

### 3.1 TEXTILE CALCULATIONS

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#### RATIONALE

A diploma holder in textile design is supposed to calculate the yarn count, yarn dimensions and carry out other textile calculations related to textile designing. This subject aims at developing knowledge of various calculations related to yarn and fabric.

#### DETAILED CONTENTS

##### Theory

1. Yarn numbering, Direct and Indirect yarn numbering systems, Universal Yarn Numbering System, conversion form one system to the other, calculation of resultant yarn number of plied yarn and average yarn number. (10 hrs)
2. Yarn twist. twist factor, twists per unit length, concepts of S and Z twists. (3 hrs)
3. Calculations of Yarn diameter. (2 hrs)
4. Simple calculations of speeds from pulley and wheel drives. (4 hrs)
5. Simple calculations of production of winding and warping (4 hrs)
6. Calculation of size percentage and calculations related to cloth take up and crimp percentage. (5 hrs)
7. Calculations of speeds and production of loom. (3 hrs)
8. Calculations of five-wheel and seven-wheel take up motion of loom. (3 hrs)
9. Calculation of length of warp and weft in a fabric, weight of warp and weft required for particular length of the cloth, weight per unit area of cloth, fabric count. (8 hrs)
10. Cloth cover, cover factor and weight of fabric per unit area. (3 hrs)
11. Concept of cloth setting and its calculations, measurement of cloth thickness. (3 hrs)

### **INSTRUCTIONAL STRATEGY**

In this subject teacher is required to show different samples of fabric and make the students understand about different calculation particulars like count of yarn, twist in the yarn, crimp etc.

### **RECOMMENDED BOOKS**

1. Weaving Calculations by R Sen Gupta
2. Spinning Calculations by WS Taggart
3. Handbook of Spinning Calculation by TK Pattabhiram

### 3.2 DYEING TECHNOLOGY - I

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2 - 4

#### RATIONALE

A diploma holder in textile design must have sufficient knowledge and skills about principles of dyeing operation, equipment and processes. He should be able to execute various recipes for dyeing.

#### DETAILED CONTENTS

##### Theory

1. Definition and history of Dyes and Dyeing (2 hrs.)
2. Classification of Dyes. (3 hrs.)  
(Natural, Mineral & Synthetic)
3. Pretreatments/Preparation of Material i.e. Fibre, yarn and fabric for Dyeing, (8 hrs.)
  - Singeing & Shearing
  - Desizing
  - Scouring
  - Bleaching
  - Mercerisation
4. Water- Hardness of water, and its removal (3 hrs.)
  - Importance of soft water in Dyeing
5. pH – its definition, function and importance in dyeing (2 hrs.)
6. Forms of Dyeing (14 hrs.)
  - Dope Dyeing
  - Fibre Dyeing-Stock Dyeing
  - Package Dyeing
  - Hank Dyeing, Cheese/Cone Dyeing,
  - Piece Dyeing/Fabric Dyeing
  - Rope Form, open width
  - Union and cross Dyeing machine

## **LIST OF PRACTICALS**

1. Study of different types of dyes and pigments.
2. Scouring of cotton, wool, silk and synthetics.
3. Bleaching of cotton fabric with sodium hypochlorite and  $H_2O_2$  (Hydrogen peroxide)
4. Bleaching of wool and silk with  $H_2O_2$  (Hydrogen Peroxide)
5. Bleaching of synthetics with sodium chlorite

## **INSTRUCTIONAL STRATEGY**

The students should be taken to textile dyeing industry to show them various dyeing processes of dyeing and its machinery so that the students can know various dyeing processes being used by textile industry.

## **RECOMMENDED BOOKS**

1. Technology of Bleaching - VA Shenai
2. Scouring and Bleaching - ER Trotman
3. Technology of Dyeing - VA Shenai
4. Chemical Tech of Fibrous Material - ER Trotman
5. Chemistry of Dyes and Principal of Dyeing - V.A. Shenai
6. Art of Dyeing - Chohan
7. The Dyeing of Textile Materials – Puente Cegarra

### 3.3 FABRIC MANUFACTURE-I

L T P  
3 - 4

#### RATIONALE

The diploma holders in textile design are supposed to have knowledge and skills related to various looms and manufacturing of fabric. Thus in this subject, student will learn manufacturing techniques and mechanism employed to produce fabric.

#### DETAILED CONTENTS

Sr. No	Theory	Practical Exercises
1.	Introduction to yarn packages and different yarn faults (3 hrs)	Study of various yarn packages and yarn faults
2.	Objects of warp winding and weft winding, precautions necessary during warp winding and weft winding, defects caused during warp winding and weft winding. Machines used for different types of yarns (10 hrs)	Preparation of Pirn on Pirn winding machine.
3.	Objects of warping, precautions during warping, methods of creeling, method of preparing warper's beam . Types of wrapping machine. (6 hrs)	Demonstration of different types of creels used for warping
4.	Importance of warping with respect to designing, (Sectional warping), defects in warping, their causes and remedies, their effects on designing and quality of the fabric (6 hrs)	Demonstration of sectional warping machine and its motions
5.	Calculations involved for the preparation of warp beam, pre planning of the required fabric to be produced like reed count of warp and weft, requirement of warp and weft colour, tape length (8 hrs)	Preparation of warp beam on warping machine.
6.	Objects of sizing, sizing ingredients and their functions. Outline of the procedure of sizing (6 hrs)	

7. Concept and Objectives of drafting and denting, procedure of drafting and denting, precautions to be taken during drafting and denting ( 6 hrs) Practice on drafting and denting
8. Gaiting up of a warp-beams on the loom procedure of gaiting up of warp-beam. ( 3 hrs) Practice on gaiting up a warp

### **INSTRUCTIONAL STRATEGY**

Students may be asked to do all the work on handloom or power loom to develop the knowledge and skill in fabric manufacturing

### **RECOMMENDED BOOKS**

1. Weaving Mechanism Vol. I and II by NN Banerjee
2. Fancy Weaving by KT Aswani
3. Winding and Warping by BTRA
4. Warp Sizing by JB Smith
5. Principle of Weaving by Marks and Robinsons
6. Yarn Preparation Vol. I and II by R Sen Gupta
7. Mechanism of Weaving by WM Fox

### 3.4 STRUCTURAL FABRIC DESIGN - III

L T P  
3 - 6

#### RATIONALE

The students of textile design are supposed to have knowledge and skill regarding various advanced weaves and their construction. Hence, in this subject, students will learn different weaves, their method of employment to acquire competency for production of woven designs for different end uses.

#### DETAILED CONTENTS

##### THEORY

1. Double Cloth: Construction of double and treble cloth on design paper, their beaming, drafting and pegging. Types of double structure (i) Tubular fabrics (ii) double faced fabrics (iii) fabrics opening to double the width (iv) concept of double equal plain fabrics, triple and four ply fabrics. Warp and weft tying principle. (This should be shown in a Textile Mill) (20 hrs)
2. Introduction to gauze and leno fabrics  
Structure of gauze and leno fabrics; bottom and top doubling principle. Different types of sheds formed in gauze and leno fabrics; comparison of gauze with leno. Combination of gauze and other weaves; striped patterns, study of special leno structures (gauze and leno structures to be shown in a textile mill). (20 hrs)
3. Brocade and demask fabrics, reversible and non-reversible demask, making of brocade and demask designs. (8 hrs)

##### PRACTICAL EXERCISES

1. Study of the fabrics regarding structure/weave and its end use:
  - Draper or curtain - material in natural colour with perforated weaves or different drafting
  - Furnishing fabrics (upholstery) in double cloth weaves
  - Bed cover, dobby weave,
  - Partitions and Lampshades in gauze and leno fabrics
  - Preparation of double cloth sample

## **INSTRUCTIONAL STRATEGY**

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

## **RECOMMENDED BOOKS**

1. Grammer of Textile Design – Nisbet
2. Structural Fabric Design by – Kilby
3. Woven Structures and Design – Doris Goerner; British Textile Technology Group  
WIRA House, Leeds UK
4. Fibre to Fabric by Ghosh
5. Watson's Advance Textile Design
6. Watson's Textile Design and Colour
7. Knitting Technology – Spencer
8. Warp Knit Fabric Construction by Charis Wildens U. Wilkens Verlag Germany



### 3.5 PRINTING TECHNOLOGY - I

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3 - 4

#### RATIONALE

A diploma holder in textile design must have enough knowledge about principles and practices employed for printing. He must be aware of various operation, materials, equipments and processes used for printing.

#### DETAILED CONTENTS

##### Theory

1. Introduction to printing and its Historical Background (2 hrs.)
2. Preparation of cloth for printing (3 hrs.)
3. Selection of thickness and its properties. (3 hrs.)
4. Essential constituents of printing paste and their importance (3 hrs.)
5. Preparation of printing Paste and its importance (3 hrs.)
6. Auxiliaries used for Printing (3 hrs.)
7. Methods of printing (10 hrs.)
  - Block printing
  - Stencil printing
  - Screen printing
  - Roller printing
8. Styles of printing (10 hrs.)
  - Direct/steam style
  - Resist
  - Discharge
  - Mordant/dyed
  - Non-conventional
9. After treatment of printed material (10 hrs.)
  - Drying
  - Steaming/ageing/curing
  - Washing off

## LIST OF PRACTICALS

1. Preparation of cloth for printing
2. Printing of following dyes by block/screen/stencil/roller on cotton
  - Pigment colours reactive dyes
  - Vat dyes
  - Rapid fast dyes
3. Printing of wool and silk by following dyes by block/screen/stencil
  - Acid dyes
  - Basic dyes
  - Metal complex dyes
4. Printing of synthetic fabric by following dyes with Block/Stencil/Screen/Roller
  - Pigment colours
  - Disperse dyes
  - Acid dyes
  - Basic dyes

## INSTRUCTIONAL STRATEGY

The students should be taken to textile printing industry to show them various printing processes and machinery so that the students can know various printing processes being used by textile printing industry.

## RECOMMENDED BOOKS

1. Technology of Printing by VA Shenai
2. Technology of Printing by Kalley
3. A glimpse of Chemical Technology of Fibrous Materials by RR Chakravorty
4. Dyeing and Printing by Varke
5. Dyeing and Printing by Jyoce storey
6. Introduction to Textile Printing by Clark
7. Screen Printing Designs and Technique by Biegelesien and Cohn
8. Manual of Textile Printing by Story

### 3.6 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

##### Relevant Instructions for Practical Exercises

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 envelopes 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