

Anna University Coimbatore
Faculty of Textile Technology
CURRICULUM 2007

B. Tech. Textile Technology (Fashion Technology) (Full Time)

SEMESTER V

Code No.	Course	Hours/week			Marks			C
		L	T	P	Sessional Marks	Exam Marks	Total	
THEORY								
07FT501	Apparel Production Planning and Control	3	1	0	50	50	100	4
07FT502	Chemical Processing of Textiles and Garments	3	0	0	50	50	100	3
07FT503	Surface Ornamentation	3	1	0	50	50	100	4
07FT504	Knitted Fabric Manufacture and Structure	3	1	0	50	50	100	4
07FT505	Principles of Garmenting	3	0	0	50	50	100	3
07FT506	Testing and Quality Control of Textiles and Apparel	3	1	0	50	50	100	4
PRACTICAL								
07FT507	Chemical Processing Laboratory	0	0	3	50	50	100	1.5
07FT508	Garment Construction Laboratory I	0	0	3	50	50	100	1.5
07FT509	Textile Testing and Quality Control Laboratory	0	0	3	50	50	100	1.5

SEMESTER VI

Code No.	Course	Hours/week			Marks			C
		L	T	P	Sessional Marks	Exam Marks	Total	
THEORY								
07FT601	Advanced Garmenting Techniques	3	1	0	50	50	100	4
07FT602	Clothing Care	3	1	0	50	50	100	4
07FT603	Computer Application in Apparel Industry	3	1	0	50	50	100	4
07FT604	Quality Assurance in Apparel Production	3	1	0	50	50	100	4
07FT605	Total Quality Management [§]	3	1	0	50	50	100	4
	Elective I	3	0	0	50	50	100	3
PRACTICAL								
07FT606	Computer Aided Garment Design Laboratory	0	0	3	50	50	100	1.5
07FT607	Garment Construction Laboratory II	0	0	3	50	50	100	1.5
07FT608	Mini Project and Design Collection	0	0	3	50	50	100	1.5

[§]: Common to B.Tech. TT, B.Tech. TT (FT), B.Tech. TT (TC)

ELECTIVES

Code No.	Course
07FT001	Advances in Textile Chemical Processing
07FT002	Apparel Brand Management
07FT003	Clothing Science [§]
07FT004	Creativity, Innovation and New Product Development [§]
07FT005	ERP in Apparel Industry
07FT006	Export Policies, Procedures and documentation
07FT007	Fabric Sourcing and Sampling
07FT008	Fashion Design: Process, Innovation and Practice
07FT009	Fashion Entrepreneurship
07FT010	Fashion Forecasting
07FT011	Home Textiles [§]
07FT012	Industrial Pattern Engineering
07FT013	Industrial Safety, Health and Environment [§]
07FT014	Management of Apparel Units
07FT015	Management Information Systems in Apparel Industry
07FT016	Operations Research [§]
07FT017	Smart Textiles [#]
07FT018	Supply Chain Management
07FT019	Value Engineering in Apparel Industry
07FT020	Visual Merchandising

[§]: Common to B.Tech. TT, B.Tech. TT (FT), B.Tech. TT (TC)

[#]: Common to B.Tech. TT and B.Tech. TT (FT)

Note:

Electives are common for B.Tech. FT (Full Time), FT (Part Time), B.Tech. FT (Diploma Stream) and B.Tech. FT (B.Sc. Stream)

UNIT I: INTRODUCTION **9**

Apparel production parameters, planning and lead time; product development steps from prototype to production model, importance of pre-production activities; introduction to timetable concepts; product data management understanding and interpretation of specification sheet

UNIT II: MARKER AND LAY PLANNING **9**

Marker planning – plain – stripes, plaid and checks – directional, non directional – spreading techniques – one way, two way – biased cross grain; step lay – splicing – marker making; lay lot planning; numerical exercises on lay lot planning

UNIT III: PRODUCTION SYSTEMS **9**

Different manufacturing systems; make through – group system – batch system – Progressive bundle system – synchro straight line system – mechanical conveyor system – unit production system – quick response system - advantages and disadvantages

UNIT IV: OPERATION SEQUENCE DEVELOPMENT **9**

Garment breakdown with machine and attachment details, development of production grid for T- Shirts - development of production flowchart – men’s full sleeve shirt – trousers – five-pocket jeans – ladies night dress – shorts – T-shirt

UNIT V: PRODUCTION PLANNING AND CONTROL **9**

Capacity calculation for cutting, sewing and finishing; determination of machine requirements for new factory; line balancing; determination and allocation of manpower and machine for balanced production in existing plant for a given target

TOTAL: 45

REFERENCES

1. Garg R.K. and Sharma V., “**Production Planning and Control Management**”, Dhanpat Rai Publishing, 1998
1. Jacob Solinger, “**Apparel Production Handbook**”, Reinhold Publications, 1998
2. Chuter, A. J., “**Introduction to Clothing Production Management**”, Osney Mead, 1995.
3. Carr Harold, Latham Barbara, “**The Technology of Clothing Manufacture**”, Om Book Service, 1994.
4. Cooklin Gerry, “**Introduction to Clothing Manufacture**”, Blackwell Science Ltd., 1995

UNIT I: GREY PREPARATION**9**

Singeing – purpose and process, principles of plate, roller and gas singeing machines – their relative merits and demerits, the precautions in singeing, yarn singeing; **desizing** – purpose and process, rot steeping, acid desizing and enzyme desizing, their relative advantages and disadvantages; **scouring** – purpose and process, batch, semi-continuous and continuous methods of scouring; **bleaching** of cotton goods with sodium hypochlorite, hydrogen peroxide and sodium chlorite; brief study of mercerisation - yarn mercerisation, fabric mercerisation, outline of pad-less chainless fabric mercerisation. Principles of working of machines used in grey preparation – padding mangle, two-bowl, three-bowl machines; jigger, winch, J-box, open-width washing

UNIT II: DYEING**9**

Classification of colorants; difference between dye and pigment; method of dyeing cotton with direct dyes; reactive dyes – M, H, HE, ME and VS reactive dyes; vat dyes; dyeing of polyester with disperse dyes, batch and continuous methods, polyester/cotton and polyester/viscose blends by batch and continuous methods; colour fastness to washing, rubbing and light of commonly used dyes – outline of test methods; Computer-aided colour matching; Dyeing equipment – principles of working of machines mentioned in Unit I, jet dyeing machine, soft-overflow jet dyeing machine, hank-yarn and package-yarn dyeing machines, garment dyeing machines

UNIT III: PRINTING**9**

Methods of printing; principles of block printing, roller printing, flat-bed and rotary-screen printing, transfer printing techniques; Styles of printing, principles of direct, discharge and resist styles of printing; printing with reactive dyes; pigment printing; principle of knitted-garment printing machine

UNIT IV: FINISHING**9**

Classification of textile finishes – Calendering, swissing, chasing, friction-calendering, Schreiner calendering, embossing; wrinkle-free finishing of cotton fabric (resin finishing); mechanical shrinking of cotton fabric (sanforising); compacting of knitted fabric; garment finishes – enzyme wash, stone wash, acid wash, peach finish, sand blasting

UNIT V: PROCESS HOUSE EFFLUENT AND ITS TREATMENT**9**

Nature of effluents in chemical processing, effect of waste water discharge on the environment, government standards for textile chemical process effluent discharges, treatment of dye house effluent – the constraints – the operations in an ETP – methods for removal of colour in dye house effluent; toxic chemicals and pollutants in textile chemical processing – azo dyes – major banned amines; guidelines for eco-friendly processing

TOTAL: 45

REFERENCES

1. Shenai V. A., **Technology of Textile Processing – Vol. III, V, VII and VIII**, Sevak Publications, Mumbai, 1995.
2. Koushik C. V. and Antao Irwin Josico, “**Chemical Processing of Textiles – Grey Preparation and Dyeing**” – NCUTE Publication, New Delhi, 2004.
3. Palmer John W., **Textile Processing and Finishing Aids: Recent Advances**, Mahajan Book Distributors, 1996.
4. Ronald James W., **Printing and Dyeing of Fabrics and Plastics**, Mahajan Book Distributors, 1996.
5. Shenai V. A., **Technology of Finishing** Sevak Publications, Mumbai, 1995

Unit I: INTRODUCTION 9

Introduction and origin of embroidery – History and development of embroidery; basic requirements of embroidery – selection of fabric, needle, thread and frame; general rules of embroidery and transferring of designs on fabric – care and maintenance of embroidered articles

Unit II: EMBROIDERY STITCHES 9

Knowledge, classification and practice of hand embroidery stitches – running, satin, long and short, chain, stem, herringbone, cross stitch, knotted stitch, fishbone, wheat, couching, buttonhole, shadow work and shade embroidery; Indian traditional embroidery - stitches, designs, colours and materials – phulkari, kasuti, kashmiri, kutch work, chikkankari work, kantha, tribal embroidery

Unit III: SURFACE ORNAMENTATION 9

Introduction to domestic embroidery machines – machine embroidery – bobbin thread, eyelet, cut work, richelieu work; surface ornamentation – drawn thread, patch work, appliqué, mirror work, badla work, bead work and sequin work, zari work, zardosi, mirror work, tinsel work and ribbon work

Unit IV: MACHINE EMBROIDERY AND TOOLS 9

Introduction to computerised embroidery machines – Needle - types, selection criteria, selection of needle number for different fabrics; thread – factors influencing selection, different types and properties; hoops – definition, types and selection criteria; stabilisers - definition, types, selection criteria and various stabilisers used for different fabrics; selection of stitch using computers; cost estimation for embroidered goods – factors influencing the costing

Unit V: WORKING OF EMBROIDERY MACHINES 9

CAD software used for embroidery – process of designing, punching, stitch application and selection, stitch density; types of embroidery machines – vertical embroidery and multi-head machines – parts, working principle, maintenance and special attachments used; sequins and bead work embroidery machines; stitch defects - causes and remedies

TOTAL: 45**REFERENCES**

1. Sheila Paine, “**Embroidered Textiles**”, Thames and Hudson Ltd., 1990
2. Gail Lawther, “**Inspirational Ideas for Embroidery on Clothes and Accessories**”, Search Press Ltd., 1993
3. Shailaja D. Naik, “**Traditional Embroideries of India**”, A.P.H Publishing Corporation, New Delhi, 1996
4. Usha Shrikant “**Ethnic Embroidery of India**” Honesty Publishers and Distributors, Mumbai, 2000
5. Sheila Paine “**Embroidery from India and Pakistan**” British Council Division, 2001

UNIT I: INTRODUCTION**9**

Basic principles of knitting - warp knitting - weft knitting, classification of warp and weft knitting - yarn quality requirements for knitting – terms and definitions used in knitting - comparison of weft and warp knitting - courses and wales; types of needles – knitting action of latch, bearded and compound needles; sinker - feeders – cylinders; gauge of the machine; cams - single-track, multi track

UNIT II: WEFT AND WARP KNITTING MACHINE**9**

Plain knit knitting machine – knitting elements-cylinder-sinker-cams-take-up mechanism; circular rib knitting machine-cycle of operation for rib knit; circular inter-lock knitting machine-purl knitting machine: warp knitting machine - tricot-knitting elements - knitting cycle; raschel-knitting elements - knitting cycle

UNIT III: WEFT KNITTED STRUCTURES**9**

Basic stitches - knit-tuck and miss stitch; ornamentation of plain knit fabrics - derivatives of plain knit – lecoste - check effect - accordian; ornamentation of rib structure - derivatives of rib structure - half cardigan - full cardigan; derivatives of interlock structures - eight lock - single pique - ponte-di-roma, ottoman rib, bourrelet, texi-pique - swiss pique

UNIT IV: WARP KNITTED STRUCTURES**9**

Representation of warp knit structures; point paper, chain-link notation, single fabrics: chain stitch, tricot lap, extension of 1 and 1 lapping, full tricot, lock knit, reverse lock knit, satin, loop raided fabrics, queen's cord, sharkskin, blind lap, open work effects, Marquissette, sand- flair net, hexagonal net

UNIT V: NEEDLE SELECTION**9**

Patterning mechanism: Pattern wheel, Pattern drum, peg drum machine, punched steel tape, jacquard punched paper roll jacquard, electronic devices for needle selection; study of fleece fabrics; study of knitted fabrics with elastomeric yarn - different combinations for different properties

TOTAL: 45**REFERENCESS**

1. Ajgaonkar D.B., “**Knitted Technology**”, Universal Publishing Corporation, Bombay, 1998.
2. Spencer David, “**Knitting Technology: A Comprehensive Handbook**”, Woodhead Publishing Ltd, 2005.
3. Anbumani N., “**Knitting-Fundamentals, Machines, Structures and Developments**”,
4. New Age International Publishers, 2007.
5. Foster Jack Stroud and Harington Raymond, “**Structure and Fabric**”, Blackwell Science Ltd, 1996
6. Henry Johnson, “**Introduction to Knitting Technology**” Abhishek Publications, 2006

UNIT I: INTRODUCTION 9

Fabric design constraints in garment manufacture; observation of defects in fabrics; direction of nap-nap one way, nap two way, reversible, non-reversible fabric, laying of stripes, checked and plaid fabrics; grain lines, true bias; design manipulation using bias

UNIT II: DRAPING 9

Introduction to draping- draping tools and equipments, draping procedure, plumb and notching theory; draping technique for garment components- front, back, plain sleeve, collars (convertible, Peter pan) , draping technique for fullness –flounce and frills; draping technique for garment -skirts (a-line, circular, pleated and gored) bifurcated and jackets

UNIT III: DESIGNING WITH FULLNESS 9

Designing with darts- dart clusters, graduated and radiating darts, asymmetric darts and parallel darts; designing with tucks-pleat tucks and pin tucks; designing with pleats-box pleat, pinch pleat, kick pleat ; designing with flares and gathers and godets

UNIT IV: SELECTION OF SEAMS AND STITCHES 9

Selection of seams, stitches, stitch density for men’s wear (trousers, shirts, shorts, T-shirt and jackets) selection of seams, stitches, stitch density for women’s wear (Chudidar, blouses, tops, trousers, lingerie) and selection of seams, stitches, stitch density for children’s wears (romper, sun suit, bib-overall, A-line frock and anorak); thread consumption for different stitches

UNIT V: FITTING 9

Fitting –Introduction, definition, principles of fit, indicators of good fit, fitting for unusual figures, common fitting problems and relevant pattern alterations, fitting problems in trousers, shirts, blouse, jackets and skirts and pattern alteration for trousers, shirts, blouse, jackets and skirts

TOTAL: 45**REFERENCES**

1. Armstrong, Helen Joseph, “**Pattern Making for Fashion Designing**” Prentice Hall, Upper Saddle River, New Jersey, 4th Edition,2004
2. Amaden Connie and Crawford, “**The Art of Fashion Draping**” Om Book Service, 2005
3. Natalie Bray, “**More Dress Pattern Designing**” Blackwell Scientific Publications, 2004
4. Natalie Bray, “**Dresses Pattern Designing: The Basic Principles of Cut and Fit**”, Blackwell Publishing, 1990
5. Winifred Aldrich, “**Metric Pattern Cutting for Children’s Wear and Baby Wear**” Om Book Services, 2001

UNIT I: SAMPLING TECHNIQUES 9

Definition – sample – random- biased- sampling techniques for fibre, yarns and fabrics; Standard RH and temperature for testing and mechanical processing – fibre testing – Principle of AFIS instrument for fibre testing. Yarn count and strength testing: yarn count – instruments used for count determination; Beesley’s balance- electronic yarn count balance – yarn diameter - yarn strength – lea strength testing, CSP; single yarn strength testing – RKM value

UNIT II: YARN TWIST AND EVENNESS 9

Twist testers - tension type – take-up -ATIRA direct type testers; yarn hairiness testing - methods – optical – yarn appearance – ASTM standards; classification of variation – methods of measuring evenness – cutting and weighing methods – electronic capacitance – Uster evenness tester – Uster standards –yarn faults – classification

UNIT III: FABRIC TESTING – I 10

Crimp – influence of crimp on fabric properties - Shirley crimp tester – fabric tensile strength tester – ravelled strip method – grab methods - Elmendorf tester– ballistic tester – hydraulic bursting strength tester; fabric abrasion resistance – Martindale abrasion tester. Fabric handle – Kawabata instrument - serviceability assessment; fabric pilling - ICI pillbox tester

UNIT IV: FABRIC TESTING - II 9

Fabric drape: measurement – drape meter, fabric bending and stiffness; Shirley stiffness tester - fabric crease resistance and crease recovery measurements; fabric permeability: Shirley air permeability tester – fabric water permeability tester

UNIT V: APPAREL TESTING 8

Seam strength testing – seam severance testing; evaluation of interlining quality; colour fastness of apparel to washing, rubbing, perspiration and light; apparel dimensional stability: shrinkage test; button/snap/pull strength test

TOTAL: 45**REFERENCESS**

1. Booth J. E. - “**Principles of Textile Testing**”, CBS Publishers and Distributors, 1996
2. Koushik C. V. and Chandrasekar R., “**Textile Testing – Fibre and Yarn Testing**” – NCUTE Publication, New Delhi, 2004
3. Saville B. P., “**Physical Textile Testing**”, Woodhead Publishing Ltd, 2002
4. BSI, “**BSI Handbook of Textile Testing**”, British Standard Institution, Manchester, 1990
5. BIS, “**BIS Handbook of Textile Testing**”, Bureau of Indian Standards, Delhi, 1989

07FT507 CHEMICAL PROCESSING LABORATORY 0 0 3 1.5

LIST OF EXPERIMENTS

1. Scouring of cotton
2. Bleaching of cotton using sodium hypochlorite
3. Bleaching of cotton using hydrogen peroxide; application of optical brightening agent
4. Dyeing of cotton with direct dyes
5. Dyeing of cotton with reactive dyes, H/HE, ME and VS dyes
6. Dyeing of cotton with vat dyes
7. Dyeing of polyester fabric by HTHP method
8. Dyeing of cotton woven fabric
9. Dyeing of cotton knitted fabric
10. Direct style of printing on cotton
11. Discharge-style printing on cotton
12. Resist-style printing on cotton

TOTAL: 45

07FT508 GARMENT CONSTRUCTION LABORATORY I 0 0 3 1.5

LIST OF EXPERIMENTS

1. Step-by-step construction of children's baba suit
2. Step-by-step construction of children's rompers
3. Step-by-step construction of children's Frock
4. Step-by-step construction of men's shorts
5. Step-by-step construction of men's formal shirt (2 sessions)
6. Step-by-step construction of men's T-shirt (2 sessions)
7. Step-by-step construction of men's formal trousers (2 sessions)
8. Step-by-step construction of men's casual trousers (2 sessions)

LIST OF EXPERIMENTS

1. Determination of count of yarn and CV %
2. Determination of yarn strength (Lea strength) CV% and CSP
3. Determination of yarn appearance - grades
4. Determination of yarn imperfections by visual examination method
5. Determination of single yarn twist and CV%
6. Determination of fabric tensile strength and CV%
7. Determination of crimp in yarn
8. Determination of abrasion resistance
9. Determination of fabric bursting strength
10. Determination of fabric tearing strength
11. Determination of shrinkage of knitted and woven fabrics
12. Determination of fabric stiffness
13. Determination of fabric crease recovery
14. Determination of fabric drape
15. Determination of fabric pilling
16. Determination of seam strength and seam slippage
17. Course length test
18. Determination of fabric air-permeability

TEXTILE TESTING and QUALITY CONTROL LAB

LIST OF EQUIPMENT (For a batch of 30 students)

- | | |
|------------------------------------|-----|
| 1. Electronic balance | - 1 |
| 2. Automatic wrap reel | - 1 |
| 3. Lea strength tester | - 1 |
| 4. Yarn appearance tester | - 1 |
| 5. Single yarn twist tester | - 1 |
| 6. Fabric tensile strength tester | - 1 |
| 7. Crimp tester | - 1 |
| 8. Martindale abrasion tester | - 1 |
| 9. Fabric bursting strength tester | - 1 |
| 10. Automatic washing machine | - 1 |
| 11. Crock meter | - 1 |
| 12. Fabric stiffness tester | - 1 |
| 13. Fabric crease recovery tester | - 1 |
| 14. Drape meter | - 1 |
| 15. Beesley's Balance | - 1 |
| 16. Air-permeability Tester | - 1 |

UNIT I: FINISHING EQUIPMENTS 9

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 9

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 9

Study of stiffening agents –purpose of stiffening-classification of stiffening agents-preparation 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 9

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 9

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

TOTAL: 45**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, 2007

07FT603 **COMPUTER APPLICATION IN APPAREL INDUSTRY** 3 1 0 4

UNIT I: COMPUTER BASICS 9

Computer basics - computer specification - input/output device- concept of internet, web and their application in garment industry; CAA - computer aided administration, CAD-computer aided designing, CAM- computer aided manufacturing, and CIM- computer integrated manufacturing

UNIT II: COMPUTER AIDED COLOUR 9

Computer aided colour matching- CAD system for printing - textile CAD- development of woven design using textile CAD-pattern making and grading using apparel software and digitizer marker efficiency; concept of computer application in fabric defect checking - computerized fabric laying - cutting - sorting and labelling machines

UNIT III: COMPUTER APPLICATION IN SEWING 9

Computer application in sewing- computerized unit production systems used in apparel industry- computer application in embroidery-computerized needle punching-computerized embroidery machines - computer controlled overhead transport and warehouse storage systems

UNIT IV: CUT PLANNER AND E-COMMERCE 9

Cut planner-general sewing data- product development using CAD-computer application in logistics- bar coding system .E-Commerce in apparel industry - concept of ERP and its application in garment unit - electronic data interchange - computer aided management and production control

UNIT V: VIRTUAL FITTING 9

Draping models in commercial CAD, Virtual fitting ,3-dimentional apparel design systems for pattern generation and garment fit,3D body scanning, principles and operations of body scanning technologies-2D photographic method, structure light ,laser scanning,infrared

TOTAL: 45

REFERENCESS

1. Aldrich Winfred, “**CAD in Clothing and Textiles**”, Blackwell Science Ltd., 1994
2. Taylor Patrick, “**Computer in the Fashion Technology**”, Om Book Service, 1997
3. Gupta, Sanjeev, Gupta Shameena, “**Computer Aided Management**”, Excel Books, 2004
4. J.Fan,W.Yu and L.Hunter , “**Clothing Appearance and Fit :Science and Technology**” Woodhead Publishing Ltd, 2004

UNIT I: INTRODUCTION 9

Introduction - quality definition - quality control and its necessity – quality assurance – current concept in quality management -total quality management – quality function deployment – Taguchi approach – Kaizen – six-sigma concept; ISO standards

UNIT II: INSPECTION 9

Inspection – no inspection - hundred percent inspection – spot checking – arbitrary sampling – statistical quality control -statistical sampling – single sampling – double sampling AQL standards. Inspection of raw material, in process inspection and final inspection

UNIT III: QUALITY CONTROL FOR RAW MATERIALS 9

Quality control for raw materials - different types of defects in fabrics - major and minor faults - fabric inspection system - sewing threads – zippers- buttons, buckles, snap fasteners ,interlining. Quality standards for different raw materials and accessories

UNIT IV: QUALITY CONTROL IN APPAREL PRODUCTION 9

Quality control in pattern making, grading, marking and marker efficiency -spreading, cutting, sewing, pressing and finishing; final inspection procedures - impact of advanced apparel manufacturing technology on quality control

UNIT V: GARMENT TESTING AND SPC 9

Statistical process control – seven tools of quality control – care labelling for apparels – colour fastness to water, rubbing, light –dimensional stability - strength properties of apparel – seam strength – seam slippage - sewability of fabrics

TOTAL: 45

REFERENCES

1. Pradip V. Mehta, “**An Introduction to Quality Control for the Apparel Industry**” ASQC quality Press, Marcel Dekker Inc., New York, 1995
2. S. K. Bhradwaj and Pradip V. Mehta, “**Managing Quality in the Apparel Industry**”, ASQC Quality Press, Marcel Dekker Inc., New York, 1995
3. Jacob Solinger, “**Apparel Manufacturing Handbook**”, Prentice Hall, 1995
4. **Quality Control for Textile and Apparel Industries**, Workshop Manual - May 1997, IIT, New Delhi
5. Booth J.E., “**Textile Testing**”, Butterworth Heinemann Ltd., U.K., 1996

UNIT I: INTRODUCTION 9

Definition of quality, dimensions of quality, quality planning, quality costs - analysis techniques for quality costs, basic concepts of total quality management, historical review, principles of TQM, leadership - concepts, role of senior management, quality council, quality statements, strategic planning, Deming philosophy, barriers to TQM implementation

UNIT II: TQM PRINCIPLES 9

Customer satisfaction - customer perception of quality, customer complaints, service quality, customer retention, employee involvement - motivation, empowerment, teams, recognition and reward, performance appraisal, benefits, continuous process improvement - Juran Trilogy, PDSA Cycle, 5S, kaizen, supplier partnership - partnering, sourcing, supplier selection, supplier rating, relationship development, performance measures - basic concepts, strategy, performance measure

UNIT III: STATISTICAL PROCESS CONTROL (SPC) 9

The seven tools of quality, statistical fundamentals - measures of central tendency and dispersion, population and sample, normal curve, control charts for variables and attributes, process capability, concept of six sigma, new seven management tools

UNIT IV: TQM TOOLS 9

Benchmarking - reasons to benchmark, benchmarking process, quality function deployment (QFD) - house of quality, QFD process, benefits, Taguchi quality loss function, total productive maintenance (TPM) - concept, improvement needs, FMEA - stages of FMEA

UNIT V: QUALITY SYSTEMS 9

Need for ISO 9000 and other quality systems, ISO 9000:2000 quality system - elements, implementation of quality system, documentation, quality auditing, QS 9000, ISO 14000 - concept, requirements and benefits

REFERENCES**TOTAL: 45**

1. Dale H. Besterfield et al., "**Total Quality Management**", Pearson Education Asia, 1999, Indian Reprint 2002
2. James R. Evans and William M. Lindsay, "**The Management and Control of Quality**", (5th Edition), South-Western (Thomson Learning), 2002
3. Feigenbaum A. V. "**Total Quality Management**", McGraw Hill, 1991
4. Narayana V. and Sreenivasan N. S. **Quality Management - Concepts and Tasks**, New Age International, 1996
5. Zeiri, "**Total Quality Management for Engineers**", Wood Head Publishers, 1991

LIST OF EXPERIMENTS

1. Develop design, pattern and marker plan for children's wear - baby frock using a one-way fabric of 38" and 42" width. Calculate the marker efficiency.
2. Develop design, pattern and marker plan for children's wear - rompers using a two-way fabric of 38" and 42" width. Calculate the marker efficiency.
3. Develop design, pattern and marker plan for a ladies top -using corduroy fabric of 44" and 52" width. Calculate the marker efficiency and develop a lay lot plan.
4. Develop design, pattern and marker plan for a ladies skirt -using plaid fabric of 38" and 60" width. Calculate the marker efficiency. Develop a lay lot plan.
5. Develop design, pattern and marker plan for a men's Full arm shirt using a checks fabric of 52" and 60" width. Calculate the marker efficiency. Develop a lay lot plan.
6. Develop design, pattern and marker plan for men's formal trouser - using a pencil stripe fabric of 60" and 72" width. Calculate the marker efficiency.
7. Design a ladies party wear including accessories and develop a 3-D visual merchandise window display.
8. Design a men's formal wear including accessories and develop a 3-D visual merchandise window display.
9. Design children wear including accessories and develop a 3-D visual merchandise window display.

07FT607

GARMENT CONSTRUCTION LAB II

0 0 3 1.5

LIST OF EXPERIMENTS

1. Step-by-step construction of ladies salwar
1. Step-by-step construction of ladies kameez
2. Step-by-step construction of ladies top (2 sessions)
3. Step-by-step construction of ladies blouse (2 sessions)
4. Step-by-step construction of ladies trousers (2 sessions)
5. Step-by-step constructions of ladies nightgown
6. Step-by-step construction of ladies brassières
7. Step-by-step construction of ladies panties
8. Step-by-step construction of ladies petticoat
9. Step-by-step construction of ladies skirt

TOTAL: 45

07FT608

MINI PROJECT AND DESIGN COLLECTION

0 0 3 1.5

EXPERIMENTS

Cycle I

1. Forecasting colours, pattern and fabric for the ensuing seasons based on international forecast.
2. Collections of fabric swatches and colours based on future forecast.
3. Preparation of story boards/Mood boards.
4. Illustrating Fashion Models.
5. Selection Fabric Swatches.
6. Selection of Surface Ornamentation techniques.
7. Preparation of various Styles for Selected fabrics.
8. Selection of Seams, Necklines, Collars, Sleeves etc.
9. Selection of Accessories.

Cycle II

- a. Preparation of garments based on cycle-I
- b. Preparation of costing sheet for each garment designed
- c. Documenting the Design Collection in suitable format and Final Presentation

(A minimum of 4 garments are to be constructed during the above course.)

ELECTIVES

07FT001 **ADVANCES IN TEXTILE CHEMICAL
PROCESSING** 3 0 0 3

UNIT I: PHYSICAL CHEMISTRY OF DYEING **9**

Adsorption isotherms- Langmuir; Freundlich and 'C' isotherms; determination of dye affinity; state of dye in solutions; aggregation number-its determination and effect on dyeing; use of solubility parameter concept in dyeing

UNIT II: GREY PREPARATION **9**

Single stage grey preparation; enzymatic treatments in grey preparation; mercerisation: theory of processes – methods-chemicals-effects; yarn mercerizer, chain and chainless mercerisers, circular mercerizing machine; liquid ammonia treatment-equipments-kier-J box-Pad roll, mangles, jigger, winch, Jet and soft-flow machines, de-twisters, dryers, stenter and stretching devices

UNIT-III: DYEING **9**

Mass coloration; differential dyeable synthetic fibres; dyeing of polypropylene; optimized dyeing techniques for PET; computer colour matching. Recent developments in dyeing of natural fibres, synthetic fibres and their blends. Problems in dyeing and their solutions

UNIT IV: PRINTING AND FINISHING **9**

Development in printing -transfer printing, jet printing, garment printing and novelty printing effects; flame-retardant finish; washing and finishing of garments; denim processing

UNIT V: ECO TEXTILES AND QUALITY CONTROL **9**

Eco-textiles- natural dyes and its application on textiles, banned dyes; low add -on techniques, low and free formaldehyde finishing; quality control measures in bleaching, mercerizing, dyeing and printing

TOTAL: 45

REFERENCES

1. QIP, Summer School, "**Advances in Textile Chemical Processing**", IIT Delhi, 1984
2. Datye K. V. and Vaidya A.A., "**Chemical Processing of Man-made Fibres and Their Blends**", John Wiley and Sons, New York, 1984
3. Gulrajani M. L., "**Dyeing polyester and its blends**", IIT Delhi, 1987
4. Shore J. "**Blends dyeing**", SDC U.K 1998
5. Johnson A., "**The Theory of Colouration of Textiles**", SDC, Second edition, 1989

UNIT I: INTRODUCTION 9

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 9

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 9

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 9

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 9

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

TOTAL: 45**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.

UNIT I: FABRIC APPEARANCE**9**

Fibre structure of common apparel fibres; relationship between fibre structure and fibre property; fibre types, yarn structure and fabric construction suitable for different end uses and specific functions; effects of fibre type, yarn and fabric constructions on fabric appearance; study of properties affecting fabric appearance such as texture, colour, lustre and pilling

UNIT II: COMFORT**9**

The effect of fibre properties, yarn structure and fabric construction on the fabric properties such as drapability, air permeability, moisture absorption, bending rigidity, sheerness, selection of fibres and yarn structure and its effect on comfort properties, effect of fabric construction

UNIT III: DURABILITY ANDEASY CARE**9**

Study of tensile, tearing strength, bursting strength with respect to fibre properties, yarn structure and fabric design .The fibre properties and chemical treatments that decide the fabric properties such as crease recovery, shrink ability, pilling formation

UNIT IV: FABRIC AS PROTECTION**9**

Study of Protective properties of Apparel for various applications-desirable properties of protective textiles-method of testing for thermal protective performance- Abrasion and wear resistance –evaluation of resistance to mildew- ageing –sunlight –chemical – electrostatic and electrical resistivity – impact properties –testing for flame retardancy- ASTM standards for protective garments

UNIT V: FABRIC ENGINEERING**9**

Selection of fibre type, yarn construction, fabric structure and special finishes for given end uses; yarn producing techniques for different yarn constructions; designing a fabric from selected fibre type and yarn construction; finishing treatments suitable for the given end uses

TOTAL: 45**REFERENCESS**

1. Morton W. E. and Hearle J. W. S., “**Physical Properties of Textile Fibres**”, The Textile Institute, England, 1993
2. Meredith. R, “**Mechanical Properties of Textiles Fibres**”, North Holland, Amsterdam, 1956
3. Hearle J. W. S., Grosberg P. and Backer S., “**Structural Mechanics of Fibres, Yarns and Fabrics**’, Vol.1, Wiley-Interscience, New York, 1969
4. Goswami B.C., Martindale J. and Scardino, F. L., “**Textiles Yarns Technology, Structure and Applications**”, Wiley Interscience, New York, 1997
5. Shenai, V.A., “**Textiles Finishing**”, Sevak Publications, Bombay, 1995

07FT004	CREATIVITY, INNOVATION AND NEW PRODUCT DEVELOPMENT^{\$}	3 0 0 3
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UNIT I: INTRODUCTION 9

The process of technological innovation –factors contributing to successful technological innovation – the need for creativity and innovation – creativity and problem solving – brain storming- different techniques

UNIT II: PROJECT SELECTION AND EVALUATION 9

Conceptualization of an idea - decision to innovate Collection of ideas- methods involved in idea generation and aim or purpose of project – selection criteria for the project – screening ideas for new products (evaluation techniques)

UNIT III: NEW PRODUCT DEVELOPMENT 9

Research and new product development- Trade secrets, patent information, patents, copyright, utility model–patent search – patent laws – international code for patents – intellectual property rights (IPR)

UNIT IV: NEW PROJECT PLANNING 9

Concept Development and Testing- target market analysis- selection of product features- Designing of proto type- testing- Beta Testing and Market Testing, analysis of feedback in implementation-quality standards – marketing research – introducing new products

UNIT V: PRODUCT LAUNCH 9

Product costing – pricing strategies – skimming and penetration strategies-Product and diversification – strategy of launch, promotional activities involves – Competitor analysis and market development

TOTAL: 45

REFERENCCESS

1. Nystrom Harry, “**Creativity and Innovation**”, John Wiley and Sons, 1979
2. Solinger Jacob, “**Apparel Manufacturing Handbook**”, Reinhold Publications, 1998
3. Twiss Brain, “**Managing Technological Innovation**”, Pitman Publishing Ltd., 1992
4. Walton Harry B., “**New Product Planning**”, Prentice Hall Inc., 1992

UNIT 1: INTRODUCTION 9

ERP: An Overview, enterprise – an overview, types of Enterprises, need for ERP, benefits of ERP, ERP and related technologies, Business Process Reengineering (BPR), Benefits of BPR

UNIT II: IMPLEMENTATION OF ERP 9

ERP implementation lifecycle, implementation methodology, hidden costs, organizing the implementation, vendors, consultants and users, contracts with vendors, consultants and employees, project management and monitoring

UNIT III: THE BUSINESS MODULES 9

Business modules in an ERP package - finance, manufacturing, human resources, plant maintenance, materials management, quality management, sales and distribution. Significance and advantages of each of the modules

UNIT IV: ERP IN APPAREL INDUSTRY 9

Production resource planning – principles and management of and demand chain analysis – quick response strategy - material management for ‘Quick Response’ – ‘Just in Time (JIT) Technology’; Production planning, costing and merchandising software

UNIT V: COMPUTER APPLICATIONS 9

Management Information System in garment industry – EDI in garment technology; Use of Computers in Designing, Pattern making, computerized production systems, communicating with vendors and buyers; Telephone, fax, video conferencing, intranet, internet, etc; Export documentation, retailing; Methods of communicating with consumers

TOTAL: 45

REFERENCES

1. Alexis Leon, “**ERP Demystified**”, Tata McGraw Hill, New Delhi, 2000
2. Glock Ruth E. and Kunz Grace I., “**Apparel Manufacturing - Sewn Product Analysis**”, Blackwell Scientific Publications, 1996
3. Joseph A. Brady, Ellen F. Monk, Bret Wagner, “**Concepts in Enterprise Resource Planning**”, Thompson Course Technology, USA, 2001
4. Garg Vinod Kumar and Venkitakrishnan N. K., “**Enterprise Resource Planning – Concepts and Practice**”, PHI, New Delhi, 2003

07FT006 EXPORT POLICIES, PROCEDURES AND DOCUMENTATION 3 0 0 3

UNIT I: INTRODUCTION 8

GATT and WTO – multi fibre agreement (MFA) and bilateral textile agreements signed by India with importing quota countries; globalization – implementation and impacts

UNIT II: EXPORT POLICIES 8

Govt. of India’s export entitlement policy – EXIM policy – export promotional bodies and their activities – EPZ (Export Processing Zone) – SEZ (Special Economic Zone) – apparel parks – AEPC - its functions and its role in the administration of export entitlement Policy – TUFs

UNIT III: FACILITIES FOR EXPORTERS 11

Facilities available for garment exporters – Govt. assistance to exporters – cash compensatory support – duty drawback — export finance through banks – export credit – short term, medium term and long term credits – anticipatory letter of credit - export credit guarantee corporation – export import bank - market development assistance - MDF (Marketing Development Fund)

UNIT IV: EXPORT PROCEDURES 8

100 percent EOU (Export Oriented Unit) – foreign exchange market – business environment – procedures to start up a garment unit – subsidies - export contracts – business ethics

UNIT V: EXPORT DOCUMENTATION 9

Documents connected to exports – international codes for products and services – principal documents, auxiliary documents - documents for claiming export assistance – exchange control regulations relating to garment exports

TOTAL: 45

REFERENCES

1. Jeannette Jamow, Kitty G. Dickerson, “**Inside the Fashion Business**”, Prentice Hall, 1997
2. Koshy Darlie O., “**Effective Export Marketing of Apparel**”, Global Business Press, 1996
3. Shivaramu S., “**Export Marketing – A practical guide to exporters**”, Wheeler Publishing, 1996
4. Koshy Darlie O., “**Effective Export Marketing of Apparel**”, Global Business Press, 1996
5. Hearle J. W. S., Hines T. and Suh. M. (Ed.), “**Global Marketing of Textiles**” JTI, 1997

07FT007 FABRIC SOURCING AND SAMPLING 3 0 0 3

UNIT I: SAMPLE CONSTRUCTION

9

Construction of sample - basic standard of professional sewing; relationship between pattern making and the ultimate quality of finished sample; analysis of component pieces and trimmings - planning a logical garment construction sequence - economic use of fabric yardage - maintaining grain lines - interfacing, lining

UNIT II: SAMPLING

9

Types of samples – pro – photo type – fit – pre-production – top – shipment – gold sealed – sales man samples etc., need and importance of the samples – quality requirements – sampling and lead time – sampling and costing – approvals

UNIT III: INTRODUCTION TO SOURCING

9

Procurement and outsourcing in the fashion industry - benefits and risks of outsourcing - searching, evaluating, and maintaining sources of supply - make-buy decisions - single-multiple sourcing decisions -domestic-global sourcing decisions

UNIT IV: RAW MATERIAL SOURCING

9

Sourcing of fabrics / accessories – bought out components – markets – domestic and international markets - sourcing – definition – need for sourcing – method of sourcing – sourcing of accessories – linings – buttons – zippers – labels etc

UNIT V: SOURCING CONCEPT

9

Manufacturing resource planning – supply chain management – demand chain analysis – Just in Time Technology – quality specifications – inventory control – purchase orders - inspection – follow up

TOTAL: 45

REFERENCESS

1. Glock Ruth E. and Kunz Grace I., "**Apparel Manufacturing - Sewn Product Analysis**", Blackwell Scientific Publications. 1996
2. Jamow Jeannette, Dickerson Kitty G., "**Inside the Fashion Business**", Prentice Hall, 1997
3. Solinger Jacob., "**Apparel Manufacturing Handbook**", Van Nostrand Reinhold Company, 1980
4. A.J. Chuter., "**Introduction to Clothing Production Management**", Om Book Service, 2004
5. Carr Harold and Latham Barbara, "**The Technology of Clothing Manufacturing**", 2nd Edition, Blackwell Scientific Publications, London, 1988

07FT008 FASHION DESIGN: PROCESS, INNOVATION AND PRACTICE

3 0 0 3

UNIT I:INTRODUCTION

9

Introduction to fashion design- analyzing the requirements (Key elements, situational elements, distracting elements) - innovation process, innovation cycle-concept generation-incubation- process of promoting innovation

UNIT II: DESIGN DEVELOPMENT

9

Method of quick starting the design process – inspiration – trends and concepts in fashion - analyzing the direction (fashion prediction, fashion cycle, fashion and art) - theme designing

UNIT III: DESIGN PROCESS

9

Introduction – design development- colour – silhouette- proportion – creation of prints, fabric textures and their rendering - fabric selection- construction –working drawing - prototypes- embellishments – designs for special markets – designing ranges and collections

UNIT IV: ADVANCES IN DESIGN PROCESS

9

Designing using computer – textile design development- garment design development – study of figure faults and solutions - fashion styling – design promotion – portfolio development for different themes and seasons

UNIT V : CAREER OPPURTUNITIES

9

Fashion careers- fabric designer- fabric agent – fashion designer-fashion predictors – fashion illustrator - product developer – visual merchandiser – accessory Designer – men’s wear stylist- ladies wear stylist - children’s wear stylist

TOTAL: 45

REFERENCESS

1. McKelvey Kathryn and Munslow Janine, “**Fashion Design: Process, Innovation and Practice**”, Blackwell Science Ltd, 2003
2. Tate, Sharon and Lee, “**Inside Fashion Design**”, Pearson Education Asia, 5th Edition, 2005
3. Waddell Gavin, “**How to Fashion Works Couture, Ready to Wear and Mass Production**”, Om Books Services, 2005
4. Goworek,Helen, “**Fashion Buying**”, Om Books Services, 2002
5. Frings and Stephens Gini, “**Fashion: From Concepts to Consumer**”, Prentice-Hall of India, 7th Edition.1997
6. White, Nicola (Editor), “**The Fashion Business: Theory Practice Image**”, Berg, 2000

UNIT I: ENTREPRENEURSHIP**9**

Entrepreneur – types of entrepreneurs – difference between entrepreneur and intrapreneur – entrepreneurship in economic growth, factors affecting entrepreneurial growth; small enterprises – definition, classification – characteristics, ownership structures; large scale industry its advantages over SSI.

UNIT II: PROJECT FORMULATION**9**

Project formulation – steps involved in setting up a business – identifying, selecting a good business opportunity, market survey and research, techno economic feasibility assessment; setting up garment manufacturing unit for direct exports, job orders, direct marketing; study of land, capital, labour, market demand etc; preparing a project; large scale industry its advantages over SSI

UNIT III: FINANCE AND LABOUR**9**

Sources of finance – fixed and working capital requirements; term loans, capital structure, financial institutions, bank assistance; management of working capital, costing; break even analysis; labour – study of labour laws –factory act – labour laws – welfare measures – safety act

UNIT IV: SUPPORT TO ENTREPRENEURS**9**

Sickness in small business – concept, magnitude, causes and consequences, corrective measures – government policy for small scale garment enterprises, incentives and subsidies given in backward areas, parks, industrial estates – growth strategies in small industry – expansion, diversification, joint venture, merger and sub contracting, forward and backward integrations

UNIT V: OTHER ENTREPRENEURIAL OPPORTUNITIES IN THE FIELD OF FASHION**9**

Freelance designing, setting up own boutique, haute couture, designer garments – labelling, designer labels; intellectual property rights, patenting, countering counterfeits, and infringement; setting up retail show rooms – franchising, licensing, visual merchandising, types of retailing; advertisement and sales promotional techniques; getting into fashion journalism, fashion photography, fashion choreography, or starting fashion institutes

TOTAL: 45**REFERENCES**

1. Khanna S. S. “**Entrepreneurial Development**” S. Chand and Co. Ltd., Ram Nagar New Delhi, 1999
2. Khanna O. P., “**Industrial Engineering and Management**”, Dhanpat Rai Publications (P) Ltd., New Delhi, 2003
3. Stephens Gini, “**Fashion: from Concepts to Consumer**”, Prentice-Hall of India, 2001
4. Rabindra N. Kanungo, “**Entrepreneurship and Innovation**”, Sage Publications, New Delhi, 1998
5. Jarnow Jeawnette A., Guerreire Miriam, Judelle Beat,” **Inside the Fashion Business: Text and Readings**”, Macmillan Publisher, 1987

UNIT I: INTRODUCTION 9

The Evolution of fashion - history of couture - 20th century influences on fashion, 1900 – 1990's, highlights of famous fashion designers - segments of fashion industry - location of fashion markets - forecasting specialties - prediction of fashion- future of fashion.

UNIT II: THE POWERFUL CONSUMER 9

Trendsetters and leaders - market segments, consumer research, socio-economic and psychological factors, buying motives, fashion and consumer research, quality movement in fashion industry

UNIT III: APPAREL: WOMEN'S MEN'S AND CHILDREN'S 9

women's wear markets, history and growth, classifications, price points, size specialization - selling seasons - promoting women's wear - men's wear markets, classifications, size specialization - selling men's wear - children's wear classifications, size classifications, price lines - promoting children's wear - fashion accessories and intimate apparel.

UNIT IV: FORECASTING FOR DESIGNERS AND MANUFACTURERS 9

The fashion forecasting process - steps in developing a forecast - forecast reports - steps in textile development - fibre forecast report, fabric forecast report - steps in colour forecasting - colour forecast reports - - specialized forecasting and its reports.

UNIT V:THE FASHION PROMOTION 9

Auxiliary fashion enterprises - fashion information and advisory services, news media, advertising and publicity agencies fashion retailing in the past, current trend, classifying the retailers, retailer locations, organizational structures, services offered, purchasing, developing a fashion image

TOTAL: 45**REFERENCES**

1. Jarnow Jeawnette A., Guerreire Miriam, Judelle Beat," **Inside the Fashion Business: Text and Readings**", Macmillan Publisher, 1987
2. Dickerson, Kitty G," **Inside the Fashion Business**" Pearson Education Asia publisher, 2004
3. Stephens Gini, "**Fashion: from Concepts to Consumer**", Prentice-Hall of India,2001
4. Waddell Gavin, **How Fashion Works: Couture, Ready-to-Wear and Mass Production**, Om Books Services, 2005
5. Goworek, Helen "**Fashion Buying**" Om book Services, 2000

UNIT I: INTRODUCTION 9

Introduction to home textiles – definition and classification of home textiles – woven, non-woven and knitted fabrics; eco-friendly home textiles; special finishes and surface ornamentation on home textile products; Indian home textiles industry and its future prospects; latest development in home textile products

UNIT II: FURNISHINGS 9

Types of furnishings used for different interiors- living room dining room, kitchen, bed room, bathroom; factors influencing the selection of home furnishings for different interiors, usage of furnishing for different workplaces

UNIT III: FLOORING 9

Floor coverings – hard floor covering-types, features and end use, soft floor covering-types, features and end use and resilient floor covering types, features and end use; factors influencing the selection of different floor covering and its maintenance

UNIT IV: DOORS AND WINDOWS 9

Different types of doors and windows and hardware used – curtains and draperies – types, choice of fabrics, calculating the material required for curtains, construction of curtains for different types of windows and doors, Method of finishing draperies

UNIT V: LINENS 9

Home decorations – sofa covers – cushion – cushion cover – upholsteries – bolster and bolster covers, throws; - bed linens –mattresses, mattresses cover definition, classification and types; hotel and hospital linens

TOTAL:45**REFERENCESS**

1. Alexander. N. G., “**Designing Interior Environment**”, Mas Court Brace Covanorich, New York, 1972
2. Donserkery K. G., “**Interior Decoration in India**”, D. B. Taraporevala Sons and Co. Pvt Ltd., 1973
3. “**Indian Textile Journal**”, S. Joseph, IP Font line Ltd., (Monthly Magazine)
4. “**Colourage**”, R. V. Raghavan Colour Publications, Pvt. Ltd., Mumbai (Monthly Magazine) “**Inside Outside**”, Business India Publications (Monthly Magazine)

UNIT I: INTRODUCTION**9**

Basic principles and methodologies used to draft basic size block patterns for industrial method - difference between bespoke pattern and industrial patterns making method-method of creating patterns from basic measurements - method of creating more complex garments from basic patterns - pattern development from various information including specification sheets, sketches and body/garment measurements; the difference between a production pattern and a sample pattern - method of creating production-ready patterns; pattern maker's responsibilities and duties

UNIT II: WOMEN'S WEAR**9**

Development of production ready patterns using ¼ scale for women's slopers for tops, skirts, dresses, shirts, pants and jackets, women's formal wear - trousers and shirt; women's casual wear – frock, skirt, house coat, ladies jeans. Women's party wears - single piece party dress

UNIT III: MEN'S WEAR**9**

Development of design and commercial patterns using ¼ scale for men's slopers for shirts, pants and jackets; men's formal wear - shirts, trousers; men's casual wear –T-shirt, Shorts, bermudas, men's - party wear –waist coat, kurta

UNIT IV: CHILDREN'S WEAR**9**

Development of design and commercial patterns using ¼ scale for children's sloper for tops, bottom, dungarees and jackets; children's uniform, children's play time dress, children's party wear, children's night dress

UNIT V: PATTERN ALTERATIONS**9**

Principles of good fit - solving fitting problems for men's wear, women's wear; children's wear - alternation of patterns for unusual figures; digitizing; principles of grading - computerized grading for tops, bottoms and paneled garments principles of marker making - computerized marker making

TOTAL: 45**REFERENCES**

1. Joseph-Armstrong, Helen, "**Pattern Making: for Fashion Design**", Prentice Hall Publishers, 2000
2. Bray Natalie "**More Dress Pattern Designing**" Blackwell Scientific Publications, 2004
3. Campbell Hilary, "**Designing Patterns: a Fresh Approach to Pattern Cutting**", Stanley Thomas Publishers, 2003
4. Gillian Holman, "**Pattern Cutting Made Easy**", Blackwell Scientific Publications, 1997
5. Cooklin Gerry, "**Master Patterns and Grading for Women's Outsizes**" Blackwell Scientific Publications, 1995
6. Beazley Alison and Bond Ter, "**Computer-Aided Pattern Design and Product Development**", Blackwell Publishing, 2004

07FT013 INDUSTRIAL SAFETY, HEALTH AND ENVIRONMENT 3 0 0 3

UNIT I: INTRODUCTION TO INDUSTRIAL SAFETY, HEALTH AND ENVIRONMENT 9

Safety, health and environment, occupational health hazards, control of occupational deceases, OSHAS, ILO, ergonomics- Introduction, definition, objectives, advantages and disadvantages

UNIT II: ENVIRONMENTAL ENGINEERING 9

Principles of environmental engineering, pollution prevention, waste treatment, disposal of waste, standards of environmental management system, engineering control health hazards, material handling safety, personal protective equipments, electrical hazards and safety

UNIT III: MONITORING FOR SAFETY, HEALTH AND ENVIRONMENT 9

Occupational safety, health and environment management system, bureau of Indian standards on safety and health: 14489 –1998 and 15001- 2000, ILO and EPA standards.ISO-14000 **Principles of Accidents Prevention:** Definition: incident, accident, injury, dangerous, occurrences, unsafe acts, unsafe conditions, hazards, error, oversight, mistakes etc; accident prevention: theories/ models of accident occurrences; principles of accident prevention; accident and financial implication

UNIT IV: PLANT DESIGN AND HOUSEKEEPING 9

Plant layout, design and safe distance; need for planning and follow-up; safety and good house-keeping; typical accidents due to poor house-keeping; disposal of scrap and other trade wastes; prevention of spillage; marking of aisles space and other locations; use of colour as an aid for good housekeeping; housekeeping contest; cleaning methods; employee assignment; inspections and check-lists; benefits of good housekeeping; role of preventive maintenance in safety and health; importance of standards and codes of practice for plant and equipment

INDUSTRIAL LIGHTING AND ILLUMINATION

Purpose of lighting - benefits of good illumination - phenomenon of lighting and safety; lighting and the work; sources and types of artificial lighting; principles of good illumination; recommended optimum standards of illumination; design of lighting installation; maintenance; standards relating to lighting and colour

UNIT V: VENTILATION, HEAT STRESS, NOISE AND VIBRATION 9

Purpose of ventilation; physiology of heat regulation; thermal environment and its measurement; thermal comfort; indices of heat stress; thermal limits for comfort, efficiency and freedom from health risk; natural ventilation; mechanical ventilation; air conditioning; control of heat exposures at source, dilution and local ventilation; recommended values for air changes required for various areas as per factories Act, 1948 and national standards; IS: 3103-1975-Code of practice for Industrial Ventilation, national building code part VIII, building services; Noise and Vibration: continued and impulse noise; the effect of noise on man; measurement and evaluation of noise; noise isolation; noise absorption techniques, silencers; practical aspects of control of noise

TOTAL: 45

REFERENCES

1. Rao “**Electrical Safety, Fire Safety Engineering and Safety Management**”
Khanna Publishers, 1998
2. Ireson W. G. and Grant E. L. “**Handbook of Industrial Engineering and Management**”, Prentice Hall of India, New Delhi 1988
3. ILO, “**Safety, Health and Working Condition in the Transfer of Technology**”,
International Labour Office Publication, 1998
4. ILO, “**Encyclopaedia of Occupational Health and Safety**” International Labour
Office Publication, 2001
5. Goetsch, D. L., “**Occupational Safety and Health for Technologists, Engineers,
and Managers**”, Prentice Hall, 5th Edition, 2004, Upper Saddle River, NJ

UNIT I: CLASSIFICATION OF GARMENT UNITS 9

Classification of Garment Units – woven – knit – sports wear – lingerie-leather Garments– sportswear-outer wear-underwear-undergarments-hospital wear and industrial garments- entrepreneurship- entrepreneurship development skills –concept of small scale industry (SSI)-advantages of SSI units.

UNIT II: SETTING UP OF SMALL GARMENT UNIT 9

Setting up of small garment unit –study of land-norms of SA-8000-Capital-labour market demand, etc-preparing a project-large scale industry-its advantages over SSI-bank assistance-marketing-national and inter national

UNIT III: LABOUR LAWS 9

Labour – study of labour laws -its advantages and disadvantages – factory act- its advantages and disadvantages – labour laws- its advantages and disadvantages- welfare measure – its advantages and disadvantages -safety act-eco friendly textiles- its advantages and disadvantages .

UNIT IV: MARKET STUDY 9

Market – study of markets for raw materials and market for finishing products-local markets-international markets –spring/summer -autumn/winter seasons affecting fashion trends.

UNIT V: EXPORT POLICY 9

Export policy – trade documentation and quota policy –AEPD and its role in garment industry –advertising –different media –trade fair-display-exhibition –fashion shows – buyer seller meet

TOTAL: 45**REFERENCES**

1. Vasudeva .P.K. “**International Marketing**”, Excel Books, 2006
2. Khanna .O. P. **Industrial Engineering and Management**, Dhanpat Rai Publications (P) Ltd, 2002
3. Prasanna Chandra, “**Project Preparation, Appraisal and Implementation**”, Tata McGraw Hill, New Delhi, 1990
4. Philip Kotler, “**Marketing Management**”, Prentice Hall Inc., 1996
5. “**How to Set up Readymade Garment Export Industry**”, Part I and II, Industrial Estate Manufacturers Association, 1992

UNIT I: LINEAR PROGRAMMING 11

Formulation of LP problem: Solution of LP problem by graphical method, simplex method

UNIT II: TRANSPORTATION PROBLEM 11

Northwest corner rule, inspection method, Vogel approximation method; Application of optimality test; Inventory control: ABC analysis; Fixation of inventory level, EOQ (Wilson's formula), Problems related to above theoretical aspects

UNIT III: PERT / CPM 12

Drawing of CPM and PERT networks, finding critical path. Project cost control, determining the value of z- variate in the case of PERT networks, S.D, variances etc

UNIT IV: GAME THEORY 11

Rule of saddle point determination, Rule of dominance, mixed strategy approach, Graphical approach, problems related to above theoretical aspects

TOTAL: 45**REFERENCES**

1. Heizer J. and Render B., "**Production and Operations Management**", Prentice Hall 1993
2. Taha Hamdy A., "**Operations Research: An Introduction**", Macmillan Publishing Company, New York, 3rd Edition, 1982
3. Taha Hamdy A., "**An Introduction to Operations Research**", Macmillan Publishing Company, New York, 5th Edition, 1996
4. Bhat Narayan U., "**Elements of Applied Stochastic processes**" John Wiley and Sons, 1972
5. Hiller Frederick S. and Liberman Gerald J., "**Introduction to Operations Research**",
6. McGraw-Hill, Industrial Engineering Series, International Edition, 1995

UNIT I: SMART TECHNOLOGY FOR TEXTILES AND CLOTHING 9

Introduction - Development of smart technology for textiles and clothing. Electrically active polymer materials-polymer materials as actuators or artificial muscle, peculiarity of polymer gel actuator, triggers for actuating polymer gels, electro-active polymer gels as artificial muscles

UNIT II: HEAT STORAGE AND CLOTHING 9

Heat storage and thermo-regulated textiles and clothing-development introduction, basics of heat-storage materials, manufacture of heat-storage and thermo-regulated textiles and clothing, properties and clothing application, development trends

UNIT III: THERMO-REGULATED TEXTILES AND CLOTHING 9

Thermally sensitive materials- introduction, thermal storage and thermal insulating fibres; thermal insulation through polymeric coatings, design of fabric assemblies; Phase changing materials – introduction, applications in textiles and clothing. Nano-technology - – introduction, applications in textiles and clothing

UNIT IV: EMBROIDERY AND SMART TEXTILES 9

Introduction, basics of embroidery technology, embroidery for technical applications - tailored fibre placement, embroidery technology used for medical textiles; tailor-made intelligent polymers for biomedical applications –introduction, fundamental aspects of shape memory materials , concept of biodegradable SMP , degradable thermoplastic elastomers having SM properties , degradable polymer networks having SM properties

UNIT V: WEARABLE TECHNOLOGY AND BIO-PROCESSING FOR SMART TEXTILES AND CLOTHING 9

Wearable technology for snow clothing -introduction, key issues and performance requirements and prototype; Bio-processing for smart textiles and clothing -introduction, Treatment of wool with enzymes, treatment of cotton with enzymes, enzymatic modification of synthetic fibres, spider silk, intelligent fibres

TOTAL: 45**REFERENCESS**

1. Xiaoming Tao (Ed.), “**Smart Fibres, Fabrics and Clothing**”, The Textile Institute, CRC Press, Woodhead Publishing Limited, Cambridge, 2001
2. Vanlangenhove L., “**Smart Textiles for Medicine and Healthcare: Materials, Systems and Applications**”, 2007
3. “**Nanotechnology and Smart Textiles for Industry, Healthcare and Fashion**” 2008, The Royal Society, London, UK
5. Mattila H. R. “**Intelligent Textiles and Clothing**”, Culinary and Hospitality Industry Publications Services, 2006
6. Industry Publications Services, 2006
7. Mattila H. R. “**Intelligent Textiles and Clothing**”, Woodhead, 2006

UNIT I: INTRODUCTION 9

Supply chain- definition, importance, types of supply chain flow, decision process in supply chain - a strategy design, chain planning and operation; organization of supply chain, process view – push/pull and cycle view; achieving strategic fit.

UNIT II: NETWORK 9

Designing and distribution – roles, factors influencing and design options-its advantages and disadvantages; value of distributors - factors influencing design frame work and networks in practice

UNIT III: DEMAND AND SUPPLY 9

Forecasting – definition, role, importance, characteristics of forecasting, basic approaches in demand forecasting and forecasting methods; managing demand and managing supply in supply chain, roles of aggregate planning in supply chain. Quick response strategy in apparel industry

UNIT IV: INVENTORY AND SOURCING 9

Inventory – definition, roles, characteristics and Inventory Functionalities; determining optimum level of availability, order point, EOQ, role of safety inventory and accommodating uncertainties. Sourcing – role, supplier assessment, selection criteria, design collaborations and plan analysis for sourcing, JIT Technology of inventory management in apparel industry

UNIT V: TRANSPORTATION, PRICING AND TECHNOLOGY 9

Transportation – modes, factors influencing the selection, routing and scheduling, transport network; Role of revenue management in supply chain – customer and seasonal demand, role of bulk and spot contract in revenues; the role of IT in supply chain – CRM, ISCM, SRM, TMF and E-Business. Effect of lack of coordination in supply chain and international issues in supply chain

TOTAL:45**REFERENCES**

1. Kulkarni Sarika and Sharma Ashok “**Supply Chain Management**”, Tata McGraw Hill, New Delhi, 2007
2. Francis Harrison, “**Supply Chain Management**”, Butterworth Publications, New Delhi, 2002
3. Chopra Sunil and Meindl Peter, “**Supply Chain Management: Strategy, Planning and Operation**”, Pearson Education, 2002
4. Burt David N., Dobler Donald W. and Starling Stephen L., “**World Class Supply Management: A Key to Supply Chain Management**”, Tata McGraw Hill, 2007
5. Mohanty R. P. and Deshmukh S. K., “**Essentials of Supply Chain Management**”, Jaico Publications, 2004

UNIT I: INTRODUCTION TO ECONOMICS 8

Introduction to Economics- flow in an economy, law of supply and demand, concept of engineering economics – engineering efficiency, economic efficiency, scope of engineering economics- element of costs, marginal cost, marginal revenue, sunk cost, opportunity cost, break-even analysis- V ratio, elementary economic analysis – material selection for product design selection for a product, process planning

UNIT II: VALUE ENGINEERING 10

Make or buy decision, value engineering – function, aims, and value engineering procedure. interest formulae and their applications –time- value of money, single payment compound amount factor, single payment present worth factor, equal payment series sinking fund factor, equal payment series payment Present worth factor- equal payment series capital recovery factor-uniform gradient series annual equivalent factor, effective interest rate, examples in all the methods

UNIT III: COSTING OF GARMENTS 9

Factors that determine the price of garments : Raw Material cost – cost of yarn, cost of fabric production, cost of fabric processing, cost of garment manufacture – labour, power, cost of accessories and trims, carrying costs, packing, administrative and other overheads, selling and distribution overheads, depreciation, other direct and indirect expenses – simple problems

UNIT IV: PRODUCTIVITY 9

Contribution of productivity in reducing garment cost, different productivities, difference between production & productivity, production control charts. Importance of line balancing, line layout and plant layout, natural lighting, working environment; ergonomics, etc. Contribution of material handling in improving productivity; Reducing; inventory costs, JIT Inventory management. Importance of Sourcing at competitive rates

UNIT V: IMPORTANCE OF METHOD STUDY 9

Importance of method study and work study in reducing garment cost; Setting standard time; Reducing wastage of material - efficient pattern making, efficient marker planning, reduction of sewing thread wastage during sewing, contribution of seam and hem allowances in cost reduction. Ways and means to reducing power cost: importance of using electronic ballasts in lighting, importance of reducing machine idle time, advantages of direct drive motors, servo motors

TOTAL: 45

REFERENCES

1. Panneerselvam, R, “**Engineering Economics**”, Prentice Hall of India Ltd, New Delhi, 2001
2. Maurice Johnson and Moore E., “**Apparel Product Development**”, Om Book Service, 2001
3. McKelvy Katherine, “**Fashion Source Book**”, Om Book Service, 2001
4. Maurice Johnson “**Introduction of Work Study**”, International labour Organization, Geneva, 1995
5. Solinger Jacob, “**Apparel Manufacturing Hand Book**”, Reinhold Co, 1998
6. Donald G. Newman, Jerome P. Lavelle, “**Engineering Economics and Analysis**” Engineering Press, Texas, 2002

UNIT I: INTRODUCTION 9

Visual merchandising-introduction, concepts and role, importance in store planning and utilizing basic visual merchandising techniques; Role of atmosphere in garment retailing – immediate effects and simulation types, visual merchandisers in garment retailing

UNIT II: STORE EXTERIOR AND INTERIOR 9

Store exterior – marquee, facade, exterior display, surrounding stores and displays; Store interior – store atmospheric, aesthetic, execution of store lay out - selection of display locations, lifts, staircase, elevators, utilization of store space; Display composition: Elements and principles of design, tools and materials

UNIT III: STORE LAYOUT 9

Factors considered in organizing effective display – balance, rhythm, proportion, texture, harmony and emphasis. Store layout planning- grid, race track, freeform – direction of flow and planogram; Design elements to create mood and impression – colour, angle, motion, simplicity, and repetition

UNIT IV: DISPLAY 9

Seasonal and trend decision for point of emphasis – creativity in display; Planning of assortment, theme, ensemble, racks, shelves, bins, etc. and balance of display in a show room. Wall as retail selling tool – types of materials used merchandise display and effective wall planning. Application of colour schemes, colour psychology, creating mood by colour

UNIT V: FASHION RETAILING 9

Lightings - Lights types, selection, advantages and disadvantages, music. Using effective graphics and sinages for theme, campaign and promotional aspects - safety and security; Theme, interior and exterior displays used in garment retail outlet, boutique and haute couture, accessories show rooms, mannequins, fabric and paper displays.

TOTAL: 45**REFERENCES**

1. Swapna Pradhan, “**Retailing Management**”, 2nd Edition, Tata McGraw Hill Publishing Company Ltd, 2007
2. Vedhamani and Gibson. G., “**Retail Management: Functional Principles and Practices**” Jaico Publishing House, 2007
3. Bajaj Chetan, Tuli Rajesh, and Srivastava Nidhi V., “**Retailing Management**” Oxford University Press, New Delhi, 2007
4. Lamba.A.J., “**The Art of Retailing**” Tata McGraw-Hill Companies, Inc, 2003
5. Berman Barry and Evans Joel R. “**Retail Management: A Strategic Approach**”
6. Prentice-Hill of India, 2002