

4.1 SPINNING TECHNOLOGY-II

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RATIONALE

Student of textile technology after completing his diploma has to work in textile mills/textile houses/quality control centres and therefore, he should have knowledge of basic concepts, objectives and working performance, quality, production of Silver Lap Machine, Ribbon Lap Machine, Comber, Doubling Machine Drawing and Simplex Machine etc . Hence this subject is introduced in the curriculum.

DETAILED CONTENTS

1.	Drawing (11 hrs)	
1.1	Objects of drawing, passage of material through Draw Frame and functions of different parts (02 hrs)	Demonstrate the passage of material through Draw Frame
1.2	Weighting systems for top rollers on modern draw frame (02 hrs)	
1.3	Factors affecting the roller settings in Draw Frame (01 hr)	roller setting of drafting rollers on draw frame
1.4	Importance and study of various stop motion on modern draw frame (01 hr)	To study the various stop motion
1.5	Object, Principle and working of auto-leveler at draw frame, type of auto leveller. (02 hrs)	Study of various electronic parts and motion of draw frame
1.6	Work load distribution in draw frame deptt. (01 hr)	
1.7	Calculations of Speeds, Drafts, Total Drafts, Draft Constant, Tension Draft, Production and Production Constant. (02 hrs)	Practice gearing diagram on draw frame machine. Calculations of speeds of various parts, total drafts, draft constant, tension draft, production and production constant
2.	Combing (31 hrs)	
2.1	Importance and uses of cotton combing sequence of machinery used for the manufacture of combed yarn (conventional and modern) (02 hrs)	

2.2	Preparatory machines for combing and their role (01 hr)	
2.3	Silver Lap Machine (SLM) - its objectives, nomenclature of various parts of SLM, and functions of various parts, passage of material through the machine (03 hrs)	<ul style="list-style-type: none"> - Sketch and describe the working of SLM - Practice of gearing diagram of silver Lap Machine (during mill visits/ industrial training)
2.4	Ribbon Lap Machine (RLM) -its objects, nomenclature and functions of various parts, passage through the RLM, (02 hrs)	<ul style="list-style-type: none"> - Demonstration of Ribbon Lap Machine, passage through the machine - Practice of gearing diagram of ribbon lap machine.
2.5	Drawing, Lap Formation Combination Lap Winder, Whitin Super Lap Machine and its advantages over Silver Lap Machine (02 hrs)	
2.6	Combing: its principles, objectives, evaluation of combing, historical development of combing, degree of combing (02 hrs)	
2.7.	Description and working of various parts, passage of material through modern comber (02 hrs)	Demonstration on comber machine, working of various parts and passage through the comber machine (during mill visit/industrial training)
2.8	Combing cycle, combing cycle with reference to relative position of various parts, combing cycle with reference to index numbers (03 hrs)	Demonstration and practice of combing cycle with reference to relative position of various parts and index numbers
2.9	Study of comber cylinder, top comb, detaching rollers, nippers (02 hrs)	Demonstration of comber cylinder, top comb, nippers
2.10		Practice of drawing of gearing diagram of comber: Calculate draft, draft constant, production and production constant
2.11	Motions and mechanisms of nippers, top comb mechanism, detaching roller mechanism (03 hrs)	Demonstration of mechanisms of nippers, top comb, detaching roller to see their working with the help of a sketch
2.12	Comber Noil, method of finding comber noil percentage and factors upon which comber noil depends, how to control comber noil percentage (04 hrs)	.

2.13		Practice of setting and gauges of following parts. - Cylinder to brush - Cylinder to nippers - Nippers settings - Top comb settings
2.14.	Difference/comparison between carded and combed yarn (02 hrs)	Study of various electronic parts and motion in RIL, SIL, comber
2.15	Modern developments in combing (Expert Lecture) (02 hrs)	Modern development to be seen in the mills during mill visits/mill training
3.	Simplex Frame (22 hrs)	
3.1	Introduction and object of Simplex Frame. Nomenclature of various parts, passage of material through the machine (01 hr)	Demonstration and practice for the passage through the simplex machine
3.2	Drafting mechanism, setting and weighting of drafting rollers (01 hr)	Practice of setting drafting rollers
3.3	Various drafting systems used in modern Simplex Machine (01 hr)	Mill visit be arranged to see the working of drafting systems on modern Simplex Frames
3.4	Twisting: twists, selection of twist, Twist multiplier, method of twisting, flyer and its function (02 hrs)	Practice of drawing diagram for the insertion of twist in roving on the machine
3.5	Winding: Principle of winding, bobbin leading and flyer leading system, coiling of roving (03 hrs)	
3.6	Objective of building motion, construction and working of building motion. (03 hrs)	Practice of drawing of building motion and its operation
3.7	Differential motion: its objectives, principle, study of differential motions used on modern Simplex Machine (03 hrs)	Study and practice of construction and working of differential motion and its operation
3.8		Practice of drawing full gearing diagram on the machine showing various drives
3.9		Mantling and dismantling of draft change pinion, twist, change wheel, lifter change wheel and ratchet wheel.

3.10	Modern development in the Simplex Machine (02 hrs)	Modern developments will be shown in the mill (Mill visit)
3.11	Calculation of production per machine, per shift; calculation of front roll delivery and spindle speed; Calculation of twist per inch and twist multiplier; Calculation of production constant, draft constant, break draft constant and twist constant; Calculation of total draft, break draft and individual zone draft of the machine; Calculation of ratchet wheel, lifter change wheel, draft change pinion for various hanks with the help of gearing diagram of Simplex frame (06 hrs)	Practice of gearing diagram of simplex frame and calculations relating to parameters as specified in theory and also study of various electronic parts and motion in speed frame

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on clarifying the concepts and principles. Teachers should use various teaching aids to clarify concepts and principles. The teachers should plan assignments so as to promote problem solving abilities and develop continued learning skills.

RECOMMENDED BOOKS

1. Spun Yarn Technology, Vol.1 Venkatasubramani
2. Cotton Opening and Picking-Gilbert R merril
3. Manual of Cotton Spinning. Vol.-II and part-I, Textile Institute.
4. Opening, Cleaning and Picking by Zoltan S Szaloki
5. Essential Elements of Practical Cotton Spinning by T.K. Pattabhiram
6. Essential Elements of Practical Cotton Spinning by T.K. Pattabhiram
7. A practical Guide to Combing by W Klein
8. Cotton Spinning by WS Taggart
9. Spun Yarn Technology by Venktasubramani
10. Cotton Spinning Calculations By WS Taggart
11. Essential Calculations on practical Cotton Spinning by Pattabhiram
12. Cotton Combing by GR Merrill
13. Toward Better Yarn Quality by N Balasubramanian and GK Trivedi
14. Doubled Yarn parts I to V by Coulson A.F.W. and Dakin G

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	11	15
2	31	50
3	22	35
Total	64	100

4.2 WEAVING PREPARATORY PROCESSES-II

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RATIONALE

To acquaint the students with the main processes to be effected on yarn before weaving, this subject is introduced in the curriculum of diploma in Textile Technology.

DETAILED CONTENTS

1. Warping (16 hrs)
 - 1.1 Introduction to warping and its objectives
 - 1.2 Different systems of warping and their limitations
 - 1.3 Working of sectional warping machine and their limitations
 - 1.4 Working of ordinary beam warping and high speed beam warping machines and their limitations.
 - 1.5 Types of creels and tensioners
 - 1.6 Common faults in warping and their remedies
 - 1.7 Process control parameter in working

2. Sizing (24 hrs)
 - 2.1 Introduction to sizing and its objects
 - 2.2 Various methods of sizing and names of the same
 - 2.3 Study of slasher sizing machine. Passage of yarn through it.
 - 2.4 Measuring and marking motion
 - 2.5 Method of drying sized warp, comparison of chamber drying and cylinder drying
 - 2.6 Multi-cylinder and hot air drying
 - 2.7 Various types of sizing ingredients and their objects
 - 2.8 Process control parameter in sizing

3. Calculations (08 hrs)
 - 3.1 Calculation regarding weight of warp and weight of weft. Number of sections, width of sections, creel capacity etc. (Calculation regarding production of warp beam)

INSTRUCTIONAL STRATEGY

The teacher should lay emphasis on understanding of basic concepts and various terms used in the subject. Industrial exposure must be given by organizing visits.

RECOMMENDED BOOKS

1. Yarn Preparation by R Sen Gupta, Vol. I and II
2. Weaving Calculation by R Sen Gupta
3. Warping and Sizing-BTRA
4. Winding – BTRA
5. Weaving Calculation-WIRA

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	30
2	24	55
3	08	15
Total	48	100

4.3 WEAVING TECHNOLOGY-II

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RATIONALE

The subject weaving technology will impart awareness and different weaving techniques to produce the good quality of fabric.

DETAILED CONTENTS

Sr. No.	Theory	Practical
1.	Dobby (09 hrs)	
1.1	Introduction to Dobby and its objects (01 hr)	Gait-up of warp on doobby loom
1.2	Introduction to different kind of dobbies with respect to lifts, shed formation, working of pattern cylinders (02 hrs)	Setting of Cylinder, knives and Feelers of doobby and sketching of the same
1.3	Mechanism and working of different parts of keighley/climax doobby (02 hrs)	Setting of T-lever Techniques of levelling heal shafts on Climax doobby loom
1.4	Introduction to paper doobby (01 hr)	Techniques of leveling healdshafts on Paper doobby loom
1.5	Timing of various working parts of doobby (01 hr)	Preparation of doobby chain. Construction, working and adjustment/setting of various parts of climax doobby with sketch.
1.6	Faults in doobby weaving and their rectification (02 hrs)	
2.	Box Motion (09 hrs)	
2.1	Introduction to box-motion, its objects and different types of box motion (01 hr)	Setting up drop-box and its timing.
2.2	Mechanism & working of following box motion: - Eccle's box motion (02 hrs)	Preparation of drop-box chain and working the same on loom
2.3	Chain making for the drop box (02 hrs)	Weaving practice on loom fitted with the doobby.
2.4	Faults in drop box and their rectification (02 hrs)	

2.5	Matching drop box with doobby (02 hrs)	
3.	Jacquard (10 hrs)	
3.1	Introduction to figure weaving and objects of Jacquard shedding (03 hrs)	<ul style="list-style-type: none"> - Sketching of various parts of Jacquard, - Mounting of jacquard - Cylinder driving and griffe driving in Jacquard - Tracing 1st hook in jacquard
3.2	Construction and working of various parts of a jacquard. Single and double lift Principles. Single Lift Single Cylinder (SLSC) Jacquard, its limitations. Double Lift Jacquards (with Single and Double Cylinders). Their merits and demerits. Comparison of jacquard weaving with doobby and tappet weaving (07 hrs)	
4.	Study of mechanism of the following jacquards: Twilling Jacquard, Gauze & Leno Jacquard-Cross Border Jacquard, Fine Pitch Jacquard (04 hrs)	Comparison of Single lift and Double lift jacquard.
5.	Study of working of various parts of Electronic Jacquard. (04 hrs)	
6.	Harness building (10 hrs)	
6.1	Parts of harness (02 hrs)	
6.2	Straight tie (02 hrs)	
6.3	Pointed tie (02 hrs)	
6.4	Mixed tie (02 hrs)	
6.5	Borders and middle tie. (02 hrs)	
7.	Sequence –wise Preparation of Jacquard Design – Example (from cloth design-graph paper design and Jacquard) (06 hrs)	
8.	Card cutting machine - its working and process of card lacing (chain maker) (04 hrs)	Preparation of harness Practice of Card-punching.
9.	Faults in jacquard weaving and their rectification (04 hrs)	Removal of faults during jacquard weaving Preparation of jacquard chain.
10.	Calculation of production, efficiency effect on production, calculation relating to set of harness and set of the reed (04 hrs)	

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on clarifying the concepts and principles. Teachers should use various teaching aids to clarify concepts and principles. The teachers should plan assignments so as to promote problem solving abilities and develop continued learning skills.

RECOMMENDED BOOKS

1. Weaving Mechanism by T.W. Fox
2. Rapier Loom-WIRA
3. Shutters Weaving Mechanism-BTRA
4. Weaving Mechanism by N.N. Banerjee
5. Weaving Mechanism by DS Verma
6. Weaving Calculation by Sen Gupta
7. Weaving Technology in India by Kishar
8. Shuttle-less Weaving Mechanism-BTRA
9. Jacquard Ek Saral Vidya (in Hindi and English both) by S.S Satsangi M/s usha publishers (SBB/AC-IV Shalimar Building Delhi-88
10. Saral Vastra Sangrachna (Simple Fabric Structure – in Hindi) by S.S. Satsangi, M/S Usha Publishers, Shalimar Bagh, Delhi-88

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	09	15
2	09	15
3	10	15
4	04	06
5	04	06
6	10	115
7	06	09
8	04	09
9	04	10
10.	04	
Total	64	100

4.4 FABRIC STRUCTURE -II

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4 - 2

RATIONALE

The students of textile technology after completing their diploma has to work in textile mills/testing houses/quality control centers & have to perform tasks for which knowledge/skills of fabric structure is essential.

DETAILED CONTENTS

1. Principle of figuring with extra material, extra warp figuring, extra weft figuring, figuring with extra warp and weft (10 hrs)
2. Weft backed cloths, warp backed clothes, Interchanging figured backed clothes, and backed cloth with wadded threads, imitation backed cloth (16 hrs)
3. Self stitched double clothes, centre stitched double cloth, wadded double clothes (Definition and design only) (14 hrs)
4. Pile Fabrics, Terry and fancy pile fabrics, simple & fancy Terry pile structure, wrap pile production with the aid of wires & on face to face principles, Weft pile fabrics, velveteen (10 hrs)
5. Damasks (Definition and design only) (08 hrs)
6. Figured warp rib brocades (Definition and design only) (06 hrs)

LIST OF PRACTICALS

1. Study of the methods of calculating and finding the repeat of unit.
2. Methods of calculating various fabric parameters like shrinkage percentage, cloth/100mts, cloth/Mtrs.
3. EPI,PPI, yarn requirements of various fabric samples.
4. Reeds space required during analysis of various fabrics mentioned in theory.

INSTRUCTIONAL STRATEGY

Student should be able to understand different weaves from fabric samples and by weaving. They must be taken to Textile industries for showing above mentioned various processes.

RECOMMENDED BOOKS

1. Watson's Textile Design & Colour Part I & II by Z. Grosicki
2. Jacquard – Ek Saral Vidya by S.S. Satsangi , M/S Usha Publishers, 53B/AC IV, Shalimar Bagh, Delhi 88.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	15
2	16	25
3	14	20
4	10	15
5	08	14
6	06	11
Total	64	100

4.5 TEXTILE CHEMISTRY - II

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4 - 2

RATIONALE

A diploma holder in Textile Technology must have the requisite knowledge and skill about various process of textile i.e. bleaching, printing and finishing etc. Hence this subject

DETAILED CONTENTS

1. Printing – scope, importance and styles of printing (04 hrs)
2. Brief study on various ingredients used in printing (04 hrs)
3. Methods of Printing (08 hrs)
 - (a) Block
 - (b) Screen
 - (c) Rollar
 - (d) Transfer Printing
4. Cotton with metal printing of pigment/vat/reactive dyes (08 hrs)
5. After treatment of printing goods (10 hrs)
 - (a) Ageing
 - (b) Steaming
 - (c) Curing
 - (d) Washing
6. Principles, construction and working of printing machine block, flat bed and rotary. Advantage and limitations (10 hrs)
7. Classification of finishes and its importance (04 hrs)
8. Brief study of following finishing treatments (08 hrs)
 - (a) Calendering
 - (b) Heal setting
 - (c) Decatizing/sanforizing
 - (d) Wash-n-wear
 - (e) Durable press
9. Chemical Finishing softeners (08 hrs)
 - (a) Moth proof
 - (b) Water repellent and water proof
 - (c) Resin finishes
 - (d) Flame résistance and flame proofing

LIST OF PRACTICALS

1. Visiting of dyeing unit to demonstrate working of various dyeing machines eg. jigger winch and fibre dyeing machine
2. To print a cotton fabric sample by screen printing method using suitable dyes/colours in single and multi colour.
3. Visit of printing unit to demonstrate working of various machines for e.g. roller, rotary, curing machine etc.
4. To draw line diagram of different finishing machines

INSTRUCTIONAL STRATEGY

Use of audiovisual aids should be made to show specialized operations. Expose the students to real life problems. Stress should be given to acquaint the students with relevant industrial practices.

RECOMMENDED BOOKS

1. Technology of printing by VA Sehnaï; Sewak Publication
2. Textile printing by I.W.C. Miles; B.I. Publication
3. Principle of cotton printing by D.G. Kale
4. Printing Guide and technique by ATIRA
5. Textile finishing by J.T. Marsh; B.I. Publication
6. Technology of finishing by A.J Hall
7. Textile finishing by Murphy, Abhishek Publication Chandigarh
8. Technology of dyeing by V.A. Shenai, Sewak Publication, Mumbai

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	04	07
2	04	07
3	08	12
4	08	12
5	10	20
6	10	12
7	04	07
8	08	12
9	08	11
Total	64	100

ENTREPRENEURIAL AWARENESS CAMP

This is to be organized at a stretch for two to three days during fourth semester. Lectures will be delivered on the following broad topics. There will be no examination for this subject

1. Who is an entrepreneur?
2. Need for entrepreneurship, entrepreneurial career and wage employment
3. Scenario of development of small scale industries in India
4. Entrepreneurial history in India, Indian values and entrepreneurship
5. Assistance from District Industries Centers, Commercial Banks, State Financial Corporations, Small industries Service Institutes, Research and Development Laboratories and other financial and development corporations
6. Considerations for product selection
7. Opportunities for business, service and industrial ventures
8. Learning from Indian experiences in entrepreneurship (Interaction with successful entrepreneurs)
9. Legal aspects of small business
10. Managerial aspects of small business

INDUSTRIAL TRAINING OF STUDENTS

(During summer vacation after IV Semester)

It is needless to emphasize further the importance of Industrial Training of students during their 3 years of studies at Polytechnics. It is industrial training, which provides an opportunity to students to experience the environment and culture of industrial production units and commercial activities undertaken in field organizations. It prepares student for their future role as diploma engineers in the world of work and enables them to integrate theory with practice. Polytechnics have been arranging industrial training of students of various durations to meet the above objectives.

This document includes guided and supervised industrial training of a minimum of one month duration to be organised during the semester break starting after second year i.e. after IV Semester examinations. The concerned HODs along with other teachers will guide and help students in arranging appropriate training places relevant to their specific branch. It is suggested that a training schedule may be drawn for each student before starting of the training in consultation with the training providers. Students should also be briefed in advance about the organizational setup, product range, manufacturing process, important machines and materials used in the training organization.

Equally important with the guidance is supervision of students training in the industry/organization by the teachers. A minimum of one visit by the concerned teacher is recommended. Students should be encouraged to write daily report in their diary to enable them to write final report and its presentation later on.

An internal assessment of 50 and external assessment of 50 marks have been provided in the study and evaluation scheme of V Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations. The formative and summative evaluation may comprise of weightage to performance in testing, general behaviour, quality of report and presentation during viva-voce examination. It is recommended that such evaluations may be carried out by a team comprising of concerned HOD, teachers and representative from industry. The components of evaluation will include the following:

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| a) | Punctuality and regularity | 40% |
| b) | Initiative in learning new things | 40% |
| c) | Relationship with workers | 20% |