

## M. Sc. - Clothing and Textiles

<b>Semester I</b>		<b>Max. Marks</b>
Paper I	- Research Methodology	50
Paper II	- Textile testing and quality control	50
Paper III	- Basic Apparel construction	50
Paper IV	- History of fashion & fashion design	50
Practical	- Based on Paper I, II, III, IV	100
 <b>Semester II</b>		
Paper I	- Statistics and Computer application	50
Paper II	- Advances in textile sciences	50
Paper III	- Advance apparel construction	50
Paper IV	- Fashion designing and communication	50
Practical	- Based on Paper I, II, III, IV	100
 <b>Semester III</b>		
Paper I	- Textile chemistry and processing of textiles	50
Paper II	- Woven fabric structures and fabric analysis	50
Paper III	- Knitting technology	50
Paper IV	- Laundry science & care of fabric	50
Practical	- Based on Paper I, II, III, IV	100
 <b>Semester IV</b>		
Paper I	- Fabric Ornamentation	50
Paper II	- Garment production technology	50
Paper III	- Training / Internship	50
Paper IV	- Dissertation and seminar	50
Practical	- Based on Paper I, II, III, IV	100

## **Semester I**

### **Paper I : Research Methodology**

1. Research Methodology – Meaning, objectives and types of research. Research approaches, Significance of research, Research and scientific methods, Research process and Criteria of good research.

Definition and Identification of a Research Problem – Selection of Research problem, Justification, Theory, Hypothesis, Basic assumptions, Limitations and delimitations of the problem.

2. Research Design – Meaning and needs, Features of a good design; important concepts relating to research design, Variables, Experimental and Control groups, Different research designs–exploratory, descriptive and diagnostic, Hypothesis testing research. Sampling Design– Population and Sample, Steps in sampling design, Criteria for selecting a sampling procedure, Different types of sampling techniques–Probability sampling and Non-probability sampling.

Methods of Data collection–Schedules and Questionnaires, Interview, Case study, Home visits, Scaling methods, Reliability and Validity of measuring instruments.

3. Concept and characteristics of a normal probability curve. Analysis of Data – Graphical and Diagrammatic presentation.
4. Interpretation – Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation– Interpretation of tables and figures. Report Writing - Significance of report writing, Different steps in writing report; Types of reports, Mechanics of writing a Research Report and precautions for writing research reports. Use of Computers in Statistical Analysis – The computer system and technology, important characteristics of computer applications in researches..

#### **Practical**

1. Observations on general development of new born and preschoolers.
2. Rapid participatory observations with adolescent groups and families across various socio-economic status.
3. Rapid participatory observation among old people in institutions and non-institutional setups.
4. Exercises relating to preparation of research designs. Preparation of tools for data collection. Administration of these tools.

## **Paper II: Textile Testing and Quality Control**

### **1 Introduction**

1. Important of Textile Testing and analysis, objectives (reasons) of textile testing, Uses of Testing objectives (reasons) of textile testing, Uses of Testing information, Factors influencing Quality Control.
2. Statistical terms, use of statistic in handling data in area of textile testing
3. Sampling, terms used in sampling, fiber sampling, yarn sampling, fabric sampling
4. Development of standard test methods, national and international organizations involved in textile testing, ISO Stds. and ISO – series
5. Precision and accuracy of testing methods, atmospheric conditions for textile testing, temperature and humidity, measurement of humidity and moisture in textile.
6. Textile properties that influence fabric performance – fiber structure, yarn structure

### **2 Fiber Dimensions**

1. Fiber Fineness, Methods of measuring fiber fineness
2. Fiber length, Methods of measuring fiber length
3. Fiber Strength – Single fiber method, Bundle strength method

### **3 Yarn Test**

1. Linear Density – Direct & Indirect system, folded yarns, methods of measuring linear density of yarns from packages and skeins and from a fabric sample.
2. Yarn Crimp
3. Yarn Twist – Level of twist and twist factor methods of measuring twist, yarn evenness and methods of assessing evenness
4. Yarn Strength – Single strand method skein method, count strength product (CSP)

### **Practicals**

1. **Fiber Testing**  
Fiber Fineness – using gravimetric method  
Fiber length – (tuft length) – comb sorter
2. **Yarn Testing**  
Measuring linear density of yarn from yarn package (skein method), yarns from Fabric samples (short length)
3. **Yarn Crimp in woven fabrics**  
Yarn twist  
i) Single spun yarn and ply yarn.  
ii) twist factor
4. **Yarn evenness**  
Yarn strength test – i) Single strand test and  
ii) skein / lea strength test and CSP

### **References**

1. Principles of Textile Testing – J.E. Booth, Newness Butterworth, London
2. Textile Testing and Analysis – Billie J. Collier and Helen E. Epps, Prentice Hall, New Jersey.
3. Textile Testing – John H. Skinkle, Brooklyn, New York
4. Handbook of Textile Testing and Quality Control – Groover and Hamby
5. An Introduction to Quality Control for Apparel Industry – Pradip V. Mehta, Marcel Dekker, New York.
6. Textile Objective measurement Automation in Garment Manufacture – George Stylios – Ellis Horwood Ltd, England.
7. Knitted Clothing Technology – Brackenbury Terry, Blackwell Science Ltd.
8. Textile Testing & Quality Control Standards like – BIS, BS, ASTM, ISO, AATCC, etc.
9. Any other available book on Quality Control.

### Paper III: Basic Apparel Construction

- 1 **Anthropometric Measurement:** Concept, importance, technique, precautions.  
*Pattern Making:* Methods of Drafting, draping, flat pattern, techniques, use.
- 2 **Commercial pattern:** Concept, selection and use of commercial pattern.  
*Selection of fabrics:* factors affecting the selection of fabric for different garments. Calculating amount of fabric needed for different garments.
- 3 **Lay out planning:** definition, types of lay outs, economy of fabrics in placing patterns, adjusting fabric to patterns.  
*Fitting:* Good fit, definition, Principles & clues for good fit – Ease, live, grain, set & balance.
- 4 **Different types of stitches:** Construction and decorative.  
Different types of seams and seam finishes.
- 5 Fashion Design
  - A. Introduction to Fashion terminologies, concepts, its creation and analysis
    1. Elements used in creating a design
    2. Composition
      - With one element
      - With more than one elements
    3. Color – Its sensitivity and composition in dress.
    4. Harmony-in form of space coverage to design of the dress
    5. Components of fashion:
      - Style, Silhouette, Details, Color, Texture, Trims

#### Practicals

1. Using Drafting Method
  - 1) Gents full sleeved shirt with fusible lining
  - 2) Jeans
2. Construct garments using following theme  
Ethnic wear or party wear -
  - 1) Salwar/Chudidar and Kameez/Kurta
  - 2) Chaniya choli
3. Western or Indo-Western outfit
  - 1) Trousers and Top or
  - 2) Skirt and Top or
  - 3) Dress

4. To construct a garment using commercial pattern

**References:**

- 1) Practical Dress Design-Erwin, Mable, New York, Macmillan Co., 1964.
- 2) A Tailoring Manual –Strickland Gertue, New York, Macmillan, 1976.
- 3) Easy Cutting-Juvekar, W.B.
- 4) System of cutting-Zarapkar, K.R., Bombay, Zarapkar Tailoring College.
- 5) Basic Fashion Design-Ireland, Patrick, London, B.T. Batsford Ltd., 1972.
- 6) Reader's Digest Complete Guide to Sewing, Reader's Digest Association, 1982.
- 7) Pattern Making for Fashion Designing-Armstrong, H. (1987), New York Harpes .

## **Paper IV: History of Fashion and Fashion Design**

### **1 History of Fashion**

Growth of the Couture: The Beginning of Dress

### **2 Couture from Ancient Period (First Century B.C. to Fifth Century A.D.)**

Assignments to be given to students.

- Indian
- Egyptian
- Greek
- Roman
- French

### **3 Couture from Middle Age Period (Fifth Century A.D. to 15<sup>th</sup> Century)**

- Indian
- Italian
- French
- England
- Flemish & German

### **4 Couture from Renaissance Period (15<sup>th</sup> Century to 18<sup>th</sup> Century)**

- Indian
- Italian
- German
- French
- Spain
- England

### **5 Couture from 18<sup>th</sup> Century till date**

- France
- Italy
- England
- American
- Japanese

### **6 Costumes of India (Past to Present)**

### **7 Theories of evolution of clothing**

### **8 Traditional and tribal costumes of India – North, East, South, West and North-East**

### **9 Traditional ornaments and jewelry of different states of India**

### **10 Effect of religion and culture, color for different ceremonies and occasions.**

**Practicals:**

1. Preparation of models with different costumes and jewellery of
  - Indian Costumes
  - Egyptian Costumes
  - Greek Costumes
  - Roman Costumes
  - American Costumes
2. Collection of photographs for traditional textiles of India & preparation of file – Jandani, Baluchar Buttiedar, Chandeni, Maheshwari, Patola, Parthiv, Himum & Amum, Kashmiri Shawl, Pochampall;
3. Preparation of one article using embroidery and motifs of ancient linex.
4. Visit to a museum.

**References:**

1. Inside Fashion design-Sharon Lee Tate, Harper and row, Publishers New York
2. Life styles, Fashion Styles-Kathryn Samuel, Orbis, London.
3. The Great Fashion Designers-Milbank, C.R. (1985) Couture, Thames and Hudson Publications
4. The changing World of Fashion-Carter, E (1977)
5. The World of Fashion-Rubin, L.G.(1976), Canfield Press, San Francisco
6. Fashion Kaleidoscope-Castelino, M. (1994), Rup & Co.
7. The Fashion Makers-Walz B. and Morris, B. (1978), Random House
8. Lifestyle – Fashion styles-Samuel, K. (1986), Orbis Book Publishing Corporation Ltd. London.
9. Fashion Design and Product Development-Carr, H. and Pomery. J. (1992), Blackwell Scientific Publications, London, Edinburgh, Boston, Abling Bina, Fashion Sketchbook, Fairchild Publishers, New York
10. The Concise History of Costume and Fashion-Laver, James, New York, Harry Abrahams, 1960
11. Costume through the ages-Laver, James, New York, Simon and Schuster, 1968
12. The Mode in Costume-Wilcox. Turner R, New York, Charles Scribner's Son
13. Indian Costume Ghurey, G.S, Bombay Popular Prakashan, 1951
14. Costume and Textile of India-Bhushan Brij J., Bombay, D.B. Taraporwala & Co.
15. Historic Costumes-Lester R.N. Illinois. Chas A. Benette and Co.
16. Costume Throughout the ages Ecan C.C., New York, J.B. Limancott
17. The History of Costume-Kemper Rachel H.



**Semester II**  
**Paper I: Statistics and Computer Applications**

1. Conceptual understanding of statistical measures. Classification and tabulation of data. Measurement of central tendency, measures of variation.
2. Frequency distribution, histogram, frequency, polygons, ogive.
3. Binomial distribution.
4. Normal distribution – Use of normal Probability tables
5. Parametric, non-parametric tests.
6. Testing of hypothesis, Type I and II errors. Level of significance.
7. Chi-Square test. Goodness of fit independence of attributes 2 X 2 and r X c contingency tables.
8. Application of student ‘t’ test for small samples. Difference in proportion for means and difference in means.
9. Correlation, Coefficient of correlation, ranks correlation.
10. Fundamental of computer, History of computer, Generation of computer, Language, Components, Applications of Computers. Operating System & Internet: MS-DOS, MS-Windows, and Internet
11. MS-Office: MS-Word, MS Excel and Power Point. Introduction to Data-base Management system, Fox-Pro.

**Practicals:** Based on above topics.

**References:**

1. Basandra, S.K.: Computer for Managers, Designing An Effective Management Information System, Abhinav Publishing Industries, N. Delhi, 1965.
2. Diwan, Parag, Information System Management, Deep & Deep Publications, New Delhi, 1997.
3. Laudon, Kenneth C. and London, Jane Price, Management Information System: A Contemporary Perspective, Macmillan Publishing Company, New Delhi.
4. Mehta, Versham Management Information System, Anmol Publication, New Delhi, 1998.
5. Banerjee, Utpal K. and sachdeva, R.K., Management Information System: A New Framework, Vikas Publishing House, Pvt. Ltd., New Delhi.

## **Paper- II: Advances in Textile Sciences**

- 1 Strength properties of Textile & Apparel-Terminologies and definitions like force units, Breaking strength and Tensile strength, Stress, Specific stress, Tenacity, Elongation, Strain, Extension, Extension percentage, Gauge length, Elastic recovery, Force and elongation curve.  
Factors affecting tensile testing, fabric characteristics affecting tensile properties, tensile testing machines and their working principles.
- 2 Fabric Test Method –

Breaking strength – Ravelled strip method, cut strip method and Grab method.

Tearing Strength – Tongue tear test, Trapezoid method, Elmendorf tear test.

Bursting strength – Hydraulic / Diaphragm bursting test Seam strength and yarn slippage in woven fabrics at seams, seam slippage tests for woven and upholstery fabrics, needle cutting in a fabric, sewability of fabrics and seam efficiency

- 3 Fabric Stiffness, Handle and Drape –

Fabric Stiffness and Handle – Definitions, methods of measuring fabric stiffness- Shirley stiffness test, Hanging loop method Drape – definitions, methods of measuring fabric drape – drape meter. Crease Resistance and Crease Recovery – Definitions of terms, advantages of giving resin treatment to fabrics, fabric characteristics affecting wrinkle resistance, method of measuring crease recovery – Total test, Shirley crease recovery test, visual comparison method.

### **Practical**

1. Fabric dimension that influence its performance – Fabric length, fabric width.
2. Fabric Thickness and instruments used for measuring thickness of woven knits and non-woven fabrics.
3. Fabric count and cover factor-ends and picks per inch, Method of counting threads/inch.

### **References:**

1. Principles of Textile Testing – J.E. Booth, Newness Butterworth, London.
2. Textile Testing and Analysis – Billie J. Collier and Helen E. Epps, Prentice Hall, New Jersey
3. Textile Testing – John H. Skinkle, Brooklyn, New York.
4. Handbook of Textile Testing and Quality Control – Groover and Hamby
5. An Introduction to Quality Control for Apparel Industry – Pradip V. Mehta, Marcel Dekker, New York.
6. Textile Objective measurement Automation in Garment Manufacture – George Stylios – Ellis Horwood Ltd, England
7. Knitted Clothing Technology – Brackenbury Terry, Blackwell Science Ltd.

### **Paper III: Advance Apparel Construction**

**1** Cutting and making the fabric

Basic bodice block: Child and adult's, sleeve blocks – child and adult's plain sleeve block, basic fitted skirt block.

**2** Different type of sleeves, collars and skirts, pockets, pleats, tucks, waist bands construction (any five of each).

Different type of yokes, necklines, basic silhouettes.

**3** Dart Manipulation: From armhole, shoulder, neckline.  
Adaptation of basic drafting to the required design.

**4** Pattern Alteration: Plain sleeve-length and width alteration. Plan Skirt-length alteration, alteration for prominent abdomen or hips. Width alteration – increase and decrease up to two inch and above 2 inch.

Alterations for fitting: any 15 problems of fitting with reference to shoulder, neckline, armhole, skirt and overall garments and their remedies.

**Practical:**

- 1 Sample preparation: blocks – child and adult's bodice block sleeve below – child and adult's plane sleeve.
- 2 Sample preparation-different types of sleeves, pockets, pleats, tucks, waist bands (5 each)
- 3 Sample preparation – Different types of yokes, necklines (5 each)
- 4 Standardization of garments – formation of standards and their care application
- 5 Selection of textile design for apparel home furnishing other household.

## Paper IV: Fashion Designing and Communication

**1** Principles and element of art in dress designing.  
Study of clothing requirements for: Special figure types – short figure, thin figure, slender figure, narrow and broad shoulder large and flat chest, large and flat hips, large abdomen, long and short neck; Special conditions – maternity, lactation, old age, physically challenged.

**2** Sketching and dress designing for: Special figure types; Special needs/ conditions; Special purpose/occasion – at home, school, work, shopping, Birth day party, Wedding party, festival, bridal.

Developing a line of garments based on a theme (any three of following): beach wear, casual wear, sports wear, night wear, evening wear, executive wear, traditional Indian Costume.

**3** Fashion: Definition, history, elements, terminology, cycle, factors affecting fashion, fashion sources, fashion trends in India and abroad.

Fashion communication: need for promotion of fashion, need for the communication process, communication through different media – written, visual.

**4** Computer aided designing: Concept, Introduction to pattern making software, knowledge of pattern making programmes, Use of computer application, making patterns for different garments and requirements.

**5** Fashion Designer and his role in Fashion Industry.

Fashion Forecasting.

Understanding and sketching of theme based on fashion forecast - Sourcing of raw materials., Developing line, based on fabric and them selected., Spec sheet study, Sampling, Garment Analyses, Costing – Construction of garments, Line Presentation, Use of sale promotion material.

Study of fashion markets and its segments.

Designers – International and National. (Assignments to be given to the students)

### Practical:

**1** Sheet preparation – dress designing according to theory syllabus.

**2** Portfolio development on a special theme.

**3** Sketching of Accessories

- Hats and Head gear
- Footwear
- Bags and Purses
- Jewelleries etc.

**4** Developing a line of garments on a theme (any one of the following)

- Casual wear
- Sports wear
- Cocktail wear
- Executive wear

**5** Understanding and sketching theme based on a fashion forecast.

- Sourcing of raw materials
- Developing line, based on fabric and theme selected
- Spec sheet study
- Sampling
- Garment analysis
- Costing – construction of garments
- Line presentation

Use of sale promotion material

**References**

1. Introduction Pattern Cutting, Grading and Modeling-Goulbourn, M. (1971)  
London: B.T. Batsford Ltd.
2. Fitting Commercial Patterns-Minott, J. (1978), Mineapolis: Minnesold  
Burgess Publishing Co.
3. Modeling and Flat Cutting for Fashion – Staneley H. (1977), London:  
Hutchison and Co., Publishers Ltd
4. Concepts in Clothing –Grate and Strom, Mc Graw Hill Book Co., New York.
5. Fabric Sewing Guide-Claire Shaeffers, Chilton Book Co., Radont,  
Pennsylvania.
6. Pattern Cutting-Melliari, M. London, B.T. Batsford, M68

**Semester III**  
**Paper I: Textile Chemistry and Processing of Textiles**

**1 Polymer Chemistry: (In brief)**

1. Definition of Polymers, its types, degree and methods of polymerization, polymerization process, molecular weights of polymers and its determination.
2. Orientation and crystallinity of fiber molecules; their influence on the fiber properties.

**2 Chemistry of Cellulosic & Protein Fibers**

1. Molecular structure and Morphology of cellulose and protein fibers
2. Brief introduction on felting and shrink proofing of wool, degumming and weighting of silk.

**3 Dyes**

1. History of dyestuffs, light, color, dyestuffs, Structure & Use wise classification of dyes.
2. Color-Beer's law and Lambert's law, colour mixing system, colour order system, CIE color specification, Instruments for the measurement of color, Kubelka – Munk Theory, Relation between K-S & concentration of colourant, understanding Color difference, Hue, Chroma, etc. Understanding the use of Color Index Standards, dye shade cards and pantone colour coding.
3. Commercial dyes, their C.I. constitution number and their C.I. generic number, nomenclature of commercial dyes.
4. Introduction on Banned dyes.  
- Color Fastness: Introduction, Color fastness test, method to washing, dry cleaning, light, cracking perspiration, heat (Hot pressing)

**Practicals**

1. Qualitative – Identification of fibers – cotton, polyester, viscose, Polyamide, silk, wool, jute, tencel and others. Use of burning, microscopic, chemical tests.
2. Desizing, scouring and bleaching of grey fabric using chemical and eco-friendly agents.
3. Dyeing of cotton with direct dye by exhaust method
4. Dyeing of wool and silk with acid dye by exhaust method.
5. Use of natural dyes and mordents (Synthetic & natural) to dye cotton, silk and

wool.

6. Printing on cotton fabric with reactive dyes and pigment, Printing on silk with acid dyes.
7. Use of Colorimeter / Spectrophotometer for determination of dye content on fabrics through optical density measurement calibration curve

## References

1. Technology of Textile Processing – Shenai, V.A. (1984), Vol. – IX, Sevak Publication.
2. Hand Book of Textile Fibers – Cook, J. Gordon, Merrow Publishing Co. Ltd, England.
3. Manmade Fibers – Moncrief: R.W, John Wiley & Sons New York.
4. Dyeing and Chemical technology of Textile Fibers – Trotman, E.r. (1975), Charles Griffino Company Ltd, London.
5. An Introduction to Textile Finishing – Marsh, J.T. (1979), B.I. Publications.
6. Chemicals after Treatment of Textile - Mark H., Wooding N. S. & Atlas Smeeds (1970), John Wiley & Sons Inc., NY.
7. Handbook of fiber Science and Technology, Vol II, Chemical Process of I and Fabrics, Functional Finishes Part A – Lewin, M. and Selio, Stephen B. (1983) Marcel Deker, Inc, NY and Basel.
8. Introduction to the chemistry of Dyestuffs-Shenai, V.A.(1991);, Sevak Prakashan.
9. Natural Dyes and their Application to Textiles, Gulrajani M.L. and Gupta, D. (1982), IIT Dellhi.
10. Natural dyeing process of India-Mohanty, Chandramouli, Naik, (1987), Ahmedabad, Calico Museum of Textiles.
11. India Horti business on line. <http://www.agroindia.org/HOL>
12. Technology of Finishing-Shenai, V.A. and Saraf, N.M. (1990), Vol. X.II Edition.
13. Fundamental Principles of Textile Processing-Shenai. V.A. (1984); Vol. IX, I Edition, Sevak Pub.
14. Evaluation of Textile Chemicals-Shenai, V.A. and Mehra, R.H. (1984); Vol. VIII, Sevak Pub.
15. Technology of Dyeing-Shenai, V.A. (1988); Vol. VI, Sevak Pub.
16. Technology of Dyeing-Shenai, V.A. (1988); Vol. I, Edition III, Sevak Pub.
17. Chemistry of Dyes & Principles of Dyes-Shenai, V.A. (1987); Vol. III, Edition III, Sevak Pub.
18. Textile Fibers-Shenai, V.A. (1990); Vol. I, Edition III, Sevak Pub.
19. Chemistry of Organic Textile Chemicals-Shenai, V.A. and Saraf, N.M., Sevak Pub.
20. History of Textile Design-Shenai, V.A. (1988), Sevak Pub.

## **Paper II: Woven fabric structure and fabric analysis**

- 1 a) Yarn and their Characteristics – Continuous Filament and Spun Yarns, Uniformity, Smoothness and luster, Resistance to flattening, Fibre and yarn strength, Fibre density shape and crimp, Bulked and textured yarns, Core spun and stretch yarns
- b) Yarn count (Single and folded or ply yarns) – different numbering systems, resultant count, yarn diameter, yarn twist and its influence on woven structure.
- 2 Cloth Calculations – Factors involved in cloth calculations - Calculation of weight of Warp & Weft calculation, Quantity of material required for a piece (Grey fabric, bleached and dyed fabric), per linear and square meter.
- 3 a) Brief Study of Preparatory Machines – Cone and cheese winding machine, Pirn winding, Beam warping machine, sizing machines and the different yarn packages with their characteristics
- b) Weaving Looms – Brief introduction to working of the following looms - Brief introduction to working of the following looms – Tappet, Dobby, Jacquard, Shuttle less looms (projectile, rapier, water jet, air jet and circular loom) – Basic operations in weaving (Sedding, picking, beating, takp up, let off), Drawing in knotting and denting plans.

### **Practicals**

1. Analysis of different woven sample studied in theory for design, repeat, draft, peg plan and other details, on inch graph paper.
2. Creating stripes, Checks and colour and weave effects on inch graph paper.
3. Creating suitable design repeat for dobby and jacquard looms on graph paper.
4. Setting of table loom/sample loom and weaving the following weave samples – plain, basket, rib, satin, twill and twill based, herringbone, diamond, honeycomb, mockleno.  
Color and weave effect designs, and any other fancy weaves.

### **References:**

1. Watson Textile Design and Colour – Grosicki, Z.J, Newness Butter Worths.
2. Advance Textile Design – William Watson, Longmans Green and Co. Ltd.
3. Grammer of Textile Design – Nisbet H., Taraporewale Sons and Co., Bombay.
4. Weaving Mechanisms – K. T. Aswani Mahajan Book Distributors, Ahmedabad.
5. Weaving Calculations – R. Sengupta, Taraporewale Sons and Co., Bombay
6. woven Cloth Construction – Robinson and Mark, Butter Worth and Co. ltd, London.
7. Elements of Weaving – Thorpe, Azaba, Double day and Co. New York.
8. Modern Weaving – Singh R. H., Mahanjan Book Distributors, Ahmedabad
9. Weaving Technology – Kulkarni M.M., Virinda, Publication, Jalgaon.
10. Yarn and Cloth Calculation – Amalsar D.M.
11. Handloom Weaving – Amalsar D.M.
12. Fabric Structure and Cloth Analysis – Amalsar D.M
13. Geotextiles Handbook – T.S. Ingold and K.S. Miller, Thomas Telford
14. Textiles – Fibre to Fabric – B.P. Corbman



15. Textiles 3<sup>rd</sup> edition – N. Hollen and J. Saddler
16. Handloom weaving technology – Allen Fannin, Van Nostrand

### **Paper III: Knitting Technology**

1. Introduction to knitting, knitted construction, History of knitting.
2. Classification of knitted fabrics – woft knitting, warp knitting, Jacquard knitting, Pile knitting, Production of pile knit, Milanese knit, Simplex knit, Raschet knit, ketten Raschel Knit.
3. Yarns used for Hosiery, Types of Hosiery construction, Full – Fashioned Hosiery, Sheerness of Hosiery, Construction of Hosiery, Circular – Knit Hosiery, Women's Nylon Hosiery
4. Men's, Children's and infant's hosiery
5. Dyeing of Hosiery
6. Care of Hosiery.

#### **Practical:**

1. Sample knitting – Purl Knit, Tricot knit, Rib Knit, Jacquard knit, Pile Knit.
2. Knitting one baby garment (set)
3. Knitting, socks, Hand gloves.
4. Knitting one adult.
5. Female and male garment.

#### **Reference:**

1. Geotextiles Handbook – T.S. Iyold and K.S. Igold and K.S. Miller, Thomas, Telford.
2. Textiles – Fibres to fabric – B.P. Corbman.
3. Textiles 3<sup>rd</sup> Edition – N. Hollen and J. Saddler
4. Handloom weaving technology – Allen Fennons V. An Nostrand..

## **Paper IV: Laundry Science and Care of fabric**

- 1 Laundry Science:** Stains – Classification and methods of removal; Soaps and detergents – Composition, manufacturing, application, merits and limitations.  
Whitening agents: Types and Functions. Dry cleaning agents, methods, advantage disadvantage.
- 2 Fabric finishing Method** - Singeing or grassing, Bleaching, Mercerising, Slack Mercerizing, shrinking, Tentering, Crabbing, Decating, Stiffening, Weighting, calendaring, Schreinerling, Embossing, Moireng, Cireing, Beetling, Napping, Giggling, Shearing.
- 3 Special Purpose Finish** – Water repellency, Waterproofing, flame proofing, Moth proofing, Mildewproofing, Anti bacterial finishes, Slip resistance, Heat-reflectant finishes, Foam Laminating, and Fabric Bonding.

### **Practicals**

1. Removal of stains on cellulose, silk and synthesis
2. Evaluation of efficiency of common.
  - a. Soaps and detergents
  - b. Bleaching agents
  - c. Optical brightness
  - d. Sizing materials
3. Dyeing of different textiles using different dyes:
  - a. Cellulosic fabric
  - b. Protein fabric
  - c. Man Made fabric
  - d. Synthetic fabric
4. Developing, designing & printing of following articles by using different printing techniques (block, screen, stencil or spray) and dyes.
  - a. Bed Sheet
  - b. Sari
  - c. Suit
5. Visit to finishing units

### **References**

1. Tortora, P.G. Understanding Textiles, Latest Edition, New York, Mac. Millan Pub. Co. Inc.
2. Wynne. A. 1997. Textiles, Mac Muller Education Ltd., London
3. Hall, A.J. Textile Finishing. Heywood Books, 1966. London
4. Hall, A.J. The Standard Handbook of Textiles. Newness-Butter-worths, 1975, London.
5. Hollen, N. and Saddler, J. Textiles. Macmillan Company, 1973. New York.
6. Anderson, F.D. 1974. Tie-dyeing and Batik, Octopus Book Limited., London.
7. Grosicki, Z. Watson's 1988. Textiles Design and Color. Universal Publishing Corporation, Bombay.

## Semester IV

### Paper I: Fabric Ornamentation

- 1 Dyeing: Tie and Dye and Batik; Dyeing with natural dyes, use of pigments; Dyeing auxiliaries and their use; Dyeing defects and their remedies.
- 2 Printing: Printing methods-Block, Stencil, screen, roller, rotary; Printing auxiliaries, their use and importance; Printing styles – direct, resist, discharge, photographic, transfer, flock printing; After treatment of printed goods.
- 3 Embroidery: General embroidery techniques; Hand embroidery-knowledge of 25 hand embroidery stitches; Traditional Indian embroidery- Chikankari, Kasuti, Phulkari, Kashida, Kantha, Kutch, and Kathiawar.
- 4 Applique Work and Quilting: Applique work-basics, hand appliqué; Machined appliqué, bias tape appliqué, reverse, reverse appliqué techniques; Quilting – the art, quilting tools, designs; Basic quilting technique.  
 Role of textile auxiliaries - Stiffening agents, Optical brightening agents, Softeners, Water repellents, Wetting agents, Thickeners, Humectants, Leveling agents, Flame retarding agents, Surfactants, Carriers/swelling agents, Cross linking agents, Sequestering agents, Dispersing agents, Antistatic agents, Antifoaming agents, Dye fixing agents, Stripping agents

#### Practical:

- a. Sample preparation – Tie-n-Dye, Batik, Printing.
- b. Sample Preparation – Embroideries
- c. Article – Applique work / Quilting

#### References

1. Pandit, S., Indian Embroidery – It's variegated charms, Latest edition. Vinu Bai Patel, Baroda.
2. Dhamija, J.S. 2002. Handicrafts of India. National book trust, India
3. Deulkar. D. 1994, Household Textiles and laundry work. Atmaram and sons, Delhi.
4. Dhaniya, J and Jain, J. Handwoven Fabrics of India. Latest edition Mapin Publishing Ltd., Ahmedabad

## **Paper II: Garment Production Technology**

- 1 Role and importance of textile and Garments Industry in Indian economy.  
Problems and prospects of textile and garment industry.  
Textile policy under 5 years plan.
  
- 2 Textile industry Management: Management hierarchy, responsibilities, coordination, organization, management aids, factors influencing management organization.  
  
Comparative organization of different textile groups: Organization of senior management, organization of productive functions, Department management organization.
  
- 3 Production management: Purpose of production planning and control; Methods of production planning and control.  
  
Role of standards in quality control: Framework of control. Organization and techniques of control.
  
- 4 Export procedure and distribution channels used to reach foreign market.  
Import and export policies of Indian government.  
Recent trends in textiles
  
- 5 Five years plans and Textile industries., Market concept, Co-ordination of production with consumer preference for various textile products., Factors influencing the production and consumption of textiles, Factors affecting the cost of textile and pricing policies., Causes for price fluctuations., Sales promotion techniques, Import and export transaction, Quality control institutions and quality regulation in India, Different textile mills, Khadi and village industry commission, weaving service centres, handloom sector, co-operative societies, research associations.

**Practicals:** Presentation and seminars on special topics.

### **References**

- Cooklin, G. 2000. Introduction to Clothing Manufacture. Blackwell Scientific Publications, London.
- Related Textile Journals.