

6.1 PROCESS HOUSE PLANNING AND ORGANISATION

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RATIONALE

Diploma holders in textile processing are responsible for production, planning and control. He is also required to ensure maintenance of equipment & machine, material handling, safety measures, etc. for better utilization of resources. Hence this subject.

DETAILED CONTENTS

1. Plant Layout (4 hrs)
 - Concept of plant layout
 - Types of layout (process, product and combination type)
 - Factors affecting plant layout

2. Production (8 hrs)
 - Types of production-mass production, job production and batch production
 - Material planning and allocation
 - Process planning and process sheet
 - Record keeping regarding men, materials and machine
 - Inventory control: need of inventory control, levels in inventory control.
 - Duty & responsibility of shift incharge

3. Maintenance (4 hrs)
 - Objective and importance of maintenance
 - Types of maintenance-procedures and advantages

4. Material Handling (6 hrs)
 - Importance of material handling in a process house
 - Handling of dyes & chemicals - methods & precautions
 - Benefited systems of handling of processed goods.

5. Accidents & safety measures (6 hrs)
 - Types of accidents-fire, mechanical & chemical accidents
 - Common sources of different types of accidents and their prevention
 - Methods of minimising the accidents in a process house.

6. Cost Estimation (6 hrs)
- Introduction and function of cost estimation
 - Estimation procedure
 - Elements of cost.
7. Environment Protection (14 hrs)
- Important effluent characteristics- their effect on environment
 - Tolerance limit enforced by state Pollution Boards & its purpose.
 - Characteristics of process waste streams-process, possible pollutants & nature of waste water
 - Methods of disposal of industrial waste (from dye house & print house specially)
 - Various methods of effluent treatment
 - Design layout & functioning of an effluent treatment plant
 - Red listed dyes & chemicals
8. Water Energy (Steam) Source & its conservation (8 hrs)
- Steam and water consumption
 - Reutilization of water
 - Recovery of chemicals from waste water
 - Methods of minimizing water & steam consumption
9. Need & scope of suitable ventilation & lightening system in a process house (4 hrs)
10. Standard and codes-National and International codes.ISO 9000-Concept and its implications. (4 hrs)

REFERENCE BOOKS

1. Art of Dyeing by B.S. Chauhan.
2. Health hazards in a Textile Mill by NITRA.
3. Dye House Management; Colour Publication, Bombay.
4. Modern Textile Management by J.B. Rattan; Abhishek Publication, Chandigarh.
5. Water and Effluents in Textile Mills by ATIRA.
6. Economy, Energy and Environment in Textile Wet Processing by S.S. Trived.
7. Occupational Health and Safety in Textile Mills by Dr. V.A. Shenai; Sevak Publication, Mumbai.
8. Energy Conservation in Textile Wet Processing by Dr. M.L. Gulrajani; Mahajan Publication Pvt. Ltd., Ahemdabad.

6.2 TECHNOLOGY OF FINISHING - II

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RATIONALE

A diploma holder in textile processing must have necessary knowledge & skills regarding principles & procedures used for finishing. For this, he should be acquainted with different types of processing machines used for finishing. In addition, relevant skills also need to be developed in him about operation of these machines.

DETAILED CONTENT

1. Special Finishes: Description, regarding Principle, Process, Chemicals. (8 hrs)
Methods of application of the following.
 - Special calendaring finishes
 - Water proof & water repellent finishes
 - Flame retarding & flame proof finishes
 - Soil release finishes and soil repellent finish
 - Anti bacterial & moth proof finishes.
 - Crease resistant/wrinkle resist finishes.

2. Stabilization finishes: Purpose, agents and applications of the following (10 hrs)
 - Mercerizing
 - Ammoniating
 - Shrinking
 - Chemical treatments/chlorination
 - Resin treatments
 - Stentering/Tentering – for dimensional stability
 - Fulling
 - Crabbing, potting
 - Decatising
 - Heat setting –Mechanism & Machines used.

3. Weightening of silk & Trubenising. (2 hrs)

4. Delustering of Rayons. (2 hrs)

5. Finishing of woolen fabrics: (4 hrs)
 - Acid & Alkaline milling of wool
 - Felting/non felting of wool

- Permanent setting:-
 - Decatising
 - London shrinking
 - Cylinder method
6. Description & working of rotary & paper press. (2 hrs)
 7. Finishing of synthetics: Heat setting, mechanism & process. (4 hrs)
 8. Anti static finish – agents & their applications. (2 hrs)
 9. Use of synthetic resins & rubber in finishing & their applications (2 hrs)
Thermoplastic resins
Thermosetting resins.
 10. Finishing routine – sequence of operations for long cloth, poplins, voiles, drills, organdie finish worsted woolens, woolen blankets, terry cot shirting/suiting, and terry wool. (10 hrs)
 11. Methods of evaluation of various finishes on textile materials. (2 hrs)

LIST OF PRACTICALS

1. To resin finish cotton fabric sample with resins in different concentrations.
2. To test wool, cotton rayon & blended fabrics for their dimensional stability (Shrinkage)
3. To draw the line diagram of different finishing machines.
4. Industrial visit to study the working of various finishing machines.

RECOMMENDED BOOKS

1. Textile Finishing by V.A Shenai; Sewak Publisher.
2. Textile Finishing by J.T Marsh – B-I Publications, New Delhi.
3. Technology of Bleaching by V.A Shenai.
4. Textile Fibres & their use – Katharine Paddock HESS Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
5. Textile Fibre to Fabric by Bernard P. Corbman; Mc Graw Hill International editions.
6. Textile Finishing by Murphy; Abhishek Publishers, Chandigarh.
7. Practical Cotton Finishing By Edge; Abhishek Publishers, Chandigarh.

6.3 ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

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RATIONALE

Entrepreneurship Development and Management is one of the core competencies of technical human resource. Creating awareness regarding entrepreneurial traits, entrepreneurial support system, opportunity identification, project report preparation and understanding of legal and managerial aspects can be helpful in motivating technical/vocational stream students to start their own small scale business/enterprise. Based on the broad competencies listed above, following detailed contents are arrived to develop the stated competencies.

DETAILED CONTENTS

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|-----|--|---------|
| (1) | Entrepreneurship | (4 hrs) |
| | 1.1 Concept/Meaning | |
| | 1.2 Need | |
| | 1.3 Competencies/qualities of an entrepreneur | |
| (2) | Entrepreneurial Support System | (6 hrs) |
| | 2.1 District Industry Centres (DICs) | |
| | 2.2 Commercial Banks | |
| | 2.3 State Financial Corporations | |
| | 2.4 Small Industries Service Institutes (SISIs), Small Industries Development Bank of India (SIDBI), National Bank for Agriculture and Rural Development (NABARD), National Small Industries Corporation (NSIC) and other relevant institutions/organizations at State level | |
| (3) | Market Survey and Opportunity Identification (Business Planning) | (6 hrs) |
| | 3.1 How to start a small scale industry | |
| | 3.2 Procedures for registration of small scale industry | |
| | 3.3 List of items reserved for exclusive manufacture in small scale industry | |
| | 3.4 Assessment of demand and supply in potential areas of growth | |
| | 3.5 Understanding business opportunity | |
| | 3.6 Considerations in product selection | |
| | 3.7 Data collection for setting up small ventures | |
| (4) | Project Report Preparation | (6 hrs) |
| | 4.1 Preliminary Project Report | |
| | 4.2 Techno-Economic feasibility report | |
| | 4.3 Project Viability | |

- (5) Managerial Aspects of Small Business (8 hrs)
- 5.1 Principles of Management (Definition, functions of management viz planning, organisation, coordination and control)
 - 5.2 Operational Aspects of Production
 - 5.3 Inventory Management
 - 5.4 Basic principles of financial management
 - 5.5 Marketing Techniques
 - 5.6 Personnel Management
 - 5.7 Importance of Communication in business
- (6) Legal Aspects of Small Business (6 hrs)
- 6.1 Elementary knowledge of Income Tax, Sales Tax, Patent Rules, Excise Rules
 - 6.2 Factory Act and Payment of Wages Act
- (7) Environmental considerations (6 hrs)
- 7.1 Concept of ecology and environment
 - 7.2 Factors contributing to Air, Water, Noise pollution
 - 7.3 Air, water and noise pollution standards and control
 - 7.4 Personal Protection Equipment (PPEs) for safety at work places
- (8) Miscellaneous (6 hrs)
- 8.1 Human relations and performance in organization
 - 8.2 Industrial Relations and Disputes
 - 8.3 Relations with subordinates, peers and superiors
 - 8.4 Motivation – Incentives, Rewards, Job Satisfaction
 - 8.5 Leadership
 - 8.6 Labour Welfare
 - 8.7 Workers participation in management

RECOMMENDED BOOKS

1. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
2. Entrepreneurship Development by CB Gupta and P Srinivasan, Sultan Chand and Sons, New Delhi
3. Environmental Engineering and Management by Suresh K Dhamija, SK Kataria and Sons, New Delhi

4. Environmental and Pollution Awareness by Sharma BR, Satya Prakashan , New Delhi
5. Thakur Kailash, Environmental Protection Law and policy in India: Deep and Deep Publications, New Delhi
6. Handbook of Small Scale Industry by PM Bhandari
7. Marketing Management by Philip Kotler, Prentice Hall of India, New Delhi
8. Total Quality Management by Dr DD Sharma, Sultan Chand and Sons, New Delhi.
9. Principles of Management by Philip Kotler TEE Publication

6.4 GARMENT PROCESSING

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RATIONALE

As garment industry is developing fast and expanding leaps and bounds. Therefore, a diploma holder in Textile Processing must know about the various fabric materials, preparatory finishing and after-care processes/chemicals related to garments. Hence this subject.

DETAILED CONTENTS

1. General Introduction (1 hrs)
Aim and scope of garment field with special reference to a Textile Processor.
2. Brief introduction to various departments in a garment export house (1 hrs)
3. General overview of various fabric materials used in garment making (2 hrs)
4. Preparation and dyeing of garments materials used (with special reference (14 hrs)
to denim dyeing & cotton hosiery (knit dye)
 - (a) Denim dyeing:
 - Brief chemistry of Indigo dyes and dyeing
 - Pre-requisite for Indigo dyeing and preparation for continuous Indigo dyeing range for denim
 - Type of dyeing machine
 - Rope form dyeing
 - Sheet form dyeing
 - Loop form dyeing
 - Dyeing with mixture of Indigo and some other dyes.
 - (b) Dyeing of Hosiery/Knitted material: General classes for dyeing of cotton & woolen hosiery and machines used (Pedal Dyeing, Winch dyeing, soft-overflow dyeing machines). Dyeing of silk garments.
5. Printing of Garments (2 hrs)
Brief description of various techniques used in printing of garments-Block, Screen, Stencils and Transfer Printing.
6. Finishing of garments and after treatment (18 hrs)
 - (a) Finishing in Pre-Garment i.e. fabric stage
 - Purpose of following textural, Semi-Permanent & Permanent finishes.

Singeing, Shearing, Sanforising (anti-shrink), Tentering, decatizing, heat-setting, mercerising, moiering, calendering, Sherinering, embossing, raising, soil release/repellent, Moth and mildew proofing, Anti crease (Resin Finish) & wash-n-wear.

- Denim Finishing
 - Preshrinking of Denim
 - Integrated finishing and shrinking range
 - Sanforest process
 - Skewing
 - Special shade effects in Denim by washing treatment
 - Stone washing
 - Acid washing
 - Bleaching washing
 - Enzyme washing
 - Over dyed denims
 - Quick wash denims and their advantages
 - Durable press finishing of Garments
 - Pre-cure process
 - Post cure process
- (b) Finishing in Garment Stage - Concept of garment finishing (Ironing & processing): Introduction, general precautions to be taken during finishing (Ironing/Processing) of cotton, linen, Woven, Woolen, blankets, Shawls, Silk, Rayons, Lace & knitted material garments.

7. Laundering (8 hrs)
Objective, Laundering procedures for various fibre fabrics i.e. cotton & Linen, Woolen, Silks & Synthetics, various laundry equipments used in commerical launderies
8. Stain Removal (8 hrs)
Object (with reference to garment processing), General procedure of stain removal. Classification of stains. Principles of stain removing. Classification of stain removers. Application techniques for stain removers; i) Local Application ii) Bulk applications.
9. Dry Cleaning (4 hrs)
General introduction, objective and principle of the dry cleaning process, Dry cleaning chemicals, Detailed description of dry cleaning operations (sequential steps)
10. After care and Care Labelling of Garments (6 hrs)
Objective of Care Labelling, Washing, bleaching, drying, Ironing, dry cleaning instructions and symbols used. Placement of labels on garments. After care of garments & storing (General steps taken to preserve the good appearance and protection against damage during storing)

PRACTICALS

1. To dye cotton/woolen /woven/knitted sample with suitable classes of dyes
2. To print cotton garment with screen printing method
3. To print cotton garment with Block Printing method
4. To print cotton garment with stencil printing method
5. To identify various types of stains & to remove them
6. To dry-clean a garment
7. Demonstration of a commercial laundry available nearby

Note:- Garment samples to be arranged by students of their own

REFERENCE BOOKS

1. Denim for All by S.S. Satsangi & Dr. Parmar, NITRA
2. Garment Finishing & Care Labelling by S.S. Satsangi Usha publishers 53-B/AC-IV, Shalimar Bagh Delhi
3. Stain Removing Techniques by S.S. Satsangi; Usha Publishers 53-B/AC-IV Shalimar Bagh, Delhi
4. Fabric Care by Noemia D'SOUZA ,New age International Publisher, Dryagang, New Delhi
5. Changing Trends in Apparel Industry by N.S. Kaplan; Abhishek Publication, Chandigarh
6. Dry Cleaning, Souring, Dyeing of Garments, Furs and Rugs by Brannt; Abhishek Publication, Chandigarh
7. House Hold Textile and Laundry work by Durga; Indian Publication
8. Stains and their removal by O.P. Singh; Indian Publication

6.5 PROJECT WORK

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Project work aims at developing skills in the students whereby they apply the totality of knowledge and skills gained through the course in the solution of particular problem or undertaking a project. The students have various aptitudes and strengths. Project work, therefore, should match the strengths of students. For this purpose, students should be asked to identify the type of project work, they would like to execute. It is also essential that the faculty of the respective department may have a brainstorming session to identify suitable project assignments. The project assignment can be individual assignment or a group assignment. There should not be more than 3 students if the project work is given for a group. The students should identify or given project assignment at least two to three months in advance. The project work identified in collaboration with industry may be preferred.

Each teacher is expected to guide the project work of 5-6 students.

A suggestive criteria for assessing student performance by the external (personnel from industry) and internal (teacher) examiner is given in table below:

Sr. No	Performance criteria	Max. marks	Rating Scale				
			Excellent	Very good	Good	Fair	Poor
1.	Selection of project assignment	10	10	8	6	4	2
2.	Planning and execution of considerations	10	10	8	6	4	2
3.	Quality of performance	20	20	16	12	8	4
4.	Providing solution of the problems or production of final product	20	20	16	12	8	4
5.	Sense of responsibility	10	10	8	6	4	2
6.	Self expression/ communication skills	5	5	4	3	2	1
7.	Interpersonal skills/human relations	5	5	4	3	2	1
8.	Report writing skills	10	10	8	6	4	2
9.	Viva voce	10	10	8	6	4	2
Total marks		100	100	80	60	40	20

The overall grading of the practical training shall be made as per following table

	Range of maximum marks	Overall grade
i)	More than 80	Excellent
ii)	79 <> 65	Very good
iii)	64 <> 50	Good
iv)	49 <> 40	Fair
v)	Less than 40	Poor

In order to qualify for the diploma, students must get “Overall Good grade” failing which the students may be given one more chance of undergoing 8 -10 weeks of project oriented professional training in the same industry and re-evaluated before being disqualified and declared “not eligible to receive diploma ”. It is also important to note that the students must get more than six “goods” or above “good” grade in different performance criteria items in order to get “Overall Good” grade.

Important Notes

- 1. This criteria must be followed by the internal and external examiner and they should see the daily, weekly and monthly reports while awarding marks as per the above criteria.**
- 2. The criteria for evaluation of the students have been worked out for 100 maximum marks. The internal and external examiners will evaluate students separately and give marks as per the study and evaluation scheme of examination.**
- 3. The external examiner, preferably, a person from industry/organization, who has been associated with the project-oriented professional training of the students, should evaluate the students performance as per the above criteria.**
- 4. It is also proposed that two students or two projects which are rated best be given merit certificate at the time of annual day of the institute. It would be better if specific nearby industries are approached for instituting such awards.**

The teachers are free to evolve another criteria of assessment, depending upon the type of project work.

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations in such an exhibition. It is also proposed that two students or two projects which are rated best be given merit certificate at the time of annual day of the institute. It would be better if specific industries are approached for instituting such awards.

6.6 PROCESS AND QUALITY CONTROL IN TEXTILE WET PROCESSING

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RATIONALE

A Diploma holder in Textile Wet Processing has to deal with chemical processes related to preparation, dyeing, printing & finishing of textiles. He must be fully aware of the various check prints/control parameters, standards and necessary actions to improve production & quality of the processed fabric. Hence this subject.

DETAILED CONTENTS

1. Introduction (2 hrs)
Scope of process and quality control in Textile Wet Processing

2. Processes & Quality Control in Preparatory Processes (16 hrs)
Study of various check points/control parameters, quality standards and necessary actions and precautions required in the following processes
 - 2.1 Grey Fabric Inspection
 - 2.2 Sticking
 - 2.3 Shearing & cropping
 - 2.4 Singeing
 - 2.5 Desizing
 - 2.6 Scouring and Bleaching (Hypochlorite Bleaching & Hydrogen Peroxide Bleaching)
 - a) In kier (Batch operation)
 - b) In Pad-Roll system (Semi-continuous)
 - c) In J-Box machine (Continuous process)
 - 2.7 Souring
 - 2.8 Mercerisation
 - 2.9 Heat Setting
 - 2.10 Washing

3. Process and quality control in Fibre Dyeing and Yarn Package dyeing (10 hrs)
Study of various check points/control parameters (Process & machine parameters), quality standards, precautions and necessary action in the following.
 - 3.1 Objective – Basic expectations from Fibre or Yarn Package Dyer
 - 3.2 Fibre dyeing
 - 3.3 Hank dyeing

- 3.4 Package dyeing
4. Process and quality control in Fabric/cloth dyeing (16 hrs)
- Study of various control parameters for process & quality improvement of dyed fabric, standards, precautions & necessary actions required to achieve quality in cloth dyeing.
- 4.1 Basic needs
- 4.2 General considerations: Selection of dyes, chemicals & Auxillaries
- 4.3 Process & quality control in Batch Dyeing machines
- a) Jigger dyeing: Steps to reduce shade variation in jigger dying.
 - b) High Temperature/High pressure Beam dyeing: Control parameters and precautions
 - c) Jet Dying.
- 4.4 Process and quality control parameters to avoid shade variation in Semi-continuous and Continuous dyeing.
- Pad bath chemicals control
 - Padding Mangle (machine Parameters)
 - Drying
 - Polymeriser
 - Steam ager
 - Soaper
5. Process and quality control in Textile Printing (8 hrs)
- 5.1 Introduction to sequential operations of Textile Printing
- 5.2 Objectives of process control in Printing
- 5.3 Process/quality control parametes/ check points & general precautions to be taken for the following
- a) Flat Bed Screen Printing
 - b) Roller Printing
 - c) Rotary screen printing
- 5.4 Control parameters during drying, Fixation (Steaming or curing).
- 5.5 Objective & control parameters in after treatments to printed cloth.
6. Process and quality control in Textile Finishing (10 hrs)
- Study of process/quality control parameters, precautions and necessary actions to be taken in the following processes
- 6.1 Stenter Finishing
- 6.2 Calendering

- 6.3 Sanforizing
 - 6.4 Decatising
 - 6.5 Carbonisation
7. General precautions, process & machine parameters to be taken care of (2 hrs)
during processing of delicate materials i.e.
- a) Silk, woolen material & their blends
 - b) Knitted goods

REFERENCE BOOKS

1. Process and quality control in Textile Chemical Wet Processing by A.A Vaidya
ATIRA
2. Process control in Chemical Processing of Textiles by Mr Shah & Rastogi, ATIRA
3. Dyeing & Chemical Technology of Textile Fibres by E.R. Trotman
4. Stains & Stains Removal by S.S. Satsangi
5. Fabric Defect by S.S. Satsangi