

BHARATHIAR UNIVERSITY, COIMBATORE
M.Sc. Apparel Production – Affiliated Colleges
(Effective from Academic Year 2009 - 2010)

Sem.	Study Components	Course title	Ins. hrs/ week	Exam				Credit
				Dur.Hrs	CIA	Marks	Total Marks	
I	Paper I	Advanced Textile Science	4	3	25	75	100	4
	Paper II	Apparel Designing and production	4	3	25	75	100	4
	Paper III	Personnel Management and Industrial Relations	4	3	25	75	100	5
	Paper IV	Knitted Fabric Science	4	3	25	75	100	4
	Paper V	Research Methodology and Business Statistics	6	3	25	75	100	5
	Practical I	Apparel Designing, Production and Accessories practical	4	4	40	60	100	3
	Elect / Dip.	Paper I	4	3	25	75	100	3
II	Paper VI	Merchandising and Retailing	4	3	25	75	100	5
	Paper VII	Testing and Quality Control	5	3	25	75	100	5
	Paper VIII	Technology of Sewing Machines	4	3	25	75	100	4
	Paper IX	Advanced Chemical Processing	5	3	25	75	100	4
	Practical II	Fabric Structure Analysis Practical	4	3	40	60	100	3
	Practical III	Advanced Chemical Processing Practical	4	3	40	60	100	3
	Elect / Dip.	Paper II	4	3	25	75	100	3
15 days industrial training in Apparel Industry								
III	Paper X	Work Study and Plant maintenance	6	3	25	75	100	5
	Paper XI	Apparel Industrial Engineering	5	3	25	75	100	5
	Paper XII	Garment Costing and Programming	6	3	25	75	100	4
	Practical IV	CAD Practical	4	3	20	30	50	4
	Practical V	Export Sampling and Presentation	5	4	20	30	50	5
	Elect / Dip.	Paper III	4	3	25	75	100	3
IV	Elect / Dip.	Paper IV	4	3	25	75	100	3
	-----	Project work and viva voce	-	-	-	-	200*	6
Total							2200	90

* Project report – 160 marks; Viva voce- 40 Marks

List of Group Elective/Diploma papers (Colleges can choose any one of the Group/Diploma papers as electives)

	GROUP A Diploma in Garment Export Management (DGEM)	GROUP B Diploma in Apparel Merchandising (DAM)	GROUP C Diploma in Technical Textiles (DTT)
Paper I/ Sem I	Export Trade and Documentation	Retail Management	Materials for Technical Textiles
Paper II/Sem II	Logistics Management	Merchandising Management	Functional Textiles
Paper III/Sem III	International Marketing	Supply chain management	Home Textiles
Paper IV/Sem IV	Export Finance Procedure	Total Quality Management	Finishes for Technical Textiles

Core Paper I - Advanced Textile Science

UNIT I

Textile fibres: Classification – General physical & chemical properties. Natural Fibres: Brief study about properties & applications of Cotton, Linen, Wool, Silk. Study about influence of fibre properties on yarn quality. Brief study on coloured Cotton & Organic Cotton.

UNIT II

Filament spinning techniques. Semi Synthetic fibres: Brief study about properties & applications of Viscose, Modal, Acetate fibres. Polymer & its types - Requirements for fibre forming polymers. Synthetic fibres: Brief study about properties & applications of Polyester, Nylon, Acrylic, Spandex fibres. Filament Drawing and its effects.

UNIT III

Developments in polyester fibres. Brief study about Banana & Bamboo fibres. Study about Polypropylene fibres. High performance fibres (Aramid, Carbon, Glass, PVA fibres) for Technical Textiles. Hollow fibres & its application – Brief study about multi component fibre & micro fibres.

UNIT IV

Yarn: Classification of yarn types- brief study about processes and its objectives in Ring spinning - Comparison of carded and combed yarn - Winding and its objectives. Ply yarn & Cable yarn – Properties. Yarn numbering systems. Various Yarn & Package defects. Blended textiles: Types of blending - Reasons for blending. Brief study about Sewing threads.

UNIT V

Modern spinning systems: OE spinning and its advantages – Airjet spinning – Bobtex yarn. Brief study about Core and Wrap spinning . Brief study about Novelty yarns. Textured filament: Types of textured yarns - Methods of texturisation- Applications of textured yarns.

References:

1. Wynne, A, The motivate.
2. Mishra, S.P. A text book of fibre science and technology.
3. Gordon Cook, J, Hand book of textile fibres –I & II.
4. Phyllis G.Torton, Understanding textiles.
5. Marjory L.Joseph, Essentials of textiles.
6. Joseph J.Pizzuto, Fabric science.
7. Goswami.J.C., Martindale.J.G, Scardino.K.L., Textile yarns, Technology, Structure & Applications.
8. Moncrieff,W, Man-made fibres.
9. Identification of textile materials, The textile institute, Manchester.
10. Eric Oxtoby, Spun yarn technology.
11. Sadov.F, Korchagin.M, Matesky.A, Chemical technology of fibrous material.

Core Paper II - Apparel Designing and Production

UNIT I

Introduction – Apparel Silhouettes – Component parts applied in different garments – Classification of apparel based on season, gender and occasion - Standard body measurements – methods of measuring. Pattern Drafting – Tools and techniques – Draping – Dress form & its types – Draping steps for basic bodice, skirt and pants.

UNIT II

Dart relocation and dart manipulation techniques. Pattern grading – principles of grading – manual and computerized grading techniques. Basic Grading for front, back sleeve and collar. Pattern positioning and lay-out – concepts – rules for pattern lay-out – Positioning patterns on the fabric.

UNIT III

Stitches – Classification of stitches based on federal standards – methods of stitch formation. Seams – Seam classes and seam finishes. Stitch and seam defects – causes and remedies.

UNIT IV

Garment breakdown analysis – Flow process for torso and bifurcated garments - Thread consumption for various types of stitches and garments. Fitting – Definition – Principles for good fit – common fit problems – causes and their remedies.

UNIT V

Style detailing – skirts, plackets, pockets, pants, sleeve, collar, neckline, fullness, trims and accessories – needle, label, fasteners, linings, interlining. Sewing thread types, packages -ticket numbering.

References:

1. Roach and Eicher, “Dress and Identity”, Fairchild publications, New York.
2. Stamper, Donnell, “Experimental apparel construction” Fairchild publications, New York.
3. Myers, Devitt, “Complete Guide to size specification and Technical design” Fairchild publications, New York.

Core Paper III - Personnel Management and Industrial Relations

UNIT I:

Introduction: Definition – Functions – Objectives – Role of personnel management in industry. Principles of good personnel policy. Organizing the personnel function. Leadership - Motivation – Job satisfaction and Morale – communication – Control process.

UNIT II:

Human resource management: Objectives and planning of manpower - Job analysis, job description, and job specification. Recruitment and selection. Training and development. Performance appraisal. Career planning and job change.

UNIT III

Job evaluation, Employee compensation – Wages and salary – Incentives, DA, Bonus and wage differentials. Wage acts and policies.

UNIT IV

Labour welfare – Safety Engineering – Accidents – Good housekeeping – Welfare acts: Welfare funds – Voluntary Benefits – Insurance – Provident Fund – Gratuity – Maternity benefits - ILO.

UNIT V

Industrial Relations: Meaning – approaches – Significance. Trade Unions – Collective bargaining. Grievance and employee discipline. Workers Participation in management. Union – management Relations. Industrial Disputes: Forms of disputes – Methods of prevention and settlements of Industrial disputes – Authorities for settlement.

References:

1. Personnel Management & Industrial Relations, P.C. Tripathi.
2. Industrial Engineering and management. O.P. Khanna

Core Paper IV - Knitted Fabric Science

UNIT-I

Comparison of warp and weft knitting - Terms in knitting - Knitting elements - Types of needles and functions - Primary structures & characteristics - Plain, rib, interlock & purl – Knitting cycle with sinkers - machine elements & knitting elements – brake - cams - fabric takedown - cone carrier devices - positive feeders and storage feeders - monitoring and maintenance devices.

UNIT-II

Scope of modern knitting machines - Scope of jacquard knitting machines - Principles of needle selection – Pattern wheel jacquard mechanism – Pattern drum jacquard mechanism – Pattern jack mechanism - Punched steel tape jacquard mechanism – Electronic jacquard mechanism – Advantages of electronic jacquard machine over other jacquard mechanisms.

UNIT-III

Concept of Designing – Different representation methods – Ornamentation of weft knitted structures – Single Jersey derivatives – Single pique – Double pique – Honey comb – Pearl – Cross miss – Cross tuck – Accordion – Rib derivatives – Half cardigan – Full cardigan – Double half cardigan – Double cardigan – Double side half cardigan – Milano rib – Half milano – Ripple – Flat back rib – Waffle rib – Swiss pique – French pique – Interlock derivatives – Single pique – Cross tubular – Cross miss – Half milano – Ponte-di-roma – Bourrelet – Texi pique – Pin tuck – Ottoman rib.

UNIT-IV

Fabric engineering concepts - control of GSM and fabric width - shrinkage control and tightness factor relationship - loop length effects- Fabric fault - Pre-requisites for faultless knitting – Various types of faults - Causes and remedies for various faults - Basic Concept – Mechanism in seamless knitting, Advantages & limitations.

UNIT-V

Working principles of flat knitting machine - Racking - Passage of material - Knitting cycle - Principles of warp knitting – Machine classifications - Basic designing principles – method of yarn preparation – two bar standard structures- Working Principles of Tricot & Raschel Warp knitting machines.

References:

1. D.B.Ajgoankar, "Knitting Technology", Universal Publishing Corporation, 1998.
2. David J. Spencer, "Knitting Technology", Wood head Publishing Limited, 2001.
3. Samuel Raz, "Flat Knitting Technology", Meisenbach Bamberg.
4. Chandrasekara Iyer/Mammal/Schach, "Circular knitting technology", Meisenbach Bamberg, 1992.
5. Dr. S. Raz, "Warp Knitting Production",

Core Paper V - Research Methodology and Business Statistics

Unit I

Introduction to Research Methodology: Meaning, Objectives and Motivation of Research – Types of research – Research process. Introduction to Statistics: Meaning and Definition – Limitations – Statistics & Business Research.

UNIT II

Research Design: Need and types of Research Design – Basic Principles of Experimental Design – Sampling Design – Characteristics of a good sample design – Random Samples and Random Sampling Design.

UNIT III

Data Collection and Statistical Measures: Methods of Data Collection – Primary data and Secondary data – Selection of Appropriate Method for Data Collection – Case Study Method. Processing data – Measure of Central Tendency – Mean, Median and Mode – Measure of Dispersion – Standard Deviation – Co-efficient of variance – Skewness.

UNIT IV

Statistical Methods: Correlation – Simple Correlation Person's Co- efficient of Correlation and Rank Correlation. Regression – Simple Linear Regression. Time Series Analysis – Components and Uses – Methods of Estimating – Trend and Seasonal Variations – Seasonal Index.

UNIT – V

Statistical Inferences and Report Writing: Null Hypothesis Vs Alternative Hypothesis – Steps in Testing Hypothesis – Tests of Significance for Small Samples t - test, ANOVA – One Way and Two Way Classification and Chi-Square Test. Interpretation of Data and Report Writing – Techniques of Interpretation – Layout of a Research Paper.

References

1. Research Methodology – C.R.Kothari
2. Business Research Methods – Donald R.Cooper.
3. Methodology and Techniques of Social Research – Wilkinson and Bhandarkar.
4. Statistical Methods – S.P.Gupta.
5. Statistics for Management – Levin and Rubin.
6. Advanced Statistical Methods – Sanchetti & Kapoor.

Practical I - Apparel Designing, Production and Accessories

Design, develop and construct garments for the following categories.

1. Cardigan dress
2. polo shirt
3. Turtle neck dress
4. One – Piece swimsuit
5. Jumpsuit
6. Pull-on pants
7. Circular Skirt (Woven)
8. Tiered skirt
9. Crew neck T-shirt
10. Raglan sleeve T-Shirt
11. A set of Fashion show garments (Woven)
12. A set of ornaments for Fashion show

Core Paper VI - Merchandising and Retailing

UNIT I

Merchandising Terminologies - Classification of Exporters – Classification of buyers – Channels for sourcing of buyers - Buyer Communication, negotiation and relation techniques.

UNIT II

Organizing for Merchandising – Role of Merchandisers in export apparel industry - Types of Samples and approvals - Production Planning & Control - Order execution – BPO and its implications - Vendor compliance.

UNIT III

Inspection and quality control: Need and scope - Types of inspection – Stages of inspection in garment industry – Garment process flow quality parameters. AQL standards and its significance in Pre final and Final inspection – Shipment hazards - Evaluation of packing and package quality.

UNIT IV

Fashion Merchandising - Nature & Environment of Fashion - Movement and Leaders of Fashion - Fashion Cycle - Business of Fashion - Fashion Focus on Textile Fibers & Fabrics - Foreign Fashion Markets - Fashion Shows -Fashion Retailing & Trends - Retailing Trends - Trade fair - Types - Planning for fair participation

UNIT V

Visual Merchandising - Meaning - Need and Importance of Visual Merchandising - Display types - Visual Merchandising Techniques.

References:

1. Daragho' Reilly, Jullian J. Gibas, Building Buyer Relationships.
2. Dennis W. Me. Leavey Peter, Production Planning & Inventory Control.
3. Mc Millan Publishing Co., Inside the Fashion Business.
4. Amubai Patel, Towards Zero Defects.
5. Pradeep Metha, Managing Quality in the Apparel Industry.
6. Strong Elian, Fashion Merchandising.

Core Paper VII - Testing & Quality Control

Unit I

Testing: objectives of testing. Moisture and humidity: Its relation to textiles – hygrometer. Standard atmospheric conditions and its importance in testing room. Fibre testing: Study about Fibrograph, Stelometer, ATIRA fineness tester. Importance of FQI in Cotton. Fibre identification tests: microscopical view, burning test, solubility test, staining test. Study about influence of fibre properties on yarn quality.

Unit II

Testing of Yarn: Principle of yarn count Determination – standard procedure. Study about Beesley Balance. Working principles of Tensile Testing Machines: CRL, CRE & CRT - Lea Strength Tester and CSP determination. Study about Uster evenness tester – ASTM Yarn Appearance Boards. Study about Yarn Twist testers. Hairiness measurement. Study about classmate faults and its effect. Influence of yarn hairiness on fabric quality.

Unit III

Testing of Fabric: Knitted Fabric Specifications - CPI, WPI, LL, CL, TF & GSM – Calculations. Fabric Bursting Strength Testing – testing of Abrasion and Pilling Resistance - Air Permeability Testing - Crease Recovery testing - Fabric Handle – testing of fabric drape. Testing of Dimensional Stability of Knitted Fabric and its Importance.

Unit IV

Color Fastness: Introduction to Color Fastness - Importance - Agencies of Color Fastness: Washing, Rubbing, Perspiration, Light - Grey Scales and Ratings - Standard Testing Procedures - Reasons For Poor Color Fastness. Brief study about computer colour matching. Testing of Garments: Tests related to garment appearance and performance such as measurement of seam pucker, seams slippage and seam strength. Testing of Garment Accessories: Testing of Zippers, Buttons, and Sewing Threads.

Unit V

Introduction to Quality – benefits – concept of quality control and quality assurance. Presentation and analysis of data. Tools of quality control. Statistical Techniques: Study on Statistical quality control Concept of reproducibility and repeatability, methods pertaining to fibre, yarn and fabric testing, concept, international quality parameters and standards like AATCC and ASTM.

References

1. Principles Of Textile Testing – J.E. Booth
2. Hand Book Of Textile Testing & Quality Control – Elliot B. Grover & D.S. Hamby
3. Textile Testing – P. Angappan & R. Gopalakrishnan
4. Managing Quality In Apparel Industries – Pradeep V Metha & Satis K. Bhardwaj.

Core Paper VIII - Technology of Sewing Machines

UNIT I

Sewing preparatory machines: Process flow of the company - Spreading – Need and methods - Specifications for good quality spreading – Study of manual and computerized spreading. Cutting- Specifications for good quality cutting – Cutting methods and types of cutting machines – Detailed study of cutting machine types.

UNIT II.

Components of sewing machines:Component parts of sewing m/c - Bed types- Flat, Post, Feed of the

arm, Cylindrical – Applications - Feed mechanism- Drop feed, Differential feed, Adjustable top and bottom feed, Puller feed and Needle feed.

UNIT III.

Primary sewing machines:Classifications of sewing m/c-Study of SNLS, DNLS, interlock m/c, flat Lock, over lock, button holing m/c and button sewing m/c.

UNIT IV.

Specialty sewing machines:Special application sewing m/c- Bar tacking, auto dot and waist pleat stitching m/c, automatic pocket setter, belt loop setter, zigzag m/c and placket making m/c – Unit Production System (UPS).

UNIT V.

Garment finishing machines:Fusing- Advantages and limitations - Types of fusing resin and equipment. Pressing-Purpose - Pressing equipment and methods. Needle detector - packing – packing equipments.

Maintenance of sewing machines Various sewing machine settings – Problems – Remedies.

References:

1. Technology of clothing manufacture – B.Latham & H.Carr
2. Apparel manufacturers hand book – Jacob Solinger
3. Sewing machine technical manuals

Core Paper IX - Advanced Chemical Processing

Unit I

Water: water hardness and its effects - water softening process methods: ion exchange - sequestering agent methods. Preparatory process:. Singeing: types of singeing- gas singeing- drawbacks and advantages. Scouring: Objectives - mechanism – recipe and controlling parameters - Evaluation of scouring efficiency - Scouring of natural and blended textiles. Bleaching: Objectives – peroxide and chlorite bleaching - Controlling parameters and mechanism - Evaluation of bleaching Efficiency.

Unit II

Mergerizing- Objectives - mechanism - Process parameters and operation. Barium activity number, its determination. Concept of colour: Visible spectrum, wavelength– Metamerism / isomerism. Theories of colour: Additive and subtractive theories - Primary, secondary, tertiary, complementary and contrasting colours - Tristimulus values. Computer colour matching, Kubelka-Munk equation, colour-co-ordinates, CIE Lab values. Dyes: classification of dyes - Dyeing methods of cellulosic fibre with reactive. - Dyeing of protein fibres with acid dyes - dyeing of polyester fibre disperse dyes. Auxiliaries used in dyeing.

Unit III

Printing: Difference between dyeing and printing. Print paste: Constituents and characteristics, thickeners and its types. Methods of printing: screen printing-roller printing-rotary screen printing - flock printing- -transfer printing- batik, tie and dye. Advantages and drawbacks. Photoelectric method of screen preparation. Printing of Cellulosic fibres with pigment and reactive dyes, Silk and nylon with acid dyes, polyester with disperse dyes. Styles of printing: direct – discharge – resist style. After-treatments: Importance - process and mechanism of steaming, curing, ageing and open soaping.

Unit IV

Finishing: Objectives – classification. Softening of textiles: classification, Functional finish: Problem of creasing - anti-crease finish on cotton . Water repellent finish - evaluation of watter repellency. Anti-microbial finishes on natural, and man made textiles. Compacting of knit goods – shearing – raising – ballon padding. Heat setting: Objectives, mechanism of setting. Working principles of wet processing machines: cheese dyeing, winch dyeing, jet dyeing and soft flow dyeing machines.

Unit V

Chemical used in textile industry: Toxicity of various chemicals. Role of each chemical on waste water load. Treatment of textile effluents: Primary, secondary and tertiary treatments in ETP. Colour removal, various chemicals used in ETP. Effluent Testing: Testing of BOD, COD, TOC and interpretation of results.

References:

1. Technology Of Textile Processing (Vol 1-9) – By V.A.Shenai
2. Dyeing And Chemical Technology Of Textile Fibres – E.R.Trotman

Practical II - Fabric Structure Analysis**Major Experiments:**

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 knitting machine with measurements & also mention the importance of each cam.
4. Trace the take down mechanism & set the mechanism for maximum & minimum tension.
5. Trace the positive feeder mechanism available in the modern knitting machine & set the mechanism for two different feed lengths.
6. Develop a pattern for flat knitting & set the machine accordingly.
7. Develop a pattern for circular knitting & set the machine accordingly.

Minor Experiments:

Analyse the given swatch for the following particulars:

1. Courses & wales per cm/ EPI & PPI
2. Loop length /Crimp
3. Technical graph
4. Cam settings
5. Needle order

Samples:**Knitted**

- | | | | |
|------------------------|----------------------|-------------------------|-----------------|
| 1. Pique | 2. Pearl knit | 3. Terry | 4. Twill |
| 5. Herring Bone | 6. Two thread fleece | 7. Mini Jacquard design | 8. Auto striper |
| 9. Rib waffle | 10.Flat back rib | 11. Ottoman rib | 12. |
| Structured interlock | | | |
| 13. Jacquard interlock | | | |

Woven

1. Plain weave and dobby weave variation
2. Jacquard design
3. Extra warp and weft

Practical III - Advanced Chemical Processing

1. Estimation of water hardness by EDTA method
 2. Scouring of cotton woven / knit fabric to determine the scouring loss percentage.
 3. Bleaching of scoured woven / knit fabric with Hydrogen Peroxide.
 4. Degumming of silk.
 5. Bleaching of silk / wool material by using hydrogen peroxide.
 6. Scouring of 100% synthetic textiles (polyester / nylon).
 7. Bio - scouring process.
 8. Dyeing Of Cotton Materials With Cold / Hot Brand Reactive Dyes.
 9. Dyeing Of Cotton Materials With Vinyl Sulphone Dyes.
 10. Dyeing Of Silk / Wool With Acid & Metal Complex Dyes.
 11. Dyeing Of Silk / Wool With Reactive Dyes.
 12. Dyeing Of Nylon with Acid Dyes.
 13. Dyeing Of Polyester With Disperse Dyes.
 14. Dyeing Of Acrylics With Cationic Dyes.
 15. Dyeing Of Polyester-Cotton Blend With Disperse / Reactive Dyes.
 16. Direct Style Of Printing Using Vinyl Sulphone Dyes.
 17. Direct Style Of Printing Using Pigment Dyes On Cotton And P/C Blend.
 18. Development of Tie & Dye Style of Printing with Vinyl Sulphone Dyes.
 19. Development of Batik Style Print With reactive Dyes.
 20. White Discharge on Ramazol Ground.
 21. Bio washing
 22. Stone washing
 23. Flame retardant finishing
 24. Fire resistant finishing
 25. Finishing with enzymes
- (Any 15 Exercises may be given for final examination)

Core Paper X - WORK STUDY AND PLANT MAINTENANCE

UNIT I

WORK STUDY: Definition and concept – need for work study – advantages – objectives of method study- objectives of work measurement – method study procedure – process chart symbols – flow process charts – flow diagram – string diagram – multiple activity chart – operation analysis – analysis of motion – principles of motion economy – THERBLIGS – SIMO charts – PMTS – MTM – activity sampling – ergonomics.

UNIT II

OPERATIONS RESEARCH: Concepts and need for OR – optimization concepts – methods of OR – Linear programming – Graphical method – Transportation problems – Queuing theory.

UNIT III

NETWORK ANALYSIS: Introduction – network techniques – Terms related to network planning methods – PERT – CPM, CPP, CPA – Application of network techniques.

UNIT IV

INVENTORY CONTROL & MANAGEMENT: Introduction to inventory management – inventory control, classification, Order point system, Material requirement Planning(MRP), Capacity requirement Planning (CRP), MRP II, ABC Analysis – EOQ. Inventory models.

UNIT V

PLANT MAINTENANCE: Plant maintenance – objectives – importance – duties, functions and responsibilities of plant maintenance engineering department. Organization of maintenance department – Types of maintenance – corrective, scheduled, Preventive, Predictive maintenance.

References

1. A. J. Chuter, Introduction to Production Management
2. Tripathi, Personal Management and Industrial Relations.
3. O.P. Khanna, Industrial Engineering and Management.
4. Rama Moorthi, Production and Operations Management.
5. T.R. Banga & S.C. Sharma, Industrial Organisation and Engineering Economics.

Core Paper XI - Apparel Industrial Engineering

UNIT I: Plant Engineering

Introduction to apparel Industry- Plant Location – Factors influencing plant location -Location Economics. Plant Layout – Classification - Process Layout - Product Layout - Combination Layout – Plant layout procedures – factory building.

UNIT II: Product Design

Product design, planning and development – Factors affecting apparel design - design by imitation – Product planning. Requirements for product design, Constituents of product planning and product development procedure. Requirements for process planning.

UNIT III: Line Balancing

Production - Definitions - Terminology - Basic Production Systems - Evaluating and Choosing the System - Process Flow and Charts for Garment - Scheduling Calculations - Introduction to Balancing Theory - Balance Control - Balancing Exercises For Garment -Industry.

UNIT IV Production Planning And Control

Functions: Planning, action and control phases – Forecasting – order writing – process planning & routing – material control - scheduling – dispatching – re-planning. Coordinating Departmental Activities. Scheduling techniques: Load analysis sheet, Gantt chart, Order schedule chart.

Cutting & Sewing room planning: Drawing and reproduction of the Marker – Marker planning & Spreading specification – Cutting planning and requirements - Sorting and Bundling

UNIT V: Productivity

Measurement of Productivity - Total Factor Productivity - Quick Response - Criteria for Increasing Productivity in Garment Industry - conducting productivity analysis survey in the garment industry.

References:

1. A. J. Chuter, Introduction to Production Management
2. Tripathi, Personal Management and Industrial Relations.
3. O.P. Khanna, Industrial Engineering and Management.
4. Rama Moorthi, Production and Operations Management.
5. T.R. Banga & S.C. Sharma, Industrial Organisation and Engineering Economics

Core Paper XII - Garment Costing and Programming

Unit – I

Principles Of Costing - Requirements Of Good Costing System - Cost Unit - Types Of Costs - Fixed Cost - Variable Cost - Semi Variable Cost - Conversion Cost- Replacement Cost - Differential Cost - Imputed Cost - Sunk Cost -Research Cost - Development Cost - Policy Cost - Shutdown Cost.

Unit – II

Elements Of Cost - Direct Material Cost - Direct Expenses - Direct Wages - Indirect Materials - Indirect Expenses - Indirect Labour - Overheads - Production Overhead - Administrative Overhead - Selling Overhead Distribution Overhead - Prime Cost - Work Cost - Cost Of Production - Total Cost

Unit - III

Cost Estimation Of Yarn, Knitted Fabric, Dyeing, Printing & Finishing. Cost Estimation For Cutting, Stitching, Checking, Packing, Forwading, Shipping, Insurance Etc., - Inco Terms & Its Relationship With Costing.

Unit – IV

Garment weight calculation, yarn requirement for an order, Dia fixation, knitting & process programming.

Unit - V

Estimation Of Factory Cost For Vest, Briefs , Shorts, T-Shirts, Pyjamas, Children's Wear, Ladies Wear Etc.- , Various Factors To Be Considered In Costing For Domestic Products & International Products.

References:

1. Industrial engineering , O.P.Khanna
2. Principles of Accounting , S.N.Maheswari
3. Cost Accounting, Jain Wakang
4. Principles of Accounting, Nataraj

Practical IV - CAD Practical

Part – A

Develop The Patterns For The Following Styles Using Any Cad Software For The Given Measurements And Also Grade The Patterns To Various Sizes And Estimate The Lay Length And Marker Efficiency.

1. Men's Basic T Shirt
2. Raglan with Pocket
3. Men's Polo T Shirt
4. Men's High Neck Shirt
5. Men's Boxer Short
6. Men's Bermudas Short
7. Men's Trouser
8. Men's Kimono Sleeve
9. Men's V – Neck Shirt
10. Men's hood
11. Men's Inner Garment – Vests RN / RNS

12. Men's Under Garment: Briefs With Inner Waist Band Or Outer Waist Band Of Various Models - Trunk Type.
13. Ladies Skirt
14. Ladies Blouse
15. Ladies Basic Bodice
16. Women's Nighties
17. Kid's Wear Of Various Styles
18. Children's Suits And Pyjama

Part – B

Digitize The Given Patterns And Store Them As Style Files And Apply Grade Rules And Estimate The Lay Length And Marker Efficiency

Practical V - Export Sampling and Presentation

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 5 Export Orders & 5 Export Enquiries Shall Be Given)

Designs may be given from the following styles :

Specialized Ladies Garments - Blouses & Cholies – Midis Skirts – Night Wears. Party Wears - Casual Wears, Specialized Men's Wear - Various Types Of Knitted T Shirts For Formal And Casuals - Over Dresses. Specialized Kid's Wear For 1 To 5 Year Age Groups. Knitted Garments for Teen Ages / School Going Boys And Girls.

Reference :

- The Style Source Book – Judith Miller, Stewart, Tabori & Chang, Newyork
- The Creative Book Of Fashion – Vol – I – Sebastian Zachariah
- Naturally 70's Fabric – Constance Korosec & Leslie Pina
- Natural Fabrics – Ian Mankin

PROJECT WORK

Students have to undertake project in the areas of Garment Manufacturing industry. A Team consisting of Internal & External Experts will evaluate the Project Report. The Viva-Voce will be conducted.

SEMESTER-I GROUP A : DIPLOMA PAPER-I

Export Trade and Documentation

Unit I

Introduction- Customs Act – other acts relating to export/import – Formalities for commencing – obtaining export/import licenses – processing of export order – customs formalities – Export documentation – role of ECGC in export promotion – terms of shipment – Export Promotion council, commodity boards – Role and functions of Export Promotion council, Commodity boards, Directorates of commercial intelligence and statistics, Indian trade promotion organization, IIFT.

Unit II

Export: Types of exporters-Registration of exporters. Major Export from India – Licensing. Facilities available to EOU'S, SEZ'S, and Status holders duty drawback procedures other incentives .

Unit III

Documentation - Performa invoice, commercial invoice and its attestation, packing list, Inspection, certificate, certificate of origin, GSP certification, shipping bills, A.R, A.R(4) forms, Mate receipts, GR-Forms or SDF, Marine insurance policy, ECGC policy, bill of exchange, bank certificate for Export B/L, AWB, Special Consular Invoice- bill of entry and airway bill.

Unit IV

Preshipment inspection formalities – inspection agencies- compulsory inspection control Act 1963 – customs clearance of export cargo – post shipment formalities and procedures excise duty and customs clearance.

Unit V

Foreign trade policies-EXIM Policy-Foreign trade policy 2004-09-provisions- Negative list-Restricted list, Shipment of Export cargo: By sea, air, ICD, courier, land customs station and by Post - Procedure and Documents required for shipment of cargo - Multimodal transport - Procedure and documentation - Central Excise and Customs clearance of export cargo - Procedure and documents.

REFERENCES

1. New Export Import Policy – Nabhi's publications
2. Export Marketing –Francis Cherunilam
3. Export Management –T.A.SBalagopal
4. Export Import Procedure - Documentation andLogistics-C.Ramagopal
5. Export Marketing-B.S.Rathor & J.S.Rathor

SEMESTER-I GROUP A : DIPLOMA PAPER-II

Logistics Management

Unit I:

Introduction to logistics management- Definition, scope, functions, objectives - Integrated logistics management, role of logistics in the Supply chain - Logistics & customer service, Role of logistics in competitive strategy, Logistics organization & performance measurement, ERP – SAP - ORACLE

Unit II:

Inventory planning, inventory costs, classifying inventory, Nature & importance of warehousing, types of warehouses, warehousing functions, warehouse layout & design. Material handling- objectives, guidelines & principles, selection of material handling equipments. Packaging-role of packaging, packaging materials, consumer & industrial packaging, material handling efficiency

Unit III:

Transportation- role of transportation in logistics, transportation selection decision, basic modes of transportation- Rail, Road, Water, Air, Pipeline- characteristics of different modes- transport economics - Inter modal operations

Unit IV:

Containerization-concept, types, benefits, Types of carriers- indirect & special carriers, Role of intermediaries- shipping agents, brokers- freight management- route planning Role of ports, ICDs, CONCOR - Global shipping options

Unit V:

Reverse logistics- scope, design, e-logistics- logistics information system-application of IT in logistics- automatic identification technologies- bar coding, RFID, Logistics Outsourcing- 3PL & 4PL, Global logistics- operational & strategic issues

REFERENCES:

1. Logistics Management, Ailawadi C Sathish & Rakesh Singh, , Prentice Hall India, 2005
2. Textbook of Logistics & Supply Chain Management, Agrawal D K, , Macmillan India Limited, 2003
3. The Management of Business Logistics, Coyle et al., , Thomson Learning, 7th edition, 2004
4. Logistical Management- The Integrated Supply Chain Process, Bowersox Donald J, Tata McGraw Hill, 2000

SEMESTER-I GROUP A : DIPLOMA PAPER-III

International Marketing

.Unit- I

Introduction to International Marketing.Process of International Marketing – scope, concepts and drivers of international marketing – Domestic marketing versus international marketing –International dimensions of marketing- Characteristics of MNC's - Benefit of International Marketing – International trade theories.

Unit- II

International Marketing Environment Dynamics of International marketing Environment- International trade distortions and marketing Barriers – Political environment- Legal and Regulatory environment – Social and Cultural environment- economic environment.

Unit- III

International Marketing strategy decisions. International marketing research : practices and Challenges – International market segmentation, targeting and positioning - International marketing plan and entry mode selection – international consumer buying behavior.

Unit- IV

Developing global marketing strategies. International product and service strategies- Branding decisions for international marketing – Managing International Distributions and logistics - Global Advertising and promotion –Pricing for international markets – Personal selling and sales management.

Unit- V

International marketing strategy implementation. Organizing and Controlling International Marketing operations. – Negotiating with international customers, partners and regulators, Conferences, Trade shares, using Internet as medium.

REFERENCES

1. International Marketing – Analysis And Strategy By Sak Onkvisit,John.J.Shaw
2. International Marketing – P.K. Vasudeva
3. International Marketing – Awdrew Mcauley
4. International Marketing – Dana-Nicoleta Lascu
5. International Marketing – Philip. R. Cateora And John . L. Graham

SEMESTER-I GROUP A : DIPLOMA PAPER-IV

Export Finance Procedure

Unit I

Export Finance & Payments – Export Credit – Financing Foreign receivables –FEMA- advances against collection – discounting trade acceptance – Institutional Support for export finance in India – RBI guidelines- trade control - ECGC guide lines –Foreign Exchange Dealing Association of India – guidelines- international chamber of commerce – stages of export finance – new schemes for export finance – rediscounting export bills – options for exporters – forfeiting and factoring – RBI guidelines.

Unit II

Export costing: cost concepts – marginal, fixed, total, relevance of variable cost for exports – duty draw back, DEPB, concessional customer tariffs, terminal excise duties, sales tax octroi –deemed export and its benefits.

Unit III

Terms of payment – Advance payment, Document against payments, Documents against acceptance, Letter of credit – Incoterms : Ex-works/FOB/CFR/CIF/CIFC - Cost sheet for exports (Elements)/Freight Calculation/ Insurance premia Calculation. Terms of Payment – Advance payment, Documents against Payments, Documents against acceptance, Letter of Credit, Examples of working out quotations taking all incentives including profit margin/ overseas commission.

Unit IV

Pre shipment finance – Packing credit - advance against incentives, Discounting of documents, interest rate structure – Full convertibility – Financial institutions – Commercial bank, Exim bank – Exchange rate mechanism – Forward exchange cover.

Unit V

Post shipment Finance – post shipment credit – Negotiation of Export documents Under letters of credit – Purchase/Discount of foreign bills – Advance against bills sent on collection – Advance against Goods Sent on Consignment – Advance against Export Incentives – Advance against undrawn Balances – Advance against Retention Money – Post-shipment Export Credit Guarantee and Export Finance Guarantee – Post-shipment Credit in Foreign Currency.

References

1. International Marketing : M.L. Varma&Agarwal
2. Export Import Finance : Parasram
3. International Finance : Maurice D.Levi

SEMESTER-I GROUP B : DIPLOMA PAPER-I

Retail Management

Unit I

Retailing – meaning & definition – global retailing – trends & strategies – types of retailers – functions of a retailer – middle man – distribution channel – functions of middle man.

Unit II

Retail store lay out – merchandise planning – merchandise calendar – sourcing – types & strategies.

Unit III

Brand types – features of a good brand – brand positioning – Re-positioning – customer loyalty (CLP) Programme – sales promotional techniques in retailing

Unit IV

Pricing – objectives – policies – pricing methods – cost control methods in retailing business

Unit V

Visual merchandising – requirements & functions of a visual merchandiser – display – types – techniques for effective display. Direct marketing – cause marketing – event marketing – trade shows – fashion shows – case studies – strategies of eminent retailers.

REFERENCES

1. Barry Berman, Joel R. Evans, Retail Management
2. Philips Kotler, Marketing Management
3. Ramaswamy. Namakumari, S. Marketing Management

SEMESTER-I GROUP B : DIPLOMA PAPER-II

Merchandising Management

Unit I

Merchandising – meaning & definition – types of export – merchant exporter, manufacturer export – job workers & their functions – requirements and traits for a merchandiser.

Unit II

Functions of a merchandiser – programming , costing methods – CMT rate calculation – execution of sample orders

Unit III

Production schedule – master schedule – job order schedule – departmental schedule – factors for production schedule – production – follow up – inspection : in process , pre final & final inspection – AQL.

Unit IV

Team – building – team dynamics – motivation theories – motivational techniques for merchandiser

Unit V

Conflict – types – reasons for conflict – conflict resolution techniques – stress types – EUSTRESS – DISTRESS – Work stress – causes – stress relaxation techniques
SWOT analysis – go – go situation – no-go situation – strategic planning – steps – strategies for an effective merchandising

REFERENCES

1. Daragho' Reilly, Jullian J. Gibas, Building Buyer Relationships.
2. Dennis W. Me. Leavey Peter, Production Planning & Inventory Control.
3. Mc Millan Publishing Co., Inside the Fashion Business.
4. Amubai Patel, Towards Zero Defects.
5. Pradeep Metha, Managing Quality in the Apparel Industry.
6. Strong Elian, Fashion Merchandising.

SEMESTER-I GROUP B : DIPLOMA PAPER-III

Supply chain management

UNIT I

SCM – Meaning, definition, need and evolution – traditional and modern approaches to SCM – key issues in SCM – phases of SCM – SCM and its relation to other departments in the organization.

UNIT II

Operations management in SCM: type of manufacturing systems – lean manufacturing- mass customization- outsourcing- service operations management- managing supply and demand.

UNIT III: Basics of Supply Chain Management

Basic Elements of Supply Chain – Just In Time (JIT) – Total Quality Management (TQM) - Enterprise Resource Planning (ERP) - Demand Planning - Capacity Management. **Master Planning of Resources:** Demand Management - Sales and Operations Planning - Master Scheduling - Measuring the Business Plan.

UNIT IV: Purchasing Essentials

Introduction to Function of Purchasing in Manufacturing or Service Enterprise - Purchasing Responsibilities, Objectives, Organization, and Personnel requirements - Purchasing Policy And Systems - The Role of the Computer In Regulating Purchasing, Planning, Transactions, And Information Retrieval - Acquisition Of Purchased Materials - Development of Sources of Supply - and Quality Assurance, and Determination, Cost and Price Analysis, Make or Buy Decisions, The Role of Standardization, and Value Analysis.

UNIT V: Strategic Resource Management

Competitive Market Issues; Choices Affecting Facilities; Supply Chain; Information Technology; And Organizational Design; Configuring And Integrating Internal Processes; Evaluating And Managing Projects. **Advanced Purchasing:** The Process of Purchase Negotiations, Ethical Considerations in Purchasing, Legal Environment and Contract Cancellations. Criteria and Rating System to Evaluate

and Manage Supplier Performance, Managing Contracts and Resolve Order Differences with Suppliers. The Role of Technology and Paperless Purchasing.

References :

1. Stock & Ellram: Fundamentals of Logistic Management.
2. William Capacino, Supply Chain Management, Basis and Beyond.
3. B.S. Sahay, Supply Chain Management for Global Competitiveness

**SEMESTER-I GROUP B : DIPLOMA PAPER-IV
Total Quality Management**

Unit I

Introduction: Quality - Evolution Of Quality Management – Quality Function And Quality Planning - . Basic Concept Of Total Quality Management (TQM)- Principles Of TQM – Important Phases Of TQM - Quality Trilogy – Four Absolutes Of Quality Management – Cost Circles (QCCS) _ Four Pillars Of TQM – PDCA Cycle Of Deming - - Kaizan 5’s Philosophy

Unit II

Statistical Quality Control: Classification And Tabulation Of Data- Diagrammatic And Graphic Presentation- Measures Of Central Tendency: Mean, Median & Mode – Measures Of Dispersion: Range, Mean Deviation, Standard Deviation & Co-Efficient Of Variation. Statistical Process Control- Control Charts: Uses & Basic Concepts- Control Chart For Variables And Attributes: X Chart- R Chart - P Chart – NP Chart – C Chart. Acceptance Sampling- Types Of Sampling Plans: Single, Double And Multiple Sampling Plans- Selection Of Sampling Plan – Construction of OC Curve – AQL And LTPD - Sampling Errors - Sampling Risks And Parameters: Producers Risk And Consumers Risk

Unit III

ISO 9000 Family Of Standards: Meaning & Definition – ISO 9000 Family Of Standards - Elements Of ISO - Benefits Of ISO 9000 System - Study On ISO 9001:2000 Guide Lines And Standard Clauses - Implementation Procedures And Requirements For ISO 9001:2000 System.

Unit IV

Certification: Accreditation And Certification Agencies – Quality Manuals- Contents Of Quality Manuals – Quality Awareness Program – Quality Audit. Types Of Quality Audit – Requirements & Characteristics Of A Quality Auditor – Audit- Procedure.

Unit V

Environmental Management: EMAS. (Environmental Management Audit System) Elements Of EMS - Benefits Of EMS – Environmental Policy – Environmental Planning & Implementation Of ISO 14000 – Norms For Eco Friendly Textiles & Eco Labels – International Eco Labels. SA 8000 Standards - Features - Introduction To OSHOS 18000 & WRAP

References:

1. Statistical Methods – Dr. S.P.Gupta
2. Juran’s Quality Control Handbook – J.M.Juran
3. Statistics – V.K.Kapoor
4. Textile Testing – P. Angappan & R. Gopalakrishnan
5. Managing Quality In Apparel Industries – Pradeep V Metha & Satis K. Bhardwaj
6. ISI Standards [BIS] / ISO 9001:2000 Standards
7. A Guide To ISO – 9000 – M. Nambiyar.

SEMESTER-I GROUP C : DIPLOMA PAPER-I
Materials for Technical Textiles

Unit I:

Introduction: Definition – classification of technical textiles – specific requirements – market potential

Unit II

High performance fibres – carbon fibres, silicate fibres, boron fibres, metal fibres, glass fibres, Kevlar and nomex. Concept of fibres extrusion – micro, hollow, trilobal – nano fibres, electrostatic spinning techniques.

Unit III

Introduction to non wovens - classifications – binders for non wovens – production techniques for non wovens – dry lay and wet lay process – process variables.

Unit IV

Adhesive bonding – water based , solvent based, hot melt based. Thermal bonding – drying – hotter bonding – heat setting – thermal calendar bonding. Lamination techniques – fabrics and methods

Unit V

Warp knitted technical textiles – warp knit structures for technical textiles – circular warp knitting – V bed technical fabrics. Socks knitting – techniques and passage of material through socks knitting machines

Reference:

1. Dr.V.K.Kothari “ Technical Textiles : Technology, Developments and Applications” IAFL Publications, 2005
2. Dr.N.Anbumani, “Knitting –Fundamentals, Machines, structures & Developments” New Age International publishers, Delhi
3. Withelm Albrechi et.at, “Nonwoven Fabrics” WILEY – VCH Veriag Gmbh & Company, 2003
4. Krema R, “Manual of NonWovens” Textile Trade Press, 1993
5. Russel.S, “Handbook of NonWovens” The Textile Institute Publication, 2004
6. Irsak O, “Nonwoven Textiles” Textile Institute, 1999

SEMESTER-I GROUP C : DIPLOMA PAPER-II
Functional Textiles

Unit I

Introduction: Functional design of textiles, need for functions properties of textiles for the specific functions, comfort and fit.

Unit II

Protective textiles; Introduction – Classification – brief study on fibre and fabrics for protective textiles.

UV protection – protection against cold – thermal protection – heat, electro magnetic radiation – ballistic protection – protection against micro organism – chemical and biological protection.

Unit III

Military Textiles: Introduction – military protection – fire fighter’s protective clothing – flight suits for military for aviators – camouflage fabrics – cold weather clothing – sweat management for military application.

Unit IV

Sports textiles: Introduction – clothing requirements – development of functional fibres, yarns and fabrics for temperature control and moisture management – stretch, bulky and light weight fabrics.

Unit V:

Medical textiles: Introduction – clothing requirements – classifications - brief study on medical fibres Cardio Vascular applications, sutures and ligatures – valves - pressure garments – protective health care garments.

Intelligent textiles: Stimuli sensitive intelligent textiles – phase change materials – smart textiles incorporating functional devices.

Reference:

1. Dr.V.K.Kothari “ Technical Textiles : Technology, Developments and Applications” IAFL Publications, 2005
2. Richard A.Scott “Textiles for Protection”, Woodhead publishing Ltd, 2005
3. Eugene Wilusz “Military textiles” Woodhead publishing Ltd, 2008
4. J.R.Holker “Bonded Fabrics” Woodhead Publishing Ltd, 2004
5. S.Anand, “Medical Textiles” Textile Institute 1996

SEMESTER-I GROUP C : DIPLOMA PAPER-III Home Textiles

Unit I

Different types of furnishing materials – woven and non – woven, factors influencing selection of furnishings. **FLOOR COVERINGS:** Hard floor coverings, resilient floor coverings, soft floor coverings, carpets and rugs, cushion and pads - Use. **WALL COVERINGS:** Types, factors for selection, use.

Unit II

WINDOW DRESSINGS: Different types of doors and windows – Draperies – Choice of fabrics, calculating the amount of material needed. Curtains – Types of curtains. Method of finishing draperies – Tucks or pleats. Uses of drapery rods, hooks, tape rings and pins.

Unit III

LIVING ROOM FURNISHINGS: Sofa covers, Wall hangers, Cushion, Cushion covers, Upholsteries, Bolster and bolster covers. **BED LINENS:** Definitions, types of bed linen - sheets, blankets, blanket covers, comforters, comfort covers, bed spreads, bed skirts, duvets, mattress and mattress covers, pads, pillows and pillow covers, throw pillows, shams and their uses.

Unit IV

KITCHEN LINENS: Definitions, types of kitchen linens - dish cloth, hand towels, fridge cover, fridge handle cover, mixie cover, grinder cover - their use.

Unit V

TABLE LINEN: Definitions, types – table linens, table mats, table cloths and place mats, hand towels – selection – use and care. **BATH LINEN:** Towels – types, selection use and care. Mats and rugs – types and its uses

REFERENCES

1. Brian. D Coleman, "Luxurious Home Interiors", Gibbs Smith Publication, Hong Kong, 2004.
2. Robett Harding, "Curtains, Blinds and Valances" , Eagtemoss, Ohio, 1998.
3. Katrin Cargill, "Simple Curtains", Ryland Peters and Small, London, 2002.
4. Charles Randall and Sharon Templeaton, "Dream Windows",Randall International Orange, California, 2003.
5. Wendy Baker, "Curtain and Fabric Selector", Collins and Brown, London, 2000.
6. Premavathy Seetharaman and Parveen Pannu, "Interior Design and Decoration", CBS Publishers and Distributors, 2005.
7. Jay Diamond and Ellen Diamond, "Fashion Apparel, Accessories and Home Furnishings", Prentice Hall, First Edition, 2007.

SEMESTER-I GROUP C : DIPLOMA PAPER-IV Finishes for Technical Textiles

Unit I

Introduction – Actual and future trends in chemical finishing – micro encapsulation – Development of nano textiles and apparel using – Nano-Tex, Nano-Care, Nano-Dry, Nano-Touch for home furnishing, technical textiles, smart and medical apparels.

Unit II

Repellant finishes – water, oil and stain – soil release – flame retardant finishes – polyester, cotton, nylon and wool – brief study on mechanism and evaluation of finishes

Unit III

Antistatic – Antipilling finishes – finishes to improve color fasteners – antimicrobial finishes – fragrance and anti odor finishes. Brief study on mechanism and evaluation of finishes

Unit IV

Introduction to testing of technical textiles – subjective evaluation of fabric handle properties – evaluation of flame retardant, anti microbial, soil release and antistatic finishes

Unit V

Measurement of air permeability, thermal conductivity, water vapour permeability - moisture transport - wetting, wicking - water repellency testing.

References:

1. W.D.Schindler and P.J.Hauser "Chemical finishing of textiles" Woodhead Publishing Ltd
2. Dr.V.K.Kothari " Technical Textiles : Technology, Developments and Applications" IAFL Publications, 2005
3. B.P.Saville, "Physical testing of textiles", Woodhead Publishing Ltd,2004