SEMESTER 1st		Contact Hrs. 32			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MFTE1-101	Structure and Properties of Fibres, Fabrics and Garments	3	1	0	40	60	100	4
MFTE1-102	Modern Technology of Fabric and Apparel Production	3	1	0	40	60	100	4
MFTE1-103	Advanced Textile & Garment Designing Concepts	3	1	0	40	60	100	4
MFTE1-104	Apparel Testing and Quality Characterisation	3	1	0	40	60	100	4
Department Elective-1		3	1	0	40	60	100	4
MFTE1-156	Fashion Design Concepts							
MFTE1-157	High Performance Fibres							
MFTE1-158	Theory and Design of Garment Machinery							
MFTE1-159	Fabrics Properties and Textile Designing							
MFTE1-160	Structure and Properties of Fibres							
MFTE1-105	Garment Development Lab.-I	0	0	4	60	40	100	2
MFTE1-106	Textile and Apparel Testing Lab.	0	0	4	60	40	100	2
MFTE1-107	Independent Study	0	0	4	60	40	100	2
Total		**15**	**5**	**12**	**380**	**420**	**800**	**26**

SEMESTER 2nd		Contact Hrs. 32			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MFTE1-208	Developments in Specialty Yarns & Texturing	3	1	0	40	60	100	4
MFTE1-209	Functional Textiles & Garments – I	3	1	0	40	60	100	4
MFTE1-210	Functional Finishes of Garments	3	1	0	40	60	100	4
MFTE1-211	Advances in Apparel Technology	3	1	0	40	60	100	4
Departmental Elective-II		3	1	0	40	60	100	4
MFTE1-261	Production Planning & Operation Management							
MFTE1-262	Technical Textiles and Smart Garments							
MFTE1-263	Environment Management & Eco-friendly Textiles							
MFTE1-264	Modern Methods of Apparel Merchandising & management							
MFTE1-212	Garment Development Lab.-II	0	0	4	60	40	100	2
MFTE1-213	Software Packages Lab.	0	0	4	60	40	100	2
MFTE1-214	Independent Study	0	0	4	60	40	100	2
Total		**15**	**5**	**12**	**380**	**420**	**800**	**26**

SEMESTER 3rd		Contact Hrs. 24			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MREM0-101	Research Methodology	4	0	0	40	60	100	4
Departmental Elective-III		3	1	0	40	60	100	4
MFTE1-365	Managing the Supply Chain							
MFTE1-366	Automation of Apparel Production							
MFTE1-367	Apparel Production CAD/CAM Systems							
MFTE1-368	Computer Aided Pattern Design							
MFTE1-369	Utility Properties of Cloth and Apparels							
Open Elective-I		3	1	0	40	60	100	4
MFTE1-315	Seminar on Advanced Topics	0	0	4	60	40	100	2
MFTE1-316	Minor Project	0	0	4	60	40	100	2
MFTE1-317	Advanced Garment Designing and Making Or Home Fashion Lab.	0	0	4	60	40	100	2
Total		**10**	**2**	**12**	**300**	**300**	**600**	**18**

SEMESTER 4th		Contact Hrs. 40			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MFTE1-418	**Dissertation**	**0**	**0**	**40**	**Satisfactory/ Unsatisfactory**		**100**	**20**

Overall

Semester	Marks	Credits
1st	800	26
2nd	800	26
3rd	600	18
4th	100	20
Total	**2200**	**90**

STRUCTURE AND PROPERTIES OF FIBRES, FABRICS AND GARMENTS

Subject Code: MFTE1-101 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives
To introduce structure, properties of fibres, fabrics and garments.

Unit-I

Raw Material: Physical and chemical properties, manufacturing, process from polymer to fibers stage. Basic principles of fibre spinning, Spinning processes: Melt spinning. High speed spinning, spinning of microfibre, solution spinning process: Dry and wet spinning. Manufacture and specifications of raw materials and monomers. Heat-setting of fibres. Regenerated fibres: Viscose, Lyocell, high tenacity regenerated fibres, regenerated protein fibres, their methods of manufacture, physical & chemical properties and applications. Synthetic fibres: nylon 6 and 66, PET, PAN, their methods of manufacture, physical & chemical properties and applications.

Unit-II

High Performance Fibres: Introduction to PU, PTFE, aramid, carbon fibre, etc. their methods of manufacture, physical & chemical properties and applications. Brief idea on microdenier, bicomponent, hollow fibres and other developments in fibres.
Staple Yarns-Conventional ring spinning, open end spinning, friction spinning, self-twist spinning twist less spinning. Filament yarns- Wet, Dry and melt spinning.

Unit-III

Fabric Geometry: woven and other types of fabrics. Importance of fabric geometry and constructional parameters on the Bending, crease, Air permeability and handle and comfort properties.

Unit-IV

Structure of Garments: patterns, Draping and grading. Effect of fabric properties like GSM, Thickness on the Drape behaviour.

Recommended Books

1. R. Meredith, 'The Mechanical Properties of Textile Fibres', North Holland Publishing Co.
2. W.E. Morton and J.W.S. Hearle, 'Physical Properties of Textile Fibres', The Textile Institute, UK.
3. V.B. Gupta and V.K. Kothari, 'Manufactured Fibre Technology', Chapman and Hall, London.
4. Jacob Solinger, 'Apparel Manufacturing Handbook', Van Nostrand Reinhold Company, **1980**.
5. Tyler, 'Carr and Latham's Technology of Clothing Manufacturing', Blackwell.
6. Jones, Richard M., 'Apparel Industry', 2nd Edn., Blackwell.
7. Chuter, 'Introduction to Clothing Production Management', Blackwell.

MODERN TECHNOLOGY OF FABRIC AND APPAREL PRODUCTION

Subject Code: MFTE1-102 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives
To introduce various terms and techniques related to fabric and garment production, etc.

UNIT-I

Classification of non-woven fabrics. A survey of non-woven field – its uses and future growth. Principles of web formation. Properties of different type of webs.

Fibre properties and their influence on properties of non-woven fabrics. Web geometry – fibre orientation, curl-factor and web density their effect on properties of non-woven fabrics. Classification of binders and methods of binder application. Binder properties and effect of binder-fibre adhesion on properties of non-woven fabrics.

Needle Bonded Nonwovens: processing variables and their effects on properties.

Stitch bonded fabrics, their manufacture and properties. Spun bonded and split film fabrics.

UNIT-II

Knitting: Manufacturing of single jersey, rib, purl and interlock weft knit fabrics. Properties of these fabrics. Manufacturing of Tricot and Rashal fabrics and properties of these fabrics.

UNIT-III

Narrow Woven Fabrics: Manufacturing of Narrow woven fabrics, Braids, Ribbons, Tapes, Elastic webs, and other type of non-woven fabrics, Properties and application of narrow woven fabrics.

Nets and Laces: Manufacturing techniques of Nets and Laces, their properties and end-uses

UNIT-IV

Modern Apparel Production: Modern marker planning, Spreading, cutting, sewing, pressing and delivery techniques. Different types of Software used for modern apparel production techniques.

Recommended Books

1. Jacob Solinger, 'Apparel Manufacturing Handbook', Van Nostrand Reinhold Company, **1980.**
2. Tyler, 'Carr and Latham's Technology of Clothing Manufacturing', Blackwell.
3. Jones, Richard M., 'Apparel Industry', 2nd Edn., Blackwell.
4. Chuter, 'Introduction to Clothing Production Management', Blackwell.
5. Radko Krecma, 'Nonwoven Textiles'.
6. S. Russels, 'Handbook of Nonwovens'.
7. D.J. Spencer, 'Knitting Technology'.
8. D.B. Ajgaonkar, 'Knitting Technology'.

ADVANCED TEXTILE & GARMENT DESIGNING CONCEPTS

Subject Code: MFTE1-103 **L T P C** **Duration: 45 Hrs.**

3 1 0 4

Course Objectives

To impart knowledge of designing concepts of fabric and apparels, etc.

UNIT-I

Fashion Design Fundamentals: Basic concept of design, elements of art, of design: Definition of line shape, form size, space, texture and colour. Structural and decorative dress designing, creating varieties through designs. Principles of Design: Definition Harmony, Proportion, Balance, Rhythm, Emphasis, meaning types and application on apparel psychology of clothing.

UNIT-II

Anatomy for Designers: Effect of Human proportion and figure construction on garment construction. Methods of determining individual proportions. Aesthetic requirement of dress, sensory factors affecting aesthetics. Display of fashion materials: Definition and importance, source techniques and window display, classic fashion shows. Important fashion centers of the world and India.

UNIT-III

Advance fabric dyeing, printing and other surface ornamentation techniques: Resist printing, Ikat – tie and dye, mélange dyeing another painting medium. Knots. Towels: Tie-towels, basin towels, bath towels designing. Quilt designing, Wadding, geometrical ornamentation techniques: Bed-sheet designing: Bed-sheet fabric, designing, cut and spread techniques, pillows/cushion covers designing, appliqué designing.

UNIT-IV

Advanced Pattern Engineering of men's, women's and kid's wear. Geometrical Principles of Apparel construction: Simple shapes, triangle, bell and balloon, complex shapes and combining techniques, wrapping and tying techniques, pleats an flares to control fullness. Latest Ornamental techniques in garment designing.

Recommended Books

1. Erwin Model, 'Clothing for Moderns', Mac Millan Publications, New York.
2. Tate and Sharon Lee, 'Inside Fashion Design', Harper Publication Inc., U. Kng.
3. Navneet Kaur, 'Comdex Fashion Design; Fashion Concepts', Vol –I, Dreamtech Press, **2010**.
4. N. Gokarneshan, 'Fabric Structure and Design', New Age Publishers
5. Z.J. Groscicki, 'Watson Textile Design and Colour', Newnes Buttersworth.
6. Nisbet H, 'Grammer of Textile Design', D.B. Tarapore Wala Sons and Co.

APPAREL TESTING AND QUALITY CHARACTERIZATION

Subject Code: MFTE1-104 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives

To impart knowledge of Testing and quality evaluation of fabrics and apparels, etc.

Unit-I

Introduction: Aim and scope of testing, Sample and Population, Sampling techniques. Fibre, yarn and fabric testing concepts, instruments and applications. Fabric comfort properties: water-vapour transmission through fabrics, Wicking properties, Air permeability and wettability. Fabric composition testing, fabric chemical testing.

Unit-II

Overview of low stress mechanical properties, FAST, Kawabatta Evaluation System. Analysis of KES, FAST data.

Garment testing concepts, instruments and applications: dimensions, seam strength, seam slippage, adhesion between interlining and fabric, shrinkage, zippers, buttons, snap fasteners and other general garment properties. Needle cutting/yarn severance.

Unit-III

Testing of specially designed fabrics and finishes: Flame resistance, Water repellency, etc. Computer colour matching: concept of colour measurement and applications. Different fastness (light, washing, perspiration, sublimation, chlorine, etc.) properties and their evaluation.

Unit-IV

International quality parameters and various standards such as AATCC, SDC, ASTM, etc. Salient features of different testing protocols for apparels, various essential standards and regulations associated with quality evaluation of apparels, safety aspects of childern's apparel, quality program of clothing sector, the role of retailer, agent, vendor and laboratory.

Recommended Books

1. B.P. Saville, 'Physical Testing of Textiles', Woodhead Publishing Ltd, Cambridge, **2002**.
2. V.K. Kothari, 'Testing and Quality Management', IAFL Publications, New Delhi, **1999**.
3. J.E. Booth, 'Principles of Textile Testing', CBS Publishers and Distributors, New Delhi, **1999**.
4. P. Angappan & R. Gopalakrishnan, 'Textile Testing', SSM Institute of Textile Technology, Komarapalayam, **2002**.
5. V.K. Mehta, 'Apparel Quality Control'.
6. A. Basu, 'Textile Testing', SITRA Coimbatore, **2002**.

GARMENT DEVELOPMENT LAB.-I

Subject Code: MFTE1-105 **L T P C**
0 0 4 2

Course Objectives

To practice developing different types of garments, etc.

Introduction and application of different aids, tools and equipment required in garment construction. Flat pattern technique: drafting, developing pattern. Drafting of child basic and adult bodic blocks. Drafting of collars and sleeves.
Preparation and construction of different types of seams, necklines, plackets, pockets, pleats and tucks. Dart manipulation and their applications.

TEXTILE AND APPAREL TESTING LAB.

Subject Code: MFTE1-106 **L T P C**
0 0 4 2

Course Objectives

To practice testing and evaluating different types of quality parameters of textile fabrics and garments, etc.

Applications of chemicals, dyes and functional finishes to make speciality garments and their evaluation. Fabric composition testing. Fabric shrinkage, Air-permeability, Limited Oxygen Index (LOI), flammability test, Water absorbency, Water repellency, Hydrostatic water proof test, Abrasion Resistance: flat and flex, Pilling resistance.
Fabric composition testing, fabric chemical testing, testing for fabric comfort. Determination light, washing, perspiration, sublimation, chlorine, etc. fastness properties of dyed samples.
Seam strength, Seam Slippage, Adhesion between interlining and fabric, shrinkage, zippers, buttons, snap fasteners and other general garment properties.

INDEPENDENT STUDY

Subject Code: MFTE1-107 **L T P C**
0 0 4 2

Course Objectives

To study and practice developing fabrics and garments depending upon individual study and research, etc.

Student has to study the particular topic as per their interest/ requirement of the project or suggested by the faculty under supervision.

FASHION DESIGN CONCEPTS

Subject Code: MFTE1-156 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives

To impart knowledge of fashion, design concepts, etc.

Unit-I

Fashion terminology, cycle, influence, fashion: Introduction to fashion and apparel design. Origin of fashion, concept, analysis, trends and creations. Fashion Theories: Fashion of different eras. fashion promotion, style-fad-trends.

Unit-II

Fashion Design fundamentals: Basic concept of design, elements of art, of design: Definition of line shape, form size, space, texture and colour. Structural and decorative dress designing, creating varieties through designs.

Principles of Design: Definition Harmony, Proportion, Balance, Rhythm, Emphasis, meaning types and application on apparel psychology of clothing.

Unit-III

Introduction to colours and their theories. Colour harmony and colour contrast, modification of colours. Principle of colour measurement. Effect of colours on garment construction. Arrangement of figures such as unit repeating design, the drop device, drop reverse design, etc.

Unit-IV

Anatomy for designers: Effect of Human proportion and figure construction on garment construction. Methods of determining individual proportions. Aesthetic requirement of dress, sensory factors affecting aesthetics.

Display of fashion materials: Definition and importance, source techniques and window display, classic fashion shows. Important fashion centers of the world and India.

Recommended Books

1. Erwin Model, 'Clothing for Moderns', Mac Millan Publications, New York.
2. Tate and Sharon Lee, 'Inside Fashion Design', Harper Publication Inc., U. Kng.

HIGH PERFORMANCE FIBRES

Subject Code: MFTE1-157 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives
To impart knowledge of fibres, high performance fibres, etc.

Unit-I

Introduction to fibres, their classification, important fibre properties. Natural fibres such as cotton, jute, wool, silk, etc., physical and chemical properties with applications. Advancement in production/cultivation of natural fibres such as BT cotton and their impact on ecology.

Unit-II

General definition of man-made or manufactured fibres, introduction to general principles of spinning and spinning processes. Basic principles of fibre spinning, Spinning processes: Melt spinning. High speed spinning, spinning of microfibre, solution spinning process: Dry and wet spinning. Manufacture and specifications of raw materials and monomers. Heat-setting of fibres.

Unit-III

Regenerated Fibres: Viscose, Liocel, high tenacity regenerated fibres, regenerated protein fibres, their methods of manufacture, physical & chemical properties and applications.
Synthetic fibres: nylon 6 and 66, PET, PAN, their methods of manufacture, physical & chemical properties and applications.

Unit-IV

High Performance Fibres: Introduction to PU, PTFE, Aramide, carbon fibre, etc. their methods of manufacture, physical & chemical properties and applications. Brief idea on microdenier, bicomponent, hollow fibres and other developments in fibres.

Recommended Books

1. A.A. Vaidya, 'Production of Synthetic Fibres', 1st Edn., Prentice Hall of India, New Delhi, **1988**.
2. V.B. Gupta and V.K. Kothari, 'Manufactured Fibre Technology', 1st Edn., Chapman and Hall, London, **1997.**
3. H.F. Mark, S.M. Atlas and E. Cernia,'Man Made Fibre Science and Technology', Vol. 1, 2, 3, 1st Edn., Willey Inter Science Publishers, New York, **1967**.
4. J.E. Macintyre, 'Synthetic Fibres', Woodhead Fibre Science Series, UK, **2003**.
5. F. Fourne, 'Synthetic Fibres: Machines and Equipment, Manufacture, Properties', Hanser Publisher, Munich, **1999**.

THEORY AND DESIGN OF GARMENT MACHINERY

Subject Code: MFTE1-158 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives
To impart knowledge of garment machineries, etc.

Unit-I

Theory, measurement and control of yarn tension in unwinding from sewing thread packages during Sewing. Study of stitch formation during sewing operation. Relationship between sewing speed and stitches per inch on stitch formation. Stitch types and stitch geometry.: Various types of stitch types produced on different types of sewing machines. Properties of stitches and their

usefulness.

Unit-II

Seam Types and Seam Geometry: Various types of seams and their geometry. Application of different seams in producing different garments.

Feed Mechanisms: Different types of sewing feed mechanisms and their uses Control of differential feed.

Unit-III

Development in design and operation of modern sewing machines. Theory and design principles of latest automatic controls in stitch regulation in sewing.

Kinematics of drop feed mechanism. Design problems of conventional sewing machines.

Unit-IV

Principles Underlying Unorthodox Sewing Machinery System: Microprocessor and computer controls, Specialty sewing machines and their Kinematics.

Timings for sewing operations for needle and looper systems.

Recommended Books

1. Jacob Solinger, 'Apparel Manufacturing Handbook', Van Nostrand Reinhold Company, **1980.**
2. Tyler, 'Carr and Latham's Technology of Clothing Manufacturing', Blackwell.
3. Jones, Richard M., 'Apparel Industry', 2nd Edn., Blackwell.
4. Chuter, 'Introduction to Clothing Production Management', Blackwell.

FABRIC PROPERTIES AND TEXTILE DESIGNING

Subject Code: MFTE1-159 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives

To impart knowledge of fabric and Textile Designing, etc.

Unit-I

Fabric formation technologies, Fabric properties-dimensional & structural, Mechanical, Comfort related properties, Low stress mechanical properties, properties related to aesthetic significance, other physical properties relevant to end use, Influence of fibres, yarn characteristics and fabric construction parameter on clothing comfort.

Unit-II

Concept of fabric designing through fabric structure, Importance of fabric structure, Basic Weaves: Plain, Twill, Sateen weaves, Theirs derivatives and ornamentation, Draft and Peg-plan for all simple weave. Other decorative weaves like Diamond, Mockleno, Corkscrew, Honey Comb, Huck-a-back, etc.

Unit-III

Knitting, comparison of knitting and weaving technology, Classification of knitting. Difference between woven and knitted fabric properties., Characteristics of warp knit and weft knit structure.

Knitting Elements: Knitting needles, sinkers, cam systems, etc. Knitting cycles, Weft knitting: properties and uses of basic weft knitted structures- Plain, Rib, Interlock and Purl.

Unit-IV

Fundamental Stitches: Knit, Tuck and float stitches and their uses. Ornamentation of knitted fabrics. Concept of loop length, production calculation,

Calculations for Tightness factor, fabric cover, stitch density, areal density and knitting machine production.

Recommended Books

1. Sabit Adanur, 'Handbook of Weaving', Technomic Publishing Company, Inc, U.S.A.
2. N. Gokarneshan, 'Fabric Structure and Design', New Age International, N. Delhi.
3. Azgaonkar, 'Knitting Technology', Universal Publishing Corp.

STRUCTURE AND PROPERTIES OF FIBRES

Subject Code: MFTE1-160 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives

To impart knowledge of fibres and their properties, etc.

Unit-I

Structure of Fibres: Traditional view of fibre structure, Methods of investigation of fibre structure, Introductory idea about identification of chemical and physical structure by IR spectroscopy, X-ray, SEM.

Unit-II

Moisture Absorption: Fundamentals of moisture like humidity, Moisture regain and content, relation, equilibrium, Heat of sorption, swelling of fibres, factors influencing results of tensile experiment, creep and stress relaxation

Unit-III

Introduction to dielectric properties and static electricity, Measurement of static electricity, Optical properties: Refractive index and birefringence, Birefringence and orientation of fibres, reflection and lustre.

Unit-IV

Introduction to thermal Properties and fibre friction, technological importance, measurement of friction, Effect of load and area of contact, static and kinetic friction. General theory of friction and application to fibres.

Recommended Books

1. R. Meredith, 'The Mechanical Properties of Textile Fibres', North Holland Publishing Co.
2. W.E. Morton and J.W.S. Hearle, 'Physical Properties of Textile Fibres', The Textile Institute, UK.
3. V.B. Gupta and V.K. Kothari, 'Manufactured Fibre Technology', Chapman and Hall, London.

DEVELOPMENTS IN SPECIALTY YARNS & TEXTURING

Subject Code: MFTE1-208 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives

To introduce specialty yarns and texturing.

Unit-I

Types of Specialty Yarns: Novelty yarns, Grindle yarns, core-spun yarns, Chennile yarns, Corded yarns, Bulky yarns and other types of specialty yarns. Methods of production of novelty yarns, their properties and applications

Unit-II

Sewing Threads: Their manufacturing techniques, special finishes, properties and end-uses

Unit-III

Different Types of Texturing: Twist texturing, Air-jet texturing, edge crimping stuffer box crimping, gear crimping, knit-de-knit etc.

Detailed discussion on False Twist. texturing process, machine. Material, process and machine variables – their effect on properties of yarn. Recent developments.

Unit-IV

Air-jet Texturing: Detailed discussion of process. Different types of variables and their effect on properties of yarn. Recent developments of air-jet texturing machine, jets and process.

Methods of assessing and evaluation of textured yarns. Hi-bulk yarns – especially acrylic. Chemical texturing.

Recommended Books

1. A. Venkatasubramani, 'Spun Yarn Technology'.
2. Allan Fellingham, 'Air-jet Texturing'.
3. J. Hearle, L Hollick and D. Wilson, 'Yarn Texturing Technology'.
4. A. Laura and J. Bryant, 'Knitting with Novelty Yarn'.
5. Ali Demir, 'Synthetic Filament Yarn: Texturing Technology'.

FUNCTIONAL TEXTILES & GARMENTS – I

Subject Code: MFTE1-209 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives

To introduce various terms and techniques related to functional textiles and garments production and properties, etc.

UNIT- I

Introduction to functional garment and their applications. Medical Textiles**:** application of various polymers and textile materials in medical field such as artificial tandem and alignments, kidney, heart, surgical product, cardiovascular graft, sterilization, wound care, etc.

UNIT-II

Nanotechnology in apparels - Introduction and Definition of Nanotechnology. Understanding Nanotechnology. Nanotechnology and Today's World. Use of nanotechnology in the field of fibres and polymers and their application in apparels. Latest developments of nanomaterials in garment sectors.

UNIT-III

Protective clothing - Brief idea about different type of protective clothing, General requirement of protective clothing, cut resistant fabric, chemical protective clothing (CPC) - Areas of use, CPC items for air-born, liquid hazard, different chemicals used, parts of CPC, performance evaluation – permeation, solubility and diffusion theory, barrier effectiveness, structural integrity, water proof breathable fabrics.

UNIT-IV

Ballistic Protective clothing – Requirements, principle of mechanism, different fibres and fabrics, soft and hard armor, factors influencing performance.

Thermal Protective Clothing (TPC)– Combustion mechanism, fire governing parameters, Requirements, Designing of TPC, Construction, various parameters affecting flame retardency, performance evaluation,

Pesticide Protective Clothing – Requirements of protective clothing, different areas, different parts of PPC, Performance evaluation of PPC.

Recommended Books

1. R. Shishoo, 'Textiles in Sport', Woodhead Publisher.
2. X.M. Tao, 'Wearable Electronics and Photonics', Woodhead Publisher.
3. S. Adanur, 'Wellington Sears Handbook of Industrial Textiles', Woodhead Publisher.
4. A.R. Horrocks and S.C. Anand, 'Handbook of Technical Textiles', UK.
5. P. Brown and K. Stevens, 'Nanofibres and Nanotechnology in Textiles', Woodhead Publisher.
6. Y. Li, 'Nanofunctional Textiles and their Applications', Woodhead Publisher.
7. L Van Langenhove, 'Smart Textile for Medical and Healthcare', Woodhead Publisher.

FUNCTIONAL FINISHES OF GARMENTS

Subject Code: MFTE1-210 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives

To impart knowledge of designing concepts of fabric and apparels, etc.

UNIT-I

Introduction to textile finishing. Aim and scope. Classification of finishes. Concept of permanent and temporary finishes. Various finishes in industrial practices such as raising and shearing, drying. Calendaring - its types, construction and function of various calendaring m/cs. Sanforizing – method and mechanism.

UNIT-II

Brief concept of finishing of wool: Crabbing, decatising, milling, shrink finishing, etc. General chemical finishes like softening, stiffening, delustering of rayon, polyester. organdy finish. Silky finish of polyester/ weight reduction of polyeste. Weighting of silk. Heat setting of synthetic fibres, concept and required machines.

UNIT-III

Introduction and preliminary concepts of specialty finishes such as durable press finish to textile and garments, anti-crease finish. Water repellent and water proof finish: concept, mechanism and their application. Flame-proof and flame-retardant finish: concept, mechanism and their application.

UNIT-IV

Introduction and preliminary concepts of specialty finishes such as Soil and oil repellent finish, anti-static finish, antimicrobial finish. Introduction to enzymes and their applications in finishing of textiles and garments. Finishing of denim: stone wash, enzyme wash, etc. enzyme wash and some other specialty finishes. UV protective finishes. Brief introduction and application of nanofinish, ultrasound, Laser, plasma Technology in textiles.

Recommended Books

1. E.P.G. Gohl and L.D. Vilensky, 'Textile Science', CBS Publishers.
2. J.T. Marsh, 'An Introduction to Textile Finishing'.
3. V.A. Shenai , 'Textile Finishing'.
4. J.N. Chakarverty, 'Fundamental and Practices in Colouration of Textiles'.

ADVANCES IN APPAREL TECHNOLOGY

Subject Code: MFTE1-211 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives
To impart knowledge of advancements in apparel technology, etc.

Unit-I

Innovation in seams, stitches, sewing thread, needles, marker, planning and cutting technology. Understanding the need and use of various construction types for sewing machinery in regards to quality and performance improvement and ease to operate,

Unit-II

Advancement in Sewing Machinery: Directive for operating special purpose sewing machinery. Various bed types of machine and their applications in manufacturing processes: Flat Bed, large area Raised Bed, DNLS m/c, Over Lock m/c, Flat Lock m/c, Multi thread Chain Stitch m/c, Blind stitch machine and their developments.

Unit-III

Various types of feed mechanisms, their suitability for different fabrics and construction of components and their contribution towards quality and productivity. Application of programmable machines in garment industries. Developments and automation in garment manufacturing machines and industries.

Unit-IV

Scientific approach in sewing techniques. Ergonomic concepts and application in the sewing room, Introduction of time targets and quality aspects, Practical approach to achieve targets, understanding of different shaped sewing lines in actual garments, Material Handling, Postural Techniques, Work Study, Working Time Arrangement, Shift Work, Motion Economy, anthropometric, Basic Sewing Patterns, Convex sewing pattern, Curved sewing pattern, Angular sewing pattern, etc.

Recommended Books

1. 'Knitted Clothing Technology', Brackenburry.
2. Harold Carr, Barbara Latham, 'The Technology of Clothing Manufacture'.
3. Gerry Cooklin, 'Introduction to Clothing Manufacture'.

PRODUCTION PLANNING & OPERATION MANAGEMENT

Subject Code: MFTE1-261 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives
To impart knowledge of production planning of apparel manufacturing & Operation management, etc.

Unit-I

Basic concept of production & operation, Macro and micro level planning with special reference to apparel industry, Production scheduling & control, PERT/CPM.

Unit-II

Application of Industrial Engineering in Apparel industry. Method of conducting Work study, Time study and method study with special reference to apparel industry. Ergonomics in garment industry.

Unit-III

Management Information system. Concept of ERP and its application.

Unit-IV

Social accountability and its impact. Implementation of SA-8000 in Industry.

Recommended Books

1. N.G. Nair, 'Production and Operation Management'.
2. S.N. Charry, 'Production and Operation Management'.
3. K.C. Batra, 'Production Management'.
4. E. Adams, 'Production and Operation Management'.
5. 'Concept, Model and Behaviour'.
6. Martland Telsang, 'Industrial Engineering & Production Management'.

TECHNICAL TEXTILES AND SMART GARMENTS

Subject Code: MFTE1-262 **L T P C** **Duration: 45 Hrs.**

3 1 0 4

Course Objectives

To impart knowledge of Technical Textiles and Smart garments, etc.

Unit-I

Introduction: Definition, Textile materials in technical applications.

Fibres: Natural and Man-made fibres suitable for technical applications and their relevant properties.

Unit-II

Geotextiles: Mechanics of reinforcement, filtration and drainage of soils by geotextiles. Typical applications. Determination of soil particle size and pore size distribution, relations between soil particle and size and pore size distribution for hydraulic applications.

Unit III

Medical Textiles: Textiles in various medical applications. Absorbency of textile materials & methods of sterilization; application oriented design of typical medical textiles (e.g. porous graft or trashed tube). Materials used and design procedure for protecting wounds, cardiovascular application, Sutures etc. Automotive Textiles: Fibres used for automotive applications-upholstery, carpeting, preformed parts, tyres, safety devices, filters and engine compartment items. Brief description for the manufacture and application of these devices or parts.

Unit-IV

Rigid Composites: Three dimensional fabrics and triaxially braided materials for composites. Filtration: Principles and some mathematical models of wet and dry filtrations. Characteristics properties of fibres and fabrics in selective examples of filtration. Ropes and Cordages: Methods of production. Application oriented structure and production of ropes, cordages and twines. Intelligent & Smart garments, Sportswear, Leisurewear, swimwear, Spacesuits. Protective clothing: Thermal protection. Ballistic protection. Protection from electromagnetic radiation and static hazards. Protection against micro-organisms, chemicals.

Recommended Books

1. W. Fung, 'Coated and Laminated Textiles'.
2. A.R. Horrocks and S.C. Anand, 'Handbook of Technical Textiles'.
3. W. Fung and J.M. Hardcastle, 'Textiles in Automative Engineering'.

4. X.M. Tao, 'Smart Fibres, Fabrics and Clothing'.
5. R.A. Scott, 'Textiles for Protection'.
6. R. Shishoo, 'Textiles in Sport'.
7. X.M. Tao, 'Wearable Electronics and Photonics'.

ENVIRONMENT MANAGEMENT & ECO-FRIENDLY TEXTILES

Subject Code: MFTE1-263 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives
To impart knowledge of Environment management and Eco-friendly textiles, etc.

Unit-I
Concept of environment management and its importance in manufacturing industry. Sources of various kinds of pollution in textile & apparel industry.

Unit-II
Assessment of environmental impact and designing of environmental management program. Environment audit.

Unit-III
Air, water and noise pollution. Disposal of waste and effluents and related processes. Standard norms for effluent emissions in textile & apparel industry.

Unit-IV
Occupational, health and safety management.
Eco-friendly chemical processing, Natural dyes, Eco standards and their applications.
Eco-friendly Textiles: Organic cotton & wool- their production and processes

Recommended Books
1. A.R. Horrocks, 'Recycling Textile and Plastic Waste'.
2. A.R. Horrocks, 'Eco-textile 98'.
3. K. Slater, 'Environmental Impact of Textiles'.
4. Y. Wang, 'Recycling in Textiles'.
5. Y. Li and A.S. Wong, 'Clothing Biosensory Engineering'.
6. Y. Li, 'Biomedical Engineering of Textiles and Clothing'.
7. R.S. Blackburn, 'Biodegradable and Sustainable Fibres'.

MODERN METHODS OF MERCHANDISING & MANAGEMENT

Subject Code: MFTE1-264 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives
To impart knowledge of Merchandising and management, etc.

Unit-I
Retailing Environment: Introduction to Retailing, Types of Retailing, Multi-channel Retailing, Retailing Strategy: Retail Audit, Retail Customer, Retail/Site Selection, Retail Organization and Human Resource Management, Customer Relationship Management, Pricing in Retailing, Retail Communication.

Unit-II

Merchandise Management: Developing and Implementing Merchandise Plans, Financial Management, Operations Management, Supply chain management.

Unit-III

Store Management: Store Layout, Design and Visual Merchandising, Customer Service

Unit-IV

Fashion Communications: Fashion shows, Portfolio, Mood board, Story board, Flat sketches, colour chart, Forecasting: Colour forecasting, Fabric forecasting, Fashion advertising, Fashion photography

Recommended Books

1. Levy and Weitz, 'Introduction to the World of Retailing', Berman and Evans.
2. Levy and Weitz, 'Retail Institutions and Multi-channel', Berman and Evans. ;
3. 'Strategic Planning in Retailing', Berman and Evans.
4. Levy and Weitz, 'Retail Market Strategy'.
5. 'Identifying and Understanding Consumers', Berman and Evans.
6. Levy and Weitz, 'Customer Buying Behavior'.
7. Levy and Weitz, 'Store Layout, Design and Visual Merchandising'.
8. 'Retail Image and Promotional Strategy', Berman and Evans.
9. Levy and Weitz, 'Pricing', Berman and Evans.

GARMENT DEVELOPMENT LAB.-II

Subject Code: MFTE1-212 **L T P C**
0 0 4 2

Course Objectives

To practice developing different types of garments, etc.

Construction of garment of children, men and women wear.
Techniques of draping and grading, their applications in dress construction. Line balancing system. Practice of pattern making and construction of selected kids, ladies and gents wear. Preparation functional/Specialty garment.

SOFTWARE PACKAGES LAB.

Subject Code: MFTE1-213 **L T P C**
0 0 4 2

Course Objectives

To practice application of tools and software packages related to pattern making and designing of textile fabrics and garments, etc.

Study and application of tools and software packages related to the topic and discipline of the study and department. Pattern making, grading and marker making and designing software's in Fashion and Technology.

INDEPENDENT STUDY

Subject Code: MFTE1-214 **L T P C**
0 0 4 2

Course Objectives
To study and practice developing fabrics and garments depending upon individual study and research, etc.

Student has to study the particular topic as per their interest/requirement of the project or suggested by the faculty under supervision.

RESEARCH METHODOLOGY

Subject Code: MREM0-101 **L T P C** **Duration: 45 hrs.**
4 0 0 4

UNIT–I (11 Hrs.)

Introduction to Research: Meaning, Definition, Objective and Process
Research Design: Meaning, Types - Historical, Descriptive, Exploratory and Experimental
Research Problem: Necessity of Defined Problem, Problem Formulation, Understanding of Problem, Review of Literature
Design of Experiment: Basic Principal of Experimental Design, Randomized Block, Completely Randomized Block, Latin Square, Factorial Design.
Hypothesis: Types, Formulation of Hypothesis, Feasibility, Preparation and Presentation of Research Proposal

UNIT–II (10 Hrs.)

Sources of Data: Primary and Secondary, Validation of Data
Data Collection Methods: Questionnaire Designing, Construction
Sampling Design & Techniques – Probability Sampling and Non Probability Sampling
Scaling Techniques: Meaning & Types
Reliability: Test – Retest Reliability, Alternative Form Reliability, Internal Comparison Reliability and Scorer Reliability
Validity: Content Validity, Criterion Related Validity and Construct Validity

UNIT–III (13 Hrs.)

Data Process Operations: Editing, Sorting, Coding, Classification and Tabulation
Analysis of Data: Statistical Measure and Their Significance, Central Tendency, Dispersion, Correlation: Linear and Partial, Regression: Simple and Multiple Regression, Skewness, Time series Analysis, Index Number
Testing of Hypothesis: T-test, Z- test, Chi Square, F-test, ANOVA

UNIT – IV (11 Hrs.)

Multivariate Analysis: Factor Analysis, Discriminant Analysis, Cluster Analysis, Conjoint Analysis, Multi-Dimensional Scaling
Report Writing: Essentials of Report Writing, Report Format
Statistical Software: Application of Statistical Soft wares like SPSS, MS Excel, Mini Tab or MATLAB Software in Data Analysis

**Each Student has to Prepare Mini Research Project on Topic/ Area of their Choice and Make Presentation. The Report Should Consists of Applications of Tests and Techniques Mentioned in The Above UNITs*

Recommended Books

1. R.I. Levin and D.S. Rubin, 'Statistics for Management', 7th Edn., Pearson Education, New Delhi.
2. N.K. Malhotra, 'Marketing Research–An Applied Orientation', 4th Edn., Pearson Education, New Delhi.
3. Donald Cooper, 'Business Research Methods', Tata McGraw Hill, New Delhi.
4. Sadhu Singh, 'Research Methodology in Social Sciences', Himalaya Publishers.
5. Darren George & Paul Mallery, 'SPSS for Windows Step by Step', Pearson Education, New Delhi.
6. C.R. Kothari, 'Research Methodology Methods & Techniques', 2nd Edn., New Age International Publishers.

AUTOMATION OF APPAREL PRODUCTION

Subject Code: MFTE1-366 **L T P C** **Duration: 45 Hrs.**

3 1 0 4

Course Objectives

To introduce various terms and techniques related to automation in garments production, etc.

Unit-I

Concept of Automation: Base subject information, basic terms and definitions from mechanization area and automation area. Energy transfer in kinematic system, drive requests, types of drives, comparison, characteristics, fluid drives, characteristics, comparing, pneumatic drives, air properties as a medium for energy transfer. Hydraulic drives, schematic diagram, power packs, Proportional hydraulic system, servo-operated valves, circuits with PAS (power assisted steering). Electric drives, general view, characteristics, powers (outputs).

Unit-II

Automated elements in cutting of textile materials, cutting by water jet. Automated elements in clothing production- sewing and ironing process.

Unit-III

Overview of conceptions of "Work Robots" and "Manipulators". Kinematic of configurations, kinematic couples, application in textile and clothing industry, Effectors of "Work Robots" and "Manipulators", Vacuum grippers, control grippers, and special grippers of gripping of textile materials.

Unit-IV

Types of driving mechanism of sewing machines, automated sewing machines. Automation in area of handling and manipulation with textile material in clothing process. Conveyor systems.

Recommended Books

1. G.A. Berkstresser & E.M. Buchanan, 'Automation and Robotics in the Textile and Apparel Industries'.
2. H. Carr and B. Latham, 'The Technology of Clothing Manufacture'.
3. C.Y. Cheng and S.F. Yip, 'Introduction to Garment Manufacture'.
4. K.P. Lau, et al., 'Garment Manufacture - Basic Sewing Technology'.
5. G. Cooklin, 'Fusing Technology'.

6. N. Relis & G. Strauss, 'Sewing for Fashion Design'.
7. G. Stylios, 'Textile Objective Measurement and Automation in Garment Manufacture'.
8. J. Solinger, 'Apparel Manufacturing Handbook'.
9. R.J. Crum, 'Methods of Joining Fabrics'.

APPAREL PRODUCTION CAD/CAM SYSTEMS

Subject Code: MFTE1-367 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives

To impart knowledge of CAD/CAM systems in apparel production technology, etc.

Unit-I

Application of company information systems, ERP, PLM systems and a engineering methods (JIT, MRP, TOC) in aid of control and company process planning ERP system Helios Orange by LSC International.

Unit-II

Control and company process planning by means of CIM, General principles of CA (computer aided) systems.

I. (CAD, CAE, CAP,), Formats of video date storage, Data interchange among CA systems General principles of CA systems.

II. (CAM, CAD/CAM, CQM)

Unit-III

Application of CA technology in clothing production I. - point of software view Application of CA technology in clothing production II. - point of hardware view (principles of digitizer, plotter, scanner, cutter).

Unit-IV

Systems for 2D and 3D clothes designing - data communication between 2D CAD AccuMark system and 3D V-Stitcher, evaluation of clothes fitting to body, creation of virtual presentation. Body scanners - MaNescan system, MIT_MaNescan program, procedure for measuring and evaluation by 3D CAD CATIA program, application of these programs for production of made to order clothes Automatic contactless data capture in clothing production - application of RFID and bar codes.

Recommended Books

1. G.A. Berkstresser & Buchanan, 'Automation and Robotics in the Textile and Apparel Industries'.
2. H. Carr and B. Latham, 'The Technology of Clothing Manufacture'.
3. C.Y. Cheng and S.F. Yip, 'Introduction to Garment Manufacture'.
4. K.P. Lau, et al., 'Garment Manufacture - Basic Sewing Technology'.
5. N. Relis & G. Strauss, 'Sewing for Fashion Design'.
6. G. Stylios, 'Textile Objective Measurement and Automation in Garment Manufacture'.
7. J. Solinger, 'Apparel Manufacturing Handbook'.
8. Stephen Gray, 'CAD / CAM in clothing and Textiles'.
9. W. Aldrich, 'CAD in clothing and Textiles'.

COMPUTER AIDED PATTERN DESIGN

Subject Code: MFTE1-368 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives
To impart knowledge of pattern design using CAD systems, etc.

Unit-I
Advanced 3D pattern design systems. Application of the MTM method (Made To Measure) for the production of individual and personalized garments.

Unit-II
Pattern modification for garment size and fit. A Good basic understanding of the variation in figure shapes and the appropriate pattern modification. Pattern alteration according to the wearer´s; bone structure, posture, body size and contour. Measurement pattern deformation. Choosing the material from a pre-defined library and defining your mechanical properties of fabrics for simulation.

Unit-III
Theory of design procedures for the automated design of garments using the CAD system PDS Tailor XQ. Using CAD technology for customization. Design Concept - software for developing templates from 3D shapes. Production of 2D templates from 3D designs for prototyping. The rational way to design clothes and the transition from 2D to 3D images of virtual body.

Unit-IV
Computer Graphics - theory, input and output devices, applications, product development. The principle of scanning the surface of the human body using a system MaNescan. Flattening the surface of 3D objects and their applications in the flattening human body surface in a 3D CAD program CATIA.

Recommended Books
1. Alison Beazley and Terry Bond, 'Computer-Aided Pattern Design and Product Development'.
2. Sandra Burke, 'Fashion Computing: Design Techniques and CAD'.
3. Stephen Gray, 'CAD / CAM in clothing and Textiles'.
4. W. Aldrich, 'CAD in clothing and Textiles'.
5. 'Computer Aided Design', Gerber Technology.
6. 'Modaris, Diamino and Justprint for Apparel Design'.

UTILITY PROPERTIES OF CLOTH AND APPARELS

Subject Code: MFTE1-369 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Course Objectives
To impart knowledge of utility properties of textile and apparels, etc.

Unit-I
Characteristics of clothing materials, according to the function of a clothing product. Classification of clothing materials. Clothing materials demands for users and garments producers.

Unit-II
CSN, ISO standards for evaluation of clothing materials and garments.

Processing properties of clothing materials. Processing and utility properties of sewing threads evaluating methods

Unit-III

End-use properties- clothing materials durability, evaluative methods, Extent of care for garments

End-use properties- aesthetic properties of clothing materials, evaluative methods

End-use properties- Physiological properties of clothing materials, evaluative methods

Unit-IV

Clothing comfort, apparent temperatures.

Hand evaluation – subjective and objective methods of hand evaluation

End-use properties- Special properties of clothing materials for extreme conditions, evaluative methods.

Multifunction and semi-permeable clothing materials, Special protective clothing.

Recommended Books

1. Hassan M. Behery, 'Nonwovens-Theory, Process, Performance and Testing'.
2. V.K. Kothari, 'Testing and Quality Management'.
3. P.V. Mehta, 'An Introduction to Quality Control for Apparel Industry'.
4. J. Fan, and L. Hunter, 'Engineering Apparel Fabrics and Garments'.
5. B.P. Saville, 'Physical Testing of Textiles'.
6. 'Fabric Testing', Woodhead Publishers.

SEMINAR ON ADVANCED TOPICS

Subject Code: MFTE1-315 **L T P C**
0 0 4 2

Course Objectives

To deliver a talk on advanced topic in the form of power point presentation supported by documents like research papers, literatures, etc. To enable a student to be familiar with Communication skills.

Student is expected to learn

a. How to make a presentation
i. Verbal
ii. Non Verbal
iii. LCD based Power Point

b. How to write a report
i. Abstract
ii. Body
iii. Conclusions
iv. Executive Summary

c. Group Discussion
i. Share the work with a group
ii. Modularization of the work
iii. Shareware Development

d. Communication
i. Horizontal
ii. Vertical

Students will be given a topic of importance and are expected
a. To present the topic verbally in 30 minutes
b. To present the topic as a report in 30 pages

MINOR PROJECT

Subject Code: MFTE1-316 **L T P C**
0 0 4 2

Course Objectives
To make literature survey, research methods, project synopsis of the research project he/she is willing to carry out in the final semester and deliver a talk on the above research work in the form of power point presentation supported by documents like research papers, literatures, etc.
The term work under this, submitted by the student shall include –
1. Work diary maintained by the student and counter signed by his guide.
2. The contents of work diary shall reflect the efforts taken by candidate for
   (a) Searching the suitable project work
   (b) Visits to different factories or organizations
   (c) Brief report of journals and various papers referred
   (d) Brief report of web sites seen for project work
   (e) The brief of feasibility studies carried to come to final conclusion
   (f) Rough sketches
   (g) Design calculation etc. etc. carried by the student.

The student has to make a presentation in front of panel of experts in addition to guide as decided by department head.

ADVANCED GARMENT DESIGNING AND MAKING OR HOME FASHION LAB.

Subject Code: MFTE1-317 **L T P C**
0 0 4 2

Course Objectives
To practice developing different types of garments, Home fashion products, etc.
Generation of advanced garments with detailed fashion motivations e.g. Jackets/Coats, Evening gowns, Maternity wear and functional wear e.g. high visibility apparels, multilayered apparels etc.

or

Home fashion
Designing of bedding textiles including bed linens, pillow covers etc. Quilt designing for strip, pieced and painted quilts. Baby mattresses and quilt designing. Towel designing e.g. tie towels, basin towels etc. Curtain designing e.g. cafe, sarong, belly dancers' curtains etc. Hand loom article designing like rugs, bath mats etc.
Note: Students have to make 4-5 garments/products from designed fabrics of their choice. Garments (menswear/womenswear/kidswear)/products should be designed based on themes and seasons as projected by likes of the students, which will be assessed by the jury comprising of external experts from Academic Institution/Industry as well as Internal subject tutor(s). Showcasing of garments or products will be done on Dummies/models/display tables/racks supported by a Technical Report.

DISSERTATION

Subject Code: MFTE1-318 **L T P C**
0 0 40 20

Course Objectives

To carry out research work, display their work in the form of exhibition/fashion show**.**
The student will submit a synopsis at the beginning of the semester for the approval from the project committee in a specified format. Synopsis must be submitted within two weeks. The first defense, for the dissertation work, should be held within two months' time. Dissertation Report must be submitted in a specified format to the project committee for evaluation purpose at the end of semester. Students should develop garments or Home Fashion products based on fashion trends/forecasting, using moodboard, storyboard and showcase their final products in the form of fashion show and exhibition supported by documents including Portfolio, Swatch book, colourboard, moodboard, storyboard and hard bound project thesis.