3.1 SPINNING TECHNOLOGY – I

L	T	P
4	-	6

RATIONALE

The student of textile technology after completing his diploma has to work in textile mills/textile houses/quality control centres, therefore, he should know the basic principles and objects of Ginning, Blow Room and Carding Machines, their working, quality and production and calculation. and hence this subject.

DETAILED CONTENTS

Sr. No.	Theory	Practical
1.	**Ginning, Mixing, Blending and Blow Room** (31hrs)	
1.1	Objects of ginning, ginning percentage, description and working of Double Knife Roller Gin, Double Macarthy Gin and Saw Gin (03 hrs)	To sketch and study the working of different parts of Single Macarthy Gin and to operate it
1.2	Importance of mixing and blending, mixing and blending techniques in Blow Room, description and working of Auto Mixer and Multi Mixer (02 hrs)	Demonstration of Mixing and Blending techniques during with visit/Mill training Practically sketch and describe the passage of material through condenser.
1.3	Principle of opening and cleaning, opening by the action of nails, beaters and air currents. Description and working of Condenser. (02 hrs)	Practically sketch and describe the passage of material through condenser.
1.4	Study of following opening and cleaning machines: Blending Bale Opener, Automatic Bale Plucker, Feeder; Super Jet Cleaner, Mono Cylinder Cleaner, ERM Cleaner, CVT-3 cleaner. (04 hrs)	Practically sketch and describe the passage of material through Blending Bale Opener, Hopper Feeder, Step Cleaner, Feed Unit, Porcupine Opener
1.5	Objects of evener motion and its importance, construction and working of Piano Type Feed Regulating Motion, of Cone Drums (01 hrs)	Study of feed regulating motion. and cone Drums
1.6	Objects, construction and working of Two Bladed Beater and Krischner Beater (02 hrs)	- To sketch and understand the working of Krischner Beater. - Practice of setting & guages of the openers & beaters in the Blow Room Line

1.7	Objects of calendaring in Scutcher and passage of cotton sheet through them (01 hr)	- Study of exhaust system and Cages in Scutcher - Practice of drawing of gearing to understand drive to various parts. - Study of Lap Forming Unit. - Calculate draft/Production of Blow Room & Maintenance schedule of Blow Room
1.8	Lap rejection and lap variation: their causes and remedies - Defects in laps and their removal - Cleaning efficiency of Blow Room line and waste percentage - Work load distribution in Blow Room Automatic lap doffing and its advantages (02hrs)	- Workload distribution at Blow Room & card machine. - Practical study of Automatic Lap doffing mechanism
1.9	Necessity & working of Chute Feed System at Blow Room. Main features and advantages of Modern Blow Room Line (02 hrs)	Practically study of the Chute Feed System during mill visit/mill training
1.10	Calculation of different yarn numbering systems and conversion from one to other system and calculation of equivalent count. (02 hrs)	
1.11	Gearing diagram of Scutcher and Calculation of lap hank, lap weight, lap length and Scutcher production per shift (2 hrs)	Gearing diagram of Scutcher and Calculation of lap hank, lap weight, lap length and Scutcher production per shift
1.12	Calculation of clearing efficiency of blow room line (02 hrs)	Calculation of production constant of blow room Scutcher
1.13	Calculation of calendar roll and shell roll speeds and tension draft between calendar roll and shell roll (02 hrs)	Calculation of calendar roll and shell roll speeds and tension draft between calendar roll and shell roll
1.14	Mixing and blending cost calculations (02 hrs)	
1.15	Maintenance schedule of Blow Room line (02 hrs)	Study of various electronics parts/motion in Blow Room

2.	**Carding** (33 hrs)	
2.1	Objects of carding, Passage of material through Revolving Flat Card and functions of various parts i.e. licker-in, mote knives, back plate, front plate, cylinder, flats, doffer and undercasing (02 hrs)	Demonstrate the passage of material through the machine and to introduce with different parts of Revolving Flat Card
2.2	Difference between carding action and stripping action (02 hrs)	
2.3	Flexible and metallic card clothing, advantages of metallic card clothing. (02 hrs)	
2.4	Objects of stripping, procedure for Plain Roller stripping and Vacuum stripping. (02 hrs)	Stripping of cylinder and doffer of Card
2.5	Objects of grinding and Types of Grinding (01 hr)	Grinding of Card with dead roll grinder and Traverse Roller Grinder
2.6	Web doffing by doffer comb, India Roll System and Cross Roll Verga System (02 hrs)	Piecing of web and sliver on Card
2.7	General settings and gauges for Semi High Speed and High Speed Card (02 hrs)	To Practice the setting and gauging between different parts of Card Machine
2.8	Objects principle and working of Auto Levellers at card (02 hrs)	
2.9	Card wastes e.g. motes, fly, strips and sweeps (02 hrs)	
2.10	Salient features of High Production Card. (01 hr)	
2.11	Defects in card web and their removal (02 hrs)	
2.12	Calculation of waste percentage of a card. Cleaning efficiency of Card. (02 hrs)	
2.13	Calculation of draft, draft constant, tension draft and tension draft constant (02 hrs)	Calculate drafts between various parts, total draft, draft constant, tension draft and tension draft constant
2.14	Calculation of production and production constant (02 hrs)	Calculate production and production constant of Card
2.15	Calculation of time taken to exhaust a lap (02 hrs)	Calculate the time taken to exhaust a lap on Card
2.16	Maintenance Schedule of Carding Machine (01 hr)	Study of various electronic Parts/Motion in carding
2.17	Process control Parameter in mixing, Blow Room, Carding (yarn realization, trash content etc) (04hrs)	

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

   Essential Elements of Practical Cotton Spinning by T.K. Pattabhiram
5. Essential Elements of Practical Cotton Spinning by T.K. Pattabhiram
6. A practical Guide to Combing by W Klein
7. Cotton Spinning by WS Taggart
8. Spun Yarn Technology by Venktasubramani
9. Cotton Spinning Calculations By WS Taggart
10. Essential Calculations on practical Cotton Spinning by Pattabhiram
11. Cotton Combing by GR Merril
12. Toward Better Yarn Quality by N Balasubramanian and GK Trivedi
13. 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	31	50
2	33	50
Total	**64**	**100**

3.2 WEAVING PREPARATORY PROCESSES – I

L	T	P
3	-	-

RATIONALE

To acquaint the students with the main processes to be effected on yarn before weaving this subject is essential**.**

DETAILED CONTENTS

1. Introduction

    1.1 Introduction to yarn preparation and its objectives (12 hrs)
    1.2 Types of different packages
    1.3 Sequence of Process involved in the preparatory and their brief description

2. Warp Winding (16 hrs)

    2.1 Objects of Warp-winding
    2.2 Conventional Winding machines and their limitations.
    2.3 Main features of high speed winding
    2.4 Construction and working of high-speed winding machine such as cone-winder.
    2.5 Main features of auto- coner
    2.6 Different types of tensioners, Balloon-breaker and its functions, Full package stop motion
    2.7 Common faults in warp-winding: their causes and remedies

3. Weft Winding (10 hrs)

    3.1 Introduction to weft-winding and different types of machines. Special features of high-speed pirn winder
    3.2 Common faults in pirn winding and their rectifications
    3.3 Comparison of slow speed, high speed and Automatic pirn winding machine

4. Drawing-in (04 hrs)

    4.1 Introduction to drawing-in and different methods of the same.
    4.2 Precautions to be taken during drawing-in
    4.3 Process Control Parameter in drawing -in

5. Calculation (06 hrs)

    5.1 Yarn numbering systems (direct system and indirect system), resultant count, average count, equivalent count and their conversion in various systems.

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
6. Sizing by Ajgaonkar et.al

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	26
2	16	34
3	10	20
4	04	08
5	06	12
Total	**48**	**100**

3.3 WEAVING TECHNOLOGY-I

L	T	P
4	-	6

RATIONALE

The Subject weaving technology will impart awareness to the students about different weaving techniques to produce good quality of fabric.

DETAILED CONTENTS

Sr.	Theory	Practical
1.	**General introduction to weaving** (06 hrs)	Precautions to be observed during working on loom
1.1	History of weaving	Practice of putting various type of knots and drawing-in of broken ends according to draft
1.2	Terminology (winding and loom)	Preparation of double flanged warper's Bobbns and cones from hank. Noting the different parts of the power loom
1.3	Introduction to handloom	
1.4	Power loom	
2.	**Technology of power loom** (16 hrs)	
2.1	**Shedding** Introduction to different types of healds, reeds and shuttles Introduction to types of sheds-their merits and demerits Tappet shedding mechanism and existing motion (for tappet loom)	Methods of finding reed count from given reed
	Introduction to Tappets Construction of tappets	Practice of Drafting & denting Gaiting-up of the beam
	Heald reversing motion Timing of shedding motion early and late shedding, Calculations regarding healds and reeds	Practice of adjustment and timing of tappets

2.2	**Picking (Overpick And Underpick)** Introduction to various parts of picking Mechanism and their adjustment	Dismantling; adjustment and timing of over-pick motion
	Mechanism of over and under pick motions. Their merits and demerits Varying the intensity of picking with relation to velocity of shuttle	Dismantling: adjustment and timing of over-pick motion Dismantling; adjustment and timing of under-pick motion
	Causes of shuttle flying out and trapping and remedies thereof	Dismantling the picking motion and sketching the different parts in both over and under pick loom
	Timing of picking motion Early and late picking Faults occurring in both types of picking and their remedies	Practice of increasing and decreasing picking force
2.3	**Beating up Motion** Mechanism of beating up motion.	Dismantling and resetting the beating up mechanism
	Eccentricity of slay methods of finding eccentricity of slay	Sketching the parts of beating up motion Reed calculations
3.	**Take up motion** (08 hrs)	
3.1	Various types of take up motions	Practice of setting of take up motion
3.2	Study of 5 wheel take up motion	Dismantling and resetting of 5 wheel take up motion
3.3	Study of 7 wheel take up motion	Dismantling and resetting of 7 wheel take up motion
3.4	Continuous take up motion	Reed calculations regarding total number of ends in the cloth

3.5	Concept of standard wheel, change wheel and ratchet wheel and dividend of a take up motion	Finding the effect of number of teeth in the change wheel on picks per units of space in cloth
3.6	Calculations in take up motion for inserting specific number of picks/unit space	
4.	**Let Off Motion** (06 hrs)	
4.1	Various types of let off motion	Sketching various parts of let off motion on the loom.
4.2	Study of various parts and the working of negative let off motion	Tension variation to change number of picks
4.3	Study of various parts and the working of positive let off motion	Preparation of warp and adjustment of bobbin/cones on the creel on Sectional Warping machine
4.4	Comparison of negative let off and positive let off motion	
5.	**Study object, various parts and working of the following motions. Weft Stop Motion** (06 hrs)	
5.1	Various types of weft fork motion.	Dismantling and setting of lett-off motion
5.2	Study of side weft fork motion	Practically setting-up of side fork motion
5.3	Centre weft fork motion	Setting of centre weft fork motion (mill visit)
5.4	Brake motion	Practice of weaving on the loom Dismantling the brake motion and setting it.
5.5	Shuttle speed checking motion	Practically set the checking device on the Machine
6.	**Warp Protectors** (06 hrs)	
6.1	Study of loose reed motion	Practically setting-up the loose reed motion
6.2	Study of fast reed motion	Check the setting of fast reed by opening and resetting
7.	**Temples**- Their types and their use in relation to different fabrics (04 hrs)	Fitting the temples on machine and resetting its parts Calculations regarding the weight of warp and weft

8.	Various types of materials used for picking stick, slay, shuttle. (04 hrs)	Dimensions of shuttle box, shuttle slay, picking stick with respect to width of loom
9.	Timing of different motion of loom. Calculations relating to speed of loom (04 hrs)	
10.	Production of loom in term of weight of cloth produced and length of cloth produced/shift and efficiency of the Loom (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 Plain Weaving Meeting by K.T. Ashwani, Abhisek Publication Ltd. Chandigarh
11. 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	06	10
2	16	24
3	08	12
4	06	10
5	06	10
6	06	10
7	04	06
8	04	06
9	04	06
10	04	06
Total	**64**	**100**

3.4 FABRIC STRUCTURE - I

L	T	P
4	-	2

RATIONALE

The students of Textile Technology after completing their diploma have 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. Classification of fabrics, weaves repeat unit, draft and lifting plan, sectional view construction, Significance of fabric structure in fabric manufacture. (08 hrs)

2. Plain weave - Their characteristics ornamentation, derivatives of plain weave. (06 hrs)

3. Twill weaves: R.H & L.H twill, effect of direction of twists on prominence of twill lines. Types of twills like pointed, zig-zag, herring bone, curved, broken, transposed, steep and low twills. (08 hrs)

4. Sateen & Satin - Characteristics, derivatives and end uses of these weaves. (08 hrs)

5. Diamonds and Diapers. (04 hrs)

6. Honeycomb weave (03 hrs)

7. Huck-a-back and mock leno (03 hrs)

8. Cork screw, Bed ford cords, welt & pique with derivatives. (08 hrs)

9. Spool figuring on plain, twill and sateen bases (08 hrs)

10. Feature of cambric, gabardine, chiffon, denim, jeans, voise, blanket and sponge cloth (08 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 Textile Design & Colour Part-I & II by Z Grosicki.

2 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	08	14
2	06	10
3	08	14
4	08	14
5	04	06
6	03	05
7	03	05
8	08	14
9	08	14
10	08	14
Total	**64**	**110**

3.5 TEXTILE CHEMISTRY - I

L	T	P
4	-	2

RATIONALE

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

DETAILED CONTENTS

1. Introduction to textile processing (02 hrs)
2. Natural and added impurities in cotton, wool and silk (02 hrs)
3. Singeing, Designing and Scouring-principle and process (04 hrs)
4. Bleaching of cotton with sodium bleaching powder, hypochlorite and hydrogen peroxide (04 hrs)
5. Scouring and carbonization of wool, Bleaching of wool with sodium hydrosulphite and hydrogen peroxide (02 hrs)
6. Degumming of silk, Bleaching of silk with hydrogen peroxide (02 hrs)
7. Scouring and bleaching of (08 hrs)
   (a) Polyamide
   (b) Polyester
   (c) Acrylic
   (d) Viscose rayon
8. Mercerization of cotton-objective, physical and chemical changes during process (04 hrs)
9. Classification of dyes, general terms used in dyeing on basis of methods of application, Principle of dyeing (04 hrs)
10. Dyeing of cotton with (12 hrs)
    a) Direct dyes
    b) Reactive dyes
    c) Sulphur dyes
    d) Vat dyes
11. Dyeing of wool with (02 hrs)
    a) Acid dyes
    b) Metal complex dyes

12. Dyeing of silk with (02 hrs)

    a) Acid dyes
    b) Basic dyes

13. Dyeing of polyester with disperse dyes (04 hrs)

    a) Carrier method
    b) High temperature method

14. Dyeing of acrylic with basic dyes (02 hrs)

15. Basic machinery used in dyeing-jigger, winch, padding mangle, fiber dyeing and hank dyeing, machine-principle and working (10 hrs)

LIST OF PRACTICALS

1. Desizing and scouring of cotton
2. Bleaching of cotton with suitable agent
3. Bleaching of wool
4. Bleaching of silk
5. Scouring and bleaching of polyester
6. Dyeing of cotton with suitable classes of dyes
7. Dyeing of wool and silk with suitable dyes
8. Dyeing of polyester with disperse dyes
9. Dyeing of acrylic with basic dyes

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 bleaching by VA Shenai
2. Technology of bleaching by Rajesh Kalra
3. Scouring Bleaching and Mercerising by ER. Trotman
4. Dyeing and chemical technology of textile fibre by E.R Trotman
5. Stains removal from textiles and garments

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	02	03
2	02	03
3	04	06
4	04	06
5	02	03
6	02	03
7	08	14
8	04	06
9	04	06
10	12	20
11	02	03
12	02	03
13	04	06
14	02	03
15	10	15
Total	**64**	**100**