SNDT Women's University, Mumbai

Master of Science in Textile Science and Apparel Design

(M.Sc. Home Science-Textile Science and Apparel Design)

as per NEP-2020

Syllabus

(2023-24)

Programme	Master of science
Specialization	Textile Science and Apparel Design
Preamble (Brief Introduction to the programme)	Master of Textile Science and Apparel Designing is a Post-Graduate degree course. The program emphasizes creativity and conceptualization, technical aspects as well as independent research and artistic expression The Master of Science course in Textile Science and Apparel Designing exposes the students to subjects like chemical processing of textiles, pattern making, fashion illustration, advanced fabric science, statistics, research methods, International embroideries, & quality control in fabric & apparel, draping of patterns. The duration of the Master of Science course in Fabric and Apparel Designing is two years and it is career-orienting in nature that opens many scopes for them. The Master of Science degree course in Textiles Science and Apparel Design is an option that combines the art of design, the science of chemistry and the perspective of history in a rich, challenging learning environment that prepares individuals for dynamic careers at the creative forefront of the textile industry.
Programme Specific Outcomes (POs)	After completing this programme, Learner will
	1. Apply the specialized knowledge of textile science to find solution for complex scientific problems related to textile and apparel industry.
	2. Develop ability to test and assess quality parameters of various textile materials as per the global standards at testing laboratories.
	3. Gain knowledge in selection, identification of fibers, yarn and fabrics for various end uses.
	4. Develop eco-friendly textile products in support of environmental sustainability.

	5. Design solutions for industry needs considering the public health and safety, culture, society and the environment.
	6. Able to identify, formulate, review of research literature and analyze complex problems of textiles.
	7. Gain knowledge on technical textiles that will help students towards designing smart, innovative apparels for various applications from sportswear to protective clothing.
Eligibility Criteria for Programme	• Minimum 45% for students with B.Sc. Degree in Textile Science and Apparel Design, Fashion, Apparel Design, Dress Design etc. • Minimum 50% for students with B Design / Textile Design • Minimum 50% for students B. Sc. Composite Home Science, B.A. Home Science, B. Sc. General Home Science, B.Sc. Human Ecology and Consumer Studies, B. Sc. Family and Community Science who have completed minimum of 8 credits under semester pattern or 200 marks under annual pattern of courses related to Textile and Apparel Design. • B Voc. (Textile Design, Fashion Design, Apparel Design and related field) with 45% marks
Intake (For SNDT WU Departments and Conducted Colleges)	25

Master of Science in Textile Science and Apparel Design

SN	Courses	Type of Course	Credits	Marks	Int	Ext
	Semester I					
114811	Chemical Processing of Textiles (Th) (U)	Major (Core)	4	100	50	50
114822	Chemical Processing of Textiles (Pr) (C)	Major (Core)	4	100	50	50
114823	Garment Design and Construction (Pr) (C)	Major (Core)	4	100	50	50
114814	Global Costumes (Th) (C)	Major (Core)	2	50	50	0
124811	Sustainability in Textile and Apparel (Th) (U)	Major (Elective)	4	100	50	50
134811	Research Methodology (Th) (U)	Minor Stream (RM)	4	100	50	50
			22	**550**	**300**	**250**
	Semester II					
214811	Quality Control for Textile & Apparel (Th) (Pr) (U)	Major (Core)	(2+2) 4	100	50	50
214822	Garment Design through Draping (Pr) (C)	Major (Core)	4	100	50	50
214813	Apparel Merchandising (Th) (U)	Major (Core)	4	100	50	50
214824	International Embroideries and Paintings (Pr) (C)	Major (Core)	2	50	0	50
224821	Advance Fashion Illustration (Pr) (C)	Major (Elective)	4	100	50	50
244841	Internship (Pr) (U)	OJT	4	100	50	50
			22	**550**	**250**	**300**

Exit option (44 credit):

Post Graduate Diploma in Textile Science and Apparel Design

Year II

SN	Courses	Type of Course	Credits	Marks	Int	Ext
	Semester III					
314811	Technical Textiles (Th) (U)	Major (Core)	4	100	50	50
314812	Knitting Technology (Th) (U)	Major (Core)	4	100	50	50
314813	Research and Statistical Applications (Th)(Pr)(U)	Major (Core)	(2+2) 4	100	50	50
314824	Garment Production Technology (Pr) (C)	Major (Core)	2	50	0	50
324811	Garment Production Technology (Th) (C)	Major (Elective)	4	100	50	50
354831	Dissertation I (Pr) (U)	RP	4	100	50	50
			22	**550**	**250**	**300**
	Semester IV					
414811	Environmental aspects of Textile and Clothing (Th) (U)	Major (Core)	4	100	50	50
414812	Fabric Structures & Fabric Analysis (Th) (Pr) (U)	Major (Core)	(2+2) 4	100	50	50
414823	Project Work (Pr) (U)	Major (Core)	4	100	50	50
424851	Recent Advances in Textile Science & Apparel Design (Seminar) (C)	Major (Elective)	4	100	50	50
454831	Dissertation II (Pr) (U)	RP	6	150	100	50

Major (Core)

Course Title	**Chemical Processing of Textiles (Theory)** **(University Exam)**
Course Credits	4
Course Outcomes	After going through the course, learners will be able to
	1. Understand the need, significance and detailed various wet preparatory processes required to prepare the fabric for dyeing and printing of textiles.
	2. Analyze and Compare different methods for the preparatory processes.
	3. Know about various machineries used for various wet processes.
	4. Gain awareness of new advancements in the area of wet processes machineries.
	5. Develop awareness towards preservation of environment.
	6. Gather adequate knowledge of different pollutants, their sources, and their effects.
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Define polymers.
	2. Differentiate different extrusion techniques.
Content Outline	**Introduction** (In brief)
	Relevance of chemical processing in apparel performance
	Fibre Science:
	Unit 1: Polymers and their essential requirements to be fibres for apparel; Filament extrusion techniques in relation to fibre properties.
	Unit 2: Natural fibres such as cotton, wool, silk; Important features of their physical and chemical structure; Properties in relation to fabric/garment performance, Introduction to cultured fibres.
	Unit 3: Synthetic fibres such as polyester, nylon, acrylic, viscose,

	Tencel and polypropylene; Important features of their physical and chemical structure; Properties in relation to fabric/garment performance
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Understand importance of pre and post treatments
	2. Know about Performance of textile material
	3. Selection of dye class as per fiber
Content Outline	**Pre-treatment of textiles**
	A. Importance of pre-treatments B. Cotton: desizing, scouring, bleaching, Mercerization C. Wool: scouring, bleaching D. Silk: degumming, bleaching E. Synthetics: scouring, heat setting
	Colouration of Textiles
	Unit 1: Colour perception, Hue, Chroma, Saturation; Dyes and pigments; Application wise classification of dyes;
	Unit 2: Principles of dyeing and application of dyes a. Direct, Reactive, Vat on cotton, b. Disperse on polyester, c. Acid on wool and nylon, d. Basic on acrylic, silk, e. Natural dyes.
	Unit 3: Performance of dyed textiles; Fastness requirements for different end uses
	Unit 4: Printing of textiles: Principles of printing, Printing using dyes and pigments on different fibre fabrics; fixation of prints using various methods; Techniques of printing. After treatments like fixation by steaming/curing, soaping, washing,etc.
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Differentiate between finishes applied on textile.
	2. Auxiliaries used and its importance.
Content Outline	**Finishing of textiles**:

	Classification of finishes; Mechanical and assisted finishes and machines used for; Specialty Finishes like wrinkle free, durable press, flame retardant, water proof, soil & stain release, antibacterial.
	Classification of auxiliary chemicals used in textile processing; Properties of wetting agents, softeners, detergents, levelling agents, carriers, bleaching agents, thickeners, binders; Eco-friendly chemicals
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Develop awareness towards working of equipments.
	2. Know the machineries suitable for different processes.
Content Outline	**Introduction to equipment and machineries used in** **Processing**, such as kier/ J-box, winch, jigger, padding mangle, steamer, curing chamber, washing unit, jet dyeing
	Smart Textiles (Assignment to students)

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Smart Textiles
2. Equipment used as per process.
3. Report on Advance fibers

References:

Books

1. Sustainable Textiles: Life Cycle and Environmental Impact, Richard Blackburn, Wood head Pub.Ltd., 2009
2. Eco Textiles, Miraftab M. and Horrocks R., Wood head Pub.Ltd, Cambridge, 2007
3. Eco Textiles and Sustainability, K.Sangeetha, Laser Park Publishing House, 2017
4. Cook, J. Gordon, Hand Book of Textile Fibers, Merrow Publishing Co. Ltd, England. 1984
5. Lewin, M. and Sello, Stephen B., Handbook of Fiber Science and Technology, Vol. II, Chemical Process of Fibres and Fabrics, Functional Finishes Part A, 1983, Marcel Decker, Inc, NY and Basel.
6. Mark H., Wooding N.S. & Atlas Smeeds, Chemicals after Treatment of Textiles, 1970, John Wiley & Sons Inc., NY.
7. Marsh, J.T. An Introduction to Textile Finishing, 1979, B. I. Publications.
8. Moncrief R.W, Manmade Fibres, John Wiley & Sons New York.
9. Shenai V.A. and Mehra, R.H. Evaluation of Textile Chemicals 1984; Vol.VIII,

10. Shenai V.A. and Saraf, N.M., Chemistry of Organic Textile Chemicals- Sevak Pub
11. Shenai V.A. Chemistry of Dyes & Principles of Dyes 1987; Vol.III, Edition III, Sevak Pub
12. Shenai V.A. Textile Fibers 1990; Vol. I, Edition III, Sevak Pub
13. Shenai V.A. and Saraf, N.M. Technology of Finishing 1990,Vol. X.II Edition
14. Shenai V.A. Technology of Dyeing, Vol.I, Edition III, 1984, Sevak Pub.
15. Shenai, V.A. Technology of Dyeing, Vol. VI, 1988; Sevak Pub
16. Shenai V.A. Technology of Textile Processing, 1984, Vol. IX, Sevak Publication
17. Shenai.V.A Fundamental Principles of Textile Processing,1984; Vol. IX, I Edition, Sevak Pub
18. Trotman, E.R. Dyeing and Chemical Technology of Textile Fibers, 1975, Charles Griffino Company Ltd, London.

Online Contents

1 Textile Fibers https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=827
2 Natural Fibers https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=827
3 Natural Dyes and Mordents https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=827
4 Textile Finishing https://nptel.ac.in/courses/116102054/
5 Chemical Technology I – Web Course - https://nptel.ac.in/courses/103/107/103107082/
6 India Horti business on line. http:/www.agroindia.org/1HOL

Major (Core)

Course Title	**Chemical Processing of Textiles (Practical)** **(College exam)**
Course Credits	4
Course Outcomes	After going through the course, learners will be able to
	1. Acquainted with the polymers of which the textile fibres are made.
	2. Explain the principles of chemical processing i.e. from pretreatments process to finishing of textiles.
	3. Understand the fastness requirements of dyed materials.
	4. Importance and use of natural dyes.
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Perform fiber identification.
	2. Differentiate between pre treatments.
Content Outline	a. **Qualitative Identification of fibres** – Cotton, polyester, viscose, nylon, silk, wool and others by use of burning, microscopic, chemical tests.
	b. Pre treatments De-sizing, scouring and bleaching of grey cotton fabric
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Understand exhaust method of dyeing.
	2. Carry out dyeing on different materials.
	3. Carry out dyeing using different dye classes.
Content Outline	**Exhaust dyeing experiments:** • Dyeing of cotton with direct dye • Dyeing of cotton with reactive dye • Dyeing of wool, silk and nylon with acid dye • Dyeing of polyester with disperse dye by carrier method • Dyeing of acrylic with basic dye • Dyeing of a natural dye on wool using mordant **Dye identification**
Module 3 (Credit 1)	

Learning Outcomes	After learning the module, learners will be able to
	1. Differentiate between different styles of printing.
	2. Carry out printing on different materials.
	3. Carry out printing with different dye class.
Content Outline	**Direct style printing experiments:** • Printing on cotton with reactive dye/ • Printing of cotton with pigment/ • Printing of nylon with acid dye/ • Printing of polyester with disperse dye
	Discharge style printing experiments: White/ color discharge under direct dyed cotton
	Mechanical resist printing experiments: Batik style, tie & dye on cotton
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Apply finish on cotton material.
	2. Perform evaluation of applied finish.
Content Outline	**Finishing experiments:** • Application of starch on cotton and stiffness measurement • Application of resin finish/ soil resistance/flame retardant on cotton (pad-dry- cure) and crease recovery angle measurement of finished cotton

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. – Market survey for fibers available
2. – Visit to dyeing unit.

References:

Books

1. Sustainable Textiles: Life Cycle and Environmental Impact, Richard Blackburn, Wood head Pub.Ltd., 2009
2. Eco Textiles, Miraftab M. and Horrocks R., Wood head Pub.Ltd, Cambridge, 2007
3. Eco Textiles and Sustainability, K.Sangeetha, Laser Park Publishing House, 2017
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5. Mohanty, Chandramouli, Naik, Natural dyeing process of India, 1987, Ahmedabad, Calico Museum of Textiles.
6. Gulrajani M.L. and Gupta, D. Natural Dyes and their Application to Textiles, (1982), IIT Delhi.
7. India Horti business on line. http:/www.agroindia.org/1HOL
8. Lewin, M. and Selio, Stephen B., Handbook of fiber Science and Technology, Vol. II, Chemical Process of I and Fabrics, Functional Finishes Part A 1983 Marcel Deker, Inc, NY and Basel.
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19. Shenai,V.A. History of Textile Design, 1988, Sevak Pub
20. Shenai,V.A. Technology of Dyeing,1984, Vol.I, Edition III, Sevak Pub.
21. Shenai,V.A. Technology of Dyeing,1988; Vol. VI, Sevak Pub
22. Shenai,V.A. Textile Fibers,1990, Vol. I, Edition III, Sevak Pub
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6. India Horti business on line. http:/www.agroindia.org/1HOL
7. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=8x0nJkh/R0vHkX1U70Z/CQ
8. http://textlnfo.wordpress.com/2011/10/24/classification-of-textile-fibers-according/
9. https://nptel.ac.in/courses/116102026

Major (Core)

Course Title	**Garment Construction (Practical)** **(University Exam)**
Course Credits	4 (Pr)
Course Outcomes	After going through the course, learners will be able to
	1. Design and develop draft patterns for different garments based on body measurements and adaptations.
	2. handling different fabrics, embellishments and quality of finishing of garments.
	3. Understand quality control and commercial process used in Apparel Industry
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Draft , cut and stitch ethnic casual wear
	2. Draft , cut and stitch Ethnic party wear
Content Outline	▪ To develop and Grade Five Basic Bodice blocks (Bodice front and back, sleeve, skirt front and back) ▪ Design and Construct garments using following theme Casual Ethnic wear • Salwar / Chudidar/ palazzo/ straight pant • Kurta ▪ Design and Construct garments using following theme Ethnic Party wear
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Design and cut indo- western outfit.
	2. Stitch and finish indo- western outfit.
Content Outline	Design and Construct Western or Indo -Western outfit • Trousers and Top or • Skirt and Top or • Dress
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Develop, Design and Grade commercial paper pattern.
	2. Construct a garment using commercial paper pattern.
Content Outline	To construct a garment using commercial pattern
Module 4 (Credit 1)	

Learning Outcomes	After learning the module, learners will be able to
	1. Understand drafting and cutting of gents garments.
	2. Understand stitching and finishing of gents garments
Content Outline	Demonstration of cutting and stitching of gent's shirt or trouser by a professional tailor and Visit to a Readymade industry • (Construction details, machinery and Quality Control to be explained to the students who have to submit a report on the same)

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Visit to any apparel production unit/Boutique
2. Innovative use of any traditional textile of India for garment construction

References:

1 Brackman, Helen L. 1965. Theory of Fashion Design, New York John Wiley & Sons
2 Helen Joseph, Armstrong. 2007. Draping for Apparel Design – Fairchild Publication, New York
3 Hilde Jaffe and Norie Relis. 1994.Draping for Dress Design (4th ed.) – Pearson Prentice Hall, New Jersey
4 Hill House M.S. & Mansfield E.A.,1944. Dress Design – Draping & Flat Pattern London
5 Natalie Bray. 2003. Dress Fitting (2nd Ed.) Blackwell Science
6 Natalie Bray.2003. More Dress Pattern Designing (4th Ed.) Blackwell Science
7 Nora Mac Donald, 2009. Prentice Hall, Principles of Flat Pattern Design (2nd Ed.) NewJersey
8 Popin, Harriet,1945. Modern Pattern Design, New York
9. Sheldon Maratha Gene. A974. Design through Draping, U.S.A. Burgers Publishing Company
10. Strickland Gertude, 2012.A Tailoring Manual, New York, Macmillan Company.
11. Adele P., 2019.The complete book of Tailoring, Margolis
12. David J. Tyler. 1991. Material Management in Clothing Production
13. Gerry Cooklin, 1991.Pattern Grading for children's/ womens'/ men's clothing technology of sizing. Oxford B.S.P. PROFESSIONAL BOOKS, London
14. Gerry Cooklin, 2012. Garment Technology for Fashion Designers, Blackwell Science Ltd.
15. Winifred Aldrich. 1987. Metric Pattern Cutting for children's wear (2-14years) 2nd edition
16. Winifred Aldrich. 1996. Metric Pattern Cutting for men's wear 3rd edition
17. Winifred Aldrich. 1996. Metric Pattern Cutting for women's wear 3rd edition

Online Content

1. https://www.youtube.com/watch?v=lB9n4KFTRmE
2. https://textilelearner.net/drafting-of-mens-short-sleeve-shirt/
3. https://www.academia.edu/27656962/PERSONAL_BASIC_PATTERN_MAKING_BLOCKS

4. https://cbseacademic.nic.in/web_material/publication/cbse/41BasicPatternDevelopment-XII.pdf
5. https://www.clothingpatterns101.com/pattern-grading.html
6. https://www.onlineclothingstudy.com/2020/07/basics-of-pattern-grading.html

Major (Core)

Course Title	**Quality Control for Textile and Apparel** **(Theory & Practical) (University Exam)**
Course Credits	(2 + 2) Th/ Pr 4 credit
Course Outcomes	After going through the course, learners will be able to
	1. Develop an understanding of methods and techniques used to analyse textile fibers, yarns and fabrics for end use performance
	2. acquire knowledge and understanding of various structural properties of textiles and relate them to end use fabric performance and product
	3. familiarize with the different testing equipment's, their underlying principles and the international accepted standards, test methods and the language of measurement
	4. able to analyze and interpret the results and predict the general textile behavior performance
	5. To develop understanding of the importance of quality control in textile testing
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	3. Identification of fibers and develop an understanding of importance of Textile Testing and analysis,
	2. Acquire knowledge national and international organizations involved in textile testing, fiber dimensions and yarn testing
Content Outline	**Introduction** Unit 1: Importance of Textile Testing and analysis, objectives (reasons) of textile testing, uses of Testing information, Factors influencing Quality Control Unit 2: Sampling, terms used in sampling, fiber sampling, yarn sampling, fabric sampling Unit 3: Development of standard test methods, national and international organizations involved in textile testing, ISO Stds. and ISO – Series Unit 4: Precision and accuracy of testing methods, atmospheric conditions for textile testing, temperature and humidity, measurement of humidity and moisture in textiles

	Fiber Test Unit 1: Fiber Fineness, Methods of measuring fiber. Unit 2: Fiber length, methods of measuring fiber length Unit 3: Fiber strength – Single fiber method, Bundle strength method **Yarn Test** Unit 1: Linear Density – Direct & Indirect system, folded yarns, methods of measuring linear density of yarns from packages and skeins and from a fabric sample Unit 2: Yarn Crimp Unit 3: Yarn Twist – Level of twist and twist factor methods of measuring twist, yarn evenness and methods of assessing evenness Unit 4: Yarn strength – Single strand method skein method, count strength product (CSP)
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Carry out Testing and Evaluation of Fabric and Garment
	2. Analyze and interpret the results of fabric and garment testing's
Content Outline	**Fabric and Garment Test** **Unit 1: Fabric and Seam Strength** Terminologies and definitions like force units, Breaking strength and Tensile strength, Stress, specific stress, Tenacity, Elongation, Strain, Extension, Extension percentage, Gauge length, Elastic recovery, Force and elongation curve • Tensile Strength: Factors affecting tensile testing, fabric characteristics affecting tensile properties, tensile testing machines and their working principles • Breaking strength – Ravelled strip method, Cut strip method and Grab method • Tearing Strength – Tongue tear test, Trapezoid method, Elmendorf tear test • Bursting strength – Hydraulic / Diaphragm bursting test • Seam strength and yarn slippage in woven fabrics at seams, seam slippage tests for woven and upholstery fabrics, needle cutting in a fabric, sew ability of fabrics and seam efficiency. **Unit 2: Fabric Stiffness, Handle and Drape -** • Fabric Stiffness and Handle – definitions, methods of measuring fabric • stiffness - Shirley stiffness test, Hanging loop method Drape – definitions, methods of measuring fabric drape – drape meter • Crease Resistance and Crease Recovery – definitions of terms, advantages of giving resin treatment to fabrics, fabric characteristics affecting wrinkle resistance, methods of measuring crease recovery – Total test, Shirley crease recovery

	test, • visual comparison method i) Kawabata Evaluation system (KES) for fabrics ii) Fabric Assurance by Simple Testing (FAST) system. **Unit 3: Fabric / Garment Serviceability –** • Definitions of terms – serviceability, wear durability Snagging – definition, methods for testing snag resistance of fabric • Pilling – definition, causes of pilling, stages in formation of pilling, remedies for reducing pilling, methods for testing pilling resistance of fabrics – brush and sponge pilling test, random tumble pilling test • Abrasion – definition, types of abrasion, properties affecting abrasion resistance, Common abrasion instruments and methods used for evaluating abrasion method, flexing and abrasion method, rotary platform method, Accelerator method, edge and fold abrasion method (all in brief), assessment of abraded sample **Unit 4: Wear Comfort of Clothing –** Air Permeability – definitions, air resistance, air porosity, fabric properties and air permeability, methods for measuring air permeability of fabrics - Shirley air permeability tester, Gurley Densometer, Frazier air flow tester **Unit 5: Water Absorption and Water Repellency of Fabrics –** • Water absorption, methods of measuring amount of water absorbed – static Immersion test • Wettability of fabrics – definition, methods used or testing wettability of fabrics • Sinking time test of fabrics • Definitions of waterproof shower proof, water repellent fabrics. • Methods for measuring the water repellency of fabrics – Spray test, Bundesmann test, Drop Penetration test, WIRA shower test, Hydrostatic head test **Unit 6: Dimensional Stability** – Definition, Types of Shrinkage – Relaxation, Swelling, Felting, Thermal / Contraction, growth shrinkage in knits Methods used for evaluating dimensional change in fabrics and garments, dimensional change in washing and drying conditions in home laundering, commercial laundering Dimensional Restoration of Fabrics Durable press evaluation of Fabrics and Apparel **Unit 7: Colour Fastness** – Introduction, colour fastness test methods to washing, dry cleaning, light, crocking, perspiration, heat (hot pressing)
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	3. Carry out Physical yarn testing like linear density, crimp, twist, evenness, strength etc.

	4. Analyze and define various physical parameters of yarn testing.
Content Outline	**Practical** **Yarn Testing** • Measuring linear density of yarn from yarn package (skein method), • Yarn Crimp in woven fabrics • Yarn twist – i) Single spun yarn and ply yarn, ii) twist factor • Yarn evenness • Yarn strength test – i) Single strand test and ii) skein / lea strength test and CSP
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Carry out physical fabric testing Fabric Strength Tests like Breaking force and Elongation, Tearing Strength, Bursting Strength and Seam Strength test
	2 Carry out Evaluation of fabric handle tests Fabric / Garment Serviceability tests, colour fastness tests.
Content Outline	**Practical** **Fabric and Garment Testing** **Strength Properties of Textile and Apparels –** i) Fabric Strength Tests – • Breaking force and Elongation of fabrics • (Strip and grab test) • Tearing Strength of woven and non-woven fabrics • Bursting Strength of knitted fabrics. ii) Seam Strength test for woven and knit fabrics- Resistance to Slippage of yarns in woven fabrics using a std. seam Failure in sewn seams of woven and knit fabrics **Evaluation of fabric handle –** • Fabric Stiffness (bending length) • Fabric Drape • Crease recovery – o Recovery angle method o Appearance method. • Fabric / Garment Serviceability – • Pilling Test • Abrasion Test • Air Permeability • Thickness Test – i) Woven and Knit fabrics • Fabric Count and Cover factor - Woven Fabrics • Fabric Count (wales and courses / inch) and Stitch

	• Mass / unit area (weight) of woven fabrics • Fabric Density Ends & Picks • Evaluation of Color fastness of dyed fabrics / apparels to – Artificial Light • Crocking • Perspiration • Washing in launder meter • Heat: Hot Pressing • UV protection and UV resistance

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

3. Visit to textile testing organization.
4. Report writing on recent developments in textile testing.

References

1. Billie J. Collier and Helen E. Epps.1998. Textile Testing and Analysis, Prentice Hall, New Jersey
2. Brackenbury Terry. 2013. Knitted Clothing Technology, Blackwell Science Ltd.
3. George Stylios. 1991. Textile Objective Measurement Automation in Garment Manufacture, Ellis Horwood Ltd, England
4. Groover and Hamby.2011. Handbook of Textile Testing and Quality Control
5. J. E. Booth.1968. Principles of Textile Testing, Newness Butterworth, London.
6. John H. Skinkle. 1949. Brooklyn, Textile Testing, New York.
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8. Textile Testing & Quality Control Standards like – BIS, BS, ASTM, ISO, AATCC, etc.
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Major (Core)

Course Title	**Garment Design through Draping (Practical)** **(College Exam)**
Course Credits	4 Pr
Course Outcomes	After going through the course, learners will be able to
	4. Draping of foundation on dress form: basic bodice, basic skirt and basic sleeve
	5. Dart variations, tucks, pleats and gathers
	6. Neckline, bodice yolk and waist line variations
	7. Princes lines, cowels and its variations
	8. Variations of skirts, collars and sleeves
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	4. Acquire knowledge about dress form, draping tools and equipment's.
	2. Prepare of muslin for draping and draping of foundation on dress form.
Content Outline	a) Introduction to dress form, draping tools and equipment required (including pressing equipment for draping) b) Preparation of muslin for draping – grain, tearing, pressing, seam allowance c) Draping of foundation on dress form • Basic Bodice (Front & Back) – Preparation of muslin, shaping steps, marking, truing, check fitting • Basic Skirt (Front & Back) – Preparation of muslin, shaping steps, marking, truing, check fitting of the finished skirt • Basic Sleeve (Front & Back) – Preparation of muslin, shaping steps, marking, truing, check fitting
Module 2 (Credit 1)	
Learning Outcomes *(Specific related to the module.. e.g. Define, Differentiate, Carry out, Design, etc. …)*	After learning the module, learners will be able to
	5. Drape dart variations on drape form.
	6. drape Tucks, pleats, gathers and Neckline variation, Bodice yoke variations, Waistline variations and Princess line Bodice. 7. Drape cowl on dress form.

Content Outline	A. Dart variation using basic (front) • Waistline dart, French dart, side seam dart, armhole dart, flange dart, shoulder dart, neckline dart, bust line (center front) dart, combination of any 2 darts (one pattern) • Sewing and Pressing darts B. Tucks, pleats and gathers – one pattern each C. Neckline variation (front) • draping of various necklines using style tape (back) – lower back neckline (one pattern) • Halter – Preparation of muslin and draping steps for different halter variations, checking the fit D. Bodice yoke variations E. Waistline variations F. Princess line Bodice – Variations – Preparation for muslin for front and back, draping steps for front and back, check the fit G. Cowls i) Basic cowls – preparation of fabric, draping steps, checking the fit ii) Cowl variation – draped, pleated, gathered
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Drape various types of skirts on drape form.
Content Outline	Skirts – Variations like (any three) a) One-piece basic skirt with darts b) Eased / A-line skirt c) Flare skirt d) Skirt with hip yoke e) Circular skirt f) Wrap skirt g) Tiered skirt h) Any other
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Drape various types of collars on drape form.
Content Outline	• Collars - a) Open / Convertible collar b) Mandarin collar c) Sailor collar d) Turtle neck e) Any other

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

5. To drape and stitch shaped one-piece dress or two-piece dress
6. To develop using draping method Basic body (Torso foundation) for Knitted Tops (like T-Shirts or Camisoles using cotton knit or any other fibre type fabric)
7. Freehand draping
8. Avant-garde
9. Draping styles and video
10. Sustainable Apparel

References

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2. Helen Joseph, Armstrong, Draping for Apparel Design – Fairchild Publication, New York
3. Hilde Jaffe and Norie Relis, Draping for Dress Design (4th ed.) – Pearson Prentice Hall, New Jersey
4. Hill House M.S. & Mansfield E.A., Dress Design – Draping & Flat Pattern London
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6. Natalie Bray, More Dress Pattern Designing (4th Ed.) Blackwell Science
7. Nora Mac Donald – Prentice Hall, Principles of Flat Pattern Design (2nd Ed.) New Jersey
8. Popin, Harriet, Modern Pattern Design, New York
9. Sheldon Maratha Gene, Design through Draping, U.S.A. Burgers Publishing Company
10. Strickland Gertude, A Tailoring Manual, New York, Macmillan Company

Major (Core)

Course Title	**Apparel Merchandising (Theory)** **(University Exam)**
Course Credits	4 (Th)
Course Outcomes	After going through course, learners will be able to 1. Students will able to get knowledge about fashion marketing & merchandising. 2. students will able to understand the concept of markets, consumers, marketing. 3. students will able to select the material and costing of goods.
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Students will able to differentiate between marketing and merchandising.
	2. Students will able to know about different kinds of marketing & merchandising techniques.
	3. Students will able to identify different types of window display & lighting techniques.
Content Outline	• Principles of Marketing • Functions of Fashion Merchandising & Marketing • Role of Merchandiser in Apparel Industry • Merchandising in Apparel Industry & Merchandising Concepts & Terminology • Visual Merchandising & Store Image • Elements of Merchandise Display • Types of Window Display • Lighting Techniques & Visual Presentation
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Students will be able to know about apparel production process.
	2. Students will be able to analyse current fashion trends in the marketplace.
	3. Students will able to gain knowledge about fashion buying process.
	4. Students will able to understand the vendors selection process.
Content Outline	• Apparel Production & Quality Management • Fashion Buying • Role of Fashion Buyer • Predicting Fashion Trends • Fabric and Garment Sourcing and Digital Sourcing • Working With Vendors
Module 3 (Credit 1)	

Learning Outcomes	After learning the module, learners will be able to
	1. Students will able to develop a product line.
	2. Students will able to understand the role of PPC in apparel industry.
	3. Students will able to analyse and select the resources.
Content Outline	• Production, Planning & Control • The Fashion Merchandising Assortment Plan • Working with Budget. • Analysing And Selecting Resources.
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Students will able to understand the concept of apparel costing.
	2. Students will able to identify the different types of discounts.
	3. Students will able to understand negotiation skills.
Content Outline	• Apparel Costing • Definition of Cost & Other Common Terms. • Discounts-Types • Negotiations & Specifications with Vendors and Customers

Assignments/ Activities towards Comprehensive Continuous Evaluation

(CCE)

1. Power point presentations
2. Quiz
3. Industry visits
4. Activity: window display
5. Assignment: How to improve digitalization in merchandising (Group Discussion)

References

1. Chapman, S. N. (2006). *Fundamentals of Production, Planning & Control*. South Asia: Dorling Kindersley (India) Pvt. Ltd. and Pearson Education.
2. Krishnakumar, M. (2011). *Apparel Coasting- A Functional Approach.* Abhishek Publication.
3. Morgan, T. (2016). *Visual Merchandising- Window & in Store Displays for Retail* (3rd ed.). Laurence King.
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8. Wolfe, M. G. (2013). *Fashion Marketing and Merchandising*. Goodheart-Willcox Company, Incorporated.

Major (Core)

Course Title	**International Embroideries and Paintings (Practical) (College Exam)**
Course Credits	2 (Pr)
Course Outcomes	After going through course, learners will be able to 1. Students will able to gain knowledge of significant development in the production of textile in the world. 2. Students will able to understand the International Embroideries and Textiles of historical significance that influenced other cultures and civilizations. 3. Students will able to focus on design details, creation of styles and accessories inspired from traditional motifs till the present. 4. Students will able to identify international painted textiles.
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Students will able to develop a sound attitude and interest regarding embroidery, styles and patterns of international Embroideries.
	2. Students will able to identify the different stitches and colour combinations used in international embroideries.
	3. Students will able to develop products with the help of various embroidery stitches.
Content Outline	Introduction to International Embroidery with respect to History, Motifs, Colors combinations and its application area: Countries with traditional embroideries 1. Ukraine- Ukrainian embroidery 2. Palestine- Tatreez and Tahriri 3. Tunisia- Tunisian embroidery 4. Serbia- Serbian embroidery 5. Japan- Sashiko 6. Spain: Spanish embroidery 7. Brazil: Brazilian embroidery 8. Turkish: gold thread work 9. Bulgaria: Bulgarian folk art 10. France: France Knot 11. England: Spider/Crewel embroidery 12. India: Kutch and Chikankari
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Students will able to develop a sound attitude and

	interest regarding embroidery, styles and patterns of international paintings.
	2. Students will able to identify different types of paintings around the world.
	3. Students will able to develop the products with the help of using various painting techniques.
Content Outline	• International Painted textiles with respect to their origin, styles, Motifs used and Color combinations. Countries of Origin: 1. Japan: Guohua 2. China: Bamboo Painting 3. India: Kalamkaari/Madhubani 4. Egypt: Egypt art 5. Persia: Paisley's motifs

Assignments/ Activities towards Comprehensive Continuous Evaluation

(CCE)

1. Product development by using Traditional Embroideries.
2. Product development by using Traditional Paintings.

References

1. Bah, S. (2015). *Madhubani Art*. Museum of Sacred Art.
2. Carr, H & Pomeroy, J (2006). *Fashion Design and Product Development*. Blackwell Science Ltd, Carsington road, Oxford UK.
3. Dhamija, J. (2004). *Asian Embroidery*. Abhinav Publications.
4. Gray, J. G. (2009). *Traditional Japanese Embroidery*. Wellwood, north farm Rd., Tunbridge wells, Kent: Search Press Limited.
5. Liao, B. (2002). *Traditional Painting- Culture of China*. Foreign Languages Press.
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10. Tyagi, A. (2008). *Let's Know Handicrafts of India*. U.K.: ibs Books.
11. Wyszynski L. (2012). *The Complete Photo Guide to Needlework*. Creative.

Major (Elective)

Course Title	**Advance Fashion Illustration (Practical)** **(College Exam)**
Course Credits	4 (Pr)
Course Outcomes	After going through course, learners will be able to
	1. Students will able to focus on design details, creation of styles and rendering techniques using different media and themes.
	2. Students will able to interpret and analyze forecast trends to design fashion communication in sync with the forecast.
	3. Students will able to understand the importance of forecasting in creating a fashion communication campaign for the forthcoming fashion collections.
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to 1. Students will able to draw fashion figures by understanding body proportion.
	2. Students will able to enhance their rendering skills using different color medium.
	3. Students will able to
Content Outline	**Sketching of different action croquis (front, back and side view) Manual/CAD** Basic Rendering Techniques: - Colour matching using different mediums Stripes, Checks, gingham and plaids Patterns and textures, reducing a print, Shading.
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Students will able to draw different necklines, collars, sleeves, etc.
	2. Students will able to explore and design different types of garments such as, skirts, pant, blouse, etc. according to market trends.
Content Outline	**Sketching of Garments and Garments Details (Manual/ CAD): -** 1. Necklines and collars

	2. Sleeves details 3. Skirts and pants 4. Blouses, coats and jackets 5. Pleats, cowls and cascades 6. Yokes and underskirts Sketching of Accessories: - • Hats and headgears • Footwear Bags and purses • Jewellery Any other accessories
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Students will able to explore different fashion accessories and footwear
	2. Students will able to develop an approach towards ideation.
	3. Students will able to develop different wears using garments details.
Content Outline	**Sketching of 6 theme wear using following (Manual/CAD)** 1. Necklines and collars 2. Sleeves details 3. Skirts and pants 4. Blouses, coats and jackets 5. Pleats, cowls and cascades 6. Yokes and underskirts 7. Hats and headgears 8. Footwear Bags and purses 9. Jewellery Any other accessories
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to 1. Students will able to gain knowledge about different theme required in the field of fashion.
	2. Students will able to draw different clothing line base on selected or particular themes
	3. Students will able to conceptualize their ideas of different accessories with the garments
Content Outline	Based on fashion forecast, develop a mood board and colour board and design a line of 6 ensembles for women's wear – with reference to Sourcing of raw materials • Developing line based on the fabric and theme selected • Spec sheet study • Sampling • Garment analysis • Costing – construction of garments • Line presentation

	• Use of sale promotion material

Assignments:

Development of one theme based design apparel along with accessories.

References:

1. Abling Bina, Fashion Sketchbook 2023, 8th edition, Fairchild Publishers, New York.
2. Anna Kiper, Fashion Illustration: Inspiration and Techniques, 2016, David and Charles.
3. David Downtan, Master of Fashion Illustration 2012, Laurence King Publication.
4. Gwyneth Holland, Rae Jones, Fashion Trend Forecasting 2017, Laurance King Publishing.
5. Harold Carr, John Ponery, Fashion Design and Product Development 2009, Willy India Pvt. Ltd.
6. Holly Nichol, Modern Fashion Illustration 2021, centennial books.
7. Lorynn R. Divita, Fashion Forecating 2015, Fairchild book.
8. Stuart Mckenzie, Creative Fashion Ilustration 2020, Bloomsbury Publishing.
9. Zeshu Takamura, Fashion Illustration Techniques: Super Reference Book for Biginners 2012, packport Publisher.

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Course outcomes

Learners will be able to

- Improve their master professional soft skills such as communication, punctuality and time management.
- Practice and improve their industry skills while also learning how to work.
- Start to build a professional network that can be a resource for the student.

Major (Core)

Course Title	**Global Costume (Theory)** **(College Exam)**
Course Credits	2 (Th)
Course Outcomes	After going through course, learners will be able to 1. Students will able to understand the significant development in production of textiles in the World.
	2. Students will able to develop sound attitude and interest regarding styles and patterns of costumes of India.
	3. Students will able to focus on design details, creation of styles and accessories used from the ancient period till present century.
	4. Student will able to identify the clothing styles from 3000 BC till 21st century.
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to 4. Students will able to identify the costumes to its nationality.
	5. Students will able to understand the Fabric, techniques and drapes of costumes.
	6. Students will able to understand the importance of textile in historical prospectives.
Content Outline	**History of Fashion from 18th Century till date** Couture: - • France • Italy • England • America • Japan • India **Importance of textiles in historical perspective** Early Fibber's and their products, their use in early civilization: - • India – • China • Egypt • Persia • Crete • Greek • Rome • Peru **Costume in ancient civilization:**

	Emphasize on fabric, Garment features, Use of colour and decoration. Accessories used in costumes with reference to design, material, colour, texture and suitability: - • Indian • Egyptian • Greek • Roman **Couture from 18th century till date: -** • France • Italy • England • American • Japanese • Indian
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Students will able to understand concept of couture.
	2. Students will able to understand the changes happen in clothing style from 3000 BC till 21st century.
	3. Students will able to develop fashion garments inspired by different eras.
Content Outline	**Changes happened in clothing style from 3000 BC till 21st century:** **Modern Age:** • Renaissance Fashion • Spanish Fashion • Netherland Fashion • Rhineland Fashion • Rococo Fashion • English Fashion **Present Day:** • 20th century ➢ 1900-1950 ➢ 1951-2000 • 21st century ➢ 2000-2010 ➢ 2011-2020

Assignment:

1. Costume of stage
2. Digital documentation on traditional textiles.

References:

1. Amy Da La Haye, James Laver, Costumes and Fashion: A concise History 2012, Thames and Hudson.
2. Bonnie English, A Cultural History of Fashion in the 20th and 21st Centuries, 2nd edition 2018, Bloomsbury Visual Arts.

3. Bonnie English, Iarin R. Webb, the Little Book of Big Ideas Fashion 2009, A & C Black.
4. Daniel Delis Hill, History of world Costume and Fashion 2007, Pearon.
5. Gini Stephens Frings, Fashion from Concept to Consumer, 2002, Prentice Hall N. Jersy Inc.
6. Janet Harney, Traditional Textiles of Central Asia 2009, Thames & Hudson.
7. John Gillow, Bryan Sentance, World Textiles 2005, Thames & Hudson.
8. Owen Jones, the ferment of ornament 2001, Gardners Book.
9. Roshen Alkazi, Ancient India Costume 2011, 1st edition NBT.
10. Ritu Kumar, Costume and Textile of Royal Insia 2006. Riu Kumar.
11. Sheila Paine, Embroidered Textiles: A World Guide to Traditional Ptterns 2010, Thames & Hadson.
12. Vandana Bhandari, Costumes, Fashion & Jewellery of India 2005, Mercury Books.

Major **(Elective)**

Course Title	**Sustainability in Textiles and Apparels (Theory)** **(University Exam)**

Course Credits	4
Course Outcomes	After going through the course, learners will be able to
	1. Know about the ecological aspects affected by textile coloration process.
	2. Effective ways to reduce textile waste
	3. Understand the different types of waste outputs from the textile industry and their management techniques.
	4. Analyze eco standards
	5 create awareness about slow fashion
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1 Understand the importance of Ecology and Structure of Eco system.
	2 Apply various techniques to extract the natural fibers for making eco textiles.
	3 Extract and apply natural dyes and finishes for eco textiles.
	4 Gain knowledge on Eco testing and Eco standards.
	5 Gain knowledge on Sustainability concepts.
Content Outline	**Eco-Textiles** Introduction & needs for eco-textiles & its importance. Ecology - Production ecology, Human ecology & Disposal ecology. Structure and stability of the ecosystem. Toxicology of textile dyes. German ban on toxic dyes, chemicals and auxiliaries
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Apply different eco standards.
	2. Evaluate connection between supply, demand and sustainability.

	3. Define the term sustainability.
	4. Analyze sustainable future.
	5. Study about eco auditing.
Content Outline	**Eco Standards for Textiles and Sustainability** Eco Standards for Textile. Eco-Auditing and Eco-labelling, Eco mark on textiles. Sustainability - definition, history, importance, primary goals, concepts, principles and dimensions, textiles circular and linear economy, Recycling of textiles, The connection between supply, demand and sustainability, a sustainable future.
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1 Gain knowledge about clothing care.
	2 Know about various processes in maintenance of clothing.
	3 Evaluating the best method for clothing maintenance.
	4 Create sustainable method for caring the wardrobe.
	5 Study about the packing of textiles.
Content Outline	**Unit 1 Sustainable Clothing Care** Green cleaning: ozone laundering, ultrasonic cleaning. Eco-friendly detergents and chemicals for sustainable clothing care. Hand vs. machine wash, wash cycles in washing machines, Energy efficiency of washing machines and dryers. Water and carbon footprint of clothing care.
	Unit:2 Green Consumerism Green consumerism and waste reduction, consumer responsibility towards sustainable fashion. 3Rs – Reduce, Reuse and Recycle
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to

	1 Understand sustainability of fashion industry.
	2 Analyze ethical fashion.
	3 Analyze eco-textiles and eco-friendly fashion labels.
	4 Evaluate sustainable fashion products.
	5 Create upcycled / down cycled products.
Content Outline	**Unit:1 Sustainability in Fashion** Introduction: Fashion, Sustainability, Pillars of sustainability, Sustainable fashion – meaning and importance.
	Unit:2 Responsible Fashion Concepts of recycling and upcycling. Carbon footprint, water footprint and energy consumption of fashion industry.
	Unit:3 Sustainable Fashion Brands and Labels Sustainable fashion designers, sustainable fashion brands, Eco-friendly fashion labels ,post life cycle

Assignments/Activities

1 Visit to industry
2 Eco fibers collection/ market survey
3 Report on sustainability of Fashion industry.
4 Create upcycled / down cycled products

Reference

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1 Eco Textiles and Sustainability, K. Sangeetha, Laser Park Publishing House, 2017
2 Sustainable Textiles: Life Cycle and Environmental Impact, Richard Blackburn, Wood head Pub.Ltd., 2009
3 Eco Textiles, Miraftab M. and Horrocks R., Wood head Pub.Ltd, Cambridge, 2007
4 Care and Maintenance of Textile Products Including Apparel and Protective Clothing Rajkishore Nayak, Saminathan Ratnapandian, Textile Institute Professional Publications, 2018
5 Household Textile & Laundry Work, Durga Deulkar, 2011
6 Fundamentals of Textiles and their Care, Dantyagi, 1996
7 Sustainable Fashion Handbook, Black, S, Thames and Hudson, 2013.
8 Re-Fashioned- Cutting Edge Clothing from Upcycled Materials, Brown S, Lawrence King Publishing, 2013.
9 Fashion and Sustainability-Design for Change, Fletcher K, Lawrence King Publishing, 2012.

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11. The Impact and Prospects of Green Chemistry For Textile, Shahid UI-Islam, Bhupendra Singh Butola, Elsevier, 2018
12. Environmental Aspects of Textile Dyeing, Christier.M., Woodhead Pub. Ltd, Cambridge, 2007
13. Bio-Textiles as Medical Implants, M W King, B S Gupta, Rguidoin, Woodhead Publishing, 2013
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15. Field Guide to Stains: How to Identify and Remove Virtually Every Stain Known to Man Book by Melissa Wagner, Nancy Armstrong, and Virginia M. Friedman, 2002
16. Laundry: The Home Comforts Book of Caring for Clothes and Linens, Cheryl Mendelson, 2010
17. Care Labeling in Garments, R.Senthil kumar, 2016
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19. Cut up Couture- Edgy Upcycled Garments to Sew, Yamase K, Interweave, 2012.
20. Sustainable Fashion and Textiles- A Design Journey, Fletcher K, Lawrence King Publishing, 2008.
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2 Natural Fibers https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=827
3 Natural Dyes and Mordents
https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=827
4 Textile Finishing https://nptel.ac.in/courses/116102054/
5 Standards and Specifications, Eco Standards
https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=827
6 Chemical Technology I – Web Course -
https://nptel.ac.in/courses/103/107/103107082/
7 Water Supply Engineering https://nptel.ac.in/courses/105/105/105105201/
8 https://www.coursera.org/learn/sustainable-fashion
9 https://www.edx.org/course/circular-fashion-in-a-sustainable-clothingindustry
10 https://www.my-mooc.com/en/mooc/sustainable-fashion/
11 https://www.sustainablefashionmatterz.com/what-is-sustainable-fashion

Minor Stream (RM)

Course Title	**Research Methodology (Theory)** **(University Exam)**
Course Credits	4 (Th)
Course Outcomes	After learning the module, learners will be able to -
	1. Develop a scientific approach and know the processes of research
	2. Develop the competence for selecting methods and tools appropriate for research topics
	3. Understand concepts of statistical measures of central tendency, dispersion, variability and probability
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to -
	1. Understand process of research and its relationship to knowledge and science. 2. Identify research process based on actual researches conducted. 3. Recognise process of research problem formulation.
Content Outline	**The Research Process** a. Scientific approach to enquiry in comparison to native, common sense approach b. Knowledge, theory and research c. Role, need and scope of research in the discipline of Home Science **Assignment**: *Differentiate between investigative reporting and research report (with examples to be brought by students as exercise)* **Steps in Research Process and Elements of Research** a. Identifying interest areas and prioritizing Selection of topic and considerations in selection b. Review of related literature and research c. Variables- types of variables including discrete and continuous variables Conceptual definitions and operational definitions d. Concepts, hypotheses and theories e Hypothesis- meaning, attributes of a sound hypothesis, Stating the hypothesis and types of hypothesis Hypothesis testing**-** null hypothesis, sample distribution, level of significance, critical regions, Type I and Type II errors f. Research Design Research questions, objectives and assumptions **Ethics in Research**
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to -

	1. Understand and apply different types of research procedures. 2. Able to design research studies by knowing methods of research.
Content Outline	**Types of Research** a. Basic and Applied research, Qualitative and Quantitative research (brief review of differences) b. Historical research c. Descriptive research methods – survey, case study, correlational study, content analysis, causal-comparative research d. Analytic studies- pre-experimental, experimental research, quasi experimental research e. Qualitative research, Ethnography f. Evaluative research- general characteristics, use of qualitative methods in enquiry Scope and importance in Home Science.
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to - 1. Understand different techniques of sampling. 2. Apply sampling procedures for specific research problems.
Content Outline	**Sampling** a. Rationale, characteristics- meaning, concept of population and sample, and utility b. Types of sampling and generalizability of results c. Probability sampling - simple random sample, systematic random sample, stratified random sampling etc - random and non-random samples, random numbers and use d.. Non-probability sampling - purposive samples, incidental samples, quota samples, snowball samples e.. General consideration in determination of sample size
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to - 3. Know different tools of data collection. 4. Design different tools of data collection.
Content Outline	**Tools for Data Collection** a. Primary and secondary methods of data collection b. Different types of questionnaires, rating scales, check lists, schedules, attitude scales, inventories, standardized tests, interviews, observation c. Development of tools, estimation of reliability and validity of tools d. Procedure for preparation of the tool, administration of tools for data collection e. Procedure for data collection f. Planning for data analysis-coding of responses

Assignments:

- Recognize different Types of variables.
- Hypothesis formations and research questions from Research readings – students identify hypothesis/research questions – Discussion
- Construction of tools for data collection a) types of questions b) Questionnaire c) interview schedule d) observation d) scales

- For a given topic student to frame and discuss the different possibilities of methods and tools
- Differentiate between (a) basic and applied research (Exercise to be based on actual research papers published in accredited journals) (b) qualitative and quantitative research
- Based on Journal contents undertake a critical appraisal of studies/research papers and discuss types of Research with examples.

References:

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