Jacquard mounting, harness building, and harness ties, 13. Methods of transferring design on graph paper from sketch and fabric sample, selection of point paper counts for it. 14. Method of card punching, card lacing, casting out.		
	Total	64	80

Practical:

Skills to be developed:

Intellectual Skills:

1. Select dobby, drop box and jacquard for fancy design
2. Analyze the fabric

Motor skills:

1. Operate the fancy design power loom.
2. Operate the warping machine.

List of Practical:

1. Dismantling and refitting of Keighley dobby.
2. Setting and timing of Keighley dobby.
3. Dismantling and refitting of Drop Box.
4. Setting and timing of C&P drop box.
5. Dismantling and refitting of Single lift single cylinder jacquard.
6. Dismantling and refitting of double lift double cylinder jacquard.
7. Dismantling and refitting of Cross border jacquard.
8. Punching of paper cards on card punching machine.
9. Operation of the Piano card cutting machine and punching of cards.
10. Sample preparation on CAD package with printouts.
11. Sample preparation on any jacquard.
12. Demonstration of Electronic Jacquard.(if available)
13. Dismantling and refitting of Sectional and beam warping machines
14. Demonstration of operation of different sections of Sizing machine.

References:

Sr.No.	Author	Title	Publisher
1	R.Marks & A.T.C. Robinson	Principles of weaving	The Textile Institute, 10 Black friars Street, Manchester M3 5DR
2	Bennett	An introduction to Automatic Weaving	Indo Overseas Trading Co.280 Carnac Road, Bombay and Columbine Press Co.Ltd., Manchester & London
3	Banerjee N.N., Smt.T.Banerjee	Weaving Mechanism, Vol.I & Vol.II	Textile Book House, 29, Krishna Nath Road, berhampore – 742 101, West Bengal India
4	J.B.Aitken,	Automatic Weaving	Columbine Press (Publishers) Ltd., Old colony House South king, Street, Manchester-2

			I) Universal Book corporation, Dhobi Talao, Bombay-2
5	A.Ormerod	Modern Preparation and weaving machinery	Butterworths & Co. (Publishers) Ltd., London, 88, Kingsway, W.C.2
6	R.Sen Gupta	Weaving Calculations	D.B. Taraporevala sons & Co.Private Ltd., 210, Dr.Dadabhai Naoroji Road, Bombay

COURSE NAME : TEXTILE MANUFACTURE AND TEXTILE TECHNOLOGY
COURSE CODE : TX
SEMESTER : THIRD
SUBJECT TITLE : TEXTILE TESTING –II
SUBJECT CODE : 9549

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
03	--	02	03	80	20	50#	--	25@	175

RATIONALE:

There are varieties of raw materials for textile manufacturing, such as cotton, silk, synthetic fibers, etc. These raw materials are being used individually or mixed in different proportions to form a yarn of desired quality. Suitability of particular raw material for a given product mix can be decided by testing like lap, sliver, yarn, fabric etc. The raw materials can be tested for numerous characteristics like fiber length, strength, maturity etc. Similarly, to control the textile processes, it becomes necessary to test the intermediate products too. Finally, to ensure the quality product, final product that may be yarn, fabric or garment, testing is imperative. This subject intends to equip students with the concepts, principles and methods of testing of various textile materials, which is helpful in selection of raw materials, process control and quality assurance.

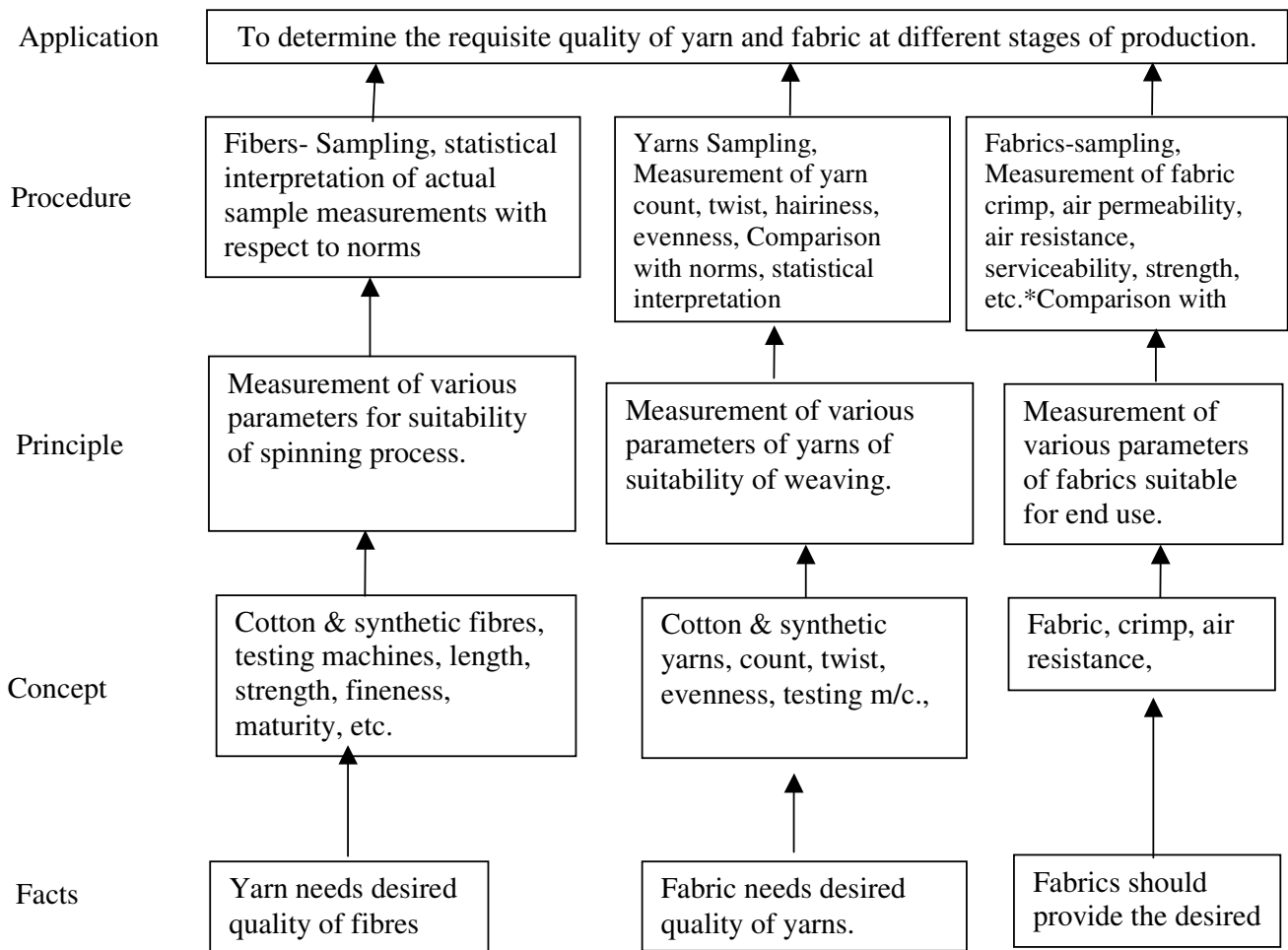
The process improvement is also an important aspect, which requires lot of experimentation. This processes results in number of observations, which are to be analyzed and interpreted and used for best results. Therefore, students are equipped with the methods to analyse the testing results statistically.

OBJECTIVES:

Student will be able to:

1. Measure different physical dimensions of yarn & fabric by using appropriate instruments accurately.
2. Select proper measuring instrument depending upon the data and precision required.
3. Test yarn and fabric parameters and interpret and correlate its' results.

Learning Structure:



Detail content

Chapter	Topic	Hours	Marks
1	<p>General Yarn Testing</p> <p>1.1 Yarn Number- Direct and indirect yarn numbering system</p> <p>1.2 Definition of British count, Metric, worsted, woolen (Yorkshire), Tex, Denier count and their conversion to another system.</p> <p>1.3 Measurement of Yarn Count: Package form- wrap reel</p> <p>1.4 Yarn in fabric form- Knowles, Quadrant and Beasley's balance.</p> <p>1.5 Count of doubled yarn.</p> <p>1.6 Relation between yarn count and diameter.</p> <p>1.7 Yarn Twist (definition), twist multiplier, twist factor</p> <p>1.8 Twist directions, twist and yarn strength relationship, some effects on fabric properties.</p> <p>1.9 Methods to measure twist: I) Straightened fibre method. ii) Continuous length method. iii) Twist contraction method iv) Twist to break method.</p> <p>1.10 Twist measurement in plied yarn. Take up twist tester.</p> <p>1.11 Crimp rigidity testing of manmade yarn. HATRA crimp rigidity tester</p> <p>1.12 Yarn hairiness testing: Manual (microscopic method).</p>	24	40
2	<p>Fabric Testing</p> <p>Measurement of :</p> <p>2.1 Length and width of fabric.</p> <p>2.2 Fabric thickness</p> <p>2.3 Ends picks / inch, weight / sq. meter and unit length.</p> <p>2.4 Crimp percentage, effect of crimp on fabric properties. Methods of determination of crimp</p> <p>2.5 Relation between yarn count, diameter and cloth cover.</p> <p>2.6 Definitions of air permeability, air resistance and air porosity, measurements of these parameters by air permeability apparatus. Relation between of air permeability and fabric properties.</p> <p>2.7 Thermal Insulation Value of fabric (TIV), and measurement by calorimeter method.</p> <p>2.8 Study of stiffness of fabric and bending length of fabric, measurement by stiffness tester based on cantilever principle.</p> <p>2.9 Study of drape and determination of drape coefficient by drape meter.</p> <p>2.10 Study of Crease Recovery and Crease Resistance, measurement by crease recovery tester.</p> <p>2.11 Definitions of serviceability, wear and abrasion. Types of abrasion. Factors affecting abrasion resistance,</p> <p>2.12 Definitions of pilling, factors affecting pilling.</p> <p>2.13 Definitions of water proof and shower proof fabrics, water repellent fabrics. Testing by i) Spray tester, ii) Drop penetration tester.</p>	24	40
Total		48	80

Skills to be developed**1) Intellectual skills:**

1. Proper selection of measuring instruments depending upon the data and precision required.
2. Analyze properties of matter & their use for the selection of material.
3. To interpret the results from observations and calculations.
4. To use these results for corrective actions in mechanical and wet processing.

2) Motor skills:-

1. Proper handling of instruments.
2. Measuring physical dimensions of yarn and fabric accurately.
3. To observe the phenomenon and to list the observations in proper tabular form.
4. To adopt proper procedure while performing the experiment.

List of Practical:**Determination of:**

1. Linear density of yarns spun of cotton system.
2. Denier of manmade yarn.
3. Twist in single yarn (straightened fibre method)
4. Twist in single yarn (twist to break method)
5. Twist in doubled yarn (Straightened fibre method)
6. Yarn hairiness: Projection Microscope method.
7. Yarn hairiness: Evenness Tester.
8. Ends and picks / inch of fabric
9. Crimp in warp and weft of fabric.

10. Weight per square meter of fabric.
11. Air permeability of fabric.
12. Thermal Insulation Value of Fabric.
13. Bending length and stiffness of fabric.
14. Drape coefficient of fabric.
15. Crease recovery angle of fabric.
16. Water repellency of fabrics by water spray test.

References

Sr. No.	Author	Title	Publisher
1	W.E. Morton & J.W. Hearle	Physical Properties of Textile Fibers	
2	--	Hand book of Textile Testing	Bureau of Indian Standards
3	John Skinkle	Textile Testing, Physical, Chemical & Microscopic	--
4	J. E. Booth	Principles of Textile Testing	-
5	Kothari	Testing and Quality Management	IAFL, New Delhi
6	Hamby & Grover	Hand book of Textile Testing & Quality Control	--
7	B. P. Saville	Physical Testing of Textiles	--
8	--	Methods of Tests, Fibre, Yarn & Fabric	CIRCOT, Mumbai
9	R. B. Beevers	Experiments in fibre physics	--
10	Angappan	Textile Testing	SS Textile Inst, Coimbatore
11	--	Quality Control	NCUTE

COURSE NAME : TEXTILE MANUFACTURE AND TEXTILE TECHNOLOGY

COURSE CODE : TX

SEMESTER : THIRD

SUBJECT TITLE : TEXTILE CHEMISTRY - II

SUBJECT CODE : 9550

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
03	--	02	03	80	20	50@	--	--	150

RATIONALE:

The textile yarns and fabrics are being used in all occasions of life, which have varieties of patterns, colours and designs all over the world. The people use fabrics treated with either with natural and/or man made synthetic colours and chemicals to produce the desired effect in numerous hue and tone of different colours. The physical and chemical properties of these chemicals and colours are of prime interest to the people in textile industry. While working in various capacities in textile industry, it is very essential to acquire the necessary knowledge and skills in using these chemicals. In textile Chemistry I we have discussed about fiber manufacturing, sizing and pretreatments. In textile Chemistry II discussion will be about

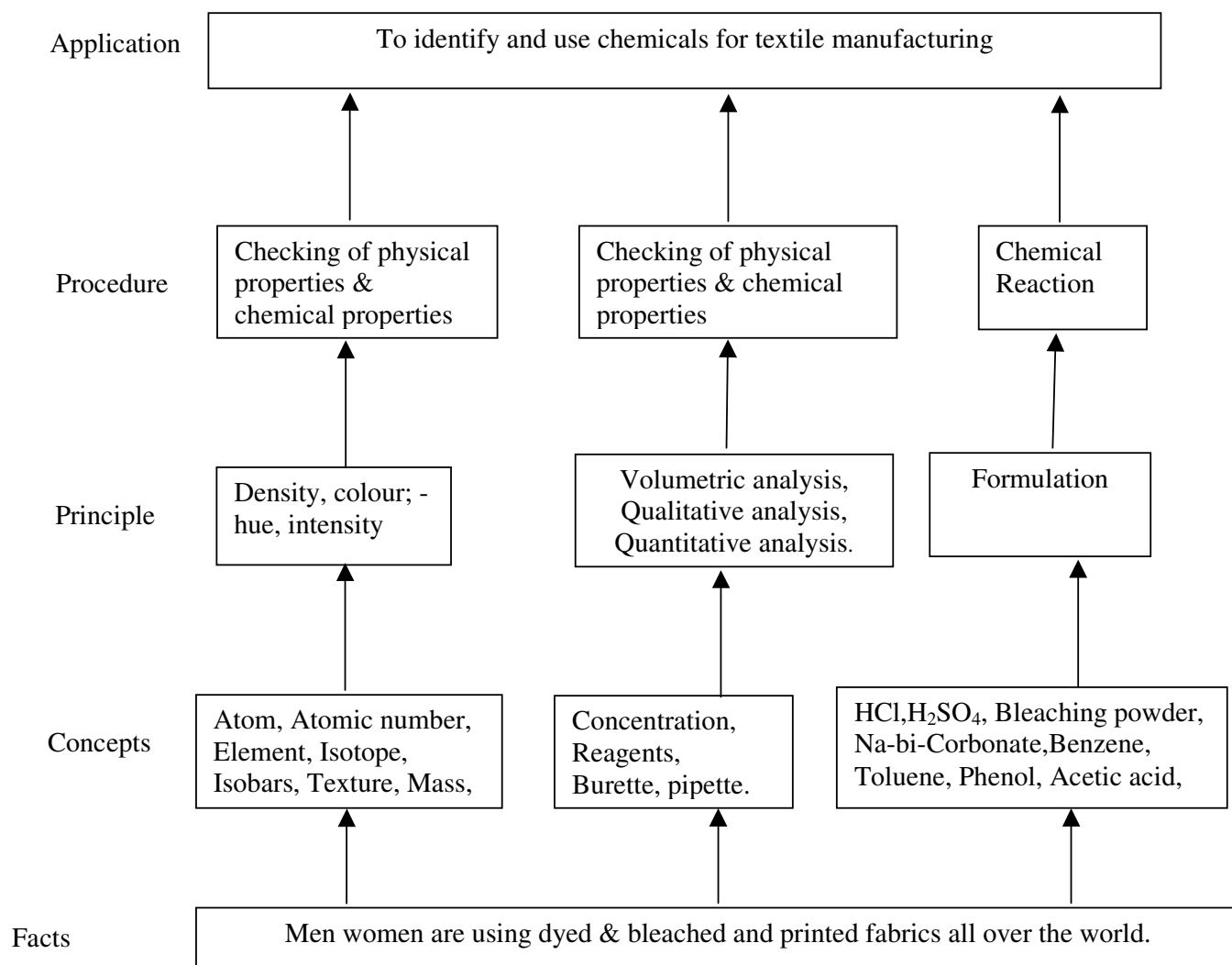
1. Dyeing of yarns and fabrics.
2. Printing of fabrics.
3. Finishing of fabrics like mercerizing, sanforising, etc.

Objectives:

The students will be able to

1. Study of various dyes and dyeing methods
2. Understand the dyeing machineries for cotton and polyesters
3. Select suitable ingredients for formulation of print paste used in printing cotton and other textiles
4. Classify the finishing processes

Learning structure:



Learning structure:**Detailed Content:**

Chapter	Topic	Marks	Hours
1	Dyeing 1.1 Study of dyeing of cellulose materials with dyes like direct, sulphur, vat, reactive, soluble vat, mineral khaki and aniline black. 1.2 Study of dyeing of synthetic fibres like Polyester, Nylon and acrylic with suitable class of dyes.	16	06
2	Dyeing Machinery 2.1. Brief description of machinery used for dyeing yarn and fabric: machines like, package dyeing, jigger winch, padding mangle and continuous dyeing range. 2.2. Study of dyeing of blends (Polyester and cotton or viscose)	16	06
3	Printing 3.1 Study of printing of cellulosic fabrics with dyes like direct, reactive, vat, soluble vat, azoics and pigment colours. 3.2 Study of direct, discharge and resist styles of printing. 3.3 Brief study of flat bed printing machine, roller printing machine and rotary printing machine 3.4 Study of carbonising, and blend printing.	24	10
4	Finishing 4.1 Object and classification of finishing processes. 4.2 Finishes applied on cellulose and synthetic fabrics with reference to resin finishing, water proofing, flame retarding, soil release. 4.3 Studies of water mangling, starching, drying, stentering, calendaring, mercerisation, shrink-resisting treatment, optical brightening treatment, and paste repelling finishes.	24	10
Total		80	32

Practical:**Skills to be developed****Intellectual skills**

To Dye of yarn and fabric

Match with the standard shed card

Motor Skills

Weigh accurately the dyes

Handle the glass apparatus carefully

List of Practical:

1. Dyeing of cellulosic fabric with different classes of dyes. -5experiments.
2. Dyeing of synthetic fabric with different classes of dyes.- 2experiments.
3. Testing of colorfastness (washing, light, and abrasion) for dyed fabrics and garments. 1experiments
4. Preparation of screen for printing 1experiments.
5. Preparation of printing paste of different dyes. 3 experiments.

6. Fixation of prints with steaming and curing methods.
7. Visit to process house.

References

Sr. No	Author	Titile
1	Dr.V.A.Shenai	Textile fibres
2	D.B.Ajgaonkar	Sizing
3	V.A.Shenai	Bleaching
4	V.A.Shenai	Dyeing
5	Printing	V.A.Shenai
6	An introduction of finishing	J.T.Marsh
7	Finishing	V.A.Shenai
8	Bleaching	E.R.Trotman

COURSE NAME : TEXTILE MANUFACTURE AND TEXTILE TECHNOLOGY
COURSE CODE : TX
SEMESTER : THIRD
SUBJECT TITLE : ELEMENTS OF APPLIED MECHANICS AND ELECTRICAL ENGINEERING
SUBJECT CODE : --

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
02	--	02	--	--	--	--	--	50@	50

RATIONALE:

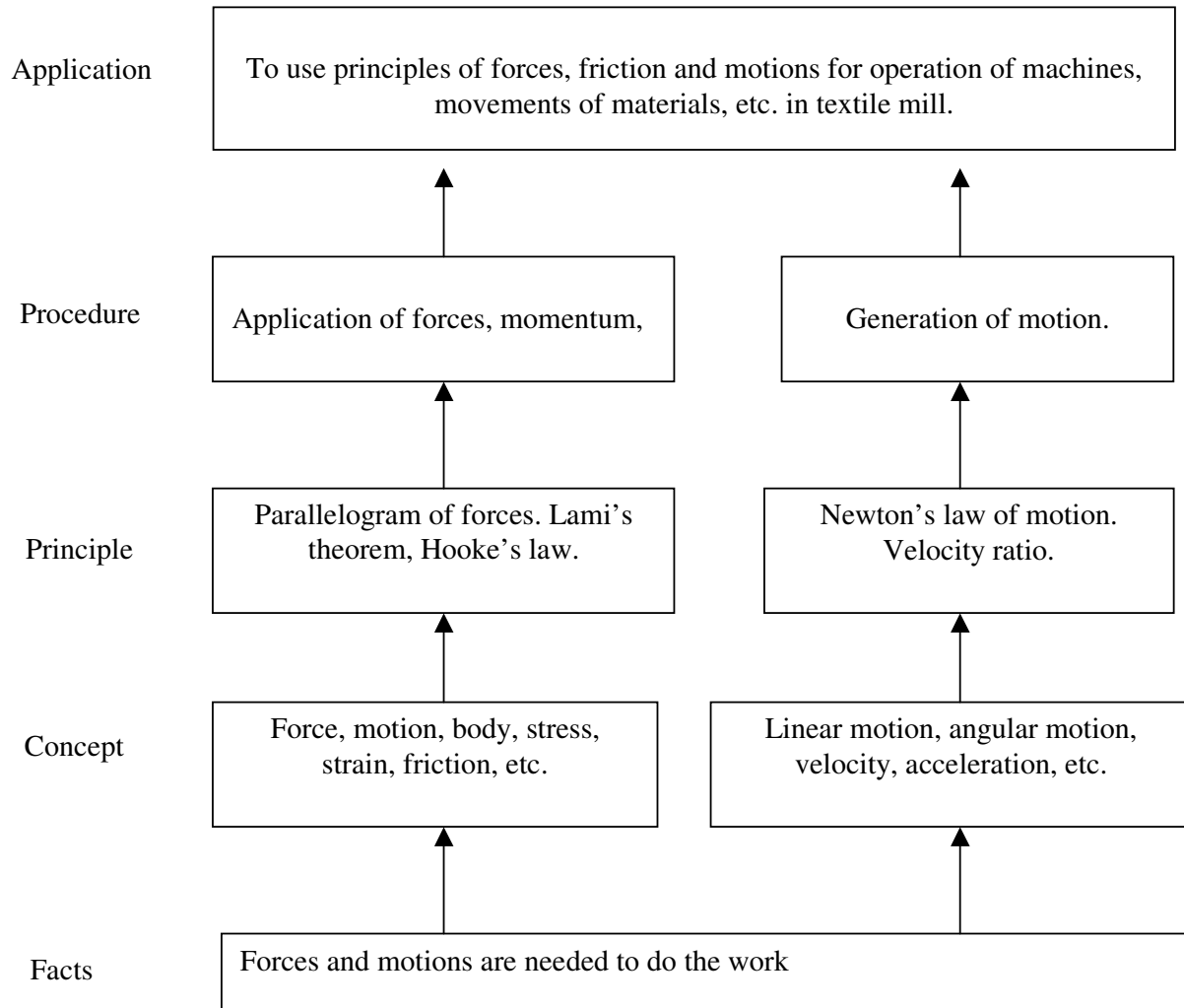
The prime responsibility of a textile technician working on shop floor is to ensure smooth and continuous functioning of all the machines and equipment for satisfactory production and quality. This requires him to maintain the machines always in good condition and to ensure that the functioning of all mechanisms in a particular machine is in a correct manner. This kind of abilities and competencies could be developed with the basic knowledge of force, work, energy, and power used for making the machine. These basic concepts help to develop principles of motion and their transformation, and the methods of maintenance, which could be used to achieve the targets of production and quality.

Secondly, the electrical power is one of the most essential input of any textile mill. We are also aware that not only the textile machinery is powered through electrical energy, but other services like, air conditioning, ventilation, water supply, lighting, etc. also are powered by electrical energy. It is also evident that lot of care is needed in use of electrical power due to cost and safety. This requires the knowledge of basic electrical concepts like voltage, current, power etc. Further, technician should know about the different types of motors, their working, billing of the electrical energy, and the safety measures while working with electrical equipment. This subject intends to impart the knowledge and skills of these aspects in the first part of the subject.

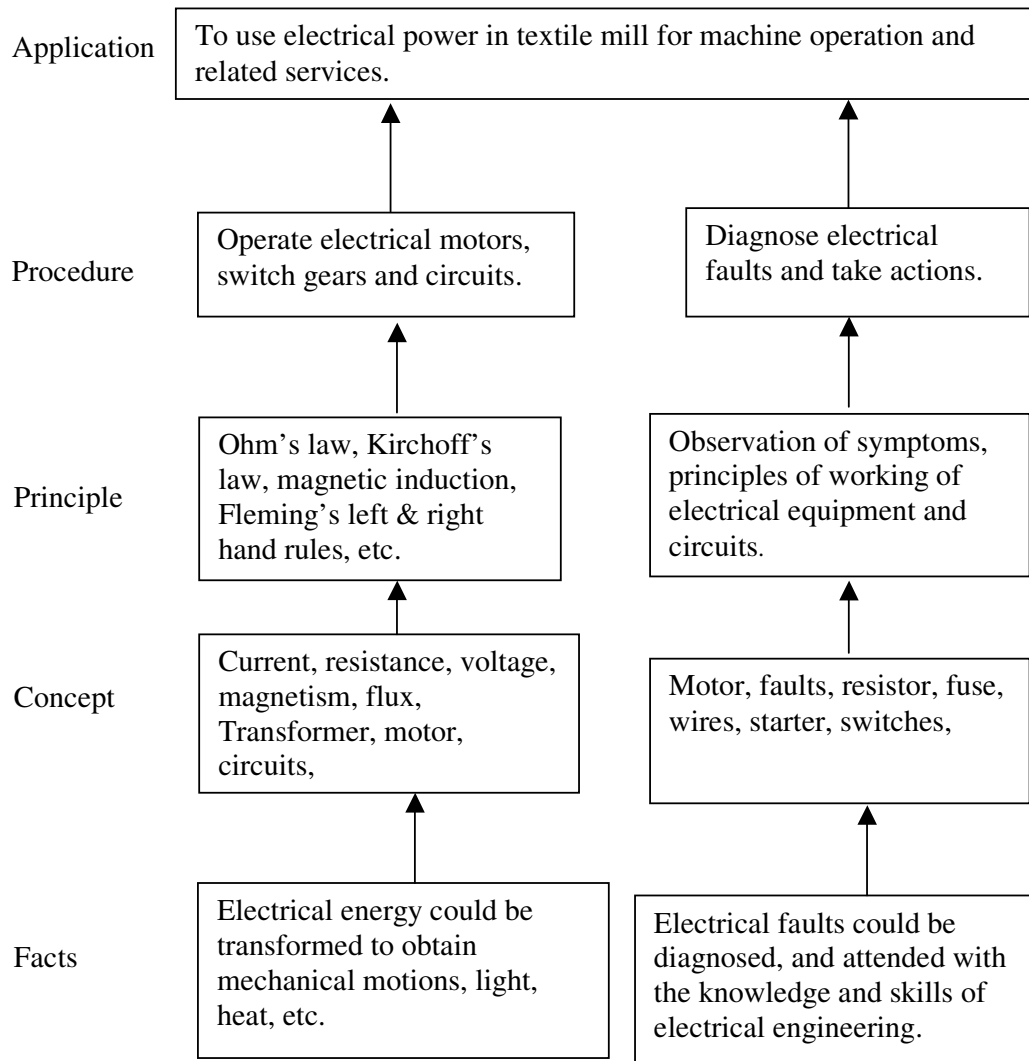
With these objectives, the subject has been created to impart knowledge about mechanics and materials. This subject thereby has been divided in to two parts.

- Section I - Applied Mechanics.
- Section II - Electrical Engineering.

Learning Structure:



Learning Structure of Applied Mechanics



SECTION-I

Objective

Student will be able to

1. Understand different mechanisms and their working in textile machines.
2. Analyze forces, moments, inertia, laws of motion in textile machines.
3. Understand various motions, power, energy required in textile machines.
4. Understand the mechanical properties of ductile materials used in textiles.
5. Study friction, its laws and importance of friction in bearing, machine etc.

Detailed Contents:

Chapter	Topic	Hours
1	Force. Concept of force, principle of transmissibility of force, moment of force, composition and resolution of forces, resultant of coplanar, concurrent and non-concurrent forces. Equilibrium and conditions of equilibrium.	03
2	Kinetics and Kinematics Kinetics – Mass, inertia, momentum, impulse, Newton’s law of motion. Kinematics – linear & angular motion. Centripetal and centrifugal forces.	02
3	Energy Work, energy and power – Law of conservation of energy work energy principal	01
4	Simple Machines Simple machines - definition of machine, mechanical advantage, velocity ratio, efficiency, law of machine reversible machine. Study of simple machines like simple wheel and axle, wheel and differential axle, pulley blocks, simple screw jack, worm & worm wheel, single & double purchase crab.	03
5	Elasticity Simple stresses & strains – stress, strain, types of stresses, elastic limit, Hooke’s law, modulus of elasticity modulus of rigidity, stress strain diagram for ductile material, yield point, ultimate stress working stress factor of safety.	02
6	Friction Concept of friction, laws of friction, types of friction, factors affecting friction, co-efficient of friction. Types of bearings: journal bearing, ball bearing and roller bearing, uses of bearings in textile machines. Bearing specifications and system of code and description. Study of lubrication. Simple problems based on above topics.	02
7	Transmission of Motion Transmission of motion and power by belts, ropes, chains, gears, and their application in textile machines. (Simple numerical problems)	03
Total		16

**Practical:
Skills to be developed**

Intellectual skills:

Determine law of machine, frictional efforts, efficiency of machine

Motor Skills:

Apply load on the machine and measure the corresponding effort required to determine the relation between load and effort and determine velocity ratio

List of Practical: (APPLIED MECHANICS)

1. Verification of law of polygon of forces.
2. To find out velocity ratio, mechanical advantage and efficiency of wheel and differential axle
3. To find out velocity ratio, mechanical advantage and efficiency of worm and worm wheel arrangement.
4. To find out velocity ratio, mechanical advantage and efficiency of single purchase crab and double purchase crab.
5. To find out velocity ratio, mechanical advantage and efficiency of screw jack
6. Determine coefficient of friction between different surfaces like metal, wood, glass etc
7. Study of different type of drives

SECTION-II

Objective

Student will be able to

1. Understand and clear basic concepts of electricity e.g. ohm law, series and parallel circuits
2. Understand different forms of energy, their conversion, units etc.
3. Understand magneto motive force, flux, self and mutual induction
4. Understand A.C., A.C. generation, transmission ,phasor representation of alternating quantizes and R,L, C circuits
5. Understand the theory of transformer, primary and secondary currents, voltages, turns etc.
6. Understand the principles of induction motors, insulation of motor winding, common faults, slip, revolving magnetic field
7. Understand the term tariff. Apparent power actual power, average demand maximum demand, energy bill etc.

Detailed Contents:

Chapter	Topic	Hours
1	Basic Concepts of Electricity 1.1. Concepts of voltage, current, resistance and power. 1.2. Laws of electricity: Law of resistance, Ohm's law, Kirchhoff's voltage law, Kirchhoff's current law. 1.3. The effect of temperature on resistance, effect of length on resistance. 1.4. Series and parallel combination of resistors. 1.5. Study of concept of electrical loading. (Simple numerical problems having only two unknowns)	02

2	Conversion of Energies 2.1 Definition of work, power, energy. 2.2 Study of relation between two types of energies: electrical to heat and vice versa, formulae involved, conversion factors. Simple numerical problems. 2.3 conversion of one energy in to other (simple numerical problems)	02
3	Magnetic Circuits 3.1 Definitions of Magneto Motive Force (MMF), flux, field strength, reluctance, permeability. 3.2 Comparison of electrical and magnetic circuit. 3.3 Concepts of self and mutual induction with formulae. 3.4 Simple problems on series magnetic circuits.	02
4	AC. Fundaments 4.1. Single line diagram of A.C. generation, transmission, distribution, and method of operation. 4.2. Induction of alternating voltage in a rotating conductor in magnetic field with derivation. 4.3. Average and Root Mean Square (R.M.S.) values of A.C. voltage and current generation. 4.4. Study of phasor representation of alternating quantities. Study of purely resistive (R), inductive(L), and capacitive(C) circuits, and study of combination circuits.(RL, RC, and RLC)	03
5	Transformer 6.1. Basic principles of transformer. 6.2. Study of construction, and operation of transformer. 6.3. Concept of ideal and Practice transformer, and regulation of transformer. 6.4. Efficiency losses in transformer, rating of transformer, Phasor diagram of ideal transformer. 6.5. Simple problems to find out primary and secondary currents, turns, and voltages, efficiency and percent regulation.	02
6	Three Phase Induction Motor 7.1. Principles, types, construction , operation, , characteristics, applications, and speed control of three phase induction motors. 7.2. Study of motors used in textile industry. 7.3. Class of insulation of motor windings in relation with temperature difference in the motor due to loading (without derivation). 7.4. Common faults in motors, effect of overloading and general maintenance required. 7.5. Simple problems to calculate slip, synchronous speed of Revolving Magnetic Field (RMF) and rotor speed 7.6. Starters (theory only)	03
7	Tariff 7.1. Types of tariffs, concept of power triangle, definitions of apparent power, actual power, reactive power, demand, average demand, maximum demand. 7.2. Load management in the industry. 7.3. Simple numerical problems to calculate energy bill, maximum demand, load factor, and of two part tariff.	02
Total		16

**Practical:
Skills to be developed**

Intellectual skills

1. To understand use of ohm's law and Kirchhoff's law.
2. To determine voltage current in R, L C circuit.
3. To understand working of electrical and magnetic circuits and induced current.
4. To understand A.C.
5. To understand principle of transformer.
6. To understand induction motors and its construction and operation, speed control.
7. To understand faults in motors to solve simple problems.
8. To understand tariff and other related terms.

Motor Skills

1. To make circuit, connect various components like resistances, capacitors etc.
2. To measure current voltage its direction.
3. Three phase wiring circuit textiles.

List of Practical: (Electrical Engineering.)

1. Verification of Ohm's law and Kirchhoff's law.
2. Compare currents and voltages in series and parallel resistive circuits.
3. Study of comparative behavior of R, L and C in AC and DC circuits by using resistance, inductance and capacitance.
4. Study of three-phase wiring for any section/department of a textile mill comprising of motors.
5. Study of DOL and star-delta starter.
6. Performance of three phase induction motor by direct loading.

Note: The practice hours of this subject will be divided between the two sections of the subjects

References:

Sr.No.	Author	Title
1	B. L. Theraja	Electrical Technology (different volumes for various topics)
2	Timothy Maloney	Electrical circuits
3	Edward Hughes	Electrical Technology
4	U. A. Bakshi	Elements of Electrical Engg.
5	Hanton	Textile Mechanics
6	J. E. Booth	Textile Mathematics
7	Khurmi	Theory of Machines
8	Slator	Textile Mechanic Vol I & II

COURSE NAME : TEXTILE MANUFACTURE AND TEXTILE TECHNOLOGY
COURSE CODE : TX
SEMESTER : THIRD
SUBJECT TITLE : PROFESSIONAL PRACTICES-III
SUBJECT CODE : --

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
--	--	05	--	--	--	--	--	50@	50

RATIONALE:

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

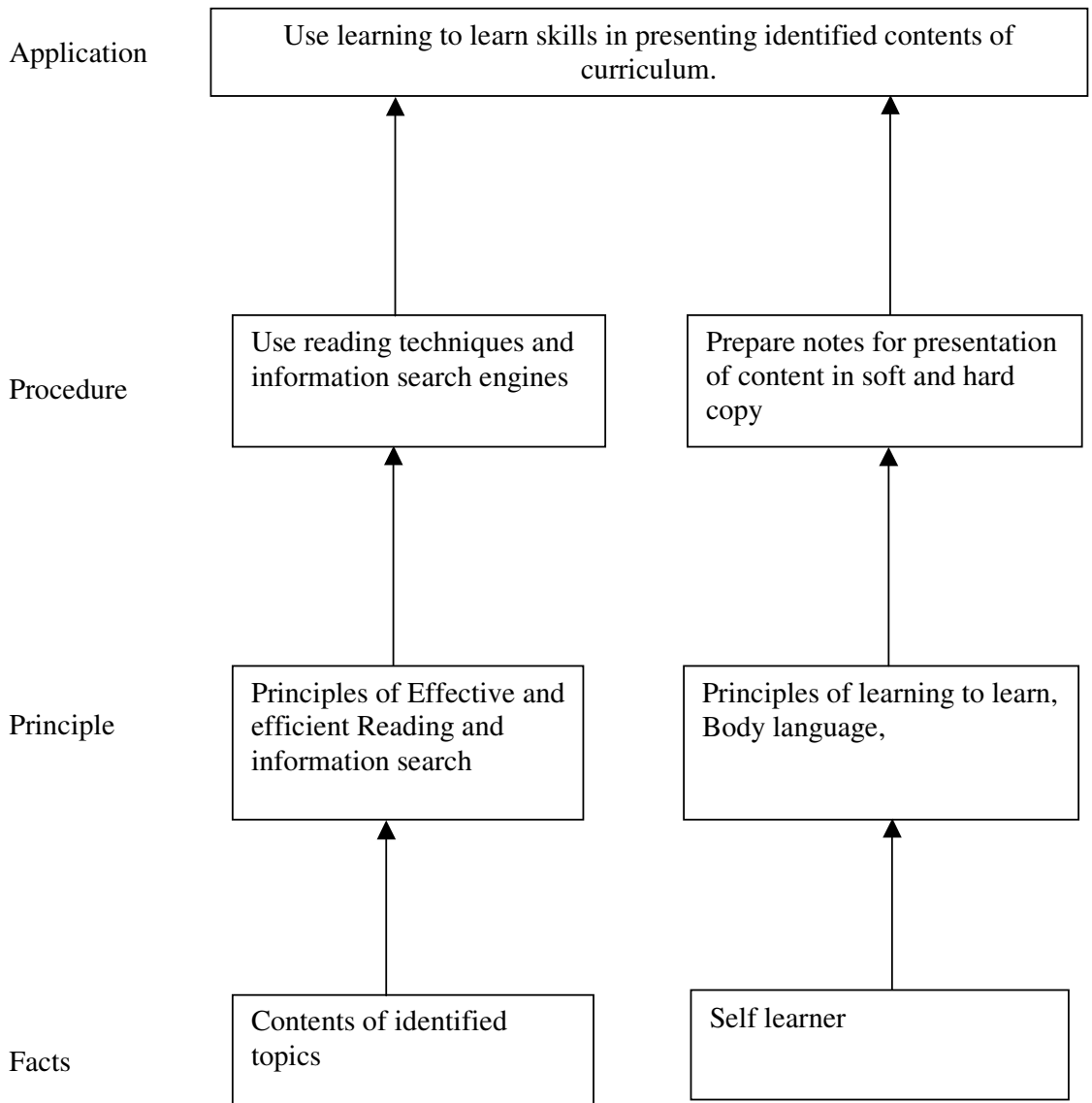
The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

OBJECTIVES:

Student will be able to:

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Present given topic in a seminar.
4. Interact with peers to share thoughts.
5. Prepare a report on industrial visit, expert lecture.

Learning Structure:



Serial No.	Activities	Hours
1	<p style="text-align: center;">Industrial Visits</p> <p>Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the term work. TWO industrial visits may be arranged in the following areas / industries :</p> <ul style="list-style-type: none"> i) The Spinning Mill ii) The weaving mill iii) Composite Mill iv) Garment Manufacturing unit v) Processing unit 	14
2	<p>Lectures by Professional / Industrial Expert be organized from ANY THREE of the following areas:</p> <ul style="list-style-type: none"> i) Use of Technical Textiles ii) Modern Spinning machines iii) Modern weaving unit(Shuttle less weaving) iv) Selection of electric motors. v) Computer aided designing vi) Industrial hygiene. vii) Composite Materials from Textile viii) Safety Engineering and Waste elimination in Textile industry 	10
6	<p>Individual Assignments: Any two from the list suggested</p> <ul style="list-style-type: none"> a) Latest development in Blow room b) Latest development in Carding c) Latest development in Draw frame d) Latest development in Speed frame e) Latest development in weaving machines f) Selection of fabric for a Garment g) List the various properties and applications of following Fibers – cotton Polyester OR, Viscose etc. for non woven Applications <p>Conduct ANY ONE of the following activities through active participation of students and write report</p> <ul style="list-style-type: none"> h) Rally for energy conservation / tree plantation. ii) Survey for local social problems such as mal nutrition, unemployment, cleanliness, illiteracy etc. iii) Conduct aptitude , general knowledge test , IQ test iv) Arrange any one training in the following areas : <ul style="list-style-type: none"> a) Yoga. B) Use of fire fighting equipment and First aid b) Maintenance of Domestic appliances. 	12
7	<p>Modular courses (Optional): A course module should be designed in the following areas for max. 12 hrs. Batch size – min. 15 students. Course may be organized internally or with the help of external organizations.</p> <ul style="list-style-type: none"> a) CAD-CAM related software In Textile b) Personality development. c) Entrepreneurship development. 	12

	d) Quality of Yarn. e) Quality of Fabric. f) Advances in technical Textiles. g) How to start a Garment manufacturing unit.	
Total		48