Yarn Manufacture-II

Subject Code 18302

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<th>Theory</th>
<th>No. of Periods in one session 60</th>
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</table>

Objective:

After completion of the courses student will be able to:-

♦ Define the terminologies related with yarn manufacture machineries and processes.
♦ Explain the principle and working of the machine.
♦ Sketch the machine parts and level them.
♦ Understand the process of production and their related problem.
S.No. | Topics | Periods
---|---|---
01 | Combing. | (14)
02 | Speed Frame. | (17)
03 | Ring Frame. | (15)
04 | Doubling Frame. | (04)
05 | Open End Spinning. | (03)
06 | Waste Spinning. | (03)
07 | Texturisation. | (04)

Total: (60)

CONTENTS:

**TOPIC: 01 – COMBING:**

01.01 Objects of combing process. (02)
01.02 Basic Principle of cotton combing. (01)
01.03 Effect of hook formation at carding on comber lap performance at combing. (01)
01.04 Amount of pre-comber draft. (01)
01.05 Construction and working of Nasmith Comber. (02)
01.06 Setting and timings of different parts of the comber. (03)
01.07 Adjustment for changing waste percentage on comber. (01)
01.08 Faults and their remedies. (01)
01.09 Recent developments in comber. (01)
01.10 Performance evaluation of combers. (01)
01.11 Speeds, Settings and production calculation pertaining to combing machineries. (02)

**TOPIC: 02 – SPEED FRAME:**

02.01 Objectives of speed frames. (01)
02.02 Principles of drafting, twisting, winding and building. (01)
02.03 Description of speed frame. (06)
02.03.01 CREEL.
02.03.02 Drafting System.
02.03.03 Twisting Mechanism.
02.03.04 Winding mechanism - Flyer leading, Bobbin leading, Advantages and Disadvantages of each method. Differential Motion - Types and Description. Building of Bobbin, Traverse motion of the bobbin.
02.03.05 Head Stock Gearing.
02.04 Different passage of flyer frame. (03)
02.04.01 Conventional Process - Slubber, Inter frame, Roving Frame. (01)
02.04.02 Short Cut Process - Simplex.
02.05 Construction and design of Conedrum. (01)
02.06 Recent developments in Speed frames. (01)
02.07 Calculation regarding draft and draft constant, Twist and twist Constant, Production, Required Change Wheel.

TOPIC: 03 – RING FRAME: [15]

03.01 Objects of Ring Spinning. (01)
03.02 Construction and Working of Conventional Ring frame. (01)
03.03 Detailed Study of the ring frame mechanism. (02)
03.04 Forces acting on the traveller and yarn balloon in ring spinning.
03.05 Resultant of the forces acting on the traveller. (01)
03.06 Variation in yarn tension during spinning.
03.07 Twist flow in ring spinning. (01)
03.08 Effect of various parameters.
03.09 Types of Draft - Tension Draft, Break Draft, Main Draft.
03.10 Types of package builds - Cop build, Roving build, Combined build. (01)
03.11 Builder motion on ring frame. (01)
03.12 Ring Rail movement. (01)
03.13 Improvement in various parts and features of modern ring frame for high speed spinning.

03.14 Setting in ring frames.

03.15 Calculation regarding Speed, Draft and draft Constant, Twist and twist Constant, Production.

03.16 Modifications required in ring frames to process, various types of blend.

**TOPIC: 04 – DOUBLING FRAME:**

04.01 Objects of doubling process.

04.02 Construction and working of a doubler-Dry doubling and Wet doubling.

04.03 Different methods of threading the yarn through delivery rollers.

04.04 Fancy yarns and fancy doublers.

04.05 Preparation of standard yarn packages.

**TOPIC: 05 – OPEN END SPINNING:**

05.01 Limitations of Ring spinning.

05.02 Principles of Break spinning.

05.03 Construction and working of Open End Frames.

05.04 Comparison of ring and open end yarns.

05.05 Recent developments in open end spinning.

**TOPIC: 06 – WASTE SPINNING:**

06.01 Classification of cotton waste.

06.02 Preparation and methods of converting waste into useful products.

06.03 Machineries involved in their conversion.
TOPIC: 07 – TEXTURISATION:  

07.01 Introduction to texturisation.  
07.02 Theory of texturing.  
07.03 Yarn texturising methods.  
07.04 Properties of textured yarns. 

Reference Books:

8. Open End Spinning. - Niglol. 

SCHEME OF EXAMINATION FOR FINAL EXAMINATION  

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
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The above table refers to the annual examinations only.
Yarn preparation and weaving calculation is one of the main activities for a diploma holder technician in Textile Engineering. He is required to handle the yarn preparatory machines, tools and equipments and also supervise the yarn preparatory processes. He must be well versed with the subject of Yarn Preparation and weaving calculation.

It will help in discharge of his duties in the world of work as he can understand a problem, analyse the same and take an appropriate decision as and when the job demands.

Objective:

After completion of the courses student will be able to :-

- Define the terminologies related with yarn preparatory machineries and processes like Warping, Section Warping, Mill Warping, Sizing, Beaming and looming.
- Explain the principle, requirements and working of the machine.
- Sketch the machine parts and level them.
- Calculate Weight of Warp and Weft, loom shed efficiency and production, Reed Calculation.
<table>
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<th>S.No.</th>
<th>Topics</th>
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<td>02</td>
<td>Sizing.</td>
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<td>03</td>
<td>Beaming.</td>
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<td>04</td>
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<td>Calculations.</td>
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**Total :** (50)

**CONTENTS:**

**TOPIC: 01 – WARPING:**

01.01 Objects and requirements of Warping process. (02)
01.02 Description and working of ordinary beam warping machine. (02)
01.03 Main working members, their functions (Ordinary, High Speed and Super Speed) (02)
01.04 Limitation of ordinary beam warping machine. (02)
01.05 Old type and Modern type of high speed warping machine. (02)
01.06 Ruti high speed beam warping machine. (01)
01.07 Barber Colman high speed beam warping machine. (01)
01.08 Franz Muller high speed warping machine. (01)
01.09 Super Speed beam warping. (01)
01.10 Barber Colman super speed warping machine. (01)
01.11 High Speed cone creels and super speed creels, Magazine creels. (01)
01.12 Sectional Warping-Principle. (02)
01.13 Description and working of Sectional warping machine.
01.14 Mill Warping-Principle. (01)
01.15 Description and working of Mill warping machine. (01)
01.16 Comparative study of different Warping machines. (01)

**TOPIC: 02 – SIZING:** [15]

02.01 Sizing Process-Its objects and requirements. (02)
02.02 Different sizing materials, their properties and functions. (02)
02.03 Equipment for Size cooking. (02)
02.04 Size preparation methods. (02)
02.05 Size recipe for important natural, regenerated, synthetic yarns. (02)
02.06 Influence of Sizing on yarn properties. (01)
02.07 Various system of sizing-Slasher Sizing, Ball warp sizing, Hank sizing. (02)
02.08 Main parts and their functions of Slasher Sizing Machine. (02)
02.09 Description and working of Multi cylinder sizing machine. (02)
02.10 Hot air sizing machine. (01)
02.11 Warp drying by different methods. (01)
02.12 Measuring and monitoring of different types of controls used in sizing machine. (01)
02.13 Factors affecting size pick up. (01)
02.14 Faults in sizing process. (01)
02.15 Comparative study of different types of sizing machines and their importance. (01)

**TOPIC: 03 – BEAMING:** [03]

03.01 Objects of Beaming. (01)
03.02 Different system of beaming. (01)
03.03 Merits and demerits of different system of beaming. (01)
<table>
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<tr>
<th>Topic: 04 – LOOMING:</th>
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<tr>
<td>04.01 Principles and objects of looming process.</td>
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<tr>
<td>04.02 Manual and Mechanical methods employed and their relative merits.</td>
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<tr>
<td>04.03 Study of Automatic drawing in.</td>
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<td>04.04 Warp tying.</td>
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<td>04.05 Study of process equipment.</td>
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<th>Topic: 05 – MODERN DEVELOPMENTS:</th>
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<tr>
<td>05.01 Review of developments in yarn preparatory machines and processing techniques.</td>
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<th>Topic: 06 – CALCULATIONS:</th>
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<tr>
<td>06.01 Production related to Warping, ordinary beam warping machines, high speed and super speed beam warping, sectional warping, ordinary and high speed Slasher sizing machine.</td>
<td>(02)</td>
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<tr>
<td>06.02 Reed Calculations.</td>
<td>(01)</td>
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<tr>
<td>06.03 Problem relating to loom production and efficiency.</td>
<td>(02)</td>
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<td>06.04 Calculation of warp and weft in a fabric by Indirect and Direct methods.</td>
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<tr>
<td>06.05 To find the quantity of material in a piece.</td>
<td>(01)</td>
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<tr>
<td>06.06 To calculate the quantity of material warp and weft required to produce a cloth.</td>
<td>(02)</td>
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</tbody>
</table>
Reference Books :

   Bombay Private Circulation.
2. Wrap Sizing Mechanism, - Ramsbottom.
   Columbia Press, Manchester.
   Mahajan Publication, Ahmedabad.
4. Sizing, - Ajgaonkar D. B.
   Textile Trade Press, Bombay.

SCHEME OF EXAMINATION FOR FINAL EXAMINATION          F.M. : 80

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Fabric Manufacture-II

Subject Code 18304

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No. of Periods per week

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<td>Shuttleless Looms.</td>
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Total : (60)
CONTENTS:

**TOPIC: 01 – DOBBY:**

| 01.01 | Definition and Principle. |
| 01.02 | Scope of dobbly and uses of dobbly. |
| 01.03 | Classification of dobbly. |
| 01.03.01 | Single lift and double lift dobbly. |
| 01.03.02 | Negative and Positive dobbly. |
| 01.03.03 | Centre shed and open shed dobbly. |
| 01.03.04 | Horizontal and Vertical dobbly. |
| 01.03.05 | Right and Left Hand dobbly. |
| 01.04 | Types of double lift dobbly. |
| 01.04.01 | Detail study of Keighley dobbly. |
| 01.04.02 | Detail study of Dobcross dobbly. |
| 01.04.03 | Detail study of Climax dobbly. |
| 01.04.04 | Brief idea about Positive Hattersley dobbly. |
| 01.04.05 | Detail study of Paper dobbly. |
| 01.05 | Methods of Pegging Lags. |
| 01.06 | Causes of ‘Jack-Missing’. |
| 01.07 | Dwell of dobbly. |
| 01.08 | Dobby Timing. |
| 01.09 | Features of Modern dobbly. |
| 01.10 | Cross – Border dobbly (In-brief). |

**TOPIC: 02 – JACQUARD:**

| 02.01 | Definition:- Jacquard, Jacquard shedding. |
| 02.02 | Principle of Jacquard shedding. |
| 02.03 | Types of Jacquard. |
| 02.03.01 | Coarse Pitch, Medium Pitch and Fine-Pitch Jacquard. |
| 02.03.02 | Single Lift Jacquard. |
| 02.03.03 | Double Lift Single Cylinder Jacquard. |
02.03.04 Double Lift Double Cylinder Jacquard.
02.03.05 Jacquard for Special use.
02.04 Size of Jacquard.
02.05 Figuring Capacity of Jacquard.
02.06 Detail Study of Single Lift Jacquard.
02.06.01 Timing of Single Lift Jacquard.
02.07 Detail Study of Double Lift Single Cylinder Jacquard.
02.07.01 Advantage of Double Lift Jacquard.
02.08 Detail study of Double Lift Double Cylinder Jacquard.
02.08.01 Advantage and disadvantage of Double Lift Double Cylinder Jacquard.
02.08.02 Timing of Double Lift Double Cylinder Jacquard.
02.09 Brief Idea about Cross – Border Jacquard.
02.10 The Vincenzi Jacquard.
02.11 The Verdol Jacquard.
02.12 Harness Building.
02.12.01 Harness, Lingoe, Mail– Eyes or Coupling, Comber board, Harness mounting.
02.12.02 System of Harness Mounting.
02.12.02.01 Norwich System.
02.12.02.03 London System.
02.13 Casting – out.
02.14 Card – Cutting and Card Lacing.
02.15 Brief Idea about Leno Jacquard and Twilling Jacquard.

**TOPIC: 03 – BOX MOTIONS:**

03.01 Importance of Multiple Box Motions.
03.02 Classification of Multiple Box Motions.
03.02.01 Drop –Box motion.
03.02.02 Circular Box motion.
03.02.03 Pick – at – will Box motion.
03.03 Conditions to Good Multiple Box Motion.
03.04 Type of Multiple Box motion (Negative & Positive).
03.04.01 Negative Multiple Box, motion.
03.04.01.01 Chain Drop –Box motion.
03.04.01.02 Pick – at – will Drop – Box motion.
03.04.02 Positive Multiple Box motion.
03.04.02.01 Eccle’s Box motion.

**TOPIC: 04 – AUTOMATIC LOOMS:**

04.01 Automatic Loom and its improvements.
04.02 Characteristic features.
04.03 Advantage of Automatic Loom over Non-Automatic Loom.
04.04 Types of Automatic Looms.
04.04.01 Shuttle – Changing automatic loom.
04.04.02 Bobbin or Pirn or Cop changing automatic Loom.
04.04.03 Comparision between Cop-changing and Shuttle changing Looms.
04.05 Warp Stop motion.
04.05.01 Function.
04.05.02 Types of Warp Stop motion.
04.05.02.01 Electrical Warp Stop motion.
04.05.02.02 Mechanical Warp stop motion.
04.05.02.02.01 Northrop Mechanical Warp stop motion.
04.06 Automatic Cop (or, Bobbin) Changing mechanism.
04.06.01 Automatic Supply of Weft.
04.06.02 Weft Feeler motion.
04.06.03 Bunching motion.
04.06.04 Methods on types of Automatic Bobbin Change Loom.
04.06.04.01 Battery Loom (Magazine Loom).
04.06.04.02 Bobbin Loaders.
04.06.04.03 Loom Winders.
04.06.05 Northrop Bobbin – changing Loom mechanism.
04.06.05.01 Shuttle Protector and Weft Cutter.
04.06.05.02 Three Miss – Thread motion.
04.06.05.03 Northrop Roper Let – off motion.
04.07 Shuttle changing Automatic Loom.
04.07.01 Characteristics.
04.07.02 Methods of changing Shuttle.
04.07.03 Types of Shuttle changing Looms.
04.07.03.01 Hattersley Automatic Shuttle changing Loom (In-brief).

**TOPIC: 05 – SHUTTLELESS LOOMS:**

- 05.01 Introduction of Shuttleless Weaving.
- 05.02 Advantage of Shuttleless weaving as compared to conventional Loom.
- 05.03 Classification of Shuttleless Loom.
- 05.03.01 Sulzer Projectile Shuttleless Loom.
- 05.03.02 Rapier Shuttleless Loom.
- 05.03.03 Air Jet Loom.
- 05.03.04 Water Jet Loom.
- 05.04 Sulzer Projectile Shuttleless Loom: - Introduction, Principle, Main Features, Advantages and Working description (Details).
- 05.05 Rapier Shuttleless Weaving : - Introduction, Principle, Main Features and Working description (details).
- 05.06 Air Jet Loom : - Introduction, Principle and working of Maxbo-air Jet and Elitex –air Jet Loom.
- 05.07 Brief idea about Water – Jet Loom.

**TOPIC: 06 – FABRIC DEFECTS:**

- 06.01 Classification of Cloth faults.
- 06.01.01 Warp defects :- Broken ends, Wrong ends, Selvedge defects, Stiching, and Floats.
06.01.02 Weft defects: - Weft Breakages and Mispicks, Bareness or Thin and Thick places, Tight pick, Picks –out, Weft Curling, kingly fabrics, slugs, cracks, shuttle Marks.

06.01.03 Cloth defects: - Oil Spots, Dirty Cloth, Hairy or Flossy cloth, Rough surface cloth and Harness skips.

**TOPIC: 07 – LOOM FAULTS:**

07.01 Loom Faults: - Reed marks and cover of cloth, Shuttle Flying out, Shuttle Trapping in warp, Loom Banging – off, Loom stopping, Weft Cutting, Bumping and splitting or cops knocking – off.

Reference Books:

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Fabric Structure & Design-II

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<td>Gauze and Leno Structures.</td>
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<td>07</td>
<td>Damasks, Brocades and Tapestries.</td>
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<td>08</td>
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<td>09</td>
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Total: (60)
CONTENTS:

TOPIC: 01 – EXTRA FIGURING:

01.01 Figuring With Extra thread.
01.02 Methods of introducing Extra Figuring threads.
01.03 Methods of disposing of the Surplus extra threads.
01.04 Extra Warp Figuring and Construction of Extra Wrap Figures.
01.04.01 Continuous Extra Wrap Figuring.
01.02.02 Intermittent Extra Wrap Figuring.
01.05 Extra Weft Figuring and Construction of Extra Weft Figures.
01.05.01 Continuous Extra Weft Figuring.
01.05.02 Intermittent Extra Weft Figuring.
01.06 Difference between Extra Wrap and Extra Weft Figuring.
01.07 Quality Particulars of above figuring.

TOPIC: 02 – BACKED CLOTH:

02.01 Introduction.
02.02 Methods of Designing.
02.02.01 Weft Backed Cloth.
02.02.02 Reversible Weft Backed Cloth.
02.02.03 Warp Backed Cloth.
02.02.04 Reversible Warp Backed Cloth.
02.03 Backed Cloths With Wadding Threads.
02.03.01 Weft Backed and Warp Wadded Design.
02.03.02 Warp Backed and Weft Wadded Design.
02.04 Quality Particulars of above types of Cloths.

TOPIC: 03 – DOUBLE CLOTH:

03.01 Introduction.
03.02 Classification of Double Cloths.
03.02.01 Self-Stitched Double Cloths.
03.02.02 Centre-Stitched Double Cloths.
03.02.03 Double Cloths Stitched by thread interchange.
03.02.04 Double Cloths Stitched by Cloth interchange.
03.02.05 Alternate Single-ply and double-ply Construction.
03.03 Self-Stitched double Cloths.
03.03.01 Stitching.
03.03.02 Construction.
03.03.03 Selection of Suitable Stitching Positions.
03.04 Wadded Double Cloth.
03.04.01 Weft-Wadded Double Cloth.
03.04.02 Warp-Wadded Double Cloth.
03.05 Centre-Stitched Double Cloths.
03.05.01 Centre-Warp Stitching.
03.05.02 Centre-Weft Stitching.
03.06 Quality Particulars of each cloth.

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04.02 Construction of Treble Cloths.
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05.02 Classification of the Figured Pique Structure.
05.02.01 Loose-back Pique.
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<td>08.03</td>
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10.04 Methods of Producing variety of effect in the Same Weave and Colouring.

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11.01 Stripe Colour and Weave effects.

11.02 Check Colour and Weave effects.

11.03 Special Colour and Weave effects.

11.04 Figured Colour and Weave effects.

**Reference Books :**

1. -
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3. -
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5. -

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TEXTILE TESTING & QUALITY CONTROL

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Rationale:

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- 01.01 Twist in Yarn.
- 01.01.01 Introduction.
- 01.01.02 Twist direction.
- 01.01.03 Amount of twist and Use of Twist Multiplier.
- 01.01.04 The function of twist in yarn structure.
- 01.01.05 Twist and yarn strength.
01.01.06 Effects of twist on fabric Properties.
01.01.07 Methods of determination of twist.
01.01.07.01 Ordinary Twist tester (or, straightened fibre method).
01.01.07.02 Continuous Twist tester
01.01.07.03 Twist Contraction method.
01.01.07.04 Take – up Twist tester.
01.01.07.05 Optical method.
01.01.07.06 The Quadrant twist tester.
01.02 Yarn Strength.
01.02.01 Introduction.
01.02.02 Forces for Strength.
01.02.03 Factors affecting the tensile Properties of textiles and the results obtained from testing instruments.
01.02.04 Principles of tensile testing machines – CRL and CRE Principles.
01.02.05 The Pendulum Lever Principle with Constant Rate of Traverse.
01.02.06 The Inclined Plane Principle.
01.02.07 Determination of Yarn Strength.
01.02.07.01 Single thread Strength tester.
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01.02.07.03 Scott Inclined plane tester.
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01.02.08.01 Ballistic Tester.
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02.02 Fabric Length and its measurement.
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02.04 Fabric Thickness.
02.04.01 Principle of the measurement of Fabric Thickness.
02.04.02 Methods of measuring thickness.
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02.04.02.02 Reynolds and Branson thickness tester.
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02.05 Fabrics weight and its measurement.
02.06 Threads per inch in woven fabric.
02.07 Crimp of Yarn in Fabric.
02.07.01 Crimp, Crimp Percentage and Crimp Amplitude.
02.07.02 Crimp and fabric properties.
02.07.03 Measurement of Crimp Percentage.
02.07.03.01 W.I.R.A. Crimp tester.
02.07.03.02 Manra Crimp tester.
02.08 Fabric Strength.
02.08.01 Introduction.
02.08.02 Tensile Strength testing :- Ravelled Strip method, cut Strip method and Grab method.
02.08.02.01 Methods of Measuring Tensile Strength.
02.08.02.01.01 Combined Tensile strength tester (vertical).
02.08.02.01.02 Horizontal cloth tester.
02.08.03 Tearing Strength testing.
02.08.03.01 Introduction.
02.08.03.02 Methods of measuring the Tearing Strength :- Tongue tear test, Tongue Double rip tear test, Trapezoid tear test, Ballistic tear test and Wing rip tear test.
02.08.03.02.01 Tearing Strength by ‘Shirley’ double Pendulum ballistic tester.
02.08.04 Bursting Strength testing.
02.08.04.01 Introduction.
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02.09 Fabric Stiffness, Handle and Drape.
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02.09.02  Drape and its measurement by Drape – Meter.
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02.13.02  Measurement of Air Permeability.
02.13.02.01  ‘Shirley’ Air Permeability tester.
02.13.03  Air Permeability and Fabric Properties.
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02.14.02  Methods of Testing & Wettability of Cotton fabrics.
02.14.02.01  Spray Test.
02.15  Flammability.
02.16  Shrinkage Tests.
02.16.01  Introduction to Shrinkage, Relaxation and Felting.
02.16.02  Testing for Shrinkage.
02.17  Denison Tensile Testing machine ( for Cords, ropes and heavy industrial fabrics).
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03.02 Nature of Irregularity.
03.03 Classification of variation.
03.04 Index of Irregularity.
03.05 Methods of measuring Irregularity.
03.05.01 Visual Examination Methods.
03.05.02 Fielden – Walker Evenness Tester.
03.05.03 Uster Evenness Tester.
03.06 Causes of Irregularity.
03.07 Effects of Irregularity.
03.08 Interpretation of the results of irregularity tests.
03.09 Uster Classimat.
03.10 Hairiness in spun yarn and its measurement.

TOPIC: 04 – STATISTICAL QUALITY CONTROL:

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04.02 Objectives of Quality Control.
04.03 Advantages of Statistical Quality Control.
04.04 Causes of Variation in Quality:- Chance causes and Assignable causes.
04.05 Techniques of S.Q.C. :- Process Control and Product control.
04.06 Process Control.
04.06.01 Quality Control Chart : concepts, Use of control chart, Advantages of using quality control charts.
04.06.01.01 Control Limits.
04.06.01.02 Control Limits for Range Chart (or Range – Chart).
04.06.01.03 Specification Limits.
04.06.01.04 Types of Control charts : Control chart for variables & Control charts for Attributes.
04.06.01.04.01 Control charts for Variables: x – charts and R-charts.
04.06.01.05 Interpretation of control charts.
04.06.01.06 The choice of Limits and effects of Sample size on the limits.
04.06.01.07 Application of Quality control charts in Textile Industry.
04.07 Product control.
04.07.01 Acceptance Sampling.
04.07.02 Single Sampling plan.
04.07.03 Double Sampling plan.
04.07.04 Multiple or Sequential Sampling plan.
04.08 Importance of Quality control in textile.

Reference Books:

1. -
2. -
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4. -
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Textile Chemistry-II

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Rationale:

Textile Chemistry is one of the main activities for a diploma holder technician in Textile Engineering. He is required to apply different types of dyes on natural and synthetic fibres finishing of natural fibres, different styles of printing. He must be well versed with the subject of Textile Chemistry.

The subject is being introduced to develop the understanding of Wet Processing, Printing and finishing.

Objective:

After completion of the courses student will be able to:

- Define the terminologies related with Textile Chemistry.
- Explain the principle and working of Dyeing, Printing and Finishing.
- Methods of application of dyes.
- Understand the Wet processing and their related problem.
S.No. | Topics | Periods
--- | --- | ---
01 | Dyeing. | (16)
02 | Dyeing of Synthetic Fibre. | (20)
03 | Printing. | (10)
04 | Finishing. | (14)

Total: (60)

CONTENTS:

**TOPIC: 01 – DYEING: [16]**

01.01 Properties, Selection and application of various dyes like vats, Aniline Black, Azoic, Reactive dyes, Mordant colour, Pre-metallised dyes and other popular dyes used on Cotton, Wool, Silk. (10)

01.02 Various after treatments given to dyed goods. (02)

01.03 Textile auxiliaries and chemicals used in dyeing and their functions. (04)

**TOPIC: 02 – DYEING OF SYNTHETIC FIBRE: [20]**

02.01 Disperse Dyes – Introduction and properties. (01)

02.02 Methods of application on Polyester by High temperature dyeing process, Thermosol process, Carrier method, Rapid dyeing technique. (06)

02.03 Brief idea about Dyeing machine like conventional and Modern H P H T Beam Dyeing machine, H P H T Jet Dyeing machine, Winch Dyeing machine. (04)

02.04 Dyeing of Polyamide fabric with Disperse dyes, Acid dyes. (02)

02.05 Dyeing of Viscose rayon with Direct Dyes, Sulphur Dyes and Vat Dyes. (01)

02.06 Dyeing of Acetate rayon with disperse Dyes. (01)

02.07 Dyeing of blended textiles and garments. (05)
**TOPIC: 03 – PRINTING:**

03.01 Detailed Study of Different styles of printing – Discharge Style, Direct Style, Resists Style. (04)

03.02 Comparative study of different styles of printing and their importance. (01)

03.03 Printing of cotton with Rapid fast colour and Rapidozones Colour. (01)

03.04 Study about Silk goods printing. (01)

03.05 Study about Pigment Printing. (01)

03.06 Printing of synthetic goods. (02)

**TOPIC: 04 – FINISHING:**

04.01 Objects and methods of Finishing. (01)

04.02 Classification of various finishes. (01)

04.03 Finishing process an overview- Sanforization, Anticrease, both internal and external application of synthetic resins, Organdy effects, Water repellent finishes, Fire proofing, Rot proofing, Water proofing, Creping, Calendering, Softening and Stiffening finishes, Raising, Shearing, Heat Setting, Methods of evaluation of finishing effects. (06)

04.04 Special study on finishing of woolen materials, Silk fabrics. (03)

04.05 Finishing of Synthetic fibre fabrics. (02)

04.06 A brief Study of finishing machines like – Water mangle, different types of Starching mangles, cylinder and hot air drying machines, Calenders. (02)
Reference Books:


SCHEME OF EXAMINATION FOR FINAL EXAMINATION F.M. : 80

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**Man Made Fibre Technology**

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**Rationale:**

Fabric made of man made Fibres are much in demand because of its durability and easy maintain. The production, therefore, of the man made fibres has increased keeping the pace with market demand.

The “Man Made Fibre Technology” is one of the main activities for a diploma holder technician in Textile Engineering. The course is designed for the students for their career advancement.

**Objective:**

A student will be able to understand :-

- Process of manufacture of Viscose Rayon, Cellulose Acetate, Polynosic rayon, Polyamide fibres, Polyesters, Polyvinyl Chloride, Orlon, Acrilian, Polypropylene.
- Their chemical behaviour, the properties of the fibres and their uses.
- The application of the process, properties, chemical behaviour in actual manufacturing of the man made fibres.
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**CONTENTS:**

**TOPIC: 01 – MAN MADE FIBRE SPINNING:** [04]

- **01.01** Viscosity of melts and solution. *(01)*
- **01.02** General principles of spinning - Melt Spinning, Dry Spinning, Wet Processing. *(03)*

**TOPIC: 02 – FIBRE MADE FROM NATURAL POLYMER:** [16]

- **02.01** Introduction of various man made fibre based on natural polymers. *(01)*
- **02.02** Manufacture of various man-made fibre based on natural polymers like viscose, cellulose, Acetate, Cupramonium rayon. *(06)*
- **02.03** Physical and chemical properties of above fibres. *(06)*
- **02.04** Uses of above fibres. *(01)*
- **02.05** Need for drawing, factors influencing disability influence of drawing on structure. *(02)*

**TOPIC: 03 – SYNTHETIC FIBRES:** [23]

- **03.01** Introduction of various synthetic fibres. *(02)*
- **03.02** Manufacture of various synthetic fibres like Polyamide (Nylon 6, Nylon 66), Polyester (Polyethylene terephthalate), Polyloefine(Polyethylene, Poly propylene, Polyacrylontrile). *(14)*
03.03 Need for drawing, factors influencing diability, influence of drawing on structure. (02)

03.04 Physical and chemical properties of above fibres. (04)

03.05 Uses of above fibres. (01)

**TOPIC: 04 – CONVERSION AND DEVELOPMENTS:** [07]

04.01 Detailed study of low to top conversion-cut method, stretch breaking method, perlock method. (03)

04.02 Need for Spin finish application in fibre processing. (01)

04.03 Spin finish composition and spin finish application method. (02)

04.04 Elastomeric fibres of spandex type, Chloro fibres, Bi-Component fibres. (01)

**Reference Books :**

1. Man Made Fibre, Wirley & Sons. - Moncriff.
2. Textile Yarns. - B. C. Goswami.

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Textile Management

Subject Code
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Theory

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TOPIC: 01 – INTRODUCTION:

01.01 Objects of Textile Management.
01.02 A Brief Profile of Indian Textile Industry.
01.03 Technocracy and Management.
01.04 Industry as a Social System.
01.05 Indian Textile Industry and its Importance.
01.06 Primary Principles of Textile Industry.
01.07 Management Problems of Indian Textile Industry and their remedies.

TOPIC: 02 – MANAGEMENT AND ORGANISATION:

02.01 Definition, Delineation and Description.
02.02 Characteristics of Management.
02.03 Scientific Management.
02.04 General Principles of Management.
02.05 Functions of Management.
02.06 Organisation.
02.07 Principles of Organisation.
02.08 Structure of Organisation.

TOPIC: 03 – PRODUCTION, PLANNING AND CONTROL:

03.01 Objects of Production Planning.
03.02 Production Resources.
03.03 Types of Production System.
03.04 Requirements of Planning Section.
03.05 Production Control.
03.06 Information required by Production Control Section.
03.07 Functions of Production Planning and Control.
03.08 Relation between Production, Planning and Control.
03.09 To determine the number of machines required for producing desired Quantities of end products (Yarns and Fabric).

**TOPIC: 04 – PLANT LOCATION AND PLANT LAYOUT:**

04.01 Definition.
04.02 Factors determining Plant Layout.
04.03 Plant Location – Economic Survey.
04.04 Objectives of Plant Layout.
04.05 Types of Layouts.

**TOPIC: 05 – STAFFING OF DEPARTMENTS:**

05.01 Labour allocation in different departments of a textile mill.
05.02 Workload standards for card tenters, Speed frame and Ring frame tenters, Winders, Weavers etc. in the terms of tripartite agreement and Labour Laws.
05.03 Nepotism.
05.04 Efficiency of Labour.
05.05 Factors affecting the efficiency of Labour.

**TOPIC: 06 – THEORY OF COST AND COSTING:**

06.01 Definition.
06.02 Different types of Costs.
06.03 Modern Version of Costs.
06.04 Costs and Profit forecasting.
06.05 Essential factors in Textile Costing.
06.06 Elements of Cost for Textile Industry.
06.07 Cost Control.
06.08 Control of Wastage of the material.
Books Recommended:

1. Practical Cotton Mill Management. - Benjamin.
2. Textile Technocracy. - Darab B. Unwalla.
4. The Textiles. - Madan Gaur.
6. Management of Textile Industry. - Dudeja

SCHEME OF EXAMINATION FOR FINAL EXAMINATION

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The above table refers to the annual examinations only.
Rationale:

Silk is called as queen of textile world. Fabric made of silk are much in demand because of its durability and appearance. The production of Silk yarns has increased keeping the pace with market demand.

“Sericulture and Silk Technology” is being offered as an elective for those students who are interested in enhancing their knowledge and skill in this field. The course is designed for the students to go a bit deep into the subject which may be useful for their career advancement.

Objective:

A student will be able to understand :-

- Sericulture industry, Silk worms seed production, Silk worm rearing etc.
- Silk reeling and silk throwing.
- Silk weaving and processing industry.
S.No. | Topics                        | Periods |
-------|-------------------------------|---------|
01     | Sericulture.                 | (16)    |
02     | Cocoons.                     | (06)    |
03     | Reeling.                     | (06)    |
04     | Silk throwing.               | (04)    |
05     | Weaving Industry.            | (08)    |
06     | Processing Industry.         | (06)    |
07     | Spun Silk Industry.          | (04)    |

Total : (50)

CONTENTS:

**TOPIC: 01 – SERICULTURE:** [16]

01.01 Mulberry Cultivation. (02)
01.02 Diseases and pests of mulberry. (01)
01.03 Silk worms seed production – Embryonic growth – Hibernating eggs. (02)
01.04 General Principles of Silk worm rearing. (02)
01.05 Primary requisites for successful silk worm rearing. (02)
01.06 Facilities for rearing, disinfection, brushing. (02)
01.07 Environmental conditions for silk worm rearing. (01)
01.08 Bed cleaning. (01)
01.09 Spacing, mounting and harvesting. (02)
01.10 Diseases and pests of silk worm. (01)

**TOPIC: 02 – COCOONS:** [06]

02.01 Physical and Commercial characteristics. (01)
02.02 Sorting of cocoons. (01)
02.03 Cocoon testing, Storage of cocoons, Stifling of cocoons, Drying of cocoons.
02.04 Cooking of cocoons – Various methods employed.

**TOPIC: 03 – REELING:**

03.01 Silk Reeling.
03.02 Methods of Silk reeling – Charkha, Cottage basins, Filatures.
03.03 Raw Silk testing.
03.04 Packing of raw silk, Utilisation of by – products.

**TOPIC: 04 – SILK THROWING:**

04.01 Manufacture of yarns for use in ordinary, Chiffon, Crepe, Georgetts fabrics.
04.02 Number of plies and different twist levels used.
04.03 Recent developments in Silk throwing industry.

**TOPIC: 05 – WEAVING INDUSTRY:**

05.01 Preparation of warp and weft Yarn.
05.02 Different machinery employed in small scale and organised sections.
05.03 Silk Weaving – Handloom and Powerloom Weaving.
05.04 Special features of Silk looms.

**TOPIC: 06 – PROCESSING INDUSTRY:**

06.01 Degumming and drying of silk yarns.
06.02 Dyeing of silk by different dyes.
06.03 Printing of Silk goods.
06.04 Finishing of Silk fabrics.
TOPIC: 07 – SPUN SILK INDUSTRY:  

07.01 Introduction regarding Spun Silk Industry.  

Reference Books:

2. F. A. O. Publications. -  

SCHEME OF EXAMINATION FOR FINAL EXAMINATION  
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Elective
Computer Aided Textile Design

Subject Code 18310B

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Rationale:

Computer Aided Textile Design are much in demand because of its own quality and varieties. The computer aided textile design, therefore, has increased keeping the pace with market demand.

The ‘Computer Aided Textile Design’ is being offered as an elective for those students who are interested in increasing their knowledge and skill in this field. The course is designed for the students to go a bit deep in to the subject which may be useful for their career advancement.

Objective:

A student will be able to understand –

♦ Concept of computer graphics.
♦ Language and their interpreters.
♦ Basic concept of design.
♦ Realisation of the Algorithm.
♦ Programming.
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**CONTENTS:**

**TOPIC: 01 – CONCEPT OF COMPUTER GRAPHICS:** [04]

01.01 Idea about Data Structure, data bases and list handlings. (02)
01.02 Picture structure and transformations. (02)

**TOPIC: 02 – LANGUAGE AND THEIR INTERPRETERS:** [08]

02.01 Idea about interaction handling, display processor, display file and picture file organisation. (04)
02.02 Language concepts of interactive computer graphics. (04)

**TOPIC: 03 – BASIC CONCEPT OF DESIGNS:** [12]

03.01 Basic concept of computer aided Textile designs. (02)
03.02 Advantages to the system. (01)
03.03 Characteristics of the range of computer. (02)
03.04 Description of a regular surface pattern, lattice, symmetry elements, point group, plane group. (03)
03.05 Basic idea of a general algorithm, the independent motif part, choice of lattice mathematical description of symmetry operations. (04)
TOPIC: 04 – REALISATION OF THE ALGORITHM: [12]

04.01 Principles of realisation of the algorithm. (02)
04.02 Properties. (01)
04.03 Limitations. (01)
04.04 Comparison of methods. (02)
04.05 Programmes. (06)

TOPIC: 05 – PROGRAMMING: [14]

05.01 Computer programmes of simple woven textile design (plan, Twill). (12)
05.02 Principles linking CAP system with production machineries. (02)

Reference Books:

1. -
2. -
3. -
4. -

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# Elective
## Wool Technology

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**Rationale:**

**Objective:**

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**Total:** (50)
CONTENTS:

TOPIC: 01 – INTRODUCTION: [06]

01.01 General Survey: The main characteristics and uses of wool, wool types and distribution; The wool textile industry.
01.02 The structure and chemistry of wool and hair.
01.03 Physical properties; the growth of wool and hairs.
01.04 The wool quality and fleece measurement.
01.05 Wool marketing.
01.06 Wool production and types; fellmongered or skin wool.
01.07 Wool waste and remanufactured wools.
01.08 Speciality hair.
01.09 Wool Processing.

PART-‘A’

TOPIC: 02 – WOOL SPINNING: [40]

02.01 Introduction.
02.02 Preparation of fibres for Blending, Blending and Emulsifying.
02.03 Characteristics of yarn and Fabrics produced by the wool Industry.
02.03.01 Characteristics of yarn.
02.03.02 Characteristics of Wool fabrics.
02.04 Characteristics of Raw Materials processes by the wool manufacturing Industry.
02.05 Preparing the fibre for blending.
02.05.01 Acceptance of Raw materials.
02.05.02 Plans of fibre preparation for blending.
02.05.03 Opening and Picking of wool.
02.05.04 Burr-Picking and Carbonization of wool.
02.05.05 Dyeing of wool and Man-made Fibres.
02.05.06 Fibre Drying.
02.05.07 Processing of Industrial Wastes.
02.06 Manufacture of Reclaimed wool.
02.06.01 Raw materials for the manufacture of reclaimed wool.
02.06.02 Preparation of Rags for processing.
02.06.03 Processing of Rags on pickers.
02.07 Blending of fibrous materials.
02.07.01 The aim of blending.
02.07.02 Classification of blends and their composition.
02.07.03 Principles of fibre selection for woolen blends.
02.07.04 Method of Blend composition.
02.07.05 Blending wool with man-made fibres.
02.07.06 Composition of blends and blenders.
02.07.07 Calculation of Blending units.
02.07.08 Evaluation of Blending Results.
02.08 Emulsification of blends.
02.09 Blend Opening.
02.10 Flow lines used in blend preparation.
02.10.01 Units and Mechanisms of Flow lines.
02.10.02 Pneumatic Transport System.
PART-‘B’

02.11 Carding of Blends and Preparation of Condenser Roving and Carded Sliver.

02.11.01 The purpose of carding and characteristics of cards and carding sets.

02.11.02 Feeding of carding sets ad machines, Design of Autoweighers and analysis of their operation.

02.11.02.01 Working organs of Autoweighers.

02.11.02.02 Autoweigher mechanism.

02.11.02.03 Analysis of Autoweigher operation.

02.11.03 Card Clothing.

02.11.04 Interaction of wired and saw-toothed surfaces with fibrous material.

02.11.05 Preliminary carding and types of Burr Breasts.

02.11.06 Working mechanism of carding machines, their design, installation and adjustment.

02.11.07 Analysis of Card operation.

02.11.07.01 Interaction of the working Roller and Main Cylinder.

02.11.07.02 Stripper Roller Interaction with working Roller and Main Cylinder.

02.11.07.03 Fancy Roller Interaction with main cylinder.

02.11.07.04 Main cylinder Interaction with Doffer.

02.11.07.05 Doffing comb interaction with Doffer.

02.11.07.06 Load applied to the Card working organs and its analysis.

02.11.07.07 Distribution, mixing and evening of fibre flow in carding machines.

02.11.07.08 Evening action of the carding machine.

02.11.08 Formation of slivers and Laps in carding machine.

02.11.09 Formation of slivers in carding sets in worsted spinning.

02.11.10 Formation of a woolen roving.

02.11.10.01 Type of Tape condensers.
02.11.10.02 Web Dividing Process.
02.11.10.03 Rubbing Aprons, their motion mechanism and process of Roving Rubbing.
02.11.10.04 Condenser Roving Winding.
02.11.11 Quality characteristics of carded sliver andollen Roving.
02.11.12 Waste obtained in carding, maintenance and up-keep of carding sets and machines.
02.11.12.01 Reworkable and unworkable waste.
02.11.12.02 Maintenance of carding sets and machines.
02.11.13 Motion transfer to the working organs of carding sets and machines. Calculation of carding sets and machines.
02.11.13.01 Calculations of carding sets.
02.11.13.02 Calculations of carding machines.

**PART-'C’**

02.12 Preparation of combed tops.
02.12.01 Unevenness of slivers and other spinning products.
02.12.01.01 Formulae for calculating the Unevenness.
02.12.01.02 Kinds of Unevenness.
02.12.01.03 Unevenness of an Ideal Product. Unevenness Index.
02.12.01.04 Change of Unevenness in the course of Doubling and Drawing.
02.12.01.05 Methods and Instruments used to determine spinning product unevenness in Linear Density.
02.12.01.06 Instruments used to determine spinning product uneven.
02.12.02 Drawing and Doubling of Spinning products.
02.12.02.01 Drawing and Draft Principles.
02.12.02.02 Fibre motion in the Drawing process.
02.12.02.03 Partial and Total Draft.
02.12.02.04 Plotting the curve of Product Attenuation in the field of Drafting.
Drawing force.
Doubling of Slivers.
Preparation of Slivers for combing, Gilling Machines.
Objectives of Combing. Types of Gilling Machines and their characteristics.
Drafting systems of Gilling Machines.
Analysis of the operation of Drawing Systems in Gilling Machines.
Sliver Winding. Winding Carriages.
Calculations of the Intersecting Production.
Maintenance of Intersectings.
Wool Combing.
Purpose of Combing.
Design and Principle of operation of Intermittent Action combers.
Types of Combers and their characteristics.
Analysis of Timing Diagram for the comb operation.
Working organs and mechanisms of combing machines.
Setting parameters of the comber and their Analysis.
Sorting of fibres in combers.
Combing and cleaning conditions of fibres throughout their length.
Profile of the Separated portion, formation of the combed product and Top.
Combing Wastes and Quality Indices of Top.
Calculating the comber.
Upkeep and maintenance of Combers.
Dyeing, Backwashing, Drying and Smoothing of Tops.
Flow line for continuous Drying, Backwashing and smoothing of Tops.
Backwashing Sets.
Quality Indices of Tops and their Keeping in Stores.
Production of Staple Slivers from Man-made Fibres.
02.12.06.01 Methods of Man-made Fibre Processing in Worsted Spinning.
02.12.06.02 Stapling of Tops by Cutting.
02.12.06.03 Stapling of Tows by Stretch Breaking.
02.12.07 Diagrams and plans for Top preparation.

PART-‘D’

02.13 Worsted Roving Preparation.
02.13.01 Systems and plans of Worsted Roving Preparation.
02.13.01.01 Modern Shorter systems of Roving Preparation.
02.13.01.02 Old conventional Multipassage systems of Worsted Roving Preparation.
02.13.02 Blending and oiling of Tops.
02.13.02.01 Blending of Tops.
02.13.02.02 Oiling the Tops in the Roving Department.
02.13.03 Automatic Adjustment of Top unevenness in Liner Density.
02.13.03.01 The Essence of adjustment, Types of Autolevellers and Control System.
02.13.03.02 Determination of the Storage Time of Signals received by the Memory Drum.
02.13.03.03 Efficiency of Autolevellers and their adjustment.
02.13.04 Design and Operation of Roving Frame for the Manufacture of Rubbed Roving.
02.13.04.01 Types of Roving Frames.
02.13.04.02 Feeding of Roving Frames.
02.13.04.03 Drafting Systems of Roving Frames for Producing Rubbed Roving.
02.13.04.04 Rubbing System and Process of Roving Rubbing.
02.13.04.05 Condensing, Doubling and Winding of the Roving of the Bobbin.
02.13.04.06 Calculation of the Roving Frame Producing Rubbed Roving.
02.13.05 Design and Analysis of the Operation of Roving Frames for Producing Twisted Roving.
02.13.05.01 Types of Flyer Roving Frames.
02.13.05.02 Drafting Systems of Flyer Roving Frames.
02.13.05.03 The Twisting Process and Roving Twist.
02.13.05.04 Twisting and Winding Mechanism of Flyer Roving Frames.
02.13.05.05 Conditions for Roving Winding in Flyer Roving Frames.
02.13.05.06 Mechanism to transmit motion to Spool and Control Roving Winding.
02.13.05.07 Roving Tension in Flyer Roving Frames.
02.13.05.08 Calculations of the Flyer Roving Frames.
02.13.06 Roving quality and Storing.

PART-'E'

02.14 Yarn Production.
02.14.01 Spinning of Worsted Yarn on Ring Spinning Frames.
02.14.01.01 Design and Operation of Ring Spinning Frames.
02.14.01.02 Roving Creels and Roving Unwinding.
02.14.01.03 Drafting Systems of Ring Spinning Frames.
02.14.01.04 Twisting and Yarn Twist.
02.14.01.05 Working organs of the Twisting and Building Mechanism of the Ring Spinning Frames.
02.14.01.06 Analysis of the Twisting and Building Mechanism Operation.
02.14.01.07 Bobbin Structure and its dimensions.
02.14.01.08 Builder Motion.
02.14.01.09 Spinning Regulators.
02.14.01.10 Calculations of a Ring Spinning Frames.
02.14.02 Spinning of Condenser Roving in Ring Spinning Frames.
02.14.02.01 Characteristics and operation of Spinning Frames.
02.14.02.02 Unwinding of Roving and Unwinding Devices.
02.14.02.03 Drafting Systems of Spinning Frames for Wollen Roving.
02.14.02.04 Twisting and Building Mechanisms of Spinning Frames for Condenser Roving.
02.14.02.05 Spinning Frames with Sleeves on Spindles.
02.14.03 Spinning in Centrifugal Spinning Frames.
02.14.06 Yarn Quality and Grades, Spinning Wastes.
02.14.08 Yarn Plying and Twisting.
02.14.08.01 Twisted yarn types, Structure and Properties.
02.14.08.02 Yarn Plying or Doubling.
02.14.08.03 Yarn Twisting, Twisters.

**TOPIC: 03 – WEAVING OF WOOL:**

03.01 Warping.
03.02 Weaving Wollen and Worsted Fabrics.

**TOPIC: 04 – FINISHING WOOL FABRICS:**

04.01 Introduction, Fulling, Crabbing, Decating etc.
Books Recommended:

3. Wollen and Worsted Spinning. - Collins.
5. Worsted Spinning. - WIRA.
6. Wollen Ring Spinning. - WIRA.
7. Woolen Spinning. - Vickermn.

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# Elective
## PROCESSING OF SYNTHETIC & THEIR BLENDS

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<tr>
<td>04</td>
<td>Carding.</td>
<td>(04)</td>
</tr>
<tr>
<td>05</td>
<td>Drawing.</td>
<td>(04)</td>
</tr>
<tr>
<td>06</td>
<td>Roving.</td>
<td>(03)</td>
</tr>
<tr>
<td>07</td>
<td>Ring spinning.</td>
<td>(05)</td>
</tr>
<tr>
<td>08</td>
<td>Spinning of Dyed Fibres.</td>
<td>(02)</td>
</tr>
<tr>
<td>09</td>
<td>Winding and Doubling.</td>
<td>(03)</td>
</tr>
<tr>
<td>10</td>
<td>Properties of Blended yarns.</td>
<td>(02)</td>
</tr>
<tr>
<td>11</td>
<td>Processing of staple Fibres in woollen and worsted spinning system.</td>
<td>(05)</td>
</tr>
<tr>
<td>12</td>
<td>Weaving.</td>
<td>(03)</td>
</tr>
<tr>
<td>13</td>
<td>Wet Processing.</td>
<td>(07)</td>
</tr>
</tbody>
</table>

**Total:** (50)
CONTENTS:

TOPIC: 01 – GENERAL INTRODUCTION TO SPINNING:

01.01 Introduction.
01.02 General information on man-mades.
01.03 Common systems of Spinning of staple fibres.
01.03.01 Cotton system of spinning.
01.04 Fibre characteristics and spinnability such as staple length, Fibre denier (Fineness), Fibre strength, Crimp, Fibre finish, Merge number.
01.05 Fibre Properties and end – uses.

TOPIC: 02 – BLENDING:

02.01 Introduction and Reason for Blending.
02.02 The aim of Blending.
02.03 Principles of fibre selection.
02.04 Measures of blending,
02.05 Migration.
02.06 Tinting.
02.07 Selection of blend constituent.
02.08 Mechanics of blending.
02.08.01 Blending at blowroom.
02.08.02 Blending at drawframe.
02.08.03 Relative merits and demerits of different blending methods.
02.08.04 Optimum blending method.

TOPIC: 03 – BLOWROOM:

03.01 Introduction.
03.02 Conditioning.
03.03 Typical Sequence of blowroom machines.
03.04 Principles of Opening.
03.05 Bale Breaker, Kirschner beater.
03.06 Speed and settings.
03.07 General Considerations such as Grid bars, Calender– roller Pressure, Draft between cages, calendars and lap roller, Pneumatic conveyance, Lap spindle, Lap licking, Lap weight, Lap storage, Atmospheric conditions etc.
03.08 Waste and Production.

**TOPIC: 04 – CARDING:**

04.01 Introduction and objectives of carding.
04.02 Intensity of carding.
04.03 Card clothing.
04.04 Speeds and settings.
04.05 General Considerations.
04.06 Waste and Production.
04.07 Card Auto- Levellers.
04.08 Fibre Hooks.
04.08.01 Formation of Fibre Hook.
04.08.02 Tracer Fibre Technique.
04.09 Carding faults & their elimination.
04.10 Process control of man – made Fibres & their blends.

**TOPIC: 05 – DRAWING:**

05.01 Introduction and objectives of drawframe.
05.02 Blending at drawframes.
05.03 Drafting Systems.
05.04 Roller lapping: causes and remedies.
05.05 General considerations.
05.06 Waste, Production and Unevenness.
05.07 Theory, of drafting for removal of hooks in sliver.
TOPIC: 06 – ROVING:

06.01 Introduction and objects.
06.02 Drafting systems adopted for man-made fibres and blends.
06.03 Roller Setting.
06.04 Spindle speed.
06.05 Roving twist and False – twist attachments.
06.06 General considerations.
06.07 Production and Unevenness.

TOPIC: 07 – RING SPINNING:

07.01 Introduction and objects.
07.02 Drafting Systems.
07.02.01 Roller settings.
07.02.02 Modified drafting system.
07.03 Yarn twist.
07.04 Spindle speed.
07.04.01 Spinning rings and travelers.
07.05 Yarn hairiness.
07.06 General considerations.
07.06.01 Feed, Roller Lapping and Roller weighting.
07.06.02 New aprons, Fibre Lubricant film.
07.07 Yarn quality and Common Yarn faults.
07.08 Waste and Production.

TOPIC: 08 – SPINNING OF DYED FIBRES:

08.01 Introduction.
08.02 Fibre dyeing.
08.03 Application of antistatic finish and Segregation.
08.04 Spinning Processes.
08.05 Effect of dyeing on Fibre Properties.
08.06 Waste and Yarn quality.

**TOPIC: 09 – WINDING AND DOUBLING:**

09.01 Introduction.
09.02 Winding machine.
09.03 General Considerations.
09.04 Doubler winding.
09.05 Doubling.

**TOPIC: 10 – PROPERTIES OF BLENDED YARNS:**

10.01 Introduction.
10.02 Influence of fibre Properties and blend composition on yarn properties.
10.02.01 Yarn tenacity.
10.02.02 Breaking extension.
10.02.03 Yarn evenness.

**TOPIC: 11 – PROCESSING OF STAPLE FIBRES IN WOOLLEN AND WORSTED SPINNING SYSTEM:**

11.01 Methods of Man-made Fibre Processing in Worsted Spinning.
11.02 Tow Conversion Technique: Cutting, abrasion and stretch – breaking.
11.02.01 Stapling of Tow by Cutting.
11.02.02 Stapling of Tow by Stretch – Breaking.
11.03 Blending wool with Man-made fibres.
11.04 Processing of Polyester/wool blends on Worsted system.
11.05 Processing of Acrylic/ wool blends on worsted system.
11.06 Processing of Acrylic /wool blends on woolen system.
TOPIC: 12 – WEAVING:

12.01 Brief study of Weaving of Synthetic: Warping, Sizing, Beaming, Looming, Weaving on Loom.

TOPIC: 13 – WET PROCESSING:

13.01 Brief study of wet Processing of synthetic and their blends grey inspection and Preparation of the stain, stamping, Bleaching, Mercerization, Heat setting, Dyeing, Printing and Finishing.

Books Recommended:

1.
2.
3.
4.
5.

SCHEME OF EXAMINATION FOR FINAL EXAMINATION F.M. : 80

<table>
<thead>
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The above table refers to the annual examinations only.
Rationale:

Diploma holder technicians in Textile Engineering is very frequently require to set the machines for their efficient running.

The course is introduced to develop the skillS to measures the diameter of pulley, set machines for different counts, sketch the machine parts for better understanding of the subject.

Objective:

Able to develop skill to:-

- Measure diameter of pulley.
- Set machines for optimum operation and productivity.
- Sketch gear and gearings.
- Sketch different machine parts.
- Dismantle, refitting and resetting of the machines and the parts for the better understanding of their functioning.
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
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<tbody>
<tr>
<td>01</td>
<td>Combing.</td>
<td>(15)</td>
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<tr>
<td>02</td>
<td>Flyer Frame.</td>
<td>(15)</td>
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<td>03</td>
<td>Ring Frame.</td>
<td>(15)</td>
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<td>04</td>
<td>Ring Doubler.</td>
<td>(09)</td>
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<tr>
<td>05</td>
<td>Spin Plan.</td>
<td>(06)</td>
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</tbody>
</table>

**Total:** (60)

**CONTENTS:**

**TOPIC: 01 – COMBING:**

01.01 Study the various parts of the combing machine and its functions and show passage of material.

01.02 Sketching the line and gearing diagram of the combing machine.

01.03 Demonstration of the working comber.

01.04 Dismantling, refitting and resetting of the machines for different cottons and counts.

01.05 Calculations regarding speed and production of comber.

**TOPIC: 02 – FLYER FRAME:**

02.01 Sketching the line and gearing diagram of the flyer and show passage of material.

02.02 Demonstration of the working of flyer frame.

02.03 Dismantling, refitting and setting of the machine for different cottons and counts.

02.04 Running the machine with the material.

02.05 Calculations pertaining to speed, draft, twist, number of coils, production per spindle and per machine.
TOPIC: 03 – RING FRAME:

03.01 Sketching the line and gearing diagram of Ring frame and show passage of material.
03.02 Demonstration of the working of Ring frame.
03.03 Dismantling, refitting and resetting of the machine for different cotton and counts.
03.04 Running the machine with the material.
03.05 Calculations pertaining to speed, draft, twist, number of coils, Production per spindle and per machine.

TOPIC: 04 – RING DOUBLER:

04.01 Demonstration of the Working of Dry doubler and Wit doubler.
04.02 Dismantling, refitting and resetting of the machine.
04.03 Calculation pertaining speed, production.

TOPIC: 05 – SPIN PLAN:

05.01 Spin Plan for different counts of yarn from available raw materials.

SCHEME OF EXAMINATION FOR FINAL EXAMINATION  F.M. : 40
Fabric Manufacture Lab.-II

Subject Code
18312

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Full Marks : 50
Annual Exam. : 40
Internal Exam. : 10

Rationale :

Objective :

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<tr>
<td>02</td>
<td>Jacquard.</td>
<td>(17)</td>
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<tr>
<td>03</td>
<td>Box-Motion.</td>
<td>(12)</td>
</tr>
<tr>
<td>04</td>
<td>Automatic Looms.</td>
<td>(14)</td>
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</tbody>
</table>
## CONTENTS:

### TOPIC: 01 – DOBBY:

| 01.01  | Study of various types of dobbies. |
| 01.02  | Practice of weaving designed fabrics on dobbys. |

### TOPIC: 02 – JACQUARD:

| 02.01  | Study of various types of Jacquard. |
| 02.02  | Practice of Weaving designed fabric on Jacquard Loom. |

### TOPIC: 03 – BOX-MOTION:

| 03.01  | Study of various types of Box-motion. |
| 03.02  | Study of Pick at will motion. |
| 03.03  | Study of Centre fork motion. |

### TOPIC: 04 – AUTOMATIC LOOMS:

| 04.01  | Study of various motions in automatic Looms. |
| 04.02  | Practice of Weaving on automatic Loom. |
| 04.03  | Weave plans for various types of fabrics. |

### SCHEME OF EXAMINATION FOR FINAL EXAMINATION

F.M. : 40
Rationale:

Diploma holder technicians in Textile Engineering is very frequently require to test the sample for these properties and purposes.

The course is introduced to develop the skill to yarn testing, fabric testing and everness testing for better understanding of the subject.

Objective:

Able to develop skill to :-

♦ Yarn testing for single yarn strength, ply yarn’s structure, abrasion on yarn strength, work of rupture, crimp in the yarn.
♦ Fabric testing for bursting strength, abrasion strength, tearing strength, crease recovery, percentage shrinkage.
♦ Everness Testing of yarn & roving.
<table>
<thead>
<tr>
<th>S.No.</th>
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<th>Periods</th>
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<tbody>
<tr>
<td>01</td>
<td>Yarn Testing.</td>
<td>(19)</td>
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<td>02</td>
<td>Fabric Testing.</td>
<td>(31)</td>
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<tr>
<td>03</td>
<td>Everness Testing.</td>
<td>(10)</td>
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</tbody>
</table>

**Total:- (60)**

**CONTENTS:**

**TOPIC: 01 – YARN TESTING:** [19]

01.01 Determination of strength of single yarn by using single thread strength tester.
01.02 Determination of Bundle strength of yarn using Lea Tester.
01.03 Determination of ply yarn’s structure.
01.04 Determination of the influence of abrasion on yarn strength.
01.05 Determination of work of rupture using Ballestic tester.
01.06 Determination of crimp by using crimp tester.
01.07 Determination of tenacity work of rupture and strain & stress curke of cotton yarns inclined plane tester.

**TOPIC: 02 – FABRIC TESTING:** [31]

02.01 Determination of the bursting strength of fabric.
02.02 Determination of Abrasion Resistance of fabric.
02.03 Determination of the fabric tearing strength by single tongue, double tongue Trapezoid, Nail, snage method.
02.04 Determination of the crease recovery of snage method.
02.05 Determination of the percentage shrinking of the given bleached cloth.
02.06 Determination of draping Duality of fabric.
02.07 Determination of colour fastness to Rubbing using crock mates.
02.08 Determination of the wettability of fabric using spray testes.

**TOPIC: 03 – EVERNESS TESTING:** [10]

03.01 Determination of Visual examination of yarn for everness and gradings.

03.02 Determination of the yarn and roving everness by using fielden walker everness tester.

**SCHEME OF EXAMINATION FOR FINAL EXAMINATION** F.M. : 40
Textile Chemistry Lab.-II

Subject Code
18314

Practical

<table>
<thead>
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<th>No. of Periods</th>
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<tr>
<td>0    0     3</td>
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No. of Periods in one session 60

Rationale:

Diploma holder technicians in Textile Engineering is very frequently require to dye natural and manmade fibre, print the fabric for their proper use.

The course is introduced to develop the skill to dye natural and manmade fibre, print the cotton fabric for better understanding of the subject.

Objective:

Able to develop skill to:-

♦ Dye cotton with vat, Azoic and Reactive dyes.
♦ Dye polyester and polyamide with Disperse dye.
♦ Print the cotton fabric by different styles.

S.No. Topics Periods
01 Dyeing. (42)
02 Printing. (12)
03 Identification. (06)

Total: (60)
## CONTENTS:

**TOPIC: 01 – DYEING:**

<table>
<thead>
<tr>
<th>01.01</th>
<th>Dyeing of five shade with vat colour on cotton. (0.5%, 0.8%, 1.0%, 1.2%, 1.5%) using all three methods (IN, IW, IK).</th>
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</thead>
<tbody>
<tr>
<td>01.02</td>
<td>Dyeing of three shade with solubalised vat colour (0.5%, 1.5%, 2%).</td>
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<tr>
<td>01.03</td>
<td>Dyeing of two shade of cotton with Aniline black (0.8%, 1.2%).</td>
</tr>
<tr>
<td>01.04</td>
<td>Dyeing of cotton with Azoic dyes (4 samples of different shades 0.5%, 0.8%, 1.2%, 1.5%).</td>
</tr>
<tr>
<td>01.05</td>
<td>Dyeing of cotton with Reactive dyes (4 Sample of different shade 0.5%, 0.8%, 1.2%, 1.5%).</td>
</tr>
<tr>
<td>01.06</td>
<td>Dyeing of Polyster fibre with Disperse dyes (4 Sample of different shade 0.8%, 1%, 1.2%, 1.5%).</td>
</tr>
<tr>
<td>01.07</td>
<td>Dyeing of Polyamide fibre with Disperse dyes (4 Sample of different shade 0.5%, 0.8%, 1.2%, 1.5%).</td>
</tr>
<tr>
<td>01.08</td>
<td>Dyeing of Polyamide fibre with Acid dyes (4 Sample of different shade 0.8%, 1.0%, 1.2%, 1.5%).</td>
</tr>
<tr>
<td>01.09</td>
<td>Dyeing of Acetate rayon with Disperse dyes (4 Sample of different shade 0.5%, 1.2%, 1.5%, 1.8%).</td>
</tr>
<tr>
<td>01.10</td>
<td>To study the effect of Time, temperature, concentration of chemicals, exhaustion etc. during dyeing.</td>
</tr>
<tr>
<td>01.11</td>
<td>Dyeing of blended fabrics and garments.</td>
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**TOPIC: 02 – PRINTING:**

<table>
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<tr>
<th>02.01</th>
<th>To study about different styles of printing (Direct, Resist and Discharge style).</th>
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<tbody>
<tr>
<td>02.02</td>
<td>To study about Pigment printing.</td>
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<tr>
<td>02.03</td>
<td>To study about Rotary Screen Printing.</td>
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</table>
TOPIC: 03 – IDENTIFICATION:

03.01 To identify the different dye stuff. (04)
03.02 To identify the different dyed goods. (02)

SCHEME OF EXAMINATION FOR FINAL EXAMINATION F.M. : 40
Rationale:

Diploma holder technicians in Textile Engineering very frequently require to analyse the sample for the purpose of reproduction.

The course is introduced to develop the skill to analyse the sample for ends/cm, picks/cm, count of yarn, twist, material, weave, crimp in the yarn, representation of Weave in point paper, preparation of artistic design, for better understanding of the subject.

Objective:

Able to develop skill to

- Analyse the test sample.
- Represent Weave in point paper, find out drafting, denting of warp yarns and its lifting plan for weaving.
- Prepare Artistic design.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
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<tbody>
<tr>
<td>01</td>
<td>Cloth Analysis.</td>
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<td>02</td>
<td>Design and Colours.</td>
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</tbody>
</table>
CONTENTS:

TOPIC: 01 – CLOTH ANALYSIS:

01.01 Discussion on the method of analysis representation of weave on point paper, thread interlacing diagrams, Drawing in drafts and peg plans.
01.02 Practice of evaluating the thread density, thickness by gauge etc.
01.03 Studying the characteristics of Riblike effect fabrics, dissecting the same fabric for various data.
01.04 Studying the characteristics of Woven rib effect fabrics, Dissecting the same fabric for various data.
01.05 Analysis of Satin and Sateen Weave fabrics.
01.06 Analysis of Bedford cord fabrics.
01.07 Analysis of Fancy cord fabrics.
01.08 Analysis of Welts and Pique fabrics.
01.09 Analysis of figured pique fabrics.
01.10 Analysis of Extra warp figured fabrics.
01.11 Analysis of Extra weft fabrics.
01.12 Analysis of Warp backed fabrics.
01.13 Analysis of Weft backed fabrics.
01.14 Analysis of Self stitching double cloths fabrics.
01.15 Analysis of Interchanging double cloths fabrics.
01.16 Analysis of Treble cloths fabrics.
01.17 Analysis of Simple terry towel fabrics.
01.18 Analysis of Warp pile fabrics.
01.19 Analysis of Weft pile fabrics.
TOPIC: 02 – DESIGN AND COLOURS:

02.01 Practice of developing all-over design effects for various fabrics.
02.02 Practice of developing Border designs.
02.03 Practice of developing Cross border designs.
02.04 Practice of representing colour and weave effects on point paper.
02.05 Practice of developing all over design using Indian historical designs.
02.06 Practice of developing all over design using Chinese historical designs.
02.07 Practice of composing textile design for household and furnishing fabrics.

SCHEME OF EXAMINATION FOR FINAL EXAMINATION F.M. : 40
Inplant Training and Visit to Works

**Subject Code**
18317

**Sessional**

<table>
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</table>

**Rationale:**

Most of the students from the technical institutes after completing their courses are absorbed by various industries. The end product of any technical institutes which is going to industries as a raw material needs to be processed by providing proper training to them by industry. The “In Plant Training” is being introduced to the final year diploma students for Textile Engineering with the view to generate technical manpower with adequate theoretical knowledge and practical skills to tackle the shop floor industry problems. They will also be able to observe how their subordinate perform in their day to day work and co-ordinate shop floor activities.

**Objective:**

With the help of Inplant Training the students will be able to:

- Understand the working of the machines, tools and equipments more clearly.
- Write down the specifications of the machines, tools and equipments.
- Know the process of material storing/handling.
- Learn to maintain office records/filing.
- Know the process of planning, implementation and monitoring.
• Learn the skill of shop-floor co-ordination.
• Know the skill of office management.
• Understand the process of production.
• Know the skill of quality control.
• Know the organisational set-up and plant Lay-out.
• Know the requirements to set-up textile mills.
• Know the markets of the end product.
• Find out opportunities and methods of recruitments.

CONTENTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Topics</th>
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<tbody>
<tr>
<td>01</td>
<td>Spinning Industry.</td>
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<tr>
<td>02</td>
<td>Weaving Industry.</td>
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<tr>
<td>03</td>
<td>Processing Industry.</td>
</tr>
<tr>
<td>04</td>
<td>Knitting Industry.</td>
</tr>
<tr>
<td>05</td>
<td>Composite mills.</td>
</tr>
<tr>
<td>06</td>
<td>Man-made fibre Industry like Man-made fibre production</td>
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<tr>
<td></td>
<td>plant, synthetic filament Industry etc.</td>
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REPORT WRITING:

The Report on “Inplant Training” should include:

<table>
<thead>
<tr>
<th>S.No.</th>
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<tbody>
<tr>
<td>01</td>
<td>Introduction.</td>
</tr>
<tr>
<td>02</td>
<td>Plant Lay-out and organisational Chart.</td>
</tr>
<tr>
<td>03</td>
<td>Planning for Product/Maintenance/Repair.</td>
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<tr>
<td>04</td>
<td>Shop-floor training (Mainly concerned with machines)</td>
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<tr>
<td>05</td>
<td>Line and Gearing diagram of different textile machines.</td>
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<tr>
<td>06</td>
<td>Testing and quality control equipments processing</td>
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</tbody>
</table>
parameters.

07 Material Storage/Handling facility/methods.

08 Markets of the end products.

09 Calculation regarding cost of production of end-products.

10 Conclusion:

- Observations.
- Typical Characteristics.
- Area of Weakness.
- Important Suggestions.

SCHEDULE FOR TRAINING
Planning/Organisational Chart/Office Management One Week
Shop-floor Two Weeks
Testing/Quality Control/Marketing One Week

The report on visit to works should be presented and assessed in the form of Seminar.

SCHEME OF EXAMINATION
Marks Distribution

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</table>
**Project Work and its Presentation in Seminar**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Sessional</th>
</tr>
</thead>
<tbody>
<tr>
<td>18318</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L  T  P/S</td>
<td>100</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>02</td>
<td></td>
<td></td>
<td>(in extra hours)</td>
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**Rationale:**

The Project work and its presentation in seminar is an important subject for a diploma holder technician in Textile Engineering. The course is designed to help a student to develop confidence, skill in report writing, skill to analyse, deciding a process etc. The course will also help in developing communication skill, and skill of quality documentation.

**Objective:**

A student will be able to:

- Identify a Problem.
- Analyse the Problem.
- Develop logical approach to solution of a Problem.
- Design of a product.
- Manufacture the product in – Textile Mill or Workshop.
- Test the product for its Quality.
- Prepare a project report (Computer printed / typed)
- Present in the form of Seminar.
## CONTENTS

01  Blending Polyester with cotton at different blending ratio.
02  Blending Polyester with viscose at different blending ratio.
03  Blending Silk with cotton at different blending ratio.
04  Silk Waste is processed in cotton system.
05  Modern Textile Design.
06  Problems related to Quality Control.
07  Problems related to Weaving Section.
08  Regarding Automatic looms.
09  Regarding fabric defects.
10  Other Similar Problems.

## REPORT WRITING:

A report must include

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Introduction.</td>
</tr>
<tr>
<td>02</td>
<td>Blends.</td>
</tr>
<tr>
<td>03</td>
<td>Fibre Selection.</td>
</tr>
<tr>
<td>04</td>
<td>Selection of Blends.</td>
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<tr>
<td>05</td>
<td>Spinning Process.</td>
</tr>
<tr>
<td>06</td>
<td>Experimental Work.</td>
</tr>
<tr>
<td>07</td>
<td>Own Experience.</td>
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<tr>
<td>08</td>
<td>Results and Discussion.</td>
</tr>
<tr>
<td>09</td>
<td>Scope for further Work.</td>
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</tbody>
</table>

OR
The Project Report should consist of :-

01 Introduction.
02 Problem statement.
03 Background.
04 Organisational set –up.
05 Plant Layout.
06 Reasons for Selecting a problem.
07 Analysis of Problem.
08 Best solution possible.
09 Any other.

Project Work/Project Report should be presented in the form of a Seminar for developing confidence and communication Skill among the students.

NOTE:-

Project work will be allotted to the students just in the beginning of the session. Each student will be given a separate work under the supervision of a teacher. Total number of students may be divided among the number of teachers available. The teacher concerned will select separate problem for each student under him and allot it to him at the beginning of the session. The work allotted should be completed within scheduled time. i.e. by the end of the session. Problems selected should preferably conform to the syllabus. If it is outside of the syllabus then it must be within the field of Textile Engineering.
GOVERNMENT OF BIHAR

DEPARTMENT OF SCIENCE & TECHNOLOGY

STATE BOARD OF TECHNICAL EDUCATION

BIHAR, PATNA

COURSE OF STUDY

FOR

PART - III Diploma

IN

Textile Engineering

THREE YEARS DIPLOMA COURSE
## Provisional

Scheme of Teaching and Examination for 3-years (w. e. f. Session 2003-2004) of
PART-III DIPLOMA in TEXTILE ENGINEERING BRANCH

### THEORY

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>SUBJECTS</th>
<th>SUBJECT CODE</th>
<th>TEACHING SCHEME</th>
<th>EXAMINATION – SCHEME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Periods per week</td>
<td>Periods in one session (year)</td>
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<td>1.</td>
<td>Professional Studies &amp; Entrepreneurship</td>
<td>00301</td>
<td>03</td>
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<tr>
<td>2.</td>
<td>Yarn Manufacture - II</td>
<td>18302</td>
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<td>3.</td>
<td>Yarn Preparation &amp; Weaving Calculation-II</td>
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<td>Fabric Manufacture – II</td>
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<td>Textile Management</td>
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<td>(A) Sericulture &amp; Silk Technology</td>
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<td>(B) Computer Aided textile Design</td>
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<td>(C) Wool Technology</td>
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<td>(D) Processing of Synthetic &amp; Blends</td>
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<td><strong>Total Periods:</strong></td>
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### PRACTICAL

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<th>EXAMINATION – SCHEME</th>
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</thead>
<tbody>
<tr>
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<td>Periods per week</td>
<td>Periods in one session (year)</td>
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<td>11.</td>
<td>Yarn Manufacture Lab. – II</td>
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| **Total** | **1000** |

| **Total Periods:** | **250** |

**Total:** **1250**
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<td></td>
<td></td>
<td>Periods per week</td>
<td>Periods in one session (year)</td>
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<tr>
<td>17.</td>
<td>In Plant Training &amp; Visit to Work</td>
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<td>(04 weeks Continuous)</td>
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<td>18.</td>
<td>Project Work &amp; Its Presentation Seminar</td>
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<td>Total :</td>
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Total Periods per week | 42 | Total Marks = 1500