

**BHARATHIAR UNIVERSITY – COIMBATORE – 641046**  
**B.Sc. APPAREL MANUFACTURING & MERCHANDISING DEGREE COURSE**  
**(For the students admitted during the academic year 2018-2019 Batch onwards)**  
**Scheme of Examination**

P A R T	SUBJECT CODE	STUDY OF THE COMPONENT	COURSE TITLE	HOURS PER WEEK	EXAMINATIONS				CREDIT
					DUR.HRS.	CIA	MARKS	TOTAL MARKS	
Semester – I									
I		Language I – (Tamil/French)		6	3	25	75	100	4
II		English I		6	3	25	75	100	4
III		Core Paper I - Textile Fibres & Yarns		4	3	25	75	100	4
		Core Paper II - Knitting Technology		4	3	25	75	100	4
		Core Paper III - Practical I - Knitting Technology		4	3	40	60	100	4
		Allied Paper I - Computer Application Practical		4	3	20	30	50	2
IV		Environmental Studies #		2	3	-	50	50	2
Semester – II									
I		Language II– (Tamil/French)		6	3	25	75	100	4
II		English II		6	3	25	75	100	4
III		Core Paper IV - Woven Fabrics & Designs		4	3	25	75	100	4
		Core Paper V - Textile Wet Processing		4	4	20	55	75	3
		Core Paper VI - Practical II - Textile Wet Processing		4	3	30	45	75	3
		Allied Paper II - Practical - Woven Fabric Analysis & Designing		4	3	30	45	75	3
IV		Value Education – Human Rights #		2	3	-	50	50	2
Semester III									
III		Core Paper VII - Garment Machineries and Equipments		4	3	25	75	100	4
		Core Paper VIII - Pattern Making & Grading		4	3	25	75	100	4
		Core Paper IX - Principles of Management		4	3	25	75	100	4
		Core Paper X - Practical III - Stitches & Seams		6	3	30	45	75	3
		Allied Paper III - Practical - Pattern Making		6	3	30	45	75	3
		Skill based Subject I - Accountancy for Merchandisers		4	3	20	55	75	3
IV		Tamil @ / Advanced Tamil# (OR) Non-major elective - I (Yoga for Human Excellence) # / Women’ s Rights#		2	3	-	50	50	2

<b>Semester – IV</b>								
III		Core Paper XI-Textile Testing & Quality Assurance	4	3	25	75	100	4
		Core Paper XII - Garment Construction 3	4	3	25	75	100	4
		Core Paper XIII - Basics of Apparel Merchandising	4	3	25	75	100	4
		Core Paper XIV - Practical IV – Garment Construction	6	4	30	45	75	3
		Core Paper XV - Practical V – Textile Testing	6	4	30	45	75	3
		Skill based Subject II - Fashion Business	4	3	20	55	75	3
IV		Tamil @ /Advanced Tamil # (OR)Non-major elective - II (General Awareness #)	2	3	-	50	50	2
<b>Semester – V</b>								
III		Core Paper XVI - Apparel Production Management	4	3	25	75	100	4
		Core Paper XVII - Advanced in Apparel Merchandising	4	3	25	75	100	4
		Core Paper XVIII - Fashion Accessories & Trims	4	3	20	55	75	3
		Core Paper XIX - Garment Costing	4	3	25	75	100	4
		Elective Paper I	4	3	20	55	75	3
		Allied Paper IV - Practical - Computer Aided Designing	6	4	30	45	75	3
IV		Skill based Subject III - Total Quality Management	4	3	20	55	75	3
<b>Semester - VI</b>								
III		Core Paper XX - International Trade & Documentation	4	3	25	75	100	4
		Core Paper XXI - Apparel Retailing	4	3	25	75	100	4
		Core Paper XXII-Entrepreneurship and Small Business Development	4	3	25	75	100	4
		Elective Paper II	4	3	20	55	75	3
		Elective Paper III	4	3	20	55	75	3
		Skill based Subject - Export Sampling & Product Development- Practical	10	-	40	60	100	4
IV								
V		Extension Activities @	-	-	-	50	50	2
		<b>Total</b>					3500	140

List of Elective papers (Colleges can choose any one of the paper as electives)		
Elective – I	A	Fashion & Apparel Marketing
	B	Business Communication
	C	Clothing Care
Elective – II	A	Research Methods
	B	Industrial Engineering Techniques
	C	Eco Textiles.
Elective – III	A	Resource Management Techniques
	B	Intimate Apparel Manufacturing Techniques
	C	Apparel Brand Management

@ No University Examinations. Only Continuous Internal Assessment (CIA)

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## **Semester – I Core Paper I - Textile Fibres & Yarns**

### **OBJECTIVE:**

To facilitate the students to understand the structural features, investigation techniques of textile fibres, and their influence on the behaviour of textiles.

### **Unit I**

Introduction of textile fibers: Classification - Physical and chemical properties. Cotton: Botanical and commercial classification - Properties - End uses. Brief study about Organic cotton Flax: Properties - End uses. Brief study about organic cotton. Wool: Producing countries - Grading - Properties - End uses - Felting –Woolen and Worsted Yarns. Silk: Producing countries – Degumming – Weighting– Properties - End uses. Brief study on wild silk varieties.

### **Unit II**

Methods of filament spinning. Semi synthetic fibres: Regenerated and modified cellulose - Viscose rayon process flow - HWM fibres - End uses –Brief study of Bamboo, Lyocell, Soya bean fibres.

### **Unit III**

Polymer – Terminologies – Types of polymers & Polymerization. Synthetic fibres: Brief study about Polyamide, Polyester, Poly Acrylic, and Spandex. Individual fibre properties and trade names – End uses. Drawing and effects. Texturisation: definition, types, properties of textured yarn-its uses. Micro fibres.

### **Unit IV**

Classification of yarn types- Staple spinning system – Types. Yarn manufacturing Process: ginning-objectives, Objectives and process sequence –Blow room, carding, Drawing, combing, simplex, ring frame, Comparison of carded and combed yarn. Principles and process sequence - Rotor spinning, Compact Spinning.

### **Unit V**

Post spinning process: cone winding, Doubling, reeling- Ply yarn and single yarn Characteristics. Properties required for export quality hosiery yarns. Study of yarn twist and its importance — Various yarn & package defects. Yarn numbering systems. Blended textiles: Types of blending – Benefits – Double yarn - Properties –Uses. Classification of Sewing threads & applications – core spun sewing thread – Advantages.

### **OUTCOMES:**

Upon completion of the course, the students will be able

- To understand the molecular conformations of textile fibres
- To carryout structural investigations techniques
- To understand the moisture, tensile and elastic behaviour of textile fibres

### **References:**

1. *Mishra, S.P.* A Text Book of Fibre Science and Technology, New Age International (P) Ltd

Publishers, New Delhi (2000).

2. *Gordon Cook, J*, Hand Book of Textile Fibres – Vol. I & Vol. II. Wood Head Publishing Ltd., Cambridge, England (1984).
3. *Goswami.J.C., Martindale.J.G, Scardino.K.L.*, Textile Yarns, Technology, Structure & Applications, Mahajan Book Distributors, Ahmedabad (1995).
4. *Moncrieff, W*, Man-made Fibres, Butterworth Scientific (1975).
5. Identification of Textile Materials, The Textile Institute, Manchester.
6. *Eric Oxtoby*, Spun Yarn Technology
7. *Sadov.F, Korchagin.M, Matesky.A*, Chemical Technology of Fibrous Material.
8. *K.P.Chellamni*, Yarns and Technical Textiles.
9. *Bernard P. Corbman*, Textiles – Fibre to Fabric.
10. *Wynne, A*, The Motivate Series – Textiles, Macmillan Education Ltd., London (1997).

### **Semester I Core II - Knitting Technology**

#### **OBJECTIVES:**

To make the students to understand

- Fundamentals of knitting
- Types of knitting processes in detail
- Functioning of components of knitting machine

#### **Unit – I**

Different fabric forming methods-Comparison of weaving and knitting-Principles of weft and warp knitting – Comparison of weft and warp knitting – Classification of knitting machines - Yarn passage diagram of a circular knitting machine – Knitting machine elements and description - Knitting cycle of latch needle with sinker.

#### **Unit-II**

Knitting terms and definitions - Principal weft knit stitches - Knit, tuck and miss stitch formation and properties - Representation of weft knit stitches – Study of Basic weft knit structures - Needle gating - Description of circular Rib & Interlock knitting machine – Characteristics of basic weft knit structures – Circular knitting GSM and production calculations.

#### **Unit-III**

Single jersey knit fabric structures, their cam and needle order: Plain jersey, Pique, Thick pique, Honey comb, Pearl and Twill. Rib fabric structures, their cam and needle order: 1x1 rib, 2x2 rib, Drop needle, Royal rib, Polka rib, Double half cardigan, Double cardigan, Milano rib, Waffle, Flat back, Swiss double pique and French double pique. Interlock fabric structures, their cam and needle order: Interlock, Eight lock, Ottoman rib, Pin tuck, Texi pique and Ponte di Roma.

#### **Unit-IV**

Jacquard knitting - Needle selection techniques – Pattern jack, Pattern wheel, Pattern drum and

Computerized jacquard knitting machines – Brief study on specialty weft knit structures – Auto stripe yarn programming – Elastomeric yarn insertion and effects – Knitted fabric faults – Causes and Remedies.

### **Unit-V**

Flat Knitting – Yarn passage diagram of a flat knitting machine – Mechanical type Flat knitting machine - Needle bed assembly – Racking, Carriage and Cam box arrangement - Transfer Stitch and Drop Stitch – Thread diagram, effects and applications – Introduction to computer controlled Flat knitting machine. Concept of fully-fashioned machines and seamless knitwears. Introduction to warp knitting – Warp knitting terminologies – Open lap and closed lap. Basic lapping variations - Detailed study of knitting elements of Tricot and Raschel machines. Knitting action of Tricot and Raschel machines. Comparison of Tricot and Raschel machine. Study of standard two bar warp knit structures and their properties – Lock knit, Satin, Reverse lock knit, Loop raised, Sharkskin and Queens's cord.

### **OUTCOMES:**

Upon completion of this course, the student shall be able to understand the

- Principle of knitting by different types of knitting machines
- Structure and properties of fabric produced by different knitting machines

### **References:**

1. *D.B. Ajgaonkar*, Knitting Technology
2. *David .J.Spencer*, Knitting Technology
3. *Chandrasekara Iyer et al.*, Circular knitting technology
4. *Dr.Samuel Raz* , Flat Knitting
5. *Dr.S.Raz*, Warp Knitting Technology
6. *Peter Lord et al.*, Fabric forming systems

### **Semester I Core III - Knitting Technology Practical**

#### **OBJECTIVE:**

To train the students in analyzing the cloth to identify construction parameters and prepare design, draft and peg plan.

#### **Part A**

1. Calculate the speed of single jersey knitting machine through gearing Diagram.
2. Calculate the speed of rib knitting machine through gearing diagram.
3. Trace the diagram of different cams in the conventional/modern knitting machine with  
Also mention the importance of each cam.
4. Trace the take down mechanism and set the mechanism for maximum and minimum
5. Trace the positive feeder mechanism available in the modern knitting machine and set the mechanism for two different feed lengths.
6. Develop a pattern for flat knitting and set the machine accordingly.

7. Develop a pattern for circular knitting and set the machine accordingly.

### **Part B - Sample Development**

1. Pique
2. Double Pique
3. Lacoste
4. Pearl
5. Twill
6. Two Thread Fleece
7. Mini Jacquard Design
8. Auto Striper
9. Rib Waffle
10. Flat Back Rib
11. Rib drop needle
12. Interlock

#### **and Analysis of the Following Particulars:**

- |                            |                    |                        |
|----------------------------|--------------------|------------------------|
| A) Course and Wale density | B) Loop length     | C) Areal Density (GSM) |
| D) Tightness factor        | E) Technical Graph | F) Cam Order           |
| G) Needle Order            |                    |                        |

**(Any one of the above designs shall be given)**

### **OUTCOMES:**

Upon completion of the lab the student will be able

- Identify the constructional parameters of fabric
- Construct design, draft and peg plan for weaving the fabric
- Analyse the blend composition of yarn used in the fabric and the type of finish applied in the fabric

## **Semester – I Allied Paper I - Computer Application Practical**

### **OBJECTIVES:**

The student should be made to:

- Be familiar with the use of MS Office software.
  - Be exposed to presentation and visualization tools
1. Prepare your Class Time Table using Table options in MS-Word.
  2. Prepare an interview call letter and send using Mail Merge in Ms-word.
  3. To create a Cheque leaf using Ms-word. Apply Various Fonts.
  4. Create a line & bar chart for given data using Ms-word.
  5. Prepare students Mark statement Using Ms-Excel.
  6. Prepare a Employee Salary list using Ms-Excel.
  7. Prepare a Power Point presentation about a product. Apply Animation and slide Timing.
  8. Create a Mail id and use various mail features.
  9. Search the given topic using search engine and prepare a report using Ms-word.
  10. Design a T-shirt and Apply Patterns.
  11. Create a jewellery design.
  12. Design a Precious stone.
  13. Design a wedding invitation.
  14. Write HTML Code to display the registration form.
  15. Design a web page with hyperlinks linking all pages

### **OUTCOMES:**

At the end of the course, the student should be able to:

- Apply good programming design methods for program development.

## **Semester II Core Paper IV - Woven Fabrics & Designs**

### **OBJECTIVES:**

The main objective of this course is to enable the students to understand

- Preparatory processes involved in the production of fabric
- Basics of weaving processes

### **Unit – I**

Classification of fabric forming methods – Weaving preparatory processes - Objects of winding process – Winding types – Passage of material through high speed automatic cone winding machine – Passage of material through precision winding machine – Winding terminologies, open wind and close wind – Winding defects, causes & remedies. Pirn winding – Objects - Passage of material through an automatic high speed pirn winder.

## **Unit – II**

Objects of warping – Types of warping – Passage of material through high speed modern beam warping machine & sectional warping machine – Warping defects, Causes & remedies. Objects of sizing – comparison of two cylinder, multi cylinder & hot air sizing machines – Sizing ingredients & their functions – Size paste preparation – Sizing defects, causes & remedies.

## **Unit – III**

Passage of material through a plain power loom – Basic mechanisms of a loom – Primary, secondary & auxiliary motions – Tappet shedding – Cone over pick & under pick mechanisms – Beat up mechanism – Types of let off & take up mechanisms – Fabric defects, causes & remedies.

## **Unit – IV**

Introduction to weaves – Weave diagram – Plain weave & derivatives – Twill weave & derivatives –  
Satin & sateen weaves – Honeycomb – Huck a back. Objects of dobby & jacquard mechanisms – Types of dobby & jacquard – Study of negative & positive dobbies – Study of single cylinder & double cylinder jacquard mechanisms.

## **Unit – V**

Shuttle less looms: Introduction - Advantages - Types of shuttle less looms. Introduction to non wovens – Production methods - Applications. Home Textiles.

## **OUTCOMES:**

Upon completion of the course, the students will be able to

- Explain the preparatory processes involved in the production of fabrics
- Explain the principles of different fabric production methods
- Identify various fabric defects and their causes and remedies

## **References:**

1. *R.Marks, A.T.C. Robinson*, Principles of Weaving, The Textile Institute, Manchester (1976).
2. *B.Hasmukhrai*, Fabric Forming, SSM ITT Co operative stores Ltd, Komarapalayam (1996).
3. *Prof.N.N.Banerjee*, Weaving Mechanism, Vol. I & Vol. II, Published by Smt.Tandra Banerjee, West Bengal (1999).
4. *Prof.J.L.Chakravorty*, Mechanism of Weaving Machines, Smt.B.Chakravorty, Serampore, W.B. (1984).
5. *Sabit Adanur*, Handbook of Weaving, Technomic Publishing Company, Inc, USA (2001).
6. *Peter Schwartz*, Trevor Rhodes, Mansour Mohamed, Fabric Forming Systems, Mahajan Book Distributors, Ahmedabad (1996).
7. *K.T.Aswani*, Fancy Weaving Mechanism, Mahajan Book Distributors, Ahmedabad (1990).
8. *N.Gokarneshan*, Fabric Structure and Design, New Age International Publishers, New Delhi



(2004).

9. Z.Grosicki, Watson"s Textile Design and Color and Advanced Textile Design and Color ,  
Newnes – Butter Worth, Universal Publishing Corporation, Bombay (1988).
10. Blinov.I, Belay.S, Design of Woven Fabrics, MIR Publishers, Moscow (1988).

### **Semester II Core Paper V - Textile Wet Processing**

#### **OBJECTIVES:**

- To acquaint student of the operational sequence in wet processing of different textile materials
- To impart knowledge in the field of pre-processing, processing and post-processing of textile substrate
- To impart fundamental knowledge of colour science and assessment of dyed and printed goods

#### **Unit – I**

Water: water hardness – types - softening process: ion exchange - sequestering agent methods - terminology & terms related to textile industries (ph, acid, base, oxidation, reduction) – role of textile auxiliaries. Preparatory process sequence for woven & Knitted fabrics.

#### **Unit – II**

Preparatory process: singeing – objectives – types of singeing, Desizing – objectives –methods, scouring – objectives –methods. bleaching –objectives - types of bleaching agents – advantages of peroxide bleaching – optical whiteners. Mercerizing –objectives - types.

#### **Unit – III**

Dyeing: classification of dyes – principles of different dyeing - direct, reactive, vat, & disperse dyes – principles of dyeing of synthetic & blended textile materials - after treatments – types & principles of different dyeing machines : winch – soft flow – cabinet - cheese and HTHP machines – merits & demerits.

#### **Unit – IV**

Printing - methods of printing – screen preparation. styles of printing – direct, resist, discharge, transfer . print paste ingredients –after treatments. pigment printing. Garment printing : flock , HiDensity, Foil, Plastisol, foam, khadi – burnout printing. Digital printing.

#### **Unit – V**

Finishing: objectives of finishing – temporary and permanent finishes. Chemical finish: wrinkle free – softeners – anti microbial – fire retardant. Mechanical finish: calendaring – raising – shearing. Bio polishing. Stone washing. Application of enzymes in textile processing. Pollution - Brief study about ETP

#### **OUTCOMES:**

At the completion of the course, the student would be able to develop a thorough knowledge on

- Chemical processing of textile materials
- Dyeing and printing methods and principles of colour application
- Assessment of fastness properties of dyed and printed goods

### References:

1. Technology of textile processing (vol 1-2), Sevak Publications – V.A.Shenai
2. Dyeing and chemical technology of textile fibres, Charles Griffin & Co – E.R.Trotman
3. Technology of Bleaching and Dyeing of Textile Fibres Vol.1, Part–I,1979, Mahajan Book Publishers, - *Chakravarthy RR And Trivedi S.S*
4. The Bleaching and Dyeing of Cotton Material 1983, Weaver's Service Cent *Prayag R.S.*,
5. Chemical Processing of Synthetic Fibres and Blends 1982, John Wiley & Sons, New York. *Datye K.V and Vaidhay A.A.*,
6. Processing of Manmade Fibres 1975, MIR Publishers, Moscow.- *Usenko V*,
7. Colour for Textiles: A User's Handbook, Society of Dyers and Colourists(1993) - *Wilfred Ingamells*,
8. Cellulosics Dyeing, Society of Dyers and Colourists(1995) - *John Shore*,
9. Wool Dyeing, Society of Dyers and Colourists(1992) - *Lewis.D.M.*,
10. Textile Coloration and Finishing, Carolina Academic Press, Durham, North Carolina (1996) - *Warren.S.Perkins*,

### Semester II Core VI – Practical II - Textile Wet Processing Practical

#### OBJECTIVE:

To train the students in pre treatment and wet processing of textile materials

1. Estimation of water hardness by EDTA method.
2. Combined Scouring & Bleaching of grey cotton woven / knitted fabrics and estimate the loss percentage.
3. Dye the given cotton sample with natural dyes.
4. Dye the given cotton sample with cold brand reactive dyes.
5. Dye the given cotton sample with hot brand reactive dyes.
6. Dye the given cotton sample with vinyl sulphone dyes.
7. Dye the given cotton sample with reactive H-E dyes.
8. Dye the given silk material with acid / basic dyes.
9. Dye the given wool material with acid / basic dyes.
10. Dye the given polyester sample using carriers.
11. Dye the given fabric for the given pattern using Tie & Dye Technique.
12. Develop a batik motif and print on the given sample.
13. Prepare the print paste with pigment colour and print on the given fabric.
14. Print the given fabric with reactive dyes by Resist Style.
15. Prepare the Print Paste with reactive dyes and print on the given fabric by discharge style.

## **OUTCOME:**

Upon completing this practical course, the student would be able to desize, bleach, dye, print and finish the fabric with different types of chemicals and colourants.

### **Semester II Allied II - Woven Fabric Analysis & Designing Practical**

## **OBJECTIVE:**

To train the students in analyzing the cloth to identify construction parameters and prepare design, draft and peg plan.

### **Part A**

To analyse the following particulars of woven fabrics

- Woven structural analysis: Design, draft, peg plan, denting plan.
  - Warp particulars: Material of warp - ends per length - count, direction of twist, Crimp percentage, cover factor, warp pattern.
  - Weft particulars: Material of weft - picks per unit length- count, direction of twist, twist per length, Crimp percentage, cover factor and warp pattern.
  - Fabric particulars: Total Cover factor, Weight of fabric and thickness.
  - Loom requirements: Shedding mechanism, heald count, and count.
1. Plain and Twill fabrics
  2. Demonstration - production of plain and twill fabrics
  3. Satin/Sateen and Honey comb fabrics
  4. Demonstration - production of satin/sateen and honey comb fabrics
  5. Huck-a-Buck
  6. Extra thread figuring fabric(s)

### **Part B**

1. Basics of Raster and vector images, types, image formats and colour concepts.
2. Development of dobby designs (part –I) based on instructiveness of weave.
3. Development of dobby designs (part –II) based on instructiveness of weave and colour order.
4. Development of motifs.
5. Development of jacquard designs (part –I) using - colour and weave selection concepts – shade and thread balance.
6. Development of jacquard designs (part –II) Spot figuring – Drop.
7. Development of jacquard designs – Ogee base.
8. Development of jacquard designs – Diamond base.
9. Development of jacquard designs – Sateen base.
10. Multilayer design – Extra Warp/Weft design Concepts.

## **OUTCOMES:**

Upon completion of the lab the student will be able

- Identify the constructional parameters of fabric

- Construct design, draft and peg plan for weaving the fabric
- Analyse the blend composition of yarn used in the fabric and the type of finish applied in the fabric

### **Semester – III Core Paper VII - Garment Machineries and Equipments**

#### **OBJECTIVE:**

- To acquaint students of the basic production machinery and equipments used in apparel construction

#### **Unit I**

Introduction to garment industry process details. Spreading machine: Types and working procedures. Cutting machines: Types of cutting machines and its application – Detailed study on band knife, straight knife, drills & notches.

#### **Unit II**

Classification of garment manufacturing machines & applications. Studies on different sewing machine – Lockstitch machine (chain stitch formation) - Features of advanced lock stitching machines. Overlock machine – Classification - Three thread overlock machine – Stitch forming elements. Brief study on double needle lock stitch machine, flat lock machines.

#### **Unit III**

Sewing machine shapes - Sewing machine bed types-Description and application of each bed – Flat bed - Cylinder bed - Post bed – Applications. Feed mechanisms – Types - Drop feed – Compound feed - Unison feed – Drop and variable top feed -Differential bottom and variable top feed (description of each type of feed mechanisms with sketch).

#### **Unit IV**

Requirements – Guides – Types (edge & curve guide) - Compensating foot - Specialized presser foot – Stitching jig- hem folders - Slack feeding and elasticsation – Cutting aids (threads, elastic and tapes) - Stacker. Simple automatics - Button hole – Button sew – Bar tack machine - Label sewers. Types and parts of machine needles – Needle sizes - Details of stand, table and motor for sewing machines.

#### **Unit V**

Introduction to various machines for garment finishing – Fusing – Sucking – Ironing - Packing. Pressing-Purpose of pressing –Categories of pressing-The means of pressing-pressing equipment and methods-Iron and steam presses. Packaging-Types of package forms-Types of packaging materials-Quality specification of packaging materials-Merchandising packaging-Shipment packaging-Selection of package design.

#### **OUTCOME:**

Upon completion of the course, the students would understand the fundamental principles and working of garment production machinery and the interrelationship of assembly methods

## References

1. *Harold Carr and Barbara Latham*, The Technology of Clothing Manufacture, Blackwell Science Ltd, England (1994).
2. *Gerry Cooklin*, Introduction to Clothing Manufacture, Blackwell Science Ltd, England (1991).
3. *Dora.S.Lewis, Mabel Goode Bowers and Marietta Kettunen*, Clothing Construction and Wardrobe Planning, The Macmillan Company : New York (1955).
4. *Terry Brackenbury*, Knitted Clothing Technology, Blackwell Science Ltd, England.
5. *Ruth. E, Glock and Grace.I.Kunz*, Apparel Manufacturing, Pearson Education, New Delhi.

### **Semester – III Core Paper VIII - Pattern Making & Grading**

#### **OBJECTIVE:**

- To introduce students about pattern making tools from the scientific and technological viewpoint in garment industry.
- To equip students with comprehensive pattern making skills

#### **Unit I**

Introduction – Concept of basic pattern and grading – Different types of block pattern. Methods of pattern making with special reference to pattern drafting - Pattern making tools – Various pattern production terms–Standard body measurements for men’s wear, women’s wear and kids wear of different countries. Style wise component parts of a garment.

#### **Unit II**

Pattern positioning and lay out – Concept of pattern layout - Rules and methods of pattern layout – Adjusting the patterns to fabric. Fitting: Definition – Principles for a good fit– Checking the fit of a garment – Solving fitting problems in various garments.

#### **Unit III**

Draping – Importance of draping – Dress form and types – Draping steps for basic bodice, skirt, pants. Procedure to develop necklines: Jewel neck - Round neck - „U“ neck - Square neck - Pentagon neck - Star neck - Inside and outside scallop neck. Procedure to develop sleeves: Plain and puff sleeves.

#### **Unit IV**

Procedure to draft the ¼th patterns for Ladies wear: Blouse, kameez, salwar, midi, midi top. Style detailing – Skirt, Plackets, Pockets, Pants, Sleeve, Collar, Necklines.

#### **Unit V**

Basic principle of dart manipulation – Displacement of bust dart (waist – side seam, armhole – neck of front edge).Grading – Definition – Principles of grading - Master grades – Basic back & front grades – Grading of basic sleeve, basic collar, trousers.

#### **OUTCOME:**

The course would help the students to develop better understanding on how clothing should be designed, so as to provide not only good fit but also enhance body image

#### **References:**

1. *Helen Joseph Armstrong*, Pattern Making For Fashion Design, Harper Collins Publishers (1987).
2. *Winifred Aldrich*, Metric Pattern Cutting, , Blackwell Science Ltd, England (1994).
3. *Winifred Aldrich*, Metric Pattern Cutting for Men’s Wear, Blackwell Science Ltd, England

- (1990).
4. *Winifred Aldrich*, Metric Pattern Cutting for Children's Wear (From 2 – 14 Years), Blackwell Science Ltd, England (1991).
  5. *Gerry Cooklin*, Pattern Cutting for Women's Outerwear, Blackwell Science Ltd, England (1992).
  6. *Gerry Cooklin*, Pattern Grading for Women's Clothes, Blackwell Science Ltd, England (1990).
  7. *Gerry Cooklin*, Pattern Grading for Men's Clothes, Blackwell Science Ltd, England (1992).
  8. *Gerry Cooklin*, Pattern Grading for Children's Clothes, Blackwell Science Ltd, England (1991).
  9. *Gerry Cooklin*, Master Patterns and Grading for Women's Outsizes, Blackwell Science Ltd, England
  10. *Natalie Bray*, Dress Pattern Designing, Blackwell Science Ltd, England (1986).
  11. *Natalie Bray*, More Dress Pattern Designing, Blackwell Science Ltd, England.
  12. *Natalie Bray*, Dress Fitting, Blackwell Science Ltd, England, (1978).
  13. *Maccam, Dinald H*, How to Make Sensible Pattern.
  14. *Gollian Holman*, Pattern Making Made Easy.
  15. *Inju Kim*, Apparel Making in Fashion Design, Fairchild Publications Inc. New York (2002).
  16. *Winifred Aldrich*, Fabric, Form and Flat Pattern Cutting, Om Book Service, New Delhi (1996).

### **Semester –III Core Paper IX - Principles of Management**

**OBJECTIVE:** To provide an insight on the fundamentals of management and techniques .  
Apparel

#### **Unit I**

Nature and scope of management – Management Science / Art – Development of management theory – Scientific management – Henry Foyal’s principles of management.

#### **Unit II**

Planning - Meaning and purpose of planning – Steps in planning – Types of planning - Objectives and policies – Objectives, policies, procedures and methods, nature and types of policies.

#### **Unit III**

Organizing – Types of organization – Organizational structure – Span of control – Committees. Delegation and centralization line & staff relationship - Staffing – Sources of recruitment – Selection process - Training methods – Performance appraisal.

#### **Unit IV**

Directing – Nature and purpose of directing – Motivation – Discipline – Leadership – Supervision – Communication – Requirements for effective controls – Critical control points and standards.

#### **Unit V**

Controlling – Need for co-ordinating – Meaning and importance of control - Control process – Types of control - Decision making – Process of decision making – Types of decisions – Problems involved in decision making.

#### **OUTCOME:**

The student would understand the framework and scope of management and functions.

#### **References**

1. *O.P.Khanna*, Industrial Engineering And Management, Dhanpat Rai Publications, New Delhi (2006).
2. *Patrick.J.Montana and Bruce.H.Charnov*, Management, Barrows (2000).
3. *D.P.Jain* ,Business Organisation and Management, Vrinda Publications (1999).
4. *Harold Koontz and Heinz Weihrich*, Essentials of Management, Tata McGraw Hill (1998).



5. *James.A.F.Stoner, R.Edward Freeman and Danier.R.Gilbert.Jr.*, Management, Prentice Hall (1995).
6. *George.R.Terry and Stephen. G.Franklin*, Principles of Management, A.I.T.B.S (2003).
7. *Dingar Pagore*, Principles Of Management
8. *L.M.Prasath*, Principles Of Management
9. *K.Balasundaram*, Industrial Engineering & Management – IV Edition, Shree Ramalinga Sowdeswari Publications, Coimbatore (1986).

### **Semester III-Core Paper X - Stitches & Seams Practical**

#### **OBJECTIVE:**

To train the students in construction of garments

#### **List of Experiments**

1. Practice on Single Needle Lock Stitch machine for given paper / fabric exercise – Straight lines and curves - Fabric exercises – Straight lines, curves, squares, rectangles, triangles and any other irregular shapes.
2. Prepare atleast five different stitch and seam samples by using different sewing machines and furnish the machine threading diagram along with stitch density and thread consumption details.
3. Developing seams of various types - superimposed, bound lapped, flat felt and piping
4. Develop the samples of components such as Draft the Pattern, Cut & Construct the Following Components for the Given Measurement:
  1. Different Neck Lines (At Least 3Types)
  2. Different Collars (At Least 3 Types)
  3. Different Sleeves (At Least 3 Types)
  4. Different Plackets (At Least 3 Types)
  5. Different Pockets (At Least 3Types)
  6. Slits

#### **OUTCOME:**

Upon completion of this practical course, the students can carry out different types of stitching, button holing and button stitching and would have hands on experience on different machines used for garment manufacture.

### **Semester – III Allied Paper III - Pattern Making Practical**

#### **OBJECTIVE:**

To train the students in pattern making of apparels.

#### **List of Experiments**

#### **Men 's Wear**

- |  |                                  |                            |
|--|----------------------------------|----------------------------|
| 1. Basic t-shirt with half sleeve.<br>full sleeve. | 2. Polo t-shirt with half sleeve | 3. T-shirt with            |
| 4. T-shirt with raglan sleeve.                     | 5. Men's Trouser                 | 6. Brief and boxer shorts. |
| 7 Vest with and without sleeve.<br>Jacket.         | 8. Night dress                   | 9. Men's Hood              |
| 10. Men's Kimono                                   |                                  |                            |

### **Kid 's Wear**

- |                 |              |           |         |
|-----------------|--------------|-----------|---------|
| 1. A line frock | 2. Baba suit | 3. Romber | 4. Pant |
|-----------------|--------------|-----------|---------|

### **Women 's Wear**

- |                        |            |          |               |                   |
|------------------------|------------|----------|---------------|-------------------|
| 1. Ladies Basic Bodice | 2.Nighties | 3.Blouse | 4.Ladies Tops | 5.Skirt " A line" |
|------------------------|------------|----------|---------------|-------------------|

### **OUTCOME:**

Upon completion of this practical course, the student would have practical experience on pattern making of garments

## **Semester III Skill Based Subject I - Accountancy for Merchandisers**

### **OBJECTIVE:**

To Equip the students by analysing Final Accounts , Statement of Depreciation and Bill of Exchange.

#### **Unit – I**

Introduction – book keeping - meaning of accounting – types of accounts – personal – real – nominal – end use of accounting – financial accounting – management accounting. Personal accounts – impersonal accounts – single entry system – double entry system – Advantage – difference

#### **Unit – II**

Journal ledger – trial balance – how to prepare a trial balance – limitations of trial Balance – rectification of errors – suspension. Subsidiary books – invoice – debit note – Credit note – cash receipts – voucher – simple problems

#### **Unit – III**

Final accounts – nature – matching principles – limitations –difference between trading profit and loss account –p/l account and balance sheet – adjustments in final accounts

#### **Unit – IV**

Depreciation – meaning – types – straight line methods or fixed installments or equal Installment method. Diminishing balance or reducing installment method. Revaluation Method (simple problems only)

## Unit – V

Bill of exchange – accounts of non trading concerns – distinctions between capital and revenue expenditure – differed revenue expenditure – capital and revenue receipts – balance sheet – bank reconciliation statement – single entry or accounts from incomplete records – meaning – types – pure single entry system – simple single entry system – quasi single entry system.

**Note for the question paper setting:** Problems and theory Questions shall be 60% and 40%.

## OUTCOMES:

- Recognize and understand ethical issues related to the accounting profession.
- Prepare financial statements in accordance with Generally Accepted Accounting Principles.

## References

1. N.Vinayakam, P.L.Mani, K.L.Nagarajan – *Principles of Accountancy* – S.Chand & Company Ltd.,
2. T.S.Grewal – *Introduction to Accountancy*– S.Chand & Company Ltd.,
3. R.L.Gupta, V.K.Gupta, M.C.Shukla – *Financial Accounting* – Sultanchand & sons
4. T.S.Grewal, S.C.Gupta, S.P.Jain – *Advanced Accountancy*– Sultanchand & sons
5. K.L.Narang, S.N.Maheswari – *Advanced Accountancy*– Kalyani publishers
6. S.K.Maheswari, T.S.Reddy – *Advanced Accountancy*– Vikas publishers
7. A.Murthy – *Financial Accounting* – Margham Publishers
8. P.C.Tulsian – *Advanced Accountancy* – Tata McGraw Hill Companies.
9. A.Mukherjee, M.Hanif – *Modern Accountancy. Vol.I*– Tata McGraw Hill Companies.

## Semester IV Core Paper -XI - Textiles Testing & Quality Assurance

## OBJECTIVE:

To infuse understanding of yarn, fabric and apparel testing methods

## Unit I

Importance of Quality. Quality terminologies. Testing: Objectives of Testing - Standardization of testing - sampling - measurement – types of error - repeatability & reproducibility -atmospheric conditions for testing lab. Brief study on fibre properties – FQI. – Identification of textile fibres.

## Unit II

Yarn numbering systems – Determination of yarn count: wrap reel, electronic yarn count balance, quadrant balance, beesley balance - count calculations. Yarn strength: Lea strength tester and CSP. Yarn evenness: Brief study on uster unevenness. Yarn twist: Terms - Electronic twist tester. Hairiness measurement.

### **Unit III**

Knitted fabric specifications - Bursting strength testing -- testing of fabric resistance to snagging, abrasion & pilling - fabric handle - drape and stiffness - Dimensional stability of knitted fabric – spirality -. Testing of color fastness to washing, rubbing, perspiration & light - Grey scales and ratings - Reasons for poor color fastness - Seam strength & seam slippage. Brief study about testing of woven fabric.

### **Unit IV**

Meaning – Definition - Types of Inspection – Study on Incoming materials inspection: fabric inspection systems & Testing of zippers, Buttons, Waistbands, Sewing thread.

### **Unit V**

In process inspection and its significance in apparel quality. Final inspection – Risks involved – AQL – MIL STD. Garment appearance after washing – package quality testing – care labels. Brief study about Testing Standards. Brief study about Oeko-Tex Standards.

### **OUTCOMES:**

The student will have knowledge on

- Methods by which the physical and mechanical properties of textile materials and products are measured and investigated
- Sampling and yarn quality parameters testing
- Fabric and garment quality parameters testing

### **References**

1. *J.E. Booth*, Principles of Textile Testing
2. *Elliot b. Grover & D.S. Hamby* -Hand book of textile Testing & Quality Control
3. *B.P.Saville* Physical testing of Textiles
4. *P. Angappan & R. Gopalakrishnan*, Textile testing
5. *Pradeep V Metha & Satish k. Bhardwaj*, Managing Quality in Apparel Industries
6. ISI standards [BIS] / AATCC / ASTM – Technical manuals

## **Semester IV Core Paper XII - Garment Construction**

### **OBJECTIVES:**

To develop knowledge of apparel construction processes

#### **Unit I**

Different departments & their role in garment industry. Product types and its influence. Garment analysis and its classification - measurement and size charts for men, women, and children - requirement and breakdown of garments - flow process - torso and bifurcated garments.

#### **Unit II**

Stitches and seams: basic principles of stitch formation – classification of stitches based on federal standards – detailed study of application of all stitches - comparison of stitches.

#### **Unit III**

Detailed study on seams classification as per federal standards –seam finishes – devices for introducing fullness. Thread consumption for various types of stitches and garments. Fabric selection techniques – Additional dress making techniques-trimming details for quality look.

#### **Unit IV**

Detailed study on various stitching, sewing and assembly defects - causes & remedies: skip stitch, unbalanced, puckering, gathering, needle defects, thread problems – quality of threads and its impact on sewing quality – sew ability and its influencing factors – needle cutting index.

#### **Unit V**

Fusing and its requirements – fusing process – interlinings – fusible resin types – factors for fusing equipment. Introduction to trims and accessories attachments -label, zips, fasteners – sewing thread types and ticket numbering.

### **OUTCOMES:**

The student will have knowledge on

- Overview of the manufacturing process and the industrial equipment used in garment construction.
- Sound knowledge of apparel pre-processing
- Understood different apparel production systems

### **References:**

1. Apparel Manufacturing – Hand Book – *Jacob Solinger*
2. Technology Of Clothing Manufacture – *Herold Carr & B.Latham*
3. Knitted Clothing Technology – *T.Bracken Berry*
4. Technology Of Stitches & Seams – *Coats Viyella Limited*
5. Apparel Manufacturing Management System – *Roche Daniel*
6. Knitting and Apparel Manufacture – *Sureshkumar, SSMITT Stores*

## **Semester IV Core Paper - XIII – Basics of Apparel Merchandising**

### **OBJECTIVE:**

The objectives of this unit are to:

- Describe the challenges in apparel business.
- Define the concept of Apparel Merchandising
- Explain merchandising as a apparel business process.
- Outline the classification of merchandising.

### **UNIT I**

Merchandising: Introduction, Meaning- Apparel Merchandising, Process of merchandising, needs of merchandiser, Importance of merchandising, Types of Merchandising Company and its difference.

### **UNIT II**

Merchandising business & service business, Activities of merchandising, Concepts of „Six Rights“ – Organisation structure of an apparel industry – Classification of Exporters - Rating or Grading of export houses – Classification of buyers – Export merchandising and retail merchandising – Company profile and its contents.

### **UNIT III**

Types of merchandiser - Functions of a merchandiser – Essential requisites of a good merchandiser – Vendor sourcing, evaluation and development – Global sourcing – Vendor nomination by buyers – Reasons for vendor nomination.

### **UNIT IV**

Work of merchandiser- role of merchandiser in garment Industry, apparel industry, super market and retail sales,, Concepts of merchandising, concepts and apparel product lines, dimensions of product change, determination and development of product line and product range.

### **UNIT V**

Flow process of sample merchandising, Procedure of sample preparation, study on teck pack details, Flow process of product merchandising, Procedure of product preparation, study on product development. Preparation of shipment sample.

### **OUTCOMES:**

The student will have knowledge on

- Merchandising is a sub set of activities dealing with merchandise management
- It involves planning, buying and selling functions.

- To separated planning and buying functions with separate teams handling these functions in co-ordination.

### References

- 1., Building Buyer Relationships, *Daragho' Reilly, Jullian J. Gibbs*
- 2 Inside the Fashion Business, Mc Millan Publishing Co.,.
3. Fashion Merchandising, *Elian Stone*,
4. Apparel Merchanidising, An integrated Approach, Krishnakumar, M, 2010, Abishek Publications
5. Apparel Merchanidising, *Robin Mathew*, Book Enclave Publishers, Jaipur
6. Apparel Merchanidising, *Jerry A & Rosenau*, Fairchild Publications, London

### Semester IV- Core Paper XIV-Practical IV- Garment Construction Practical

#### OBJECTIVE:

To train the students in construction of garments

Draft the Pattern, Cut & Construct Then and develop and construct the following.

- |                        |                        |                                      |
|------------------------|------------------------|--------------------------------------|
| 1. Men's Vest RN       | 2.Men's Vest RNS       | 3.Men's round neck t-shirt.          |
| 4.Men's Polo t-shirt   | 5.Men's Hooded t-shirt | 6. Men's T-shirt with raglan sleeve. |
| 7. Men's Trouser       | 8.Men's Boxer shorts   | 9.Men's Kimono Sleeve                |
| 10. Romber             | 11.Baba Suit           | 12.A Line Frock                      |
| 13.Ladies Basic Bodice | 14.Nighties            | 15 Ladies Skirt                      |

#### OUTCOME :

Upon completion of this practical course, the student will be able to sew and finish different types of wears.

### Semester IV Core Paper XV - Textile Testing – Practical

#### OBJECTIVE:

To impart knowledge of fabric and garment quality parameters testing.

1. Determination of count of yarn using wrap reel & weighing scale.
2. Identification of Fibre using microscope and by chemical test.
3. Determination of lea strength & CSP using lea strength tester.
4. Determination of yarn count from fabric swatch using Beesley balance.
5. Determination of twist of Single yarn/ Double Yarn using electronic twist tester.
6. Determination of Bursting Strength Tester for the Knitted Fabric
7. Analysis of given fabric sample for determining weight, CPI, WPI, SL, CL & yarn count.
8. Determination of the Fabric Pilling Property for the given Fabric and grade it by Grey Scale

and No of Pills.

9. Analysis of Blend composition of given fabrics.
10. Determination of thickness of fabric using fabric thickness gauge.
11. Determination of CRA of fabric using crease recover tester.
12. Determination of colour fastness of given sample to washing by using launderometer.
13. Determination of colour fastness of given sample to rubbing by using crockmeter
14. Determination of colour fastness of given sample to perspiration by using Perspirometer
15. Determination of dimensional stability% of a given fabric/garment to washing.

### **OUTCOMES:**

Upon completion the students will be able to

- Measure important characteristics of fabric and garment
- Interpret the results obtained during evaluation of fabrics

## **Semester IV - Skill Based Subject II – Fashion Business**

### **OBJECTIVE:**

To acquaint the student with the history of fashion, its elements, traditional costumes and accessories.

#### **Unit I**

Fashion Environment: Introduction to fashion industry - Fashion environment - Demographic & Psychographic, Economic, Sociological and psychological factors – Fashion cycle. Fashion business- Designer's role, manufacturer's role and retailer's role. Leaders of fashion - Theories of fashion adoption.

#### **Unit II**

Fashion Business: Scope of fashion business - Primary level, secondary level and retail level – Type of fashion designers - Role of fashion designers – Principles of merchandising – Types of merchandising – Role of merchandiser - Effect of Consumer – Types of buyers – communication with buyers and consumers.

#### **Unit III**

Fashion Forecasting: Fashion forecasting – Need for forecasting - Forecasting agencies – Role of forecasting agencies - Fashion direction and recent trends – Product development – product mix, factors affecting product mix.

#### **Unit IV**

Fashion Market: Market research: Types of market – Retail & wholesale market – Domestic & international market – Designers labels – Chain stores – Brand market. Sourcing: method of sourcing – Raw material sourcing – Accessory sourcing . Resource planning – Supply and demand chain analysis – Just in time technology.

#### **Unit V**



Advertisement and Promotions: Advertising: purpose – methods - types of advertising media - Sales promotion methods - Trade fairs and fashion shows as sales promotion techniques - Feedback to production and marketing departments - Use of computers as a tool for effective merchandising - Fashion auxiliary services.

### **OUTCOME:**

Upon completion of the course, the student would develop an understanding of fashion evolution and fashion designing

### **References**

1. Fashion Merchandising, *Elia Stone*,
2. Inside the Fashion Business.. Mc Millan Publishing Co.,
3. Apparel Merchandising
4. Fashion : Concepts to Consumers

## **Semester V Core XVI - Apparel Production Management**

### **OBJECTIVES:**

- To emphasis on the improved methods of material control in apparel production
- To acquaint student with quality concepts for implementing quality in apparel production

### **Unit – I**

Introduction To Garment Industry Plant Location – Location Economics – Plant Layout – Process Layout – Product Layout – Combination Layout – Introduction To Balancing Theory – Balance Control – Balancing Exercises For Garment Industry.

### **Unit– II**

Materials Management: classification of materials – importance and objectives of Materials Management. Inventory – classification – inventory control models- factors influencing inventory control – ABC analysis - EOQ. MRP: introduction – concepts and advantages-factors influencing the requirements of inventory. CRP : types- measurement & determination of capacity – CRP inputs & outputs. optimum level of production.

### **Unit – III**

Concept And Need – Method Study And Work Measurement – Techniques – Process Chart Symbol – Process Flow Chart – Flow Diagrams – String Diagrams – Multiple Activity Chart – Principles Of Motion Economy – SIMO Chart – Time Study Methods – Standard Time Data – Ergonomics With Special Reference To Garment Industry.

### **Unit – IV**

Methods of Production Systems – Job, Mass & Batch – Section Systems, Progressive Bundle System & „Synchro“ System – Conveyor Systems – Unit Production System – Quick Response.

Productivity Concepts – Measurement Of Productivity – “Man Machine Material” – Criteria For Increasing Productivity.

### **Unit – V**

Function, Qualitative and Quantitative Analysis of Production - Coordinating Departmental Activities - Flow Process and Charts For Garment - Scheduling Calculations - Assigning Operators Optimally - Setting Up Complete Balanced Production Lines To Produce Given Amount Of Garments

### **OUTCOME:**

The course will enable students to practise better methods in apparel production and planning to take informed business decisions in the apparel industry

### **References:**

1. Technology Of Clothing Manufacture – *Carr & Latham*
2. Apparel Manufacturers Handbook – *Jacob Solinger*
3. Introduction To Clothing Manufacture – *Gerry Cooklin*
4. Introduction To Production Management – *A. J. Chuter*
5. Personal Management And Industrial Relations – *Tripathi*
6. Industrial Engineering And Management – *OP. Khanna*

## **Semester V Core XVII – Advanced in Apparel Manufacturing**

### **OBJECTIVE:**

To acquaint the students of the concepts of business, merchandising, sourcing and export documentation, Know about the software's in merchandising.

### **Unit I**

Process flow in apparel industry – Buyer sourcing & communication – Enquiry Order confirmation – order review and its importance – Planning & programming: Master planning, Scheduling or route card – Factors for route card - programming for yarn, knitting, dyeing, stitching, sampling, accessories – Samples: Meaning & importance – Types of samples – expedition of samples

### **Unit II**

Inspection and its types – Testing – Check points before cutting - Pilot run or trial run and its importance – Approvals - Types of approvals – Shipping marks – Final inspection procedures – Self, Second and Third party inspection - Effective expedition procedures.

### **Unit III**

Order sheet and its contents – Packing list and its contents – Document formats: order sheet, packing list, invoice, inspection and testing reports etc., - Assortment and its types. Documents recording and maintenance – Claims and reasons for claims - Factory audits – Buyer's code of conducts.

### **Unit IV**

Advertising- scope, importance, types, merits & demerits; sales promotion, personal selling. Retail management. Export associations – Apparel Export Promotion Council – Journals and magazines related to apparel and textiles –Trade shows and Fairs – Participation in trade shows – Advantages of trade shows and fairs - Apparel & Textile Trade shows and fairs in India.

### **Unit V**

Visual merchandising, Visual display - Fashion communication – Visual / 3D visual –Elements of visual merchandising, Comparison of Visual Merchandising with Fashion Merchandising Visual merchandising as a communication tool, presentations in visual merchandising, Software used in merchandising, Merchandise Planning Software, buy ease software.

### **OUTCOMES:**

Upon completion of this course, the student shall be able to apply

- Concept of marketing and merchandizing in the apparel industry in India
- Procedure involved in the export of apparel

### **References**

- 1., Building Buyer Relationships, *Daragho' Reilly, Jullian J. Gibbs*
- 2 Inside the Fashion Business, Mc Millan Publishing Co.,.
3. Fashion Merchandising, *Elia Stone*,
4. Apparel Merchandising, An integrated Approach, Krishnakumar, M, 2010, Abishek Publications
5. Apparel Merchandising, *Robin Mathew*, Book Enclave Publishers, Jaipur
6. Apparel Merchandising, *Jerry A & Rosenau*, Fairchild Publications, London.

## **Semester V Core Paper - XVIII - Fashion Accessories & Trims**

### **OBJECTIVE:**

- To acquaint students of the different trims, components, accessories and embellishments used as fashion accessories
- To make them acquire skills essential to evaluate the performance of accessories

### **Unit I**

Accessory and its importance – the concept – the difference between accessories and trims – specifications – standards pertaining to accessory – types of accessories and trims. sourcing of accessory – single sourcing – multiple sourcing – advantages and disadvantages of sourcing –

vendor evaluation – rating – vendor based rationalization

## **Unit II**

Sewing threads and its applications – quality control in sewing thread – types of thread packages – embroidery threads – quality requirements – appliqué works – sequence works, beads, crystals & stones

## **Unit III**

Functions and application of accessories and trims – zippers – quality parameters and testing procedures – buttons – types – testing procedures – lace – elastic, draw strings – velcro – snap fastness – hooks performance and properties of components and trims.

## **Unit IV**

Labels and its types – testing procedures – tags and its types – quality parameters and testing procedures – lining – interlining – poly bags - master poly bags – hangers – cartons – wrappers – pouches for inner wear.

## **Unit V**

Trends in accessory and trims – forecasting procedure –innovation in accessory industry – costing procedure in accessory and trims – sample collections – presentation – possible defects and remedies.

## **OUTCOMES:**

Upon completion of the course, the students would be able

- To develop a thorough understanding of the different accessories and embellishments their performance, properties and application
- To independently hint accessories apt for different garment styles

## **References:**

1. Technology of clothing manufacture – *Carr & Latham*
2. Apparel manufacturers handbook – *Jacob Solinger*
3. Introduction to clothing manufacture – *Gerry Cooklin*
4. Know your Fashion Accessories – *Celia Stall Meaoows*, Fairchild Publications, New York, 2004
5. Singer creating Fashion Accessories – *Cy. De Cosse Incorporated*, IAFL Publications

## **Semester V Core Paper - XIX - Garment Costing**

### **OBJECTIVE:**

To facilitate better understanding of apparel costing and Budgeting.

#### **Unit – I**

Principles of costing - requirements of good costing system - cost unit - types of costs - Elements of cost - direct material cost - direct expenses - direct wages - indirect materials - indirect expenses - indirect labour - overheads - - prime cost - work cost - cost of production - total cost. INCO terms & its relationship with costing

#### **Unit – II**

Budgeting: The budgeting process: Budgeting principles for the apparel industry- Fixed vs. variable budget - Master budget-laminations of budgets- any justification effort -Planned Vs Actual Cost.

#### **Unit III**

Cost estimation of yarn, knitted fabric, dyeing, printing & finishing. Woven Fabric Costing: fabric types, yarn consumption, weaving price Cost estimation for cutting, stitching, checking, packing, forwarding, shipping, and insurance.

#### **Unit – IV**

Estimation of factory cost for Woven & Knitted - vest, briefs , shorts, t-shirts, pajamas, children's wear, ladies wear, Woven Shirt, Woven Tops & Bottom. Various factors to be considered in costing for domestic products & international products

#### **Unit – V**

Determining Pricing of apparel products: Price elasticity of demand and supply, sample costing- marginal revenue and marginal cost, cost plus pricing methods;, Full cost pricing, conversion cost pricing, differential cost pricing ,variable cost pricing, direct cost pricing derivation of cost of apparel products-woven/knits.

### **OUTCOMES:**

At the end of this course, the students would have knowledge on

- Cost accounting and cost elements
- Cost elements involved in fabric and apparel costing
- Ascertaining apparel product standard that maximise quality while balancing cost restrictions

### **References**

1. *S.P.Jain and KL. Narang*, "Cost Accounting", Kalyani Publishers, New Delhi. Edn.2005
2. *R.S.N. Pillai and V. Bagavathi*, "Cost Accounting", S. Chand and Company Ltd., New Delhi. Edn.2004.
3. *Apparel Costing, A functional Approach – Krishnakumar, M*, Abishek Publications, Chandigarh, 2012

### **Semester V - Allied Paper IV - Computer Aided Pattern Making – Practical**

#### **OBJECTIVE:**

To train the students in CAD used for pattern making of garments

CAD software is used to practice the following on the styles mentioned,

1. Create Pattern on computer screen, adding details to patterns.
2. Saving, extracting & editing patterns from stock library of Patterns.
3. Grading patterns on different size scale.
4. Making Marker plan for cutting fabrics.
5. Estimating lay length and calculating marker efficiency.
6. Fit analysis of the given pattern.

Styles

1. Men's Basic T Shirt
2. Raglan with Pocket
3. Men's Polo T Shirt
4. Men's Trouser
5. Men's T-Shirt with hood
6. Men's Inner Garment – Vests RN / RNS
7. Briefs
8. Ladies Skirt
9. Women's Nightwear
10. Kid's Wear – Romber
11. Kid's Wear – A Line frock
12. Children's Suits and Pyjama

#### **OUTCOME:**

Upon completion of the course, the student will have practical experience on pattern making of different wears and maker planning and optimization

### **Semester V - Skill Based Subject III - Total Quality Management**

#### **OBJECTIVE :**

To facilitate the understanding of Quality Management principles and process.

#### **Unit I**

Quality – Evolution of Quality management – Quality Function and Quality Planning – Basic concepts of Total Quality Management (TQM) – Principles of TQM – Important Phases of TQM – Quality Trilogy – Four pillars of TQM – PDCA cycle & PDSA cycle – Kaizan concept – 5“S Philosophy – Quality Circles

## **Unit II**

Statistical Quality Control (SQC) : Definition – SQC techniques – Frequency distributions: Discrete and Continuous – Measures of Central tendency: Mean, Median & Mode – Measures of dispersion: Range, Mean Range, Mean Deviation, Percentage Mean Deviation, Standard Deviation, Coefficient of Variation – Normal distribution – Binomial distribution – Poisson distribution

## **Unit III**

Control charts: concepts and uses – Control limits – Control charts for Variables and Attributes: X Charts – R chart – P chart – NP chart – C chart – Acceptance sampling – Types of sampling plans: Single, Double and Multiple Sampling plans – OC curves – AQL and LTPD – Sampling errors and sampling risks – Producer's risk and Consumer's risk

## **Unit IV**

ISO 9000 Standards: Meaning & Definition – ISO 9000 family of standards – Elements of ISO – Benefits of ISO 9000 System – Study on ISO 9001:2000 Guidelines and Standard Clauses – Implementation Procedures and requirements for ISO 9001:2000 system – Quality Manual and its contents – Accreditation and Certification agencies – Quality audit – Types of quality audit – Audit procedure – Requirements and characteristic of a Quality auditor

## **Unit V**

Environmental Management System (EMS) – Meaning & Definition – Elements of EMS – Benefits of EMS – Environmental Policies – Implementation of ISO 14000 – Study on other management systems : SA8000, OHSAS 18000, WRAP.

## **OUTCOME :**

The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

## **References**

1. *Dr. S.P.Gupta*, "Statistical Methods"
2. *J.M. Juran*, "Quality Control Handbook"
3. *V.K.Kapoor*, "Statistics"
4. Total Quality Management – *Bhaskar, S* - Anuradha Publications, Kumbakonam.
5. Total Quality Management – *Shridhara Bhat, K* -, Himalaya Publishing Corporation New Delhi
6. Handbook of Total Quality Management - *Armstrong* , Jaico Publications, New delhi.

## **Semester VI - Core Paper - XX International Trade & Documentation**

### **OBJECTIVE:**

Trade procedures and documentation formalities are a critical part of International Business Management. This subject aims at imparting knowledge of trade procedures and documentation formalities.

#### **Unit – I**

Firm establishment: introduction – export promotion councils and their role – registration formalities - rcmc –IE code – RBI code – garment classification and categories for various countries – quota – quota distribution methods – quota transfer

#### **Unit – II**

Foreign trade documents: need, rationale and types of documents relating to goods – invoice – packing note and list – certificate of origin – certificate relating to shipments – mate receipt – shipping bill – caret ticket – certificate of measurement – bill of lading – air way bill – documents relating to payment – letter of credit – types of l/c - bill of exchange – letter of hypothecation – bank certificate for payment – document relating to inspection – certificate of inspection – gp and other forms.

#### **Unit – III**

Import procedure : import license – procedure for import license – import trade control regulation procedure – special schemes – replenishment license – advance license – split up license – spares for after sales service license – code number – bill of entry.

#### **Unit – IV**

Shipment and customs: preshipment inspection and quality control – foreign exchange formalities – preshipment documents - documentation terms - excise and customs clearance of export cargo – shipment of goods and port procedures – customs clearance of import cargo. Post – shipment formalities and procedures – claiming duty drawback and other benefits.

#### **Unit – V**

Payment and deliveries: terms of delivery – INCO terms – EXW – FCA – FOB – CFR – CIF – CPT – DAF – DDP – DDU. Terms of payment – open account – cheque – cash payment against documents – bank payment against documents (LC) – security and cost of various payment terms – assessing the risk in payment – role of ECGC and standard policy.

### **OUTCOMES:**

At the end of this course, the students would have knowledge on

- Evaluate and justify the various documents for processing export and import orders.



- Understand the implications of foreign trade policy.
- Evaluate the legal implications in the area of exports and imports.
- Assess the various terms and conditions of export finance.

### **References:**

1. Govt. Of India : Hand Book Of Import And Export Procedures.
2. *Bose. A.* : Streamline Your Export Paper Work., International Trade Form, Oct – Dec 1965.
3. How To Start Export.
4. CBI Booklets – Netherland
5. ECG C Services And Guidelines
6. AEPC Booklets

## **Semester VI - Core Paper -XXI Apparel Retailing**

### **OBJECTIVE:**

To introduce students to the concept of Retail, Retailing strategies and legal issues of Retail sector in Apparel Industries.

### **Unit I**

Retail & Retailing – Meaning & definition – Scope of apparel retailing – Retailing terminologies – Types of retailers and retail formats – Global retailing scenario – Retailing scenario in India – Functions of retailers

### **Unit II**

Retail strategies : Operational excellence , Product differentiation, Customer intimacy – Growth strategies – Market expansion strategies – Store planning – Location planning – Store design – Store design & retailing image mix – Space mix – Effective retail space management – Store layout – Floor space management

### **Unit III**

Retail merchandising – Merchandise planning – Merchandise hierarchy – Buying function – Category management – Mark up & Mark down – Shrinkage in merchandising management – Gross margin return on inventory – Supply chain management in apparel retailing – ERP in apparel industry

### **Unit IV**

Retail operations – Significant areas – Store operating parameters related to customers, stocks, space, employee, finance – Managing retail personnel – Manpower planning – Types of employees in retail – Remuneration structure – Visual Merchandising (VM): Definition & Meaning – VM Techniques – Elements of VM – Functions of a Visual Merchandiser

## **Unit V**

Retail Brands and Branding – Functions of brands – Types of brands – Branding strategies – Store brands or private labels – Store brands Vs National brands – Famous apparel retail brands – Packaging – Functions of packaging – Kinds of packaging – Requisites of good package – Customer service management in retail – Service management model.

## **OUTCOME:**

The students would have knowledge on Retail Management, types of retailing, strategies and retail management.

## **References**

1. Jaico Books, “Retail Management – Functional Principles & Practices”, *Gibson G. Vedamani*
2. “Retail management “
3. Retail Merchandising – part I
4. Art of retailing – *Arun Mahabharata* , Lotus press, New Delhi, 2008
5. Fundamentals of retailing – *Madan*, Tata Mcgraw, New Delhi
6. Retailing Management – *Levy*, Diamond Publications, Delhi

## **Semester VI - Core Paper XXII - Entrepreneurship and Small Business Development**

## **OBJECTIVE:**

Study of this subject provides an understanding of the scope of an entrepreneur, key areas of development, financial assistance by the institutions, methods of taxation and tax benefits.

## **Unit I**

Entrepreneurship: Concept and Definitions; Entrepreneurship and Economic Development; Classification and Types of Entrepreneurs; Entrepreneurial Competencies; Factor Affecting Entrepreneurial Growth – Economic, Non-Economic Factors; EDP Programmes; Entrepreneurial Training; Traits/Qualities of an Entrepreneurs; Entrepreneur; Manager Vs. Entrepreneur.

## **Unit II**

Opportunity / Identification and Product Selection: Entrepreneurial Opportunity Search and Identification; Criteria to Select a Product; Conducting Feasibility Studies; Project Finalization; Sources of Information.

## **Unit III**

Small Enterprises and Enterprise Launching Formalities : Definition of Small Scale; Rationale; Objective; Scope; Role of SSI in Economic Development of India; SSI; Registration; NOC from Pollution Board; Machinery and Equipment Selection; Project Report Preparation; Specimen of Project Report; Project Planning and Scheduling using Networking Techniques of PERT / CPM; Methods of Project Appraisal.

## **Unit IV**

Role of Support Institutions and Management of Small Business : Director of Industries; DIC; SIDO; SIDBI; Small Industries Development Corporation (SIDC); SISI; NSIC; NISBUD; State Financial Corporation SIC; Marketing Management; Production Management; Finance

Management; Human Resource Management; Export Marketing; Case Studies.

### Unit V

Incentives and subsidies – Subsidised services – subsidy for market. Transport – seed capital assistance – Taxation benefit to SSI role of entrepreneur in export promotion and import substitution.

### OUTCOME:

The students will have confidence and entrepreneurial skills essential for the successful launch and scaling-up of an enterprise

### References

1. *Desai, Vasant* (2003). Small-Scale Industries and Entrepreneurship. Himalaya Publishing House, Delhi.
2. *Kaulgud, Aruna* (2003). Entrepreneurship Management. Vikas Publishing House, Delhi.
3. *Cynthia, L. Greene* (2004). Entrepreneurship Ideas in Action. Thomson Asia Pvt. Ltd., Singapore.
4. *Chandra, Ravi* (2003). Entrepreneurial Success: A Psychological Study. Sterling Publication Pvt. Ltd., New Delhi.
5. *Balaraju, Theduri* (2004). Entrepreneurship Development: An Analytical Study. Akansha Publishing House, Uttam Nagar, New Delhi.
6. *David, Otes* (2004). A Guide to Entrepreneurship. Jaico Books Publishing House, Delhi.
7. *Taneja* (2004). Entrepreneurship. Galgotia Publishers.

## Semester VI – Skill based Subject - Export Sampling and Product Development P r a c t i c a l

### OBJECTIVE:

To train the students in Export sampling and apparel product development including sourcing of fabrics and designing of apparel

Students Will Be Given Export Order Or Export Enquiry And They Are Asked To Design The Samples As Per The Specification Given And Also Prepare A Report Containing The Following Details.

1. Yarn Details & Composition
2. Yarn Consumption per Garment
3. Fabric Details – Design, GSM, Machine Etc.,
4. Size Details
5. Factory Cost of Garment

(Totally 6 Export Orders & 6 Export Enquiries Related To Following Styles Shall Be Given)

( Men's Basic T Shirt / Men's Crew Neck Shirt / Men's Polo T Shirt / Men's High Neck Shirt / Men's Boxer Short / Men's Bermuda Short / Men's Trouser / Men's Full Arm Shirt / Men's V – Neck Shirt / Men's Collar Neck Shirt / Men's Inner Garment – Vests Rn / Rns / Men's Under Garment: Briefs With Inner Waist Band Or Outer Waist Band Of Various Models - Trunk Type. / Ladies Skirt With Pleats / Ladies Blouse / Ladies Basic Bodice / Women's Nighties / Kid's

Wear Of Various Styles / Children's Suits And Pyjama)

**OUTCOMES:**

Upon completion of this course, the student would be able to

- Source the fabric and design the apparel for specific end uses
- Sew and finish the apparel for specific end uses

**Semester V Elective I – A - Fashion & Apparel Marketing**

**OBJECTIVE:**

To impart knowledge on principles marketing, marketing research. Domestic and international market.

**Unit I**

Meaning and classification of marketing, Fashion marketing, fashion market – size and structure, marketing environment – micro and macro marketing environment, trends in marketing environment

**Unit II**

Marketing function – assembling, standardization and grading and packaging, product planning and development, importance of fashion products, nature of fashion products. The fashion industry and new product development, product-mix and range planning, fashion and related cycles.

**Unit III**

Fashion advertising and preparation of advertising for apparel market, advertising media used in apparel market – advantages and limitations, advertising department – structure and functions, advertising agencies- structure and functions. Advertising budget

**Unit IV**

Fashion sales promotional programmed for apparel marketing, communication in promotion, personal selling, point of purchase, sales promotion – objectives and methods, Marketing research – definition, scope and process – areas of research

**Unit V**

Pricing policies and strategies for apparel products, Importance of price policies, Functions and factors influencing pricing – internal and external, pricing strategies for new products, methods of setting prices

**OUTCOME:**

The students will have understanding on principles of marketing, factors affecting domestic and international market, fashion trends and consumer behaviour.

### References

1. Marketing – *R S N Pillai and Bhagavathi, S Chand* and company ltd, New Delhi, 1987
2. Marketing management – *Dr B K Chatterjee Jaico*, Juice Publishing house, Bombay 1982
3. Marketing Principles and methods – *Philip C F and Duncon*, Irwin Publications
4. Principles of marketing – *Backman T N, Munard H H and Davidson W R*, Ronald Press company, New York 1970
5. Fashion Marketing – *Mike Easey*, Black well Science Ltd, 1995
6. Advertising – *C N Sonatakki*, Klyani Publishers New Delhi, 1989

### **Semester V Elective I – B: Business Communication**

#### **OBJECTIVES:**

- To make learners acquire listening and speaking skills in both formal and informal contexts.
- To help them develop their reading skills by familiarizing them with different types of reading strategies.

#### **Unit I**

Meaning of communication – Importance of effective communication in business – Objectives of communication - Media – Types – Principles, Process, Barriers - Methods to reduce barriers. Role of English Language in business communication - The sentence – Types – Verbs – Main and auxiliary – Agreement of verb and subject – Use of articles and prepositions – “WH” question and „yes” or „no” type questions - Punctuation and use of capital letters – Common errors- words often confused – Antonyms- Synonyms.

#### **Unit II**

Functions of a business letter - Foreign words used in correspondence – The layout planning – Enquiries and replies – Orders and execution – Credit and status enquiries.

#### **Unit III**

Complaints – Collection letters – Circular – Sales letters - Bank and insurance correspondence – Import and export correspondence - Agency correspondence – Correspondence of a company secretary.

#### **Unit IV**

Memos and forms of messages – Office correspondence – Telegrams – E-mail – Fax – Interview letters – Testimonials – Appointments – Confirmation – Resignation – Report writing

#### **Unit V**

Agenda and minutes of meeting – Advertisement – Speech making – Interviews- Information technology of the future - Telex - Teleconferencing - Fax-Internet – Multimedia.

#### **OUTCOMES:**

Learners should be able to speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies.

#### **Reference**

1. *Rajendra paul, Korlahalli.J.S.* Essentials of business communication.
2. *Krishna Mohan,* Developing communication skills.
3. *Champa Tickoo & Jaya sasikumar,* Writing with a purpose.
4. *F.T.wood,* A Remedial English Grammar for Foreign Students
5. Basic business communication – *Lesikar & Flatiley* , Jaico Publications, Chennai
6. Business communication Strategies – *Matha kutty & Monipally*, TBH Publications, Coimbatore
7. Business communication – *Locker*, Excel books, Delhi

### **Semester V Elective I – C Clothing Care.**

#### **OBJECTIVES:**

To educate the students in techniques and machinery for dyeing and finishing of garments and to impart knowledge on different garment care techniques

#### **Unit I**

Finishing Equipments: Study of finishing room equipments - steam iron - steam busters - vacuum ironing tables - form finishing equipments - trouser topper, shirt press, collar/cuff press, form finisher for jackets and coats - study of boiler and related equipment for finishing room; fusing machines for interlinings; water treatment plant -soft water -hard water - methods of softening water

#### **Unit II**

Laundry equipment and reagents: Study of laundry equipment and laundry reagents - soaps - detergents - cleaning action of soaps, indigenous cleaning agents - rita nut - shikakai - green gram - bran solution – study of modern and industrial cleaning agents

#### **Unit III**

Stiffening Agents: Study of stiffening agents –purpose of stiffening-classification of stiffening agentspreparation and uses of stiffeners- natural and commercial starches - preparation of starch for use - bleaching agents - blueing and tinting agents and their application – optical whiteners

#### **Unit IV**

Stain Removal: Principles of laundering - stain removal - various solvents for stain removing blood, tea, rust; oil/grease etc. – different methods of washing - application of friction by hand rubbing - scribing - tumble wash

#### **Unit V**

Washing Machine And Care Labels: Study of different types of house hold/industrial washing machines- rotary -swirling - pressure - tumble wash etc; the various systems of care labelling- washing instruction. bleaching instruction-drying instruction-ironing instruction-dry cleaning instruction. placement of labels on garments.

#### **OUTCOMES:**

The students would have knowledge on Dyeing techniques for apparel

- Applying of different finishes on garments
- Machinery and equipments for garment care

#### **References**

1. *Dantyagi S.*, “Fundamentals of Textile and Their Care”, Oriental Longmans Ltd, New Delhi, 1996
2. *Denlkar*, “Household Textiles and Laundry Work”, Atma Ram and Sons, Delhi, 1993
3. *Neomi D’Souza*, “Fabric Care”, New Age International Publisher, 1998
4. *Davis*, “Laundry and Clothing Care”, Drama Book Publishers, 1995
5. *Mary Schenck Woolman*, “Clothing: Choice, Care, Cost” Kessinger Publishing,
6. Clothing care & Repair – *Singer*, IAFL Publications, Delhi, 2000

## **Semester VI - Elective II - A - Research Methods**

### **OBJECTIVES:**

This course aims at providing the required skill to apply the statistical tools in problems.

### **Unit-I**

Introduction to Business Research - Research – Definition – Importance – Advantages and Limitations. The Research Process – Problem Identification and Definition – Hypothesis Formulation-Research Proposal- Ethical issues in Research.

### **Unit II**

Scaling Techniques and Sampling -Scaling Techniques and Attitude Measurement- Online Data Sources and Research. - Sample types - Sample size and sampling errors Sample Design: Defining the Universe and Sampling Unit- Sampling Frame- Sample Design - Probability and Non-probability Sampling Methods - Sample Size Determination.

### **Unit III**

Data Collection and Processing-Data collection –methods -Primary and Secondary Data- Data collection - tools Questionnaire- Questionnaire Designing and Testing; Interview Schedule ; Observation Methods; Qualitative Research - Data Collection and Survey Errors – Data Processing -Editing, Coding, Tabulation.

### **Unit IV**

Data Analysis and Statistical Tests-Data Analysis – Test of Significance – Statistical tests - Parametric and Non – Parametric -Analysis of Variance - Z test, T test - Chi-square test .Correlation and regression.

### **Unit V**

Interpretation, Report Preparation and Presentation-Interpretation and report writing - steps in writing reports - layout of report- types and Principles of report writing - Graphical representation of results

### **OUTCOME:**

The students will have a fundamental knowledge of the concepts of probability. Have knowledge of standard distributions which can describe real life phenomenon. Have the notion of sampling distributions and statistical techniques used in management problems.

### **References**

1. Donald, R. Cooper and Parmela, S. Schindler (2003). Business Research Methods. Tata McGraw Hill.
2. Kothari C.R. (2004). Research Methodology Methods and Techniques. Wishwa Prakashan.
3. Malhotra, Naresh K. (4th Edition, 2004). Marketing Research. Pearson Education Pvt. Ltd.
4. Richard, I Levin (2003). Statistics for Management. PHI, Delhi.
5. Management Research Methodology – Krishnaswamy, K.N.,Pearson Education, Delhi



6. Research Methodology for business – Sekaran, Wiley Publishers, Delhi

### **Semester VI - Elective II - B Industrial Engineering Techniques**

#### **OBJECTIVES:**

- To enable the students to learn about Basics of industrial engineering
- Different tools of industrial engineering and its application in apparel industry

#### **Unit I**

Introduction: Definition, purpose, available techniques, Aspects, physical facilities & operating facilities, scientific management, resources productivity. Work Study: Definition, objectives, Techniques, method study, work measurement, Purpose of work study, steps, different phases,

#### **Unit II**

Method Study: Definition, Steps, Selection of problems, Collection of facts and consideration about objectives, Recording techniques, Elements of a process analysis, Operation process chart, Different process charts, Critical examination.

#### **Unit III**

Work Measurement :Definition ,Uses, Techniques, Time Study, Measuring Instruments, Elements in time study, factors, alignment chart, Performance rating methods, observed time & normal time , allowances, Standard time, Work sampling Predetermined Motion Time study, Motion time data for assembly operations, Work factor system, method time measurement.

#### **Unit IV**

Job Evaluation: definition, Aspects, Uses, different methods of job ,Ranking system, Grade description system, point method, Factor comparison method. Wage Incentive Plans: Unit of measurement, Various methods, Characteristics of wage, Incentive schemes, relationship between productivity, wages & cost. different wage incentive plans , relationship between indirect labour , direct labour & total plant productivity . Plant Maintenance: Introduction, Systems of maintenance, break down, Planned, Corrective and Preventive maintenance, maintenance schedule

#### **Unit V**

Operations Research: Introduction, concept of optimization, methods of operations research, linear programming , distribution methods, Assignment models, queuing theory, Sequencing problems, Network Analysis, Game theory, Replacement analysis, depreciation.

#### **OUTCOMES:**

Upon completion of this course the student will be able to apply the following methodologies in apparel industry.

- Method study, work measurement
- Layout study and line balancing
- Statistical process control

### References

1. Industrial Engineering and Management by *O. P. Khanna*,
2. Textile Mill Management by *Ormerod* ,
3. Engineering Economics by *Kleinfeld*,
4. Managerial Economics by *M.V.Palyee, K.C. Sankaranarayan & J.T. Payyappilly*,
5. Essentials of Engineering Economics by *Kasner*,
6. Management in a Global Perspective by *K'oonze & Weihrich.*,
7. Quantitative Approach to Management by *Levin, Rubin, et. al.*,

### Semester VI Elective II - C Eco Textiles

#### OBJECTIVES:

- To make the student acquire sound knowledge of the material characteristics required for ECO clothing.
- To acquaint student of the mechanism, chemistry and evaluation of chemical finishes for the ECO textiles.

#### Unit I

Introduction: Need for eco-friendly processing. Pesticides in fibres / yarns..Heavy metals, Formaldehyde and Pentachlorophenol in textiles. Eco Standards And Eco-Labels: Introduction. M.S.T., OTN100, COMITEXTIL and Ecomark scheme of India. Criteria for an eco-label based on the life cycle.

#### Unit II

Eco-Friendly Processing: Environmental problems associated with textile processes. Approach to eco-friendly processing – fibre origin, eco- friendly production, processing and clothing production. Study about organic cotton processing. Study about Natural dyes & Dyeing.

#### Unit III

Eco-Management: Introduction. Preparation of Ecology Policy Statement. Organization. Systematic review of orders. Purchase policy. Assessment of suppliers. Testing, Calibration and Checking procedures. Documentation.

#### Unit IV

Eco- Audit: introduction. product audit and production audit in textile industry. auditing parameters.Certification and Labelling of Eco-Friendly Textiles: introduction. Organizations. Relationship between Eco-labelling and Eco-management & Auditing schemes. Legislation and controls on packaging and packaging waste.

#### Unit V

Testing of Textiles to Eco-Standard Specifications: Introduction. Test methods for testing the banned chemicals – free formaldehyde, pesticides, pentachlorophenol, heavy metals, azo dyes containing aromatic amines& benzidine and halogenic carriers.

#### OUTCOME:

The students would develop and understanding of the materials, mechanism, chemistry and evaluation of ECO garments

### **References**

1. Miraftab M and Horrocks A R, "Eco Textiles", The Textile Institute, Woodhead Publication Limited., Cambridge, 2007.
2. Susanna Benny and Janakiraman K.P., "Eco parameters: Present Status", Mill Control Report No.15 , The South India Textile Research Association, Coimbatore,1998.
3. The Gazette of India, Extraordinary, Part II section 3, subsection 1 No 157, Ministry of Environment and Forests, Government of India , May 4 ,1996.
4. The Gazette of India, Extraordinary, Part II section 3, subsection 11 No 193, Ministry of Environment and Forests, Government of India , May 26 ,1997.
5. Oeko-tex Standard 100, International Association for Research and Testing in the field of Textile Ecology (Oeko- tex), Zurich, Switzerland, January, 1997.

## **Semester - VI - Elective III – A - Resource Management Techniques**

### **OBJECTIVES:**

To enable the students to learn about Planning of Resources in Production Management of Apparel Industries.

### **Unit I – Introduction about Operation Research**

Mathematical models – Deterministic and Probabilistic – Operation Research and Optimization Models – Linear Programming – Formulation – Graphical Solution – Dual of Linear Programming Problem.

### **Unit II – Techniques of Transportation and Assignment**

Transportation Model – Initial basic Feasible Solutions – Optimum solution for Non-degeneracy Model – Assignment Model.

### **Unit III – Network Model**

Introduction to Network Model – Networking – Critical Path Method (CPM) – Time estimates – Critical Path Crashing – Program Evaluation and Review Technique.

### **Unit IV- Inventory Models**

Introduction to Inventory Models – Deterministic – EOQ – EOQ with Price breaks – Probabilistic Inventory Models – Probabilistic EOQ Model.

### **Unit V – Simulation and Decision Tree**

Simulation – Types of Simulation – Monte Carlo Simulation – Simulation Problems – Decision theory – Pay off Tables – Decision criteria – Decision trees.

### **OUTCOME:**

The students would develop and understanding of the efficient use of Resources in Apparel industries.

### **References**

1. Operations Research – An Introduction – Hamby .A.
2. Operations Research – Kanti Swarup , Gupta and Manmohan.
3. Problems in Operation Research – Gupta and Manmohan.

## **Semester VI Elective III – B – Intimate Apparel Manufacturing Techniques**

### **OBJECTIVE:**

To acquaint student on the design, material, accessories and sewing aspects of intimate garments

### **Unit I**

Intimate apparels – Definition, classification, materials-fiber, fabric and accessories; physical and physiological requirements of intimate apparels

### **Unit II**

Design analysis, measurements, pattern drafting of men's intimate apparel – Long johns, tank top, tanga, boy shorts, knickers, bikini underwear, thong, boxer briefs, boxer shorts and jock strap.

### **Unit III**

Design analysis, measurements, pattern drafting of women's intimate apparel – waist petticoats, panties, camisoles, tube top, shape wear, bikini and bra.

### **Unit IV**

Intimate apparel accessories - Bra wire, hook and eye tape, ring and slider, buckle, plastic bone, elastics and sewing threads

### **Unit V**

Sewing of intimate apparels - seams, stitches, machines; lamination; moulding and welding technique.

### **OUTCOME:**

Upon completion of this course, the students will have the skills essential to design and develop intimate apparels

### **Textbook:**

1. Ann Hagggar, "Pattern Cutting for Lingerie, Beach Wear and Leisure Wear", Black Well Science Limited, France, 2001

### **Reference:**

1. W.Yu, J. Fan, S.C. Harlock, S.P. Ng., "Innovations and Technology of Womens Intimate Apparel", Wood head Publishing Limited, England 2006

### **Semester VI Elective III - C Apparel Brand Management**

#### **OBJECTIVE:**

To introduce students to the concept of brand, brand building, branding strategies and legal issues in brand management

#### **Unit I**

Introduction :Brand – introduction, functions, brand significance; branding – types and strategies international apparel brands - identification of perspectives and challenges to build brand- Indian garment brands and prospects of Indian brands

#### **Unit II**

Brand Appraisal:Brand appraisal – Definition and methods - exploration, market, customer, competition analysis, reasoning of brands importance and methods involved - laddering, emotional and rational, Brand mapping – circle, prism and triangle

#### **Unit III**

Positioning: Positioning – definition, types – benefit, usage, features, users, price, value technology, tradition, perceptual map – product class and customer segment; positioning strategies – non functional values, brand loyalty and pyramid; positioning strategies of international garment retailers

#### **Unit IV**

Identity And Extension: Brand identity and articulation – name, colour, design, logo and symbols, brand service advertising and cross cultural influence; brand extension – need and types; labelling and licensing of apparel products – types, license agreement, and international property rights; need for developing brand names and labels for apparel manufactured and exported from India

#### **Unit V**

Brand Measurement: Brand measurement- definition, need and methods – audit, track, brand overtime – managing brand image - need, concepts of management, forces affecting brand and maintenance of brand, Study on brands and brand management of Indian Garment

#### **OUTCOME:**

The students would have knowledge on consumer behaviour, brand identity and brand equity management

#### **References**

1. *Parameswaran M. G.*, “Building Brand Value”, Tata McGraw Hill Publishing Company Ltd, 2006
2. *Moorthy Y. L. R.*, “Brand Management –The Indian Context” Vikas Publication Pvt Ltd, 2007
3. *Verma Harsh V.*, “Brand Management Text and Cases” Excel books, 2006
4. *Mathur U. C.*, “Brand Management Text and Cases”, Macmillan India Ltd 2006.
5. Branding – *Vanauken*, Jaico Books, Delhi
6. Branding – *Geoffrey Randall*, Wood Head Publishing, England
7. Personal Branding – *Montoya*, Jaico Books, Chennai

