

### 3.1 BASICS OF INFORMATION TECHNOLOGY

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#### RATIONALE

Information technology has great influence on all aspects of life. Almost all work places and living environment are being computerized. In order to prepare diploma holders to work in these environments, it is essential that they are exposed to various aspects of information technology such as understanding the concept of information technology and its scope; operating a computer; use of various tools of MS office; using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

#### Note:

1. *Teaching of theory should be dovetailed with practical work*
2. *The following topics may be taught in the laboratory along with the practical exercises.*

#### DETAILED CONTENTS

1. Information Technology – its concept and scope
2. Computers for information storage, information seeking, information processing and information transmission
3. Elements of computer system, computer hardware and software; data – numeric data, alpha numeric data; contents of a program, processing
4. Computer organization, block diagram of a computer, CPU, memory
5. Input devices; keyboard, mouse etc; output devices; VDU and Printer, Scanner, Plotter
6. Electrical requirements, inter-connections between units, connectors and cables
7. Secondary storage; magnetic disks – tracks and sectors, optical disk (CD and DVD Memory), primary and secondary memory: RAM, ROM, PROM etc., Capacity; device controllers, serial port, parallel port, system bus
8. Exercises on file opening and closing; memory management; device management and input – output (I/O) management with respect of windows

9. Installation concept and precautions to be observed while installing the system and software
10. Introduction about Operating Systems such as MS-DOS and Windows
11. Special features, various commands of MS word and MS-Excel
12. About the internet – server types, connectivity (TCP/IP, shell); applications of internet like: e-mail and browsing
13. Various Browsers like WWW (World wide web); hyperlinks; HTTP (Hyper Text Transfer Protocol); FTP (File Transfer Protocol)
14. Basics of Networking – LAN,WAN, Topologies

### **LIST OF PRACTICALS**

1. Given a PC, name its various components and list their functions
2. Identification of various parts of a computer and peripherals
3. Practice in installing a computer system by giving connection and loading the system software and application software
4. Installation of DOS and simple exercises on TYPE, REN, DEL, CD, MD, COPY, TREE, BACKUP commands
5. Exercises on entering text and data (Typing Practice)
6. Installation of Windows 98 or 2000 etc.
  - (1) Features of Windows as an operating system
    - Start
    - Shutdown and restore
    - Creating and operating on the icons
    - Opening closing and sizing the windows
    - Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file
    - Creating and operating on a folder
    - Changing setting like, date, time color (back ground and fore ground)
    - Using short cuts
    - Using on line help
7. MS-WORD

- File Management:  
Opening, creating and saving a document, locating files, copying contents in some different file(s), protecting files, Giving password protection for a file
- Page Set up:  
Setting margins, tab setting, ruler, indenting
- Editing a document:  
Entering text, Cut, copy, paste using tool- bars
- Formatting a document:  
Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
- Aligning of text in a document, justification of document ,Inserting bullets and numbering
- Formatting paragraph, inserting page breaks and column breaks
- Use of headers, footers: Inserting footnote, end note, use of comments
- Inserting date, time, special symbols, importing graphic images, drawing tools
- Tables and Borders:  
Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
- Print preview, zoom, page set up, printing options
- Using Find, Replace options
- Using Tools like:  
Spell checker, help, use of macros, mail merge, thesaurus word content and statistics, printing envelops and lables
- Using shapes and drawing toolbar,
- Working with more than one window in MS Word,
- How to change the version of the document from one window OS to another

- Conversion between different text editors, software and MS word

## 8. MS-EXCEL

- Starting excel, open worksheet, enter, edit, data, formulas to calculate values, format data, create chart, printing chart, save worksheet, switching from another spread sheet
- Menu commands:  
create, format charts, organise, manage data, solving problem by analyzing data, exchange with other applications. Programming with MS-Excel, getting information while working
- Work books:  
  
Managing workbooks (create, open, close, save), working in work books, selecting the cells, choosing commands, data entry techniques, formula creation and links, controlling calculations, working with arrays
- Editing a worksheet, copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet
- Creating a chart:  
Working with chart types, changing data in chart, formatting a chart, use chart to analyze data
- Using a list to organize data, sorting and filtering data in list
- Retrieve data with MS – query: Create a pivot table, customising a pivot table. Statistical analysis of data
- Customise MS-Excel:  
  
How to change view of worksheet, outlining a worksheet, customise workspace, using templates to create default workbooks, protecting work book
- Exchange data with other application: linking and embedding, embedding objects, linking to other applications, import, export document.

## 9. Internet and its Applications

- a) Log-in to internet

- b) Navigation for information seeking on internet
- c) Browsing and down loading of information from internet
- d) Sending and receiving e-mail
  - Creating a message
  - Creating an address book
  - Attaching a file with e-mail message
  - Receiving a message
  - Deleting a message

### **RECOMMENDED BOOKS**

1. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
2. Computers Today by SK Basandara, Galgotia publication Pvt ltd. Daryaganj, New Delhi
3. MS-Office 2000 for Everyone by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., New Delhi
4. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
5. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
6. Mastering Windows 95, BPB Publication, New Delhi
7. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
8. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi

### 3.2 BASIC CHEMISTRY

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#### RATIONALE

A Diploma holder in textile processing is required to supervise the processing of textiles in various sections. He is supposed to be aware of qualitative and quantitative aspects of chemistry. Hence this subject.

1. Colloids (6 hrs)
  - Introduction, types of colloidal solutions, characteristics of colloidal solutions (Mechanical, optical, electrical) coagulation of solution, Schulze-Hardy law, Protective colloids. Gold number, Emulsions and Gels, application of colloids.
  - Equivalent wt., Atomic wt. Their relationship, concentration of solution- Molarity, Molality, Normality
  
2. Kinetics of chemical Reactions (3 hrs)
 

Introduction, factors affecting rate of reaction, difference between order and molecularity of reaction, Kinetic equations of different orders.
  
3. Catalysis (3 hrs)
 

Introduction, types of catalysis, characteristics of catalytic reaction, Promoters, Auto catalysis, Theory of catalysis, Acid-base catalysis, Enzyme catalysis.
  
4. Chemical Equilibrium (4 hrs)
 

Concept of reversible reactions, chemical equilibrium and its characteristics, law of mass action, equilibrium constant, Le-chatelier's Principle-effect of change in concentration, Pressure and temperature. Application of Le-chatelier's principle in industry.
  
5. Acids and Bases: (14 hrs)
  - Concept of acid and bases- (1) Arrhenius concept (2) Bronsted loway (3) Lewis concept, relative strength of acid and bases. Concept of pH and its measurement by pH meter, pH scale, Relation between pH and pOH, concept of buffers and mechanism of buffer action
  - Types of reactions in organic chemistry : Organic compounds and their classification and nomenclature based on IUPAC system, Empirical and molecular formule and their calculation.
  - Detection of elements in organic compounds:  
Carbon, hydrogen, nitrogen, sulphur, halogens and oxygen. Detection of functional groups.

6. Aliphatic compounds (6 hrs)

Properties and uses of alkanes, alkenes, alkynes, halogens derivatives, alcohols, amines, aldehydes, ketones, carboxylic acids, formic acid, acetic acid, oxalic acid, urea, glycerol, carbon tetra chloride.

7. Aromatic compounds (6 hrs)

Introduction to coal and petroleum as sources of aromatic compounds, properties and uses of aromatic, hydrocarbon, benzene and toluene, halogen derivatives, hydroxy compound, nitro compounds, sulphonic acids, amino compounds, diazonium compounds, carboxylic acids and their derivatives.

8. Fats, oils, soaps and detergents (6 hrs)

Introduction to fats and oils, their sources, chemical structure and composition, physical and chemical properties and their analysis. Introduction to soap and detergents, their chemical composition, mechanism of cleaning action of soaps and their limitations. Types of detergents, difference between soap and detergent.

### PRACTICALS

1. Detection of Nitrogen, Sulphur, Chlorine, Bromine, and iodine in organic compounds.
2. Determination of functional groups in the given organic compounds (by any chemical test).
3. To measure pH of a solution by pH meter.
4. Volumetric exercises involving redox reactions using potassium permagnate and potassium chromate as standards.
5. To measure the viscosity of an oil by viscometer.

### RECOMMENDED BOOKS

1. A text book of organic chemistry by B.S. Bahl and Arun Bahl, S. Chand and Company Ltd., Delhi.
2. Organic chemistry by Morrison and Boyd, P.H.I of India Ltd., Delhi.
3. Engineering Chemistry by Jain and Jain; Dhanpat Rai and Sons, New Delhi.

### 3.3 DESIGN, COLOUR & CATD

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#### RATIONALE

Textile designing is an important part of textile field. In this subject students are given an understanding of various elements and concepts of colour and designing which develop their competency to create ideas for designing and enriching their aesthetic and colour sense according to market point of view.

The colour & design work will be displayed on display boards & be changed every 15/30 days.

#### NOTE:

1. Teachers will provide theoretical instructions along with practice and demonstration/illustration.
2. Design, colour & Computer Aided Textile Design (CATD) should be dealt simultaneously, starting with design for 2-3 weeks & then all the three components/parts (design, colour & CATD) should be practiced together.

Sr. No.	Theory (Instructions)	Practical
	<b>Part-I DESIGN</b>	
1.	Basic elements of drawing and design, Understanding of principles of design- Rhythm, Balance, Harmony, Unity, Emphasis, Proportion, Colour combination to form a good composition.	Teachers will illustrate and discuss the basic concept of drawing and designing with the help of replicas pictures, paintings, designs, etc., which help the students to create suitable and good Designs. (5 hrs)
2.	Study of objects in nature like leaves, flowers, vegetables, fruits, animals, birds etc.	Students will practice the following topics on separate drawing sheets by observing them in nature or by taking references from various books, charts, pictures, etc. At least one sheet of each topic will be prepared by students in pencil drawing. <ul style="list-style-type: none"> <li>- Sketching of different type of leaves</li> <li>- Sketching of different types of flowers.</li> <li>- Sketching of different types of vegetables</li> <li>- Sketching of different types of fruits</li> <li>- Sketching of different types of animals</li> <li>- Sketching of different types of birds</li> </ul> (7 hrs)
3.	Unit and Repeat of design	Students will learn to select unit or repeat from various samples (2 hrs)

4.	Understanding various styles of designs <ul style="list-style-type: none"> <li>- Natural (realistic)</li> <li>- Conventional (Oriental)</li> <li>- Geometrical</li> <li>- Abstract</li> <li>- Traditional</li> <li>- Folk</li> <li>- Symbolic</li> </ul>	Student will make at least three motifs based on each different style by using various colour schemes (14 hrs)
5.	Change of one style of design to another	Students will practice to change natural forms into conventional, geometrical and abstract forms (3 hrs)
6.	Construction and arrangement of designs on various basis <ul style="list-style-type: none"> <li>- Drop base</li> <li>- Half drop base</li> <li>- Drop reverse base</li> <li>- Sateen base</li> </ul>	Students will do practice on construction of designs on various basis (14 hrs)
7.	Enlargement and Reduction of designs	Students will practice to make various designs into enlarged and reduced sizes (4 hrs)
<b>PART-II (COLOUR)</b>		
1.	Light and colour phenomena and the physical basis of colour	Teacher will illustrate the basic concepts of Colour theory with the help of diagrams, charts, pictures etc (3 hrs)
2.	Introduction of 'Colour Vision Theory' and 'Pigment Theory'	Teacher will discuss the basic concepts of both the theories with the help of diagrams and charts (4 hrs)
3.	Classification of Colours	Students will prepare a chart of classification of colours using poster colours on drawing sheet (4 hrs)
4.	Chromatic Circle	Students will prepare a chart of chromatic circle on drawing sheet by using poster colours (3 hrs)
5.	Colour measurement	Teacher will discuss with students various elements of colour measurement (2 hrs)
6.	Attributes of primary and secondary colours	Teacher will discuss various attributes of primary and secondary colours with students (3 hrs)
7.	Methods of modification of colours	Students will practice to produce various hues, tints, tones, shades, broken-hues by mixing various colours in various ratio (5 hrs)

8.	<ul style="list-style-type: none"> <li>- Cool colours and warm colours</li> <li>- Analogous and contrasting colour</li> <li>- Complementary colour</li> <li>- Advancing and receding colour</li> </ul>	Students will learn the concepts of cool colours, warm colours, analogous and contrasting colours, complementary colours, advancing and receding colours through different practices. (2 hrs)
9.	<p>Colour in combination</p> <ul style="list-style-type: none"> <li>- COLOUR HARMONIES:</li> <li>- Monochromatic, polychromatic and Achromatic colour schemes</li> <li>- Analogous and Contrast colour schemes</li> <li>- Complementary colour scheme</li> <li>- Split complementary colour scheme</li> <li>- Double split complementary colour scheme</li> <li>- Cool &amp; warm colour scheme.</li> </ul>	Students will practice these different colour schemes while preparing the various motifs of designs under topic 3 to 7 of Part-I (Design) (5 hrs)
10.	Colour ways	Students will practice to make some samples of designs in different colour ways (2 hrs)

### PART-III

PART-III(CATD) Computer Aided Textile Designing. The teachers will demonstrate the use of different softwares mainly Paint, Coral Draw & Adobe Photoshop-their tools and usage etc.

	Theory (Instructions)	Practical
1.	Utility of software like 'paint' to do free-hand drawing	Students will learn to do free hand drawing with computer (5 hrs)
2.	Introduction to computers compared to using of different tools in layering of design (Coral Draw)	Students should be taught how to use different tools & designing in layers using Coral (9 hrs)
3.	Use of symbol transferring with the help of tools (Coral Draw)	After the students have learnt the use of tools, they should use the symbols to transform them, using the tools, and make designs from Part-I (Design) The specific designs made should be filled with colour & texture taking advantage of layering techniques. (7 hrs)

4.	Capturing a picture/design in computer using scanner, editing and stylization.	Students will learn to do scanning of their hand-made designs, editing, stylization and change of colour-schemes, etc. (using Adobe Photo Shop) (9 hrs)
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### REFERENCE BOOKS

1. Colour Harmony (A guide to creative colour combination) by Hideaki Chijiiwa.
2. Designer's Guide to Colour-II by Jeanne Allen
3. Designer's Guide to Colour-III by Jeanne Allen
4. Designer's Guide to Colour-IV by Shibukawa and Takahashi
5. Designer's Guide to Colour-V by Shibukawa and Takahashi
6. An introduction to Colour by Ralph M Evans
7. Patterns (Designer's Guide to Japanese by Jeanne Allen
8. Traditional Indian Motifs by K Parkash; Bombay Publication
9. Textile Designs (Idea and Applications) by Jokel Sokolov; Hearts Book International, 1350, Avenue of the Americas, New York, NY 10019
10. Anupam Nature Drawing by KV Kamble: JS Gala, Gala Publishers Ahmadabad 380021
11. Anupam Freehand Drawing by KV Kamble; J.S. Gala, J S Gala Publishers Ahmadabad 380021
12. Anupam Design Drawing by KV Kamble; JS Gala, Gala Publishers, Ahmadabad 380021
13. Alankar Series Vol.1,2,3,4,5,11 by Chamankiran; Kala Bhawan, Chaman School of Art, Zeemkhana, Ground, Meerut
14. Alankar (Textile Design) by Chamankiran; Kala Bhawan, Chaman School of Art, Zeemkhana, Ground, Meerut
15. Dhawan's Art Bool Vol.1,3,4,5 by Avtar Dhwan; Tip Top Trading Company, RK Dhawan;s Building Sangala Shivala Raod, Ludhiana
16. Costumes and Textile Designs of India, by Paul Bhatnagar; Abhishak Publication Chandigarh.

### 3.4 TECHNOLOGY OF BLEACHING - I

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#### RATIONALE

To effectively supervise the processing of textiles in bleaching section, a diploma holder in textile processing must know about principles of bleaching, operations, materials, equipments and processes. Hence this subject. The emphasis should be made on development of skills in bleaching through practice.

#### DETAILED CONTENT

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| 1. Natural and added impurities in cotton.   | (2 hrs)  |
| 2. Singeing, objectives and working of singeing machines.  | (4 hrs)  |
| 3. Desizing – purpose, desizing agents and desizing methods.   | (4 hrs)  |
| 4. Principles and process of scouring of cotton and coloured woolen goods.   | (6 hrs)  |
| 5. Description and working of high pressure kiers, J. Box and vapour lock machines.  | (6 hrs)  |
| 6. Washing and souring – purpose, counter current washing, tight and slack rope washing machines.  | (6 hrs)  |
| 7. Bleaching – Process of bleaching of cotton with bleaching powder, sodium hypo chlorite, hydrogen peroxides and sodium chlorite. Effect of pH on bleaching. Advantages of one method over other. | (10 hrs) |
| 8. Drying machines – Cylinder drying, stenter drying, and chamber drying.  | (4 hrs)  |
| 9. Mercerisation – Purpose, fundamentals, physical and chemical changes, mercerization of yarn and fabric. Mercerizing machines – pad chain, pad chainless machines.                               | (6 hrs)  |

#### LIST OF PRACTICALS

1. Desizing of cotton by rot steep method.
2. Desizing of cotton by acid steeping method.
3. Desizing of cotton by enzyme steeping method.

4. To scour a given cotton sample.
5. To bleach cotton with bleaching powder.
6. To bleach cotton with sodium hypochlorite.
7. To bleach cotton with hydrogen peroxide.
8. To bleach cotton with sodium chlorite.
9. To mercerise given cotton sample.
10. Study of drying machines through industrial visit.

**Note:** Material used can be yarn/fabric.

### **RECOMMENDED BOOKS**

1. Technology of Bleaching by V.A. Shenai; Sevak Publication, Mumbai.
2. Scouring Bleaching and Mercerising by E.R. Trotman; B-I Publication, New Delhi.
3. Dyeing and Chemical Technology of Textile Fibres by E.R. Trotman, B-I Publication, New Delhi.

### 3.5 TECHNOLOGY OF DYEING -I

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#### RATIONALE

A diploma holder in textile processing must have sufficient knowledge and skills about principles of dyeing, operations, materials, equipment and processes. He should be able to execute various recipes for dyeing. Hence this subject.

#### DETAILED CONTENT

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| 1. Definition and brief history of dyeing of textile.  | (2 hrs)  |
| 2. Classification of dyestuffs on the basis of methods of applications.  | (5 hrs)  |
| 3. General terms and definitions used in technology of dyeing.   | (3 hrs)  |
| 4. Principles of dyeing machines   | (2 hrs)  |
| 5. Basic machinery used in dyeing of textile viz. Jiggers, hand dyeing machines, winches, package dyeing machine, paddle dyeing machine, padding mangles, fibre dyeing machines. | (12 hrs) |
| 6. Direct dyestuffs – Properties and application to cotton, wool and silk, after treatments of direct dyes. Dyed material to improve fastness properties.                        | (4 hrs)  |
| 7. Basic dyestuffs – Properties, mechanism and method of application to cotton, wool, silk and jute.   | (8 hrs)  |
| 8. Acid dyestuffs – Properties, mechanism and method of application to wool and silk.  | (6 hrs)  |
| 9. Acid mordant and metal complex dyes – Properties, mechanism and application to wool and silk.   | (6 hrs)  |

#### LIST OF PRACTICALS

1. Preparation of line diagram of dyeing machines and description of their working.
2. Dyeing of cotton with direct dyes, (three dyes)
3. After treatments of direct dyed material.

4. Dyeing of wool with direct dyes (three dyes)
5. Dyeing of silk with direct dyes (three dyes)
6. Dyeing of cotton with basic dyes (three dyes)
7. Dyeing of wool with basic dyes (three dyes)
8. Dyeing of silk with basic dyes (three dyes)
9. Dyeing of jute with basic dyes (three dyes)
10. Dyeing of wool with acid dyes (three dyes)
11. Dyeing of silk with acid dyes (three dyes)
12. Application of acid mordant dyes to wool
13. Application of metal complex dyes to wool and silk.

### **RECOMMENDED BOOKS**

1. Technology of Dyeing by V.A Shenai; Sevak Publication, Mumbai.
2. Dyeing and Chemical Technology of Textile Fibres by E.R Trotman; B.I Publication, New Delhi.
3. A Text Book of Dyes by Arora.
4. Printing and Dyeing of Fabric by James.
5. Chemistry and Principles of Dyeing by V.A Shenai; Sevak Publication, Mumbai.
6. Dyeing of Wool and Silk by R.S Paryag.
7. The Dyeing of Woolen fabrics by F. Beech; Abhishek Publication, Chandigarh.
8. Silk Dyeing, Printing and Finishing by Hurst; Abhishek Publication, Chandigarh.
9. Dyeing and Silk by Dr. V. A. Shenai; Sevak Publication, Mumbai.

### 3.6 TECHNOLOGY OF PRINTING-I

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#### RATIONALE

A diploma holder in textile processing must have thorough knowledge about principles and practices employed for printing. He must be fully aware of various operations, materials, equipment and processes used for printing of textiles. Hence this subject.

#### DETAILED CONTENTS

1. Introduction to Textile Printing: (4 hrs)

Objectives, brief historical background, methods and styles.

Difference between

- Dyeing and printing
- Discharge and resist style
- Methods and style

2. Printing Paste (12hrs)

Various ingredients of a printing paste, their objectives, commercial products available and name of few. Classification of dyes/colours used for printing. Classification of thickeners, essential qualities of a thickeners used in printing of textiles. Rheological behaviors of gums. Study of raw materials, properties, general method of preparing stock thickening and their suitability for different fibres in respect of the following thickeners.

- Starch and its derivatives.
- British gum
- Locust Bean gum, difference between bean gum and guar gum
- Guar gum and modified Guar gums-commercial varieties
- Alginates
- Gum Arabic
- Gum Traga canth
- Emulsion thickenings
- Starch Ethers
- Aquous based synthetic thickeners.

Precautions to be taken during making of a printing paste- factors affecting print paste consumption.

3. Preparation of cloth for printing (6 hrs)
- Steps of textile printing, study of various methods used for singeing, shearing, desizing scouring, bleaching (Hypochloride Bleaching & H<sub>2</sub> O<sub>2</sub> bleaching), stentering.
4. Fixation and after treatments (8 hrs)
- Objectives of ageing, steaming, curing, washing, soaping. Construction and working of rapid ager, high pressure steamer. Continuous steamer (fastoon steamer). Principle and Mechanism of High Temperature steaming (super heated steaming) and its advantages. Study of washing & soaping machines.
5. Block Printing (6 hrs)
- Significance of Block Printing. Steps of block printing by hand, Various equipments used in block printing by hand. Various types of blocks and their making.
- Block Printing machines -Surface Roller machine, Perrotine machine, advantages and limitations of Block Printing method. Precautions to be taken during Block Printing.
6. Screen Printing by Hand Method (4 hrs)
- Brief historical background of screen printing i.e. conversion of stencils to screens. Use of stencils (Paper & film) in Hand Screen Printing and its advantages. Photo chemical method of making screen for hand screen printing. Study of various steps of screen printing operation. Various equipment used in hand screen Printing. Various faults of screen printing, their causes and remedies.
7. Roller Printing (8 hrs)
- Concept of cylinder or Roller Printing. Study of various parts of roller printing machines and their working.
  - Methods of engraving of copper roller: Mill Engraving, Pantograph Engraving, Photo Engraving
  - Modification of cylinder Printing machine-Duplex Printing machine, jumper or intermittent printing machine.
  - Defects of Roller Printing machine , their causes and remedies.
  - Advantages and limitations of Roller Printing.

**PRACTICALS**

1. Preparation of thickening paste of following thickeners and calculate their working concentration.
  - a) Wheat starch
  - b) C.M.C.
  - c) Sodium alginate
  - d) Guar gum
2. To make fabric sample on cotton using film stencils on following themes
  - a) Flowers b) Geometric pattern C) Leafs
3. To Print a cotton fabric sample by Block Printing (wooden blocks) using reactive dyes (cold brand) in single and double colours.
4. To print a cotton fabric sample by pin blocks
5. To print a cotton fabric sample by Screen Printing method using suitable dyes/colours in single and multi colour.
6. To print a cotton fabric sample by using film/paper stencils and screen using suitable colours.
7. To print cotton fabric sample by direct dyes using block printing method and make a border design.
8. To demonstrate the working of a curing machine and cure a printed sample of cotton in lab curing machine.
9. To demonstrate the working of a roller printing machine in operation in a process/print house.
10. Demonstration of singeing machine, washing machine, stenter, steaming machine in an institute or in a processing unit.

**REFERENCE BOOKS**

1. Technology of Printing by Dr.V.A.Shanai ; Sewak Publications, Mumbai
2. Textile Printing by I.W.C. Miles

3. Textile Printing by Joyci Storey ; Thames & Hudson Ltd., London.
4. The creative guide to fabric screen printing by Pam stall ebrans; New Holland Publishers Ltd., 37, Connaught street, London
5. Principles of cotton printing by D.G. Kale
6. The Principles and practice of Textile Printing by Knecht, E and Fothergill, J.B. London
7. A guide to printing Techniques by Bast, Japan