ಬೆಂಗಳೂರು
ನಗರ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

BENGALURU
CITY UNIVERSITY

Office of the Registrar, Central College Campus, Dr. B.R. Ambedkar Veedhi, Bengaluru – 560 001.
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No.BCU/BoS/Syllabus-PG/Science/ 332 /2025-26 Date: 23.09.2025

NOTIFICATION

Sub: Syllabus for the Post Graduate Courses in the Faculty of Science– reg

Ref: 1. Recommendations of the Boards of Studies in the Faculty of Science
2. Academic Council resolution No.04 dated.22.09.2025
3. Orders of Vice-Chancellor dated. 23.09.2025

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The Academic Council in its meeting held on 22.09.2025 has approved the syllabus prepared by different Board of Studies for the Post Graduate Courses in the Faculty of Science. Accordingly, the following CBCS Syllabus for the Semester PG Courses of Science Faculty are hereby notified for implementation effective from the academic year 2025-26.

Sl. No.	Programmes
1.	M.Sc. Chemistry – I & II Semester
2.	M.Sc. Biochemistry – I to IV Semester
3.	M.Sc. Physics – I & II Semester
4.	M.Sc. Mathematics – I to IV Semester
5.	M.Sc. Psychology– I to IV Semester
6.	M.Sc. Counselling Psychology – I to IV Semester
7.	M.Sc. Fashion & Apparel Design – I to IV Semester
8.	M.Sc. Zoology – I & II Semester
9.	M.Sc. Botany – I to IV Semester
10.	M.Sc. Computer Science – I & II Semester
11.	M.Sc. Speech Language Pathology – I to IV Semester
12.	Master of Computer Applications – I & II Semester

The detailed Syllabi for above subjects are notified in the University Website: www.bcu.ac.in for information of the concerned.

REGISTRAR

Copy to;

1. The Registrar(Evaluation), Bengaluru City University
2. The Dean, Faculty of Science, BCU.
3. The Principals of the concerned affiliated Colleges of BCU- through email.
4. The P.S. to Vice-Chancellor/Registrar/Registrar (Evaluation), BCU.
5. Office copy / Guard file / University Website: www.bcu.ac.in

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BENGALURU
CITY UNIVERSITY

M.Sc. (FASHION & APPAREL DESIGN) SYLLABUS

(I TO IV SEMESTERS)

(REVISED)

2025-2026 onwards

M.Sc. (FASHION & APPAREL DESIGN)
SCHEME (REVISED)

Semester I								
CODE	Subjects	Paper Theory/ Practical	Instruction Hrs/week	Duration of Exam (Hrs)	Marks			CREDITS
					IA	Exam	Total	
FAD 1.1	Textile Process & Products	Theory	4	3	30	70	100	4
FAD 1.2	Advanced Fashion Design	Theory	4	3	30	70	100	4
FAD 1.3	Apparel Technology I	Theory	4	3	30	70	100	4
FAD 1.4	Research Methodology	Theory	4	3	30	70	100	4
FAD 1.5	Textile Process and Products	Practical	4	4	15	35	50	2
FAD 1.6	Design Methodology	Practical	4	4	15	35	50	2
FAD 1.7	Garment Construction I	Practical	4	4	15	35	50	2
FAD 1.8	Computer Aided Design	Practical	4	4	15	35	50	2
FAD 1.9 Soft Core	Knitwear Design and Technology	Theory	3	3	30	70	100	2
							700	**26**

Semester II								
CODE	Subjects	Paper Theory/ Practical	Instruction Hrs/week	Duration of Exam (Hrs)	Marks			CREDITS
					IA	Exam	Total	
FAD 2.1	Chemical Processing & Finishing	Theory	4	3	30	70	100	4
FAD 2.2	Fashion Accessory Design	Theory	4	3	30	70	100	4
FAD 2.3	Apparel Technology II	Theory	4	3	30	70	100	4
FAD 2.4	Fashion Merchandising & Marketing	Theory	4	3	30	70	100	4
FAD 2.5	Chemical Processing & Finishing	Practical	4	4	15	35	50	2
FAD 2.6	Garment Construction II	Practical	4	4	15	35	50	2
FAD 2.7	Apparel Value Addition	Practical	4	4	15	35	50	2
FAD 2.8	Fashion Accessory Design & Production	Practical	4	4	15	35	50	2
FAD 2.9 Soft Core	Sustainable Clothing	Theory	3	3	30	70	100	2
							700	**26**

Semester III								
CODE	Subjects	Paper Theory/ Practical	Instruction Hrs/week	Duration of Exam (Hrs)	Marks			CREDITS
					IA	Exam	Total	
FAD 3.1	Apparel Quality Control and Standards	Theory	4	3	30	70	100	4
FAD 3.2	Apparel Costing	Theory	4	3	30	70	100	4
FAD 3.3	Retail Management	Theory	4	3	30	70	100	4
FAD 3.4	Fashion Draping	Practical	4	4	15	35	50	2
FAD 3.5	Advanced Textile & Apparel Testing	Practical	4	4	15	35	50	2
FAD 3.6	Internship	-	8	Viva Voce / Report Evaluation	-	100	100	4
FAD 3.7	Open Elective	Theory	4	3	30	70	100	4
							600	**24**

Internship shall be carried out after II Semester examination and the viva voce and the internship report shall be evaluated during the III Semester practical examinations.

Semester IV								
CODE	Subjects	Paper Theory/ Practical	Instruction Hrs/week	Duration of Exam (Hrs)	Marks			CREDITS
					IA	Exam	Total	
FAD 4.1	Functional Textiles & Clothing	Theory	4	3	30	70	100	4
FAD 4.2	Fashion Journalism and photography	Theory	4	3	30	70	100	4
FAD 4.3	Enterprise Resource Planning	Theory	4	3	30	70	100	4
FAD 4.4	Export Trade & Documentation	Theory	4	3	30	70	100	4
FAD 4.5	Fashion Studio	Practical	4	4	15	35	50	2
FAD 4.6	Portfolio Presentation	Practical	4	4	15	35	50	2
FAD 4.7	Project Work	-	8	Viva voce / Report Evaluation	-	100	100	4
							600	**24**

SEMESTER I

FAD 1.1 TEXTILE PROCESS AND PRODUCTS

No. of Teaching Hours: 52

Objectives:

- To familiarise students with the process of yarn and fabric manufacturing.
- To acquaint students with the requisite knowledge of textile processes to suit the product and fields of application.

Unit 1 **6 Hrs**

Yarn manufacturing process: Influence of fibre property on various techniques of spun yarn process. Suitability of spun yarns produced with different techniques for specific products in various fields. Post spinning process of spun yarns for efficient performance in further stages of manufacture and uses. Manufacturing process of linen, wool, silk. Understanding correlation of various functional fibers and filaments with special reference to their technical properties.

Unit 2 **6Hrs**

Features of various methods of filament yarn production, controls and post-spinning requirements. Study of special uses of filament yarn. Texturisation.

Unit 3 **10 Hrs**

Controls in shuttle and shuttle- less weaving machines. Yarn quality requirements for weaving domestic and export products. Understanding the major characteristics of various fabric types (woven and knits) in relation to their end use/application.

Unit 4 **8 Hrs**

Introduction to dobby and jacquard woven products. Jacquard knitting machine - Wrap patterning and gaiting of needles. Fabric defects - types, causes and remedies. Knitted fabric structure: Tightness factor, dimensional properties, spirality – relaxation- shrinkage. Dimensional characteristics of warp knits, warp knitted fabric geometry - relation between loop length and construction, fabric relaxation and shrinkage.

Unit 5 **10 Hrs**

Non wovens: Definition, Classification, Raw materials, Web formation techniques - dry laid, wet laid. Bonding techniques – mechanical, thermal and chemical. Properties of nonwoven fabrics, products, applications and its characteristics. Braids- construction methods, properties, characteristics and application.3 D woven fabrics and their application.

Unit 6 **8Hrs**

Thermal Properties and Comfort: Thermal comfort, concept of heat and mass transfer, thermal protection, moisture vapour transmission, permeability, factors affecting moisture

vapour permeability, relationship between moisture vapour permeability and comfort, liquid – moisture transmission, water repellence and water absorption, factors affecting liquid – moisture transmission, correlation between air permeability and other factors.

Unit 7 **4 Hrs**

Fabric mechanical properties and tactile pressure sensations: Fabric prickliness, itchiness, stiffness, softness, smoothness, roughness, and scratchiness, garment fit and pressure, comfort – general aspects, construction factors, dimensional changes and the effects of fit on comfort.

References

1. Hayavadana J, "Advanced Woven Fabric Design", Woodhead Publishing India Pvt. Ltd., 2018.
2. Karthik T, Prabhakaran C, and Rathinamoorthy R, "Non-woven - Process, Structure, Properties and Applications", Woodhead Publishing India Pvt. Ltd., 2016.
3. Li Y, "The Science of Clothing Comfort", Textile Progress, Vol.31, No.1/2, The Textile Institute, 2001.
4. Lord P R, "Hand book of yarn production: Technology, Science and Economics", Woodhead Publishing, 2003.
5. Mukesh Kumar Singh, "Industrial Practices in Weaving Preparatory", Woodhead Publishing India Pvt. Ltd., 2016.
6. Ray S C, "Fundamentals and Advances in Knitting Technology", Woodhead Publishing India Pvt. Ltd., 2012.
7. Sabit Adanur, "Handbook of Weaving", Technomic Publishing Co., Inc., India, 2001.

FAD 1.2 ADVANCED FASHION DESIGN

No. of Teaching Hours: 52

Objectives:

- To equip students with fashion research and design innovation
- To develop creative competence in designing innovative design solutions for various fashion categories.

Unit 1 **6 Hrs**

Advanced Design & Illustration: process of concept development, design elements & principles, advanced illustration techniques, and digital design software.

Unit 2 **6 Hrs**

History of Art & Costumes**:** Advanced analysis of fashion history, art movements, and their influence on contemporary fashion.

Unit 3 **6 Hrs**

Fashion Theory & Criticism: History, theories, criticism, and contemporary debates within fashion.

Unit 4 **6 Hrs**

Design Studios & Creative Process: Deep-dive into advanced design thinking, creative development, and personal portfolio creation.

Unit 5 **8 Hrs**

Cultural Studies & Social Responsibility: Study of global fashion trends, cultural influence, ethics, sustainability, and the social impact of design, ethical practice in the fashion industry.

Unit 6 **10 Hrs**

Fashion Communication & Styling: Advanced styling, image design, and communication strategies for the design catalogues, creative styling methodologies, brand image development, and communication strategies. Effective strategies for fashion media, marketing, and digital presentation.

Unit 7 **10 Hrs**

Fashion Forecasting & Trend Analysis: Understanding and predicting national and global fashion trends. Community & Social Connect: Real-world design projects with social impact or community engagement.

References:

1. Dingemans, J. (1999). Mastering fashion styling. Macmillan Press.
2. Gavin Wadddell," How Fashion works", Blackwell Publishing, 2013.
3. Habisch, A., & Schmidpeter, R. (Eds.). (2016). Cultural roots of sustainable management: Practical wisdom and corporate social responsibility (1st ed.). Springer International Publishing.
4. Helen Goworek, "Fashion Buying", Wiley-Blackwell, 2nd edition, 2007.

5. Holland, G., & Jones, R. (2017). Fashion trend forecasting. Laurence King Publishing
6. Laver, J., de la Haye, A., & Tucker, A. (2020). Costume and fashion: A concise history (5th ed.). Thames & Hudson.
7. Reis, J. (2022). Advanced Design: Universal Principles for All Disciplines (1st ed.). Springer Nature Switzerland AG.
8. Sullivan, B. (2017). The Design Studio Method: Creative problem solving with UX sketching. Routledge

FAD 1.3 APPAREL TECHNOLOGY I

No. of Teaching Hours: 52

Objectives:

- To develop a comprehensive understanding of the advanced technologies and processes that drive modern apparel manufacturing.
- To enable students to identify, operate, and apply diverse tools, equipment, and machinery used across different stages of apparel production.

Unit 1 **10 Hrs**

Indian apparel industry: Overview of organizational frameworks, key sectors of the garment industry and range of apparel product categories. Exploring recent innovations, market developments, opportunities, and challenges shaping the Indian apparel sector. The global landscape and emerging future trends in apparel manufacturing.

Unit 2 **12 Hrs**

Innovation in apparel product development: Adoption of 3D body scanning, digital pattern engineering, automated grading, marker planning, and precision cutting. Pre-production processes: Comprehensive workflow including Pre-Production (PP) and Time & Action (TNA) meetings, sample development: varied sample types, approvals, and fit evaluations. Pre-costing analysis and order follow-up.

Unit 3 **6 Hrs**

Fabric Spreading Technology: Exploring spreading methods tailored to diverse fabric types and innovative lay configurations for efficient cutting. Semi-automatic and fully programmable machines Next-gen spreading systems: Automatic pattern matching spreaders, air-assisted & intelligent handling, smart, programmable spreaders, tubular & folded fabric specialists.

Unit 4 **8 Hrs**

Cutting and fusing technology: Advanced cutting machines and its working principle, AI-integrated automatic fabric cutters, robotic cutting arms, and IoT- enabled cutting rooms working environment and safety measures. Fusing machines: Automated continuous fusing presses, spot fusing machines, 3D thermo-bonding, ultrasonic bonding, fusing materials, components of fusing, types of resin coating & its applications for various apparel products.

Unit 5 **8 Hrs**

Computer-controlled and multi-programmable sewing systems: Pocket attaching, belt-loop making, button sewing, edge control, welting, sleeve setting, texture stitching, serging, and automated work aids. Automated sewing systems: Complete garment knitting machines, sewbot, automated pleated pants sewing machines, and automated elastic waistband sewing.

Unit 6 **8 Hrs**

Garment finishing systems: Energy-efficient steam boilers, vacuum pressing tables, pneumatic presses & automated finishing equipment - tunnel finishers, form finishers, and steam mannequins. Types of folds & automated folding machines. Warehousing & Packing: Modern assortment, smart storage solutions, climate-controlled warehousing, innovative

packing methods - automated packing lines, vacuum packing, polybagging, cartonization, and sustainable eco-packaging.

References

1. Gerry Cooklin, "Garment Technology for Fashion Designers", John Wiley & Sons, 2008.
2. Gerry Cooklin, "Introduction to Clothing Manufacturers", Blackwell Publishing, 2nd Edition, 2006.
3. Harold Carr, Barbara Latham, "The Technology of Clothing Manufacture", Blackwell publishing, 4th edition, 2008.
4. Jacob Solinger – Apparel Manufacturing Handbook: analysis, principles, and practice' 2nd Edition, Bobbin Blenheim Media Corp, 1988
5. Jane Alvarado, "Computer Aided Fashion Design Using Gerber Technology", Fairchild Books, 2018.
6. Rajkishore Nayak, Rajiv Padhye, "Automation in Garment Manufacturing", Woodhead Publishing, 1st edition, 2017.
7. Rajkishore Nayak, Rajiv Padhye, "Garment Manufacturing Technology", 1st Edition, Woodhead Publishing, May 2015.
8. Rathinamoorthy R, Surjit R, "Apparel Machinery and Equipments", Woodhead Publishing India Pvt. Ltd., 2015.
9. Ruth E Glock &Grace I Kunz – Apparel Manufacturing- Sewn Product Analysis, Pearson Education Inc., 2005.
10. Sumithra M, "Advanced Garment Construction Guide", Woodhead Publishing India Pvt. Ltd., 2020.

FAD 1.4 RESEARCH METHODOLOGY

No. of Teaching Hours: 52

Objectives:

- To equip students with a strong foundation in research concepts, methods, and ethical practices, enabling them to design, conduct, and analyze research effectively.
- To develop the ability to communicate research findings effectively through report writing.

Unit 1 **6 hrs**

Research: Meaning and significance of research, different approaches to research- scientific method and non-scientific methods, types of research.

Unit 2 10 **hrs**

Research problem: Formulation of research problem, defining research problem, generating research hypothesis, research process, research design, classification of research designs, need for research design, features of good research design, research proposal.

Unit 3 **8 hrs**

Sampling techniques: Steps in sampling, types of sample design - probability and non-probability sampling designs, size of sample, sampling errors, concept of measurements and scaling, scaling techniques, characteristics of sound measurement.

Unit 4 **8 hrs**

Sources of data: Primary v/s secondary data, sources of primary data – observation, interview method, questionnaire construction and design. Processing of research data: Editing, coding, classification and tabulation.

Unit 5 **10 hrs**

Analysis of research data, measures of central tendency, measures of variation, measures of dispersion and skewness, test of randomness. Hypothesis testing: Null and alternative hypothesis, level of significance, one and two sample tests, Statistical packages.

Unit 6 **10 hrs**

Research report: Different types- Contents of report, executive summary, chapterization, report writing, the role of audience, readability – comprehension – tone, final proof, report format, title of the report. Ethical issues in research: Code of Ethics in Research, Ethics and Research Process.

References

1. Ingrid E. Mida, Alexandra Kim, “The Dress Detective: A Practical Guide to Object-Based Research in Fashion”, Bloomsbury Visual Arts, 2019.
2. Judy Zaccagnini Flynn, Irene M Foster, “Research Methods for the Fashion Industry”, Fairchild Publications, 1st edition, 2009.
3. Kothari CR, “Research Methodology: Methods and Techniques”, New Age International Publishers, 2019.
4. Ranjit Kumar, “Research Methodology”,Sage Publishing, 4th edition 2014.
5. Simon Seivewright, Richard Sorger, “Research and Design for Fashion”, Bloomsbury Academic, 2019.
6. Uwe Flick, “Introducing Research Methodology: A Beginner's Guide to Doing a Research Project”, Sage Publications India Private Limited, 2nd edition, 2017.

FAD 1.5 TEXTILE PROCESS AND PRODUCTS

16 Practicals of 4 Hrs each

Unit 1 **2**
Yarn test for its quality- Yarn unevenness, Hairiness, Strength.

Unit 2 **2**
Collection of yarn samples with associated products.

Unit 3 **6**
Determination of geometric properties of woven and knitted fabrics (10 types).
Wovens: Yarn linear density, GSM, thread density, crimp, cover factor.
Knitted fabrics: Course per inch, wale per inch, thickness, GSM, loop length, count of Yarn, spirality and tightness of the fabric.

Unit 4 **6**
Structural analysis of woven and knitted fabrics (10 types).

FAD 1.6 DESIGN METHODOLOGY

16 Practicals of 4 Hrs each

Unit 1 **4**

Ideation – Research methods, identification of need, inspiration, theme development and storytelling, visual boards (inspiration, mind mapping, theme/ concept, colour mapping, client board and swatch board).

Unit 2 **6**

Creative development – motif development, design morphology, design development (artistic & product), final design sheets.

Unit 3 **4**

Material studies – exploration and experimentation with fabrics, textile materials and other sustainable alternatives.

Technical skills – advanced pattern making, draping and other creative constructions.

Unit 4 **2**

Critical design thinking & product development – assessing design, material and processes in product development for sustainability, cultural relevance and market suitability.

FAD 1.7 GARMENT CONSTRUCTION I

16 Practicals of 4 Hrs each

Unit 1 **2**

Application of dart manipulation on dress foundation block.

Unit 2 **2**

Lining, facing, binding- Stylized Necklines.

Unit 3 **4**

Principles of Contouring, Development of women's contoured dress block.

Unit 4 **8**

Designing and stitching of halter neck/off shoulder dress with style variations (2 garments).

FAD 1.8 COMPUTER AIDED DESIGN

16 Practicals of 4 Hrs each

Unit 1 **2**

Pattern Design Systems (PDS): Digital storage, standardized measurement units, and intelligent rule-table configurations. Hands-on learning of digital drafting tools - creation of anchor points, virtual notches, vector lines, and pattern pieces.

Unit 2 **3**

Learning digital pattern modification & editing tools: Mastering interactive tools for dart creation and manipulation, adding fullness through flare, pleats, and gathers, combining, mirroring, splitting, and reshaping pattern pieces. Automated seam allowance generation & naming.

Unit 3 **8**

Digital pattern development: Introduction to digitizing and drafting techniques for the foundational pattern blocks for children wear, menswear and womenswear, with emphasis on style-driven adaptations. Smart grading techniques: Digital grading methods through rule-table configuration, size-range allocation, and coordinate-based (X & Y axis) grading.

Unit 4 **3**

Marker making & plotting: Marker-making workflow - fabric lay planning, working width optimization, and design repeat calculations. Calculating marker efficiency through digital tools and executing the plotting process.

FAD 1.9 KNITWEAR DESIGN AND TECHNOLOGY

No. of Teaching Hours: 39

Objectives:

- To impart knowledge on knit structures and its applications.
- To acquaint students on various knitwear categories and knitwear apparel production.

Unit 1 **6 Hrs**

Introduction to knitted fabrics. Difference between knits and wovens, Indian knitting industry - past, present and future. Introduction to knitted apparels: Apparel categories - Men, women and children - casual, formal, sportswear, sweaters and hosiery.

Unit 2 **5 Hrs**

History of knitting, hand knitting, terms used in knitting, weft knitting & warp, parts and functions of weft knitting and warp knitting - calculations used in knitting, dyeing and finishing of knit fabrics.

Unit 3 **5 Hrs**

Yarns used for knitting and knit structures - Cotton, wool, nylon, acrylic, high bulk acrylic, spandex. Properties of knits for apparel production - stretch and shrinkage factors.

Unit 4 **5 Hrs**

Wefts knit fabric structures – single jersey or plain, rib, purl, interlock – knit float - tuck and stitch structures - designing of weft structures. Warp knit fabric structures – Underlap, overlap, closed lap and open lap stitches.

Unit 5 **6 Hrs**

Knitwear production - Machineries: Flat bed, circular & stock knitting machines, latest knitting machines, warp and weft knitting machines, categories of knitted garments – fully cut, stitch shaped cut, fully fashioned and integral garments, seams, seam finishes & stitches, machinery used, pre-production and production, finishing, precautions in apparel production, knitted fabric defects.

Unit 6 **7 Hrs**

Knitted garment manufacture and quality aspects: Cutting, stitching, finishing. Quality control of knitted garments - Fabric quality - weight per unit area, tightness factor, knitted faults, pilling. Garment quality - spreading, cutting, sewing and final inspection.

Unit 7 **5 Hrs**

Innovations in knitwear- Recent trends in knit wear-seamless garment construction, surface embellishments on knitwear, knits in interiors and computer aided designing in knitwear.

References

1. Brown, C., Knitwear design. Laurence King Publishing., 2013
2. Gokarneshan N, “Technology of Knit Spacer Fabrics”, Woodhead Publishing India Pvt. Ltd., 2020.
3. Juliana Sissons, “Knitwear: An Introduction to Contemporary Design”, Bloomsbury Visual Arts, 2018.
4. Ray, S C “Fundamentals and Advances in Knitting Technology”, Woodhead Publishing India Pvt. Ltd., 2012.
5. Sandy Black, “Knitwear in Fashion”, Thames and Hudson Publication, 2005.
6. Spencer, D J “Knitting Technology: A Comprehensive Handbook and Practical Guide”, Woodhead Publishing, 2001.
7. Terry Brackenbury, “Knitting Clothing Technology”, Blackwell Publishing, 2005.

SEMESTER II

FAD 2.1 CHEMICAL PROCESSING & FINISHING

No. of Teaching Hrs. 52

Objectives

- To acquaint students with modern concepts in dyeing, finishing & bio processing.
- To enable students to understand energy conservation & pollution control approaches in textile processing.

Unit 1 **6Hrs**

Preparatory processes: Desizing, Scouring, Bleaching, Mercerization.
Application of enzymes in processing: Mechanism of enzyme reactions – bio scouring bio-bleaching, bio-polishing and the other combined processes.

Unit 2 **12Hrs**

Dyeing: Introduction, classification, Theory of Dyeing, Application of dyes- direct, basic, acid, vat, reactive, sulphur and disperse dyes. Eco-friendly dyeing, Natural dyes – importance and applications. Developments in the application of direct, reactive, disperse dyes to textile materials using batch wise and continuous methods, Waterless dyeing.

Unit 3 **6 Hrs**

Printing with different dye classes: Direct, resist and discharge styles of printing - Transfer printing of polyester and blends, digital printing.

Unit 4 **8Hrs**

Chemical finishing: Application of water repellent/proof, flame retardant, mildew proof, moth proof, anti-static, soil release, UV protection, anti-microbial, odour control and fragrance finishes, resin finishing: durable press, wrinkle free, silicone finishing.

Unit 5 **6 Hrs**

Garment Processing & finishing: Processing of grey fabric garments, garment dyeing, machinery for garment dyeing, garment finishing and printing.

Unit 6 **8Hrs**

Denim finishing: Process conditions, machineries, chemicals and enzymes used for various special effects, stone wash, enzyme wash, sand blasting, ozone and laser fading.

Unit 7 **6Hrs**

Energy conservation steps in chemical processing: Low wet pick-up techniques - causes and remedies for water and air pollution. Wastewater characteristics; wastewater treatment - objectives, methods and implementation considerations, recycling of effluents, low cost adsorbents and modern effluent treatment processes.

References

1. Chakraborty, J N “Fundamentals and Practices in Colouration of Textiles”, Woodhead Publishing India Pvt. Ltd., 2nd edition, 2014.
2. Choudhury, A. K. R. Sustainable practices in textile processing. Woodhead Publishing., 2017.
3. Chritie R., “Environmental aspects of textile dyeing”, Woodhead Publishing Ltd, UK, 2007.
4. Mahapatra N N, “Textile Dyeing”, Woodhead Publishing India Pvt. Ltd., 2018.
5. Mahapatra N N, “Textile Dyes”, Woodhead Publication Pvt., Ltd., 2016.
6. Mathews Kolanjikombil, “Pretreatment of Textile Substrates”, Woodhead Publishing India Pvt. Ltd., 2016.
7. Shenai, V. A. Textile finishing: Recent developments and sustainability. Sevak Publications., 2015.
8. Vigneswaran C, Ananthasubramanian M, Kandhavadivu P, “Bioprocessing of Textiles”, Woodhead Publishing India Pvt. Ltd., 2014.

FAD 2.2 FASHION ACCESSORY DESIGN

No. of Teaching Hrs. 52

Objectives:

- To make students understand current accessory categories, trends, designs, materials selection, production process, costing and marketing aspects.
- To prepare students for professional roles in accessory design and product development.

Unit 1 **10 Hrs**

Introduction to Fashion Accessories: Categories for men, women and children, functions and features, inspirations, analyse forecasting reports different sources, accessory trend reports, designing aspects, selection of colours, materials, with relation to clothing line.

Unit 2 **8 Hrs**

History of jewellery from various cultures, gemmology and categories of traditional and contemporary jewellery, production and processing procedure, beading techniques with application on earrings, bracelets, and neckpiece, current trends in jewellery.

Unit 3 **6 Hrs**

Trends in imitation jewellery: Design, inspirations, production process, compatibility of design concepts between materials used and style characteristics with clothing line.

Unit 4 **8 Hrs**

Designing with leather and fur: Evolution categories, sources, production and processing procedure, design and current trends in leather and fur, laws and regulation for production, marketing and labelling of leather and fur products.

Fashion leather goods: Belts, shoes and socks and shoe accessories, bags, clutches and travel accessories.

Unit 5 **10 Hrs**

History of headgears from various cultures, categories, styles, materials used and current trends. Hair accessories and hair adornments.

Scarves and wraps: Current trends, materials used and style features.

Unit 6 **6 Hrs**

Lifestyle and tech accessories: Sunglasses and readers, materials used and manufacturing process, current trends in sunglasses and readers.

Unit 7 **4 Hrs**

Major fashion accessory houses, inspirations, product releases, marketing overview.

References:

1. Dhir, Y. J. Fashion accessories: A complete guide to raw materials, construction methods and styles. CRC Press., 2024.
2. Frings, Gini Stephens, “Fashion: From Concept to Consumer”, Prentice Hall, 9th Edition, 2007.
3. John Peacock, “Fashion Accessories: The Complete 20th Century Sourcebook”, Thames and Hudson, 2000.

4. John Peacock, “Shoes: The Complete Sourcebook”, Thames & Hudson Ltd., 2005.
5. Judith C. Everett , “Guide to Producing a Fashion Show” Fairchild Books, 3rd Revised Edition, 2013.
6. Olivier Gerval, “Fashion Accessories” (Studies in fashion), Firefly Books, 2010.

FAD 2.3 APPAREL TECHNOLOGY II

No. of Teaching Hours: 52

Objectives:

- To equip students with in-depth knowledge of advanced apparel production processes, systems, and technologies.
- To develop awareness of cutting-edge industrial engineering practices and innovations shaping the apparel industry.

Unit 1 **8 Hrs**

Introduction to core concepts of apparel production: Evolution of industrial engineering, mass production concepts and standardization of sizing, scope of industrial engineering in global perspective, IE interface with apparel production, emerging trend in apparel production process, Efficiency, performance, capacity, utilisation calculations.

Unit 2 **8 Hrs**

Production plant layout and material handling: Principles of plant layout, plant layout considerations; integration of workforce, material and machines for seamless workflow, minimum movement, safety measures, maximum process visibility, advanced material handling techniques - conveyor automation, overhead handling systems, robotic arms, and IoT-enabled smart sensors for real-time tracking and efficient movement of materials.

Unit 3 **8 Hrs**

Elements of production planning and control: Task scheduling, material and resource planning, process selection and production workflow design, capacity planning and load balancing through digital tools, cost estimation and production forecasting.

Unit 4 **8 Hrs**

Work study & smart line planning: Method study, work measurement, principles of motion economy, ergonomics, and SAM calculations for efficiency. Line planning – apparel type, order size, and lead time with operator–machine requirement analysis. Innovative trends - Integration of IoT-enabled tracking, AI-based motion capture, digital ergonomics,

Unit 5 **8 Hrs**

Productivity management: Overview of productivity measures, measuring labour productivity, machine productivity and value productivity, strategies to improve productivity, smart line balancing software - predictive analytics, and real-time dashboards for productivity insights, factors affecting productivity, balancing productivity and quality.

Unit 6 **6 Hrs**

Operator training: Performance appraisal (PA) - Criteria for PA, techniques of PA - AI-based skill assessments, and real-time feedback systems. Classification of sewing operators, need based training-primary and secondary training, training modules - Gamified training modules, VR/AR-based training simulators, multi skilled operator development, employee turnover, absenteeism, attrition and retention- employee engagement, wellness initiatives, and career growth pathways, industrial hygiene and safety standards.

Unit 7 **6 Hrs**

Emerging trends in apparel production concepts: Lean manufacturing concepts, digital lean principles, six sigma, theory of constraints (TOC), smart lean principles enhanced by AI-driven predictive analytics, IoT-enabled Just-in-Time system, lean tools; muda, just in time, 5s, total productive maintenance (TPM), cloud-based kanban boards, AI-powered Kaizen platforms, KPI, poka yoke, PCDA, SMED, value stream mapping, takt time calculation, root cause analysis.

References

1. Gordana Colovic, "Ergonomics in the Garment Industry", Woodhead Publishing India Pvt. Ltd., 2014.
2. Gordana Colovic, "Management of Technology Systems in Garment Industry", Woodhead Publishing India Pvt. Ltd., 2011.
3. Gordana Colovic, "Strategic Management in the Garment Industry", Woodhead Publishing India Pvt. Ltd., 2012.
4. Jacob Solinger – Apparel Manufacturing Handbook: analysis, principles, and practice' 2nd Edition, Bobbin Blenheim Media Corp, 1988
5. Purushothama B, "Handbook of Managing Apparel Production and Quality", Woodhead Publishing India Pvt. Ltd., 2019.
6. Ramesh Babu V, "Industrial Engineering in Apparel Production", Woodhead Publishing India Pvt. Ltd., 2nd edition, 2012.
7. Ruth E Glock, Grace I Kunz, "Apparel Manufacturing: Sewn Product Analysis", Pearson/Prentice Hall, New Jersey, 4th edition, 2005.

FAD 2.4 FASHION MERCHANDISING AND MARKETING

No. of Teaching Hours: 52

Objectives

- To acquaint students with fashion merchandising and marketing concepts.
- To endow students with a broad perspective on emerging trends in merchandising & challenges in marketing.

Unit 1 **6 Hrs**

Introduction to merchandising: Evolution, merchandising types -retail merchandising, production merchandising, merchandising in buying house, basic functions of merchandising, 6 R's of fashion merchandising, merchandising technology, merchandiser's key responsibilities.

Unit 2 **6 Hrs**

Domestic and export marketing: Study of market, market structure, market types, business strategic planning, micro and macro environments, market development, problems and benefits.

Unit 3 **8 Hrs**

Market Research: Research types, research objectives, developing research plan - consumer behaviour, target market and market segmentation. Data source and collection methods, data analysis, presenting findings. Fashion forecasting, fashion interpretation, merchandise resource planning, elements of planning, capacity planning, merchandising calendar, KPI measurements, buying and selling seasons in different market.

Unit 4 **6 Hrs**

New product line development: Types of products, study apparel product lines, product life cycle, brand management, idea generation, screening, concept testing, test marketing, commercialization, product positioning, major reasons for product failure.

Unit 5 **10 Hrs**

Purchase Management: Role and responsibilities of purchase department, purchase cycle, global sourcing methods, identification of vendors, vendor analysis, evaluation of vendor, ratings criteria and selection procedure, negotiation and bargaining, vendor relations.
Order confirmation, consumption, final costing, pricing, purchasing of raw materials, bill of materials, trim card, production file, and production follow-up.

Unit 6 **10 Hrs**

Marketing mix, assortment and range planning, promotional techniques, distribution channels, market intermediaries & logistics management.

Retail formats: Organized, unorganized formats, types of retail stores – convenience stores, super markets, departmental stores, hyper markets, lifestyle stores, franchisee outlets & specialty stores.

Unit 7 **8 Hrs**

Emerging trends and issues in marketing: Consumerism, rural marketing, social marketing, online marketing, and green marketing.

Quality assurance and IT application in merchandising, Textile and apparel policies- FDI policies in retail sector.

References:

1. David Shaw, Dimitri Koumbis, "Fashion Buying: From Trend Forecasting to Shop Floor", Fairchild Books India, 2018.
2. Doris H Kincade, "Merchandising of Fashion Products", Pearson Education, 2011.
3. Easey, M. Fashion marketing (3rd ed.). Wiley-Blackwell., 2009
4. Gaynor Lea-Greenwood, "Fashion Marketing Communications", Wiley Blackwell, 2014.
5. Grace I. Kunz, "Merchandising: Theory, Principles, and Practice", Fairchild Books, 3rd Edition, 2009.
6. Jeremy A. Rosenau, David L. Wilson, "Apparel Merchandising - The Line Starts Here", Fairchild Books, 3rd Edition, 2006.
7. Mike Easey, "Fashion Marketing", Wiley Publication, 3rd edition, 2008.s
8. Ramesh Babu V, Arunraj A, "Fashion Marketing Management", Woodhead Publishing India Pvt. Ltd., 2019.
9. Rathinamoorthy R, Surjit R, "Apparel Merchandising", Woodhead Publishing India Pvt. Ltd., 2017.
10. Sachdeva, N. Fashion: Marketing, merchandising and buying. Heritage Publishers., 2017.

FAD 2.5 CHEMICAL PROCESSING & FINISHING

16 Practicals of 4 Hrs each

Unit 1 **4**

Pre-processing of textiles: Desizing, degumming, scouring, bleaching, bio polishing, optical whitening, mercerization.

Unit 2 **8**

Dyeing: Dyeing textiles with direct, acid, basic, reactive, disperse, sulphur, vat dyes & natural dyes. Assessment of colour fastness of dyed samples.

Unit 3 **2**

Colour measurement: Determination of K/S values and colour difference of dyed fabrics.

Unit 4 **2**

Printing: Printing of cotton by direct technique.

FAD 2.6 GARMENT CONSTRUCTION II

16 Practicals of 4 Hrs each

Unit 1 **3**

Development of basic Jacket block for men using flat pattern and draping technique.

Unit 2 **8**

Designing and constructing a jacket and developing a specification for the same.

Unit 3 **1**

Analysing the constructed garments using standard methods.

Unit 4 **4**

Garment quality test for dimensions, stitches, seam appearance, seam strength, seam slippage.
Garment accessory tests: Buttons impact and compression tests, zippers test, hooks and loop fastener tests.

FAD 2.7 APPAREL VALUE ADDITION

16 Practicals of 4 Hrs each

Unit 1 **2**

Trend analysis – analysis of current trends and technology in value addition.

Unit 2 **4**

Culture studies – opting any culture to study their values, beliefs, practices, clothing culture, accessory & jewelry

Unit 3 **6**

Thematic product development – based on the chosen culture following sampling to be done;
Surface ornamentation- hand/machine/digital embroidery. Applique work, patch work, quilting. Bead work, sequins, and metallic embellishments, stone work.
Print techniques -screen, block, digital, roller, transfer, sublimation. Tie-dye, batik, and fabric painting.
Special textile manipulation – pleating, smocking, tucking, etc.
Sustainable value addition- upcycling, using innovative techniques, eco-friendly dyes/pigments, recycled trims.

Unit 4 **4**

Product presentation – construction of a garment and complete ensemble based on the selected theme. Product cataloguing.
Value addition portfolio development – development of a portfolio of value addition samples/ swatches showing their applications using rendered sketches.

FAD 2.8 FASHION ACCESSORY DESIGN AND PRODUCTION

Practicals of 4 Hrs each

Unit 1 **4**

Fundamentals of accessory design – anatomy of various accessories like bags, footwear, eyewear, belts, etc.

Unit 2 **2**

Material exploration – market survey and sourcing of various trims and materials used in accessory and jewelry making.

Unit 3 **4**

Design conceptualization – trend analysis, ideation, and inspiration based design development – bags, jewelry, head gear, footwear (one each).

Unit 4 **6**

Product development & Presentation – processes, stages of production, prototyping, finishing, and quality checking. Development of materials and trims portfolio. Cataloging of products developed with story telling

FAD 2.9 SUSTAINABLE CLOTHING

No. of Teaching Hrs. 39

Objectives:

- To acquaint students with the concept of sustainability and its relevance in textile and fashion industry.
- To impart knowledge about eco-friendly processes, products and circular economy

Unit 1 **5 Hrs**

Historical context: Overview of how sustainable fashion has evolved over time, including key movements and milestones.
Sustainable development goals (SDGs) for the textile and fashion industry.
Overview of textile industry and Sustainable practices for environmental, social and economic impacts across the textiles and fashion industry.

Unit 2 **8 Hrs**

Sustainable textiles: Cotton-organic, naturally coloured, bast fibre based -hemp, flax, jute, ramie, wool, silk, recycled polyester, Vegan leather
Techniques of sustainable design process: Zero waste pattern making, Modular and transformable clothing, Unisize, Mono material, Minimal seams, Subtractive pattern making, Trans seasonal clothing, Recycle, Upcycle.

Unit 3 **12 Hrs**

Regulations and recommendations for using chemicals, raw materials & waste handling for sustainable textiles & clothing.
Environmental impact: Discussion on pollution, waste, Reduction of carbon footprints and water foot print in textile processing.
Eco-friendly garment processing: Modern approaches to eco-friendly wet processing of woven and knitted garments. Washing and processing of denims using eco-friendly methods

Unit 4 **6 Hrs**

Social Sustainability: Labour practices, Social justice and injustice Félix Guattari's concept of The Three Ecologies. Economical Sustainability: Circular economy, Principles of Circular fashion, Theory of doughnut, Degrowth theory.

Unit 5 **5 Hrs**

Advances and innovative technologies used in Sustainable fashion: Study of new technologies like 3 D printing, Laser cut, Biodegradable materials, Smart textiles, Bioplastics, Bacterial dyes, Block chain technology, Closed loop system, Use of AI

Unit 6 **3 Hrs**

Case studies on Sustainable fashion brands and sustainable garment industry, Rana plaza disaster. Developing sustainable fashion brand with vision, mission, values, branding, marketing ideas, Range development of sustainable garment line.

References:

1. Brismar, C. Circular fashion: “A supply chain for sustainability in the textile and apparel industry”. Routledge., 2022.

2. Christie R M, “Environmental aspects of textile dyeing”, Woodhead Publishing Ltd, UK, 2007.
3. Fletcher, K. Sustainable fashion and textiles: Design journeys (2nd ed.). Routledge.2014.
4. Mahapatra N N, “Textile and Environment”, Woodhead Publishing India Pvt. Ltd., 2015.
5. Parthiban M, Srikrishnan M R, Kandhavadivu P, “Green Apparels”, Woodhead Publishing India Pvt., Ltd., 2019.
6. Parthiban M, Srikrishnan M R, Kandhavadivu P, “Sustainability in Fashion and Apparels”, Woodhead Publishing India Pvt. Ltd., 2017.
7. Richard Blackburn, “Sustainable textiles: Life cycle and environmental impact”, Woodhead Publishing Ltd, UK, 2009.
8. Subramanian Senthilkannan Muthu, “Fast Fashion, Fashion Brands and Sustainable Consumption”, Springer, 2019.

SEMESTER III

FAD 3.1 APPAREL QUALITY CONTROL AND STANDARDS

No. of Teaching Hrs. 52

Objectives:

- To familiarize students with advanced apparel quality tests and standards.
- To impart skills for analysis of garment specification sheets and to translate them into quality output.

Unit 1 **6 Hrs**

Introduction to quality control and standards: Evolution of quality, quality planning, quality control, quality assurance, total quality management-contributions of Deming, Juran and Crosby, Quality Management System- Organizing, planning and implementation. Quality standards: importance, benefits, levels and sources of standards- ISO, AATCC, ASTM, BS, BIS, DIN.

Unit 2 **6 Hrs**

Quality Specifications: Garment Standards and Specifications: Analysis of pre-sample specification of garment or apparel product, understanding quality assurance in terms of measurement, sewing operations and finishes as per the specification sheet and garments defect analysis.

Role of quality in Sampling and pre-production – types of samples, pattern making, grading, preproduction meeting and pilot run.

Unit 3 **8 Hrs**

Eco management of textile and apparel industry: Global scenario, eco textiles, eco standards and certifications - ISO 14001, Eco-mark, Oeko-Tex 100, GOTS, Global Recycle Standard, RWS, SA 8000, Fair Trade, WRAP.

Unit 4 **14 Hrs**

Fabric hand characteristics- Drape, bending, crease recovery, shear, bias extension, formability, friction- objective measurement by FAST & KES.

Serviceability: Snagging, pilling, abrasion resistance, tearing strength, tensile, bursting, seam strength, seam slippage, flammability, soil resistance, soil release, UV protection, antimicrobial.

Durability characteristics of trims - resistance of zippers, buttons, snaps, buckles to abrasion, bursting and corrosiveness.

Unit 5 **8 Hrs**

Aesthetics-Colour measurement, shade variation and colour fastness to washing, light, perspiration, crocking and other agencies.

Hygral expansion, relaxation shrinkage- methods of measuring dimensional change to dry cleaning, dry heat and steam.

Unit 6 **6 Hrs**

Labelling: Introduction, labelling parameters, fibre content, care labelling and flammability, wash care labels, labelling systems, Regulations for labeling parameters, Eco-labelling.

Product safety- Product safety laws, Product recalls.

Unit 7 **4 Hrs**

Inspection: Inline, Midline and end of line inspection, Key Inline checkpoints for standards Garment Types. Final audits-Final inspection report, statistical sampling, application of AQL, Zoning of garments and classification of defects.

References

1. Amutha K, “A Practical Guide to Textile Testing”, Woodhead publishing India Pvt. Ltd., 2016.
2. David H, “ISO 9000 Quality System Handbook”, Butterworth publishing, New Delhi, 2006.
3. Juran J M and Gryna, F M, "Quality Planning and Analysis - From Product Development through Use", Tata McGraw Hill Publishing Limited, New Delhi, 2001.
4. Pradeep V Mehta, “Managing Quality in Apparel Industry”, NIFT publication.
5. Purushothama B, “Effective Implementation of Quality Management Systems”, Woodhead Publishing India Pvt. Ltd., 2010.
6. Purushothama B, “Implementing ISO 9001:2015”, Woodhead Publishing India Pvt. Ltd., 2015.
7. Saville, B.P. “Physical testing of textiles”, Woodhead Publishing Ltd. and CRC Press LLC, 1999.
8. Subrata Das, “Product Safety and Restricted Substances in Apparel”, Woodhead publishing India Pvt. Ltd., 2nd edition, 2016
9. Subrata Das, “Quality Characterisation of Apparel”, Woodhead Publishing India Pvt. Ltd., 2nd edition, 2019.

FAD 3. 2 APPAREL COSTING

No. of Teaching Hours: 52

Objectives:

- To familiarize students with apparel costing methods and techniques.
- To provide an insight into apparel pricing and budgeting process

Unit 1 **8 Hrs**

Cost accounting: Classification of cost elements - direct and indirect costs. Determination of factory cost, administration cost and sales cost of an apparel product. Manufacturing cost account statement - preparation and analysis, cost behavior patterns – fixed, variable, semi variable. Calculations related to job order costing and process costing.

Unit 2 **6 Hrs**

Accounting for factory overhead: Capacity level concepts, production and service departments, indirect costs, over and under applied overhead costs.

Unit 3 **8 Hrs**

Cost volume profit analysis: Break-even analysis, Contribution margin, variable, cost ratio, marginal income. Sales mix by garment style, effect of volume change, price/volume analysis.

Unit 4 **8 Hrs**

Standard Costing: Variance analysis, setting cost standards, price variance analysis for material, labour and overheads. Determination of standard cost for weaving, knitting and processing cost of woven/knitted fabrics. Fabric cost – stripe/checked, printed and embroidery and special finished goods.

Unit 5 **6 Hrs**

Determining pricing of apparels: Price elasticity of demand and supply, Sample costing-marginal revenue and marginal cost. Assortment order planning -cost determination, size and colourwise – men's, women's and children's wears.

Unit 6 **8 Hrs**

Pricing methods: Cost plus pricing methods/full cost pricing, conversion cost pricing, differential cost pricing; variable cost pricing, direct cost pricing. Derivation of cost of apparel products – woven/knits. CM, CMT cost analysis for various styles. Activity based costing, Cost analysis for various styles of garments. FOB/CIF/C&F pricing of apparels.

Unit 7 **8 Hrs**

Budgeting process: Budgeting principles for the apparel industry, fixed vs. flexible budget, master budget, limitations of budgets. Project proposal for setting up a new garment unit.

References:

1. Andrea Kennedy, Andrea Reyes, Francesco Venezia, “Apparel Costing”, Bloomsbury Visual Arts, 2020.
2. Bhabatosh Banerjee, “Cost Accounting: Theory and Practice”, Prentice Hall India Learning Private Limited, 2006.
3. Edward Blocher, David Stout, Gary Cokins, “Cost Management: A Strategic Emphasis”, McGraw-Hill Education, 2009.
4. Michael Maher, “Fundamentals of Cost Accounting”, McGraw-Hill Education, 2013.
5. Nathalie Evans, Michael Jeffrey, Susan Craig, “Costing for the Fashion Industry”, Bloomsbury Visual Arts, 2020.
6. Rathinamoorthy, R., Surjit, R., & Vishnu Vardhini, K. J. Handbook of textile and apparel costing. CRC Press, 2024
7. Ronald Hilton, Michael Maher, Frank Selto, “Cost Management: Strategies for Business Decisions”, McGraw-Hill Education, 2005.

FAD 3.3 RETAIL MANAGEMENT

No. of Teaching Hrs. 52

Objectives:

- To provide a deep understanding of retailing as a fast-evolving, tech-driven global industry.
- To develop competencies in managing store operations, retail marketing, and merchandising for effective business performance.

Unit 1 **10 Hrs**

Overview of Retailing Environment: Evolution of retail, structure of global retail markets and consumers, profile of Indian retail markets, types of retailers and ownerships, retail functions & distribution channels. Emerging trends in retailing - Digitalization, consumer behavior shifts, sustainability, and experiential retailing.

Unit 2 **12 Hrs**

Trade area analysis: Site selection criteria for store formats, demographics, and consumer behavior, competitor mapping, GIS, AI-driven heat maps, mobile tracking, footfall evaluation – big data analysis, logistics efficiency, location advantage and disadvantage. Departmentalization, layout planning and space allocation, modern store operations - workforce efficiency, visual merchandising, digital displays, energy-smart maintenance, and renovations.

Unit 3 **12 Hrs**

Retail Store Business Plan: Business concept, store format selection, elements of retail mix target market, financial planning, resource allocation, and marketing strategies. Basic profit factors - the relationship of markup to profit, net profit margins, returns on assets, budgeting decisions, operating expenses, trade discount, pricing and repricing, inventory methods, six months buying plans - stock turnover, open to buy.

Unit 4 **8 Hrs**

Retail sales techniques and promotions: Print and digital advertising, public relations, content-driven publicity, AI-powered personalized promotions, influencer collaborations, social media marketing, experiential campaigns, word-of-mouth marketing, referral programs, loyalty systems, gamification, and data-driven incremental promotions.

Unit 5 **4 Hrs**

Customer Service: Understanding customer expectation - tech-enabled experiences, emerging trends in retail services - Omni channel support, AI-driven chatbots, self-service technologies, and data-driven personalization. Customer relationship management - significance of relationship marketing, benefits and challenges of CRM.

Unit 6 **6 Hrs**

Retail mathematics: Retail financial metrics - strategic profit model, return on assets, return on investment, asset turnover, financial leverage, liquidity ratios, cash flow management - cash inflows & outflows collection periods, profit-to-net worth analysis, inventory turnover - sales-to-stock ratios, and ROI, productivity measures - sales per square foot, basket size, customer-centric metrics - customer lifetime value (CLV), customer acquisition cost (CAC).

References:

1. Barry R Berman, Joel R. Evans, “Retail Management: A Strategic Approach”, Prentice Hall, 12th Edition, 2012.
2. Choi, T.-M., & Shen, B. (Eds.). Luxury fashion retail management. Springer. 2017
3. Doug Stephens, “The Retail Revival: Reimagining Business for the New Age of Consumerism” Wiley; 1st edition, 2013.
4. Gibson B Vedamani, “Retail Management”, Pearson Education, 5th edition, 2017.
5. Goworek, H. Fashion buying (2nd ed.). Wiley-Blackwell. 2015
6. James C. Makens, Robert G. Roe, “Retail management: Satisfaction of consumer needs”, Chicago: Dryden, 3rd Edition, 1983.
7. Jochen Strähle, “Green Fashion Retail”, Springer, 1st edition, 2017.
8. Koumbis, D. Fashion retailing: From managing to merchandising. Bloomsbury Publishing. 2018
9. Tsan-Ming Choi, Edwin Cheng T C, “Sustainable Fashion Supply Chain Management: From Sourcing to Retailing”, Springer, 1st edition, 2015.

FAD 3.4 FASHION DRAPING

16 Practicals of 4 Hrs each

Unit 1 **1**

Introduction to draping: Draping terminology, tools and equipment, dress forms, elements of fabric behaviour, principles and techniques of draping.

Unit 2 **4**

Draping of foundation patterns-Basic bodice, basic skirt / trousers, basic sleeve- Children and adults

Unit 3 **5**

Designing draped garments based on theme using following components with different fabrics

a. Bodice variations- dartless silhouettes, princess shape.
b. Midriffs &Yokes
c. Collars
d. Sleeves

For upper garment, skirts / pants.

Unit 4 **2**

Designing and developing garments using

-Origami technique
-style lines
-Zero waste material

Unit 5 **4**

Transformational Reconstruction technique for design and volume (TR cutting).

FAD 3.5 ADVANCED TEXTILE AND APPAREL TESTING

16 Practicals of 4 Hrs each

Unit 1 **4**

Determination of fabric tensile characteristics, tearing strength and bursting strength. Seam strength and seam slippage.

Unit 2 **6**

Testing fabrics for stiffness, drape co-efficient, abrasion resistance, pilling resistance, dimensional stability, crease recovery, air permeability and colour fastness.

Unit 3 **2**

Testing fabrics for moisture properties: moisture management, water vapour permeability, wicking, repellence properties.

Unit 4 **4**

Assessment of tailorability of fabrics using FAST, Testing fabrics for Flammability and UV Protection. Objective colour measurement.

FAD 3.6 INTERNSHIP

Students shall undertake internship in the relevant areas of apparel manufacturing / design / retail sector. Internship shall be carried out for 30 days after the completion of second semester in a reputed industry/ organisation or under a reputed designer.

Students have to submit two copies of the internship reports duly approved by the guide prior to the commencement of third semester examination.

SEMESTER IV

FAD 4.1 FUNCTIONAL TEXTILES & CLOTHING

No. of Teaching Hours: 52

Objectives:

- To introduce students to functional aspects of textiles.
- To impart knowledge on manufacture and end use applications of functional clothing and textiles.

Unit 1 **6 Hrs**

Functional Textiles: Market overview, need for functions, properties of textiles for specific functions, global and regional trends in functional textile production, world market trends.

Unit 2 **6 Hrs**

Functional fibres: Introduction, high performance fibers and specialty fibres – classification and important applications. Functional yarns - Introduction, staple and filament yarns.
Functional fabric structures – criteria to select fabric structures for various functional fabrics, Surface modification for improved functionality.

Unit 3 **6 Hrs**

Functional clothing: Introduction, Definition, Classification: Protective functional, medical functional, sports functional clothing, Cross functional clothing needs.

Unit 4 **8 Hrs**

Medical textiles: Introduction, biomaterials for medical textiles, implantable, non-implantable, extra corporal, healthcare and hygiene applications of textiles.

Unit 5 **10 Hrs**

Defense textiles and textile reinforced composites: Military textile materials, water proof breathable, water vapour permeable fabrics, military combat clothing systems, camouflage clothing, composite materials, and applications of textile composites.
Protective textiles: Thermal, chemical and ballistic protection and their application.

Unit 6 **10 Hrs**

Nano textiles: Nano science and technology. Carbon nanotubes and nano applications in textiles and their importance in textile industry.
Smart textiles: Interaction design in smart clothing, specific requirements and applications of sensors, actuators, data processing, storage and communication in intelligent textile assembly, phase change materials, stimuli sensitive materials applications in textiles, wearable electronics and applications.

Unit 7 **6 Hrs**

Eco-functional textiles: Introduction to eco-friendly textile materials, green composites.

References:

1. Amar K. Mohanty, Manjusri, Lawrence T, “Natural Fibers, Biopolymers and bio composites” Boca Raton, London, 2005.

2. Anand S.C., Kennedy J.F. Miraftab M. and Rajendran S., “Medical Textiles and Biomaterials for Health care”, Wood Head Publishing Ltd. England, 2006.
3. Horrocks, A.R, Anand, S.C “Handbook of Technical Textiles”, Wood Head Publishing Ltd., 2000.
4. HVJ, “Shape Memory Polymers and textiles”, Wood Head Publishing limited, England, 2007.
5. Majumdar, A., Gupta, D., & Gupta, S. (Eds.). Functional textiles and clothing. Springer Verlag. 2019
6. Shahid Ul-Islam, Butola BS, “Advanced Functional Textiles and Polymers: Fabrication, Processing and Applications”, Wiley-Scrivener; 1st edition, 2019.
7. Watkins, S. M., & Dunne, L. E**.** Functional clothing design*:* From sportswear to spacesuits. Bloomsbury Publishing., 2015.
8. Xiaoming Tao, “Wearable Electronics and Photonics”, The Textile Institute, CRC press, Manchester, 2005.

FAD 4.2 FASHION JOURNALISM AND PHOTOGRAPHY

No. of Teaching Hrs. 52

Objectives:

- To educate students on the fashion journalism methods and thematic fashion article presentation and interpretations.
- To develop creative fashion photographic approaches and current trends of fashion photography methods and equipment.

Unit 1 **8 Hrs**

Fashion journalism: Introduction, history, elements of fashion journalism, types, scope in the current fashion world. The writing process-Planning, shaping, drafting, revising, editing, proofreading.

Unit 2 **7 Hrs**

Fashion journalists: Researching for fashion trends and conducting interviews, working methods, information gathering methods, tools and techniques used to gather information, reporting styles.

Unit 3 **10 Hrs**

Fashion journalism media: Newspapers, Magazines, broadcasting media, books, lifestyle sections of newspapers, on-line fashion magazines, websites, blogs and social network. Fashion promotion and communication: Public relation management, writing for public relations, writing for advertising, writing for business communications.

Unit 4 **9 Hrs**

Fashion photography: Types of photography, cameras and working principles of professional cameras, equipment and accessories, criteria for selecting cameras and lens.

Photo techniques and equipment's for different fields: Modelling, newspapers, magazines, occasions - fashion shows, fashion fairs.

Unit 5 **10 Hrs**

Indoor and outdoor photography: camera, lens and equipment selection, half and full-length shots, comparison of outdoor and indoor photography, glamour shots, mood shots, styling and make up for fashion and glamour photography. Lighting technique - need, methods - shooting with natural light, modification of lighting on location, lighting ratio and effects of soft high key.

Unit 6 **8 Hrs**

Fashion photography trends: Photography using digital cameras, video photography, image mixing, application of computers in photography-image collage method, cloning technique, printing technique.

References

1. Billy Pegram, “Fashion Model Photography: Professional Techniques and Images”, Amherst Media, 1999.
2. Bruce Smith, “Fashion Photography: A Complete Guide to the Tools and Techniques of the Trade”, Amphoto Books, Watson Guptill Publication, New York, 2008.
3. John Hedgecoe, “The Book of Photography”, DK Publishing Inc., United States, 2005.
4. Julie Bradford.“Fashion Journalism” Routledge, 2014.
5. Sanda Miller, Peter McNeil, “Fashion Journalism”, Bloomsbury Academic, 1st edition, 2018.
6. Stephen A Dantzig,” Lighting Techniques for Fashion and Glamour Photography”, Amherst Media, Inc, New York, 2005.

FAD 4.3 ENTERPRISE RESOURCE PLANNING

No. of Teaching Hrs. 52

Objectives:

- To familiarize students with the core functionalities and applications of ERP systems in apparel manufacturing and retail operations.
- To develop awareness of change management challenges and emerging trends in ERP adoption, including cloud-based, AI-driven, and data-integrated solutions.

Unit 1 **8 Hrs**

Introduction to enterprise resource planning: Basic concepts and objectives of ERP, origin, significant characteristics, need for ERP in the fashion industry, its contributions in organizational change to meet global market requirements, risks - investments and ROI. Application and benefits of modern ERP.

Unit 2 **10 Hrs**

Information system: Data and information- characteristics, types, need for effective information system, and core components of information systems. Information system types - transaction processing system, management information system, decision support system, executive support system, office automation system, business expert system.

Unit 3 **8 Hrs**

ERP setup process: Selection process for apparel industry- criteria involved in ERP vendor and consultants in selecting ERP, ERP tools and software, ERP implementation lifecycle, implementation methodologies, ERP transition strategies- training and education, challenges in ERP implementation- employee resistance, post-implementation activities, success and failure factors.

Unit 4 **10 Hrs**

ERP modules for Apparel industry- Finance management, HR management, plant maintenance, production planning & control, quality management, manufacturing resource planning (MRP), product lifecycle management, purchase order management, material requirement planning (MRP), shop floor control (SFC), master production schedule, inventory management, capacity requirements planning (CRP), warehouse management, bill of material management (BOM), customer relationship management (CRM).

Unit 5 **10 Hrs**

Maintenance and performance measurement of ERP: Operation and maintenance of the ERP system, measuring the performance of the ERP System, maximizing the ERP system.
Management issues in ERP- Information security and control, quality assurance, ethical and social dimensions and intellectual property rights- managing global information systems.

Unit 6 **6 Hrs**

Trends and future directions in ERP: Turbo charging ERP with business intelligence (BI) and corporate performance management (CPM), e-business, mobile ERP application, cloud storage, block chain in ERP, AI & advanced analytics, IoT & smart manufacturing, two-tiered ERP, extended ERP.

References:

1. Kelly Rainer R, Brad Prince, Casey G. Cegielski, "Introduction to Information Systems: Supporting and Transforming Business", Wiley Publications, 5th edition, 2013.
2. Michael W Pelphrey. "Directing the ERP Implementation: A Best Practice Guide to Avoiding Program Failure Traps While Tuning System Performance", CRC Press, 1st edition, 2015.
3. Paige Baltzan Instructor, Amy Phillips, "Business Driven Information Systems", McGraw-Hill Education, 5th edition, 2015.
4. Ray, R. Enterprise resource planning. Tata McGraw-Hill Education. 2011.
5. Sumner, M. Enterprise resource planning. Pearson Education. 2005.
6. Surjit R, Rathinamoorthy R, Vishnu K J, Vardhini, "ERP for Textiles and Apparel Industry", Woodhead Publishing India, 1st edition, 2016.
7. Veena Bansal, "Enterprise Resource Planning: A Managerial perspective", Pearson, 1st edition, 2013.

FAD 4.4. EXPORT TRADE AND DOCUMENTATION

No. of Teaching Hrs. 52

Objectives:

- To acquaint students with the nature and scope of export trade.
- To familiarize students with the documents involved in foreign trade & processing of an export order.

Unit 1 **8 Hrs**

Global business environment: Nature and scope of export trade, factors influencing export trade, benefits and problems in international trade. Business organizations; principles of formation, forms of business

Unit 2 **8 Hrs**

Export firm: Nature of export firm, setting up of an export firm, export licensing and registrations

Export order execution: Steps in export procedure, risks involved in documentation procedure, customs clearance.

Unit 3 **8 Hrs**

Export payments: Pre-shipment and post shipment finances, negotiation of documents.

Letter of credit: Definition and processing of letter of credit, principles and types of letter of credit, checklist, advantages and disadvantages of letter of credit.

Unit 4 **6 Hrs**

Export documents: Principal and auxiliary documents, steps involved in availing export documents.

Unit 5 **6 Hrs**

International economical, monetary and technological coordination: Regional trade agreements, major trade blocs - SAARC, EU, ASEAN and NAFTA

Unit 6 **10 Hrs**

Export promotional measures: Role of export promotional councils, commodity boards, ECGC, role of commercial banks, establishment and significance of SEZ and EPZ, availing concessions and incentives under various export promotion schemes, duty drawback, subsidies.

Unit 7 **6 Hrs**

Export risk management, export barriers- tariff and non-tariff barriers, foreign exchange market, trade policy - challenges in making policies and recent developments.

References

1. Donnellan, John, "Merchandise Buying and Management", Fairchild Books, 3rd edition, 2007.
2. Jain, R.K. "Customs tariffs of India", CENTAX Law Publications Pvt. Ltd.; 72nd Edition 2021.

3. Jain, R.K. “Foreign Trade Policy & Handbook of Procedures”, CENTAX Law Publications Pvt. Ltd; 26th edition, 2021.
4. Sandeep M. Bhatnagar, “Export Oriented Units - Law and Procedures”, 14th edition, 2013.
5. Thomas E. Johnson and Donna L. Bade, “Export/Import-Procedures and Documentation” Amacom, 4th edition, 2010.
6. Warren J. Keegan, “Global Marketing”, Prentice Hall PTR, 7th edition, 2012.

FAD 4.5 FASHION STUDIO

16 Practicals of 4 Hrs each

Unit 1 **3**

Visual Storytelling in Photojournalism: Digital imaging with smart use of lighting setups, creative lenses, dynamic camera perspectives and diverse photography genres. Photo compositions: Create impactful and meaningful images.

Unit 2 **4**

Fashion Journalism: Exploring and critiquing style columns, editorial shoots, and visual narratives from both heritage archives and contemporary media platforms. Crafting engaging fashion article on emerging fashion trends using creative storytelling with the 5Ws & 1H.

Unit 3 **4**

Digital Fashion Creativity & 3D Visualization: Conceptualizing theme-driven motifs and digital fabric development with repeats, followed by virtual draping and simulation of the designed textiles on 3D fashion avatars/models.

Unit 4 **5**

Virtual Product Showcase: Creating immersive digital layouts with thematic virtual props and environments for impactful product presentation.

FAD 4.6 PORTFOLIO PRESENTATION

16 Practicals of 4 Hrs each

Unit 1 **1**

Introduction to portfolio: Organization, content and customer focus.

Unit 2 **3**

Flats: Different techniques of drawing flats from croqui and body silhouettes, knit flats and free hand flats, Illustrative and Production flats, Specs- Generation of spec sheets.

Unit 3 **4**

Presentation formats: Inspiration/mood board, colour, board, swatch board, client board and figure boards – different styles of presentation of each kind of board.

Unit 4 **5**

Presentation boards: Men's wear, Women's wear, Children's wear with accessories.

Unit 5 **3**

Compilation & Presentation of a digital portfolio and fashion show production.

FAD 4.7 PROJECT WORK

Students have to undertake projects in the relevant areas of apparel manufacturing. At the end of the second semester, students have to submit project proposal for approval. The project work shall be carried out during the III and IV Semesters either in the Department or at an approved industry / organisation under the supervision of the approved guide. Three copies of the project reports are to be submitted to the Department through the guide before the commencement of IV Semester examination.

FASHION DESIGN

(Open Elective) **No. of Teaching Hrs. 52**

Unit 1 **14 Hrs**

Design concepts: Elements and principles of design, application of design concepts in fabrics and fashion products. Structural and applied design, colour - colour theories, dimensions of colour, colour schemes, design principles applied in apparel design.

Unit 2 **12 Hrs**

Introduction to fiber: Definition, classification and identification of fibers - essential and desirable properties and end uses - natural fibers - cotton, silk, wool, jute. Synthetic fibres - polyester, nylon and acrylic. Yarns, fabrics- knitted, woven and nonwovens. Basics of dyeing and printing of textile materials.

Unit 3 **14 Hrs**

Introduction to fashion: Fashion terminologies, fashion cycle, fashion theories, couture, ready-to-wear, luxury fashion, fast fashion, mass production. Figure irregularities and remedies. Designing of apparels for specialty shows -Introduction, need for specialty shows, different categories - designer fashion show, formal runway fashion show, trade shows, collection shows.

Unit 4 **12 Hrs**

Indian traditional textiles: Brocades of Banaras, Chanderi silks, Paithani brocade, Kancheevaram, Dharmavaram, Sambalpuri fabric, Ikat fabric and kalamkari. Traditional Indian Embroideries: Kashida of Kashmir, Kantha of Bengal, Phulkari of Punjab, Kutch embroidery of Gujarat, Kasuti of Karnataka, Chamba Rumal of Himachal Pradesh and their motifs, colours, stitches used and their applications.

References:

1. Corbman B.P, Textiles fiber to fabric, International McGraw- Hill, Editions, 1983.
2. Dantyagi. S Fundamental of Textiles and their care, Orient Longman Ltd., New Delhi, 1980.
3. Gavin Waddell, “How Fashion Works’’, Blackwell Publishing, 2005.
4. Ireland, J. Fashion design. Bloomsbury Publishing. 2010.
5. Jay Diamond, Ellen Diamond, “The World of Fashion’’, Fairchild Publication, 3rd Edition, 2002.
6. Jenkyn Jones, S**.** Fashion design. Laurence King Publishing. 2011.
7. John Gillow and Nicholas Bernard, Traditional Indian textiles, Thames & Hudson, 1993.
8. Rubin LG, “The World of Fashion’’, Canfield press, 1976.
9. Shenai VA. Textile Printing- Sevak publications, Mumbai 1991.