M. Tech Textile Technology (1st Year)

Total Contact Hours = 24 **Total Marks = 600** **Total Credits = 24**

SEMESTER 1st		Contact Hrs			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MTEX1-101	Advances in Fibre Production Technologies	4	0	0	40	60	100	4
MTEX1-102	Advances in Yarn Production Technologies	4	0	0	40	60	100	4
MTEX1-103	Advances in Fabric Production Technologies	4	0	0	40	60	100	4
MTEX1-104	Garments Manufacturing Technology	4	0	0	40	60	100	4
Departmental Elective – I (Select any one)		4	0	0	40	60	100	4
MTEX1-156	Process Control in Spinning and Weaving							
MTEX1-157	Production Management in Textiles							
Departmental Elective – II (Select any one)		4	0	0	40	60	100	4
MTEX1-158	Textile Product Design							
MTEX1-159	Physical Properties of Fibres							
Total	**Theory = 6 Lab = 0**	24	0	0	240	360	600	24

M. Tech Textile Technology (1st Year)

Total Contact Hours = 20 **Total Marks = 500** **Total Credits = 20**

SEMESTER 2nd		Contact Hrs			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MTEX1-205	Structural Mechanics of Yarns	4	0	0	40	60	100	4
MTEX1-206	Structural Mechanics of Fabrics	4	0	0	40	60	100	4
Departmental Elective – III (Select any one)		4	0	0	40	60	100	4
MTEX1-260	Research Methodology							
MCAP0-195	Computer Programming and Its Application							
Departmental Elective – IV (Select any one)		4	0	0	40	60	100	4
MTEX1-261	Advance Knitting Technology							
MTEX1-262	Post Spinning Operation							
Open Elective – I (Select any one)		4	0	0	40	60	100	4
Total	**Theory = 5 Lab = 0**	20	0	0	200	300	500	20

M. Tech Textile Technology (2nd Year)

Total Contact Hours = 12 **Total Marks = 500** **Total Credits = 26**

SEMESTER 3rd		Contact Hrs			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MTEX1-307	Profession Skill	4	0	0	40	60	100	4
MTEX1-308	Project Part-I	-	-	-	50	50	100	10
MTEX1-309	Seminar	-	-	-	100	-	100	4
Departmental Elective – V (Select any one)		4	0	0	40	60	100	4
MTEX1-363	High Performance Fibres and Composites Textile Structural Composite							
MTEX1-364	Environmental Practices in Textiles							
MTEX1-365	Technical Textiles							
Open Elective – II (Select any one)		4	0	0	40	60	100	4
Total	**Theory = 3 Lab = 0**	12	0	0	270	230	500	26

**The credits shall be consolidated on the completion of Project part – II*

M. Tech Textile Technology (2nd Year)

Total Credits = 20

SEMESTER 4th		Contact Hrs			Evaluation Criteria	Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Satisfactory/ Unsatisfactory**	
MTEX1- 410	Project Part – II	0	0	0		20

Overall

Semester	Marks	Credits
1st	600	24
2nd	500	20
3rd	500	26
4th	--	20
Total	**1600**	**90**

M. Tech.

Textile Technology

FIRST SEMESTER

SYLLABUS

ADVANCES IN FIBER PRODUCTION TECHNOLOGIES

Subject Code - MTEX1-101 **L T P C** **Duration - 40 Hrs**

4 0 0 4

UNIT – I (10 Hrs)

General Definition of Man Made or Manufactured Fibres, Introduction to General Principles of Spinning and Spinning Processes, Basic Principles of Fluid Flow during Fiber Spinning, Factors Affecting Shear Viscosity. Elongational Flow, Spinnability and Flow Instabilities

UNIT - II (10 Hrs)

Extruder Design, Spin Head, Spinneret, Quench Chamber, Spin Finish Application, Wind Up Mechanism, Manufacture and Specifications of Raw Materials and Monomers.

UNIT - III (10 Hrs)

Types, Methods of Manufacture, Mechanism of Polymerisation and Production Techniques of Viscose, Nylon 6 And 66, PET, PAN And PP, Introduction to New Developments, other Fibres including PU, PVA, PE, PVC and Polyvinylidene Chloride.

UNIT-IV (10 Hrs)

Primary and Secondary Variables and Their Effect on Melt Spinning, High Speed Spinning, Spinning of Microfibre, Solution Spinning Process: Dry and Wet Spinning, Heat-Setting of 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.**

ADVANCES IN YARN PRODUCTION TECHNOLOGIES

Subject Code - MTEX1-102 **L T P C** **Duration – 40 Hrs**

4 0 0 4

UNIT – I (10 Hrs)

Fiber Quality Requirements for Different Spinning Technologies, Systems of Yarn Manufacture in Cotton, Worsted, Woolen and Semi Worsted System, Comparative Study of New Spinning Technologies, Concept of Opening and Cleaning

UNIT-II (10 Hrs)

Aerodynamics and its Role in Blowroom, Theories of Cardin, Drafting Theories,

Developments in Comber, Quality Aspects of Roving, Balloon Theory in Spinning, Significance of Modern Developments in Spinning Process, Modern High Speed Draft Spinning Systems

UNIT-III (10Hrs)

Machine and Process Variables Affecting The Structure and Properties of Spun Yarns, Introduction to Core Spinning, Cover Spinning, Siro-Spinning and Compact Spinning.

UNIT-IV (10 Hrs)

Processing of Wool and Man Made Fibres in New Spinning Systems, Non Conventional Methods of Yarn Manufacture, Air-Vortex Yarn, Quality Standards of Different Yarns with Emphasis on USTER Standard

Recommended Books

1. P. Grosberg and C. Iype, "Yarn Production-Theoretical Aspects", 1st edition, The Textile Institute, UK, **1999.**
2. R. Chattopadhyay, "Advances in Technology of Yarn Production", 1st Edn., NCUTE, New Delhi, **2002.**
3. M.V.S. and A.B. Talele, "A Guide to Crimping / Texturing Technology", 1st Edn., Nasnal Printers and its Associates, Surat,**1992.**
4. Klein W, "Manual of Textile Technology-New Spinning Systems", Vol.5, 1st Edn., The Textile Institute, UK, **1993.**

ADVANCES IN FABRIC PRODUCTION TECHNOLOGIES

Subject Code - MTEX1-103 **L T P C** **Duration – 40 Hrs**
4 0 0 4

UNIT-I (14 Hrs)

Development Trends in Winding, Warping and Sizing Machines for Improving Quality of Preparation and Cost Reduction, Loom Development Trends and Objectives, Kinematics of Sley and Heald Motion with Reference to Shuttle Loom, Mechanics of Shuttle Checking, Analysis of Warp Tension during Weaving, Cloth Fell Position, Beat Up Force and Pick Spacing

UNIT-II (10 Hrs)

Theoretical Analysis of Weft Insertion in Shuttleless Loom, Electronic Control of Different Motions of Loom, Techno-Economics of Different Methods of Fabric Production

UNIT-III (4 Hrs)

Weft Knitted Fabric Manufacturing by Circular Knitting and Flat Bed Knitting Machine, Warp Knitting Manufacturing

UNIT-IV (12 Hrs)

Classification and Areas of Application of Nonwoven Fabrics, Different Methods of Production of Nonwoven Fabrics, Effect of Machines, Fibre and Process Variables on Properties of Nonwoven Fabrics, Failure Mechanism of Nonwoven Fabrics. Prediction Of Needle Punched Nonwoven Fabric Behavior. Designing of Nonwoven For Engineering Applications. Developments In Nonwoven Machineries.

Recommended Books

1. R. Marks and A.T.C. Robinson, "Principles of Weaving", Textile Institute, UK, **1986.**

2. A. Ormerod, "Modern Preparation and Weaving Machinery", Buttersworth & Co., UK, **1983**.
3. O. Talavasek and V. Svaty, "Shuttleless Weaving Machine", Elsevier Scientific Publishing Co. Amsterdam, **1981**.
4. J. Lunenschloss and W. Albrecht, "Nonwoven Bonded Fabrics", Ellis and Harwood Ltd. UK, **1985.**
5. W. Albrecht, H. Fuchs and Kittelmann, "Nonwoven Fabrics", Wiley – VCH Weinheim. **2003.**
6. V. Mrstina and F. Fejgal, "Needle Punching Textile Technology", Elsevier Scientific Publishing Co. Amsterdam, **1990**.
7. M.L. Gulrajani, "Book of Papers of International Conference on Nonwoven", The Textile Institute, UK, **1992.**
8. D.J. Spencer, "Knitting Technology", 2nd Edn.,, Pergamon Press, **1989.**

GARMENT MANUFACTURING TECHNOLOGY

Subject Code - MTEX1-104 **L T P C** **Duration – 40 Hrs**
4 0 0 4

UNIT-I (6 Hrs)

Introduction to Garment Manufacturing and Indian Apparel Industry

UNIT-II (10 Hrs)

Pattern Alteration Techniques, Principles of Fittings. Selection of Fabrics, Trims and Accessories, Methods of Fabric Inspection, Interlining, Trade Pattern Design and Grading, Types of Seam and Stitches.

UNIT-III (14 Hrs)

Sewing Machinery and Its Special Attachment, Apparel Production System and Practices, Production Planning and Control. Bundling Techniques, Batch, Piece and Sectional Assembling, Special Finishes on Garments Such as Stone Wash, Labeling System, Checking, Pressing, Folding and Packing Standards for Domestic and Export Market, Checking and Quality Control. Ready to Wear Garment

UNIT-IV (10 Hrs)

Garment Comfort, Kawabata and FAST Evaluation System, Plant Layout for a Garment Unit, Application of CAD and CAD Min Garment Manufacturing, Phasing of MFA and Its Implications and Export Documentations

Recommended Books

1. Cooklin Gerry, "Garment Technology for fashion Designers", Om Book Service Delhi, **1997**.
2. Carr Harold and Barbara, "The Technology of clothing Manufacture", Om Book Service, Delhi, **1998**
3. P.V. Mehta and S.K. Bhardwaj, " Managing Quality in Apparel Industry", New Age International (P) Ltd., Delhi.

4. A. Bhattacharye, "Garment TechnologyNCUTE Series", Ed. NCUTE-IIT, Delhi, **2003**.
5. W. Aldrich, "Metric pattern cutting", Om Book Service, Delhi, **1998.**
6. J. Wilson, "Hand book of Textile Design", Woodhead Publishing Ltd., UK, **2002.**

PROCESS CONTROL IN SPINNING & WEAVING

Subject Code -MTEX1-156 **L T P C** **Duration – 40 Hrs**
4 0 0 4

UNIT - I (12 Hrs)

Process Control in Spinning: Optimum Fibre-Mix for Various End Use Requirements, Yarn Realization, Waste Control in Blow room and Card for All Types of Fibres Spun on Cotton System, Minimizing Lea Count Variation, Controlling Yarn Irregularity, Imperfections and Faults, Yarn Tenacity and Elongation, Hairiness. Production of High Quality Export Yarns

UNIT - II (8 Hrs)

Machinery Audit, Work Load, Ambient Environment etc. Trouble Shooting, Some Case Studies, Life of Accessories, Work Load, Indices of Productivity, Temperature and Humidity Control & Its Effect on Performance.

UNIT - III (12 Hrs)

Process Control in Weaving: Principles for Control of Productivity in Different Sections, Contribution of Control in Yarn Winding, Warping, Sizing & Weaving to The Cost of Production in Fabric Manufacture, Splicing, Machine Allocation and Load Distribution, Control of Migration in Sizing, Size Droppings, Sizing Materials, Loom Allocation, Control of Value Loss in Fabrics Through Evaluation & Grading of Fabric Defects, Control of Loom Accessories, Control of Loss of Efficiency by Snap Study.

UNIT - IV (8 Hrs)

Process Control in Special Conditions: Controls in the Process of High Twist Yarns, Blended Yarns, Filament Yarns in Warp and Weft, Controls in The Winding for Processing Yarns for Dyeing & Knitting, Controlling Sloughing Off During Winding, Warping & Weaving, On-Line Data System and Its Use In Controls

Recommended Books

1. ATIRA, "Process Control in Spinning".
2. ATIRA, "Process Control in Weaving".
3. R. Chattopadhyay, "Process Control in Spinning", IIT, NCUTE, Delhi.
4. SITRA, "Quality Control in Spinning".

PRODUCTION MANAGEMENT IN TEXTILE

Subject Code - MTEX1-157 **L T P C** **Duration – 40 Hrs**
4 0 0 4

UNIT – I (10 Hrs)

Operation Management: Operations Management in Corporate Profitability and Competitiveness, Types and Characteristics of Manufacturing and Service Systems,

Operations Planning Control: Planning Production in Aggregate Terms, Quality Assurance

UNIT – II (10 Hrs)

Plant Location and Layout: Plant Layout: Features, Basic Principles, Types of Layout, Merits And Demerits, Optimization Of A Product/Line Layout And Process Layout. Location of Facilities: Nature of Location Decision, Situations That Influence Location Decision, Backward Areas And Industrial Policy, Behavioral Aspects In Location Planning

UNIT – III (10 Hrs)

Material Management: Purchasing, Objectives, Value Engineering, Vendor Relations, Selection of Vendors, Material Requirement Planning, MRP Calculations, Material Handling

UNIT - IV (10 Hrs)

Job Evaluation and Waste Management: Job Evaluation, Incentive Schemes, Job Redesign, Work Measurement Techniques, Different Types of Pollution: Water, Air, Solid Waste, Soil, Noise, Odours etc. Pollution Caused by Textile Industries, Waste Definition, Characteristics and Perspectives, Different Types of Waste

Recommended Books

1. M.R. Raymond, "Production and operations management", Mcgraw-Hill international Edition, New York, **1993.**
2. S.E. Buffa and R. Sarin, "Modern Production/Operations Management**",** John Willey and Sons, Delhi**, 1995.**
3. R. Collard, "Total quality", Jaico Publishing House, Mumbai, **1988**.
4. S.K., Sharma, Sand Sharma T, "Industrial Engineering and Operations Management", S.K. Kataria and Sons, Delhi, **1996**.
5. S. Asolekar, "Environmental Problems in Chemical Processing of Textiles"1st Edn., NCUTE, Department of Textile Technology, IIT-Delhi, **2000.**

TEXTILE PRODUCT DESIGN

Subject Code - MTEX1-158 **L T P C** **Duration - 40 Hrs**
4 0 0 4

UNIT-I (10 Hrs)

Concepts of Engineering, Product Development and Design, Characteristics of Successful Product Design, Product Development Process Tools, Product Architecture. Evolution of Engineering, Engineering Attributes and Concepts

UNIT-II (10 Hrs)

Basic Concepts and Critical Factors for Product Development, Simplified View of Product Development, The Product Development Cycle, Business and Marketing Aspects Related To Product Development Product-Focus Versus User-Focus Product, Development Role Of Research in Product Development, The Core Task in Product Development

UNIT-III (10 Hrs)

The Product Design Cycle, Design Conceptualization Design Analysis, Basic Differences between Design Conceptualization and Design Analysis, General Guidelines for Design Conceptualization Basic Tools of Design Conceptualization

UNIT-IV (10 Hrs)

Purpose of Design Analysis, Optimization Analysis: Linear programming, Product Design Economics.

Recommended Books

1. Kevin Otto, & Kristin Wood, "Product Design Techniques in Reverse Engineering and New Product Development", Pearson Education Publication, 1st Edn., **2006.**
2. K.T. Ulrich, "Product Design and Development", Tata McGraw Hill, 3rd Edn., **2004.**

PHYSICAL PROPERTIES OF FIBRES

Subject Code - MTEX1-159 **L T P C** **Duration – 40 Hrs**
4 0 0 4

UNIT – I (10 Hrs)

Moisture Absorption and Desorption of Fibres, Sorption Isotherms, Heat of Sorption and Theory of Sorption, Swelling of Fibres.

UNIT - II (10 Hrs)

Mechanism of Deformation of Fibres, Principles of Elasticity and Visco-Elasticity, Stress-Strain Behaviour of Textile Fibres, Creep and Stress Relaxation. Dynamic Mechanical Properties of Fiber, Model Theory, Time Temperature Superposition Principle, Thermodynamic Analysis of Deformation.

UNIT - III (10 Hrs)

Fiber Friction, Its Nature, Theory, Application and Measurement, Unibirefringence and Its Measurement, Thermal Transition and Its Importance

UNIT – IV (10 Hrs)

Dielectric Properties of Fiber, Static Electricity and Measurement of Static Charge in Fibres, Fiber Micro Structure, X-Ray Analysis, IR Spectroscopy and SEM

Recommended Books

1. R. Meredith, 'The Mechanical Properties of Textile Fibres', North Holland Publishing Co; Amsterdam, **1959.**
2. W.E. Morton and J.W.S. Hearle,"Physical Properties of Textile Fibres", 1st reprint, The Textile Institute, Manchester, **1986.**
3. V.B. Gupta and V.K. Kothari, "Manufactured Fibre Technology"1st Edn., Chapman and Hall, London, **1997.**
4. J.W.1.S. Hearle, Polymers and their Properties, Vol. I, John Wiley and Sons, NY, **1982.**

M.Tech.
Textile Technology

SECOND SEMESTER
SYLLABUS

STRUCTURAL MECHANICS OF YARNS

Subject Code - MTEX1-205 **L T P C** **Duration – 40 Hrs**

4 0 0 4

UNIT-I (07 Hrs)

Elements of Yarn Geometry, Geometry of Helix and Its Application to Yarn Structure, Geometry of Folded Yarn, Yarn Diameter and Density

UNIT-II (12 Hrs)

Theoretical Analysis of Effect of Fiber Properties and Their Geometrical Configuration on the Tensile and Bending Properties of Yarn, Theories and Analysis of Yarn Strength and Irregularity

UNIT-III (12 Hrs)

Fiber Migration Characteristics of Continuous Filament and Spun Yarns, Breakage of Continuous Filament and Spun Yarns, Effect of Properties of Constituent Fibres and Blend Composition on Behavior of Composite Yarn.

UNIT-IV (9 Hrs)

Effect of Yarn Structure on Different Properties of Yarns, Structure and Property Relationship of Ring, Rotor, Air-Jet and Friction Spun Yarns

Recommended Books

1. J.W.S. Hearle, P. Grosberg and S. Backer, "Structural Mechanics of Fibres Yarns and Fabrics", Wiley Interscience, New York, **1969.**
2. B.C. Goswami, J.G. Martindale and F. Scardino, "structure and applications", Wiley Interscience Publisher, New York, **1995.**
3. J.W.S. Hearle, J.J. Thwaites and J. Amirbayat, "Mechanics of Flexible Fibre Assemblies", Sijthff and Noordhoff International Publishers BV, Alphen aan den Rijn, Netherlands, **1980.**

STRUCTURAL MECHANICS OF FABRICS

Subject Code - MTEX1-206 **L T P C** **Duration – 40 Hrs**

4 0 0 4

UNIT-1 (10 Hrs)

Fabric Cover Factor and Its Significance, Engineering Approach for Fabric Formation, Pierce's Cloth Geometry, Practical Aspect of Cloth Geometry, Graphical Relationship in Cloth Geometry for Plain, Twill and Sateen Weaves

UNIT-II (10 Hrs)

Concept of Jammed Structure, Analysis of Racetrack Section of Yarn in Cloth Geometry, Theoretical Investigation of Weavability Limit of Yarns, Elastic Thread Model for Fabric

UNIT-III (10 Hrs)

Concept of Fabric Relaxation for Knitted Fabrics, Geometry and Properties of Weft Knitted Fabrics – Importance of Doyle's and Munden's Research, K-Values and Pierce's Geometry of Knitted Fabrics

UNIT-IV (10 Hrs)

Tensile and tearing Behaviour of Fabric, Bending Deformation of Fabric, Bending Hysteresis of Woven Fabric, Buckling, Shear And Drape Behaviour of Woven Fabric, Mechanical Properties of Nonwoven Needle Punch and Stitch Bonded Fabric, Brief Study of Formability, Tailorability and Hand of Apparel Fabric.

Recommended Books

1. J.W.S. Hearle, P. Grosberg and S. Backer, "Structural Mechanics of Fibres Yarns and Fabrics", Wiley Interscience, New York, **1969.**
2. F.T. Peirce and J.R. Womersley, "Cloth Geometry", The Textile Institute, Manchester, **1978.**
3. J.W.S. Hearle, J.J. Thwaites and J. Amirbayat, "Mechanics of Flexible Fibre Assemblies", Sijthff and Noordhoff International Publishers BV, Alphen aan den Rijn, Netherlands, **1980.**
4. **J. Hu, "Structural Mechanics of Fabrics", Woodhead Publishing Co., Cambridge, UK, 2006.**

RESEARCH METHODOLOGY

Subject Code - MTEX1-260 **L T P C** **Duration – 40 Hrs**
4 0 0 4

UNIT-I (10 Hrs)

Overview of Research: Research and Its Type, Identifying and Defining Research Problem and Introduction to Different Research Designs, Essential Constituents of Literature Review, Basic Principles of Experimental Design, Completely Randomized, Randomized Block, Latin Square, Factorial, Response Surfaces

UNIT-II (10 Hrs)

Methods of Data Collection: Primary and Secondary Data, Methods of Primary Data Collection, Classification Secondary Data, Designing Questionnaires and Schedules

Sampling Methods: Probability Sampling -Simple Random Sampling, Systematic Sampling, Stratified Sampling, Cluster Sampling and Multistage Sampling,
Non –Probability Sampling: Convenience Sampling, Judgement Sampling, Quota Sampling, Sampling Distributions

UNIT-III (10 Hrs)

Processing and Analysis of Data: Statistical Measure and Their Significance: Central Tendencies, Variation, Skewness, Kurtosis, Time Series Analysis. Correlation and Regression, Testing Of Hypothesis: Parameters (T, Z and F) Chi Square, ANOVA and Non Parametric Tests

Multivariate Analysis: Multiple Regression, Factor Analysis, Discriminant Analysis, Cluster Analysis, Multidimensional Scaling.

UNIT-IV (10 Hrs)

Reliability and Validity: Test - Retest Reliability, Alternative Form Reliability, Internal-Comparison Reliability and Scorer Reliability, Content Validity, Criterion Related Validity and Construct Validity

Essentials of Report Writing

Note: Application and Uses of Various Software for Case Studies Should Be Essential.

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. W.G. Zikmund, "Business Research Method" 7th Edn., Thomson South Western.
4. K.N. Krishnaswami, A.I. Sivakumar and M. Mathirajan, "Management Research Methodology", Pearson Education, New Delhi.
5. C.R. Kothari, "Research Methodology Methods and Techniques" New Age International Publishers, 2nd Edn.

COMPUTER PROGRAMMING AND ITS APPLICATIONS

Subject Code – MCAP0-195 **L T P C** **Duration – 40 Hrs**

4 0 0 4

UNIT - I (6 Hrs)

Fundamentals of Computer Programming, Programming Methodology: Structured Programming and Concepts of Object-Oriented Programming

UNIT - II (12 Hrs)

Programming in C++ Statements and Expressions, Control Statements, Structure, Functions: Function Overloading etc.

UNIT – III (10 Hrs)

C++ as Object-Oriented Programming Language: Classes and Objects, Data Abstraction

UNIT – IV (12 Hrs)

Inheritance - Multilevel and Multiple Inheritance etc., Polymorphism - Operator Overloading and

Virtual Functions, File Handling. Application Development using C++.

Recommended Books

1. Sumita Arora, "Fundamentals of Computer Programming & Information Technology", Dhanpat Roy & Sons.

2. E. Balagurusamy, "Object Oriented Programming using C++".
3. Robert Lafore, "Object Oriented Programming with C++" Galgotia Publications.

ADVANCE KNITTING TECHNOLOGY

Subject Code - MTEX1-261 **L T P C** **Duration – 40 Hrs**
4 0 0 4

UNIT-I (10 Hrs)

Concepts of Loop Formation in Weft Knitting, Different Forces Acting on The Needle Butt and Mechanics of Loop Formation. Study of Dynamics of Knitting Process, Study of Different Machines, Process and Yarn Parameters Affecting The Yarn Tension in Knitting Zone and Loop Length, Concept of 'Robbing Back' of Yarn in Loop

UNIT-II (10 Hrs)

Study of Design and Performance of Knitting Cam and Increase in Knitting Production, Yarn Feeding Devices on Circular Knitting Machines

UNIT-III (10 Hrs)

Geometry and Properties of Weft Knitted Fabrics, Importance of Doyle's and Munden's Research, K-Values, Pierce's Geometry of Knitted Fabric

UNIT-IV (10 Hrs)

Outlines of Process Control in Knitting, Use of Electronics and Computers and other Developments in Knitting, Features of Warp Knitted Fabrics and Their Uses.

Recommended Books

1. D.J. Spencer, "Knitting Technology", 3rd Edn., Woodhead Publishing Limited, England, **2001.**
2. S.C. Ray, "Fundamentals and Advances in Knitting Technology", Woodhead Publishing India Limited, New Delhi, **2013.**
3. C. Mazza and P. Zonda, "Knitting: Reference Book of Textile Technologies", 2nd Edn., ACIMIT, Italy, **2001.**

POST SPINNING OPERATIONS

Subject Code - MTEX1-262 **L T P C** **Duration – 40 Hrs**
4 0 0 4

UNIT-I (8 Hrs)

Drawing: Drawing Process, Neck Drawing, Initiation and Propagation of Neck, Neck Stabilization. Natural Draw Ratio, Effect of Temperature and Strain Rate on Neck Drawing, Prediction of Neck Formation, Influence of Drawing on Structure and Properties of Filament, Spin - Draw process.

UNIT-II (16 Hrs)

Texturing: Texturing and Warping Process, Material and Process Variables in Texturing and Their Influence on Yarn Quality, Recent Advances in Texturing, Testing and Evaluation of

Textured Yarn Properties of Fabrics Made from Textured Yarn.

UNIT-III (8 Hrs)

Heat Setting: Heat Setting Process, Parameters for Heat Setting, Equipment for Heat Setting and Evaluation of Degree of Set.

UNIT-IV (8 Hrs)

Multifilament Sewing Threads: Post Spinning Operation on Multifilament Sewing Threads

Recommended Books

1. V.B. Gupta and V.K. Kothari, "Manufactured Fibre Technology", 1st Edn., Chapman and Hall, London, **1997.**
2. H.F. Mark, S.M. Atlas, E. Cernia, "Man Made fibre Science and Technology", 1st Edn.,Vol. I, II, III, Willey Interscience Publishers, NewYork, **1967.**
3. Macintyre J E, "Synthetic Fibres", Woodhead Fibre Science Series, UK, **2003**
4. F. Fourne, "Synthetic Fibres: Machines and Equipment, Manufacture, Properties", Hanser Publisher, Munich, **1999.**

M. Tech.

Textile Technology

THIRD SEMESTER

SYLLABUS

PROFESSIONAL SKILLS

Subject Code -MTEX1-307 **L T P C** **Duration – 40 Hrs**

4 0 0 4

UNIT I (8 Hrs)

Communication, Its types & Significance: Communication; process of communication; its kinds, channels and role in the society.

Reading Skills: Process of reading; reading purposes, models, strategies, methodologies; reading activities, structure of meaning techniques.

UNIT II (8 Hrs)

Writing Skills: Elements of effective writing; writing styles; scientific and technical writing.

Grammar: Transformation of sentences; words used as different parts of speech; one word substitution; abbreviations, technical terms etc.

UNIT III (12 Hrs)

Business Correspondence : Business letters; elements of business writing; kinds of business letters – office order memorandum, report, purchase order, quotations and tenders, job application letters, personal resume and curriculum vitae etc.

Listening Skills: The process of listening; the barriers to listening; the effective listening skills; feedback skills.

UNIT IV (12 Hrs)

Speaking Skills: Speech mechanism, organs of speech, production and classification of speech sounds, phonetic transcription; the skills of effective speaking, the components of an effective talk; oral presentation and the role of audio visual aids in it.

Discussion, Meeting and Telephone Skills: Group discussion; conducting a meeting; attending telephonic calls.

TEXT BOOKS

a. Bhattacharya, Indrajit, An Approach to Communication Skills, Dhanpat Rai Co.,(Pvt.) Ltd., New Delhi.
b. Wright, Chrissie, Handbook of Practical Communication Skills, Jaico Publishing House, Mumbai.
c. Gartside, L, Modern Business Correspondence, Pitman Publishing, London.
d. Day, Robert A., How to Write and Publish a Scientific Paper, Cambridge University Press, Cambridge.
e. Gimson, A.C., An Introduction to the Pronunciation of English, ELBS

f. Bansal, R.K. and Harrison, J.B. Spoken English Orient Longman, Hyderabad.

REFERENCE BOOKS

1. Roach, Peter, English Phonetics & Phonology, Cambridge University Press, Cambridge.
2. Rutherford, Andrea J. Basic Communication Skills for Technology, Addison Wesley Longman, New Delhi.
3. Scott, Bill, The Skills of communicating, Jaico Publishing House, Mumbai.
4. Janis, J. Harold, Writing and communicating in Business, The Macmillan Company, New Delhi.
5. Berry, Thomas Elliott, The Most Common Mistakes in English Usage, Tata McGraw Hill Publishing Company Limited, New Delhi.

HIGH PERFORMANCE FIBRES AND THEIR COMPOSITES

Subject Code - MTEX1-363 **L T P C** **Duration - 40 Hrs**
4 0 0 4

UNIT – I (10 Hrs)

Polyamide Fibres: Aliphatic Polyamide (N6 and 66) and Their Application in Rubber Tyre. Fully Aromatic Polyamides or Aramid Fibres (Nomex And Kevlar), Their Manufacture, Structure, Properties and Applications

UNIT – II (10 Hrs)

Carbon Fibres: Different Precursors, Preoxidation, Carbonization, Graphitization, Structure and Properties. Application in Composite. Flexible Chain High Performance Fibres, Manufacture and Application in Composite. Glass fiber, Manufacture, Properties and Applications in Composite.

UNIT-III (10 Hrs)

Nanocomposite: Introduction, Advantages and Different Nano-materials Commonly Used as Fillers Carbon Nanotubes, Carbon Nano-fibres and Nano Clay.

UNIT-IV (10 Hrs)

Definition of Composite, General Introduction to Fibres and Resins for Composites, Composite Fabrication Techniques, Matrices and Inter phase.

Recommended Books

1. N.G. Mc Crum, C.P. Buckley and C.B. Bucknall, "Principle of Polymer Engineering", Oxford University Press, New York, **1990.**
2. Ed. J.W. Stteare, "High Performance Fibres", Woodhead Publishing Co., England, **2001.**
3. D. Hull, "An Introduction to Composite Materials",Cambridge University Press, UK, **1981**.
4. H. Broody, "Synthetic Fiber Materials", Longman Scientific and Technical, UK, **1994.**

ENVIRONMENTAL PRACTICES IN TEXTILES

Subject Code - MTEX1-364 **L T P C** **Duration – 40 Hrs**
4 0 0 4

UNIT – I (10 Hrs)

Introduction to Environment, The Impact of Human upon the Environment, Improvement of Environment Quality, Role of Environmental Engineer.

UNIT - II (10 Hrs)

Different Types of Pollution: Water, Air, Solid Waste, Soil, Noise, Odours etc. Pollution Caused by Textile Industries.

UNIT – III (10 Hrs)

Waste: Definition, Characteristics and Perspectives, Different Types of Waste. Waste Water Collection, Treatment and Disposal, Solid Waste Generation, Collection and Disposal.

UNIT-IV (10 Hrs)

The Textile Effluents, Textile Waste Characteristics, Textile Waste Water Problems, Chemicals Used in Textile Industry, Treatment of Textile Effluents and its Testing.

Recommended Books

1. S. Asolekar, "Environmental Problems in Chemical Processing of Textiles",1st Edn., NCUTE, Department of Textile Technology, IIT-Delhi, **2000.**
2. V. Padma, "Textile Effluents" 1st Edn.,. NCUTE, Department of Textile Technology, IIT-Delhi, **2002.**
3. B. Edmund, "The Treatment of Industrial Wastes" 2nd Edn., Tata McGraw-Hill, New Delhi, **1976.**
4. M.N. Rao, "Environmental Engineering" 2nd Edn., Tata McGraw-Hill, New Delhi, **1993.**

TECHNICAL TEXTILES

Subject Code - MTEE1-365 **L T P C** **Duration - 40 Hrs**
4 0 0 4

UNIT - I (10 Hrs)

Definition and Scope for Technical Textiles, Brief Idea about Technical Fibres, Role of Yarn and Fabric Construction. Filtration Textiles: Definition of Filtration Parameters, Filtration Requirements

UNIT - II (10 Hrs)

Geotextiles: Brief Idea about Geosynthtics and Their Uses, Essential Properties of Geotextiles, Geotextiles Testing and Evaluation, Application Examples of Geotextiles

UNIT – III (12 Hrs)

Medical Textiles: Classification of Medical Textiles, Description of Different Medical Textiles. Protective Clothing: Brief Idea about Different Type of Protective Clothing, Functional Requirement of Textiles in Defence including Ballistic Protection Materials and Parachute Cloth, Flame Retardant Clothing, Chemical Protective Clothing.

UNIT - IV (8 Hrs)

General Technical Textile: Textiles in Agriculture, Electronics, Power Transmission Belting, Hoses, Canvas Covers and Tarpaulins.

Recommended Books

1. Ed. A.R. Horrocks and S.C. Anand "Handbook of Technical Textiles", Woodhead Publication Ltd., Cambridge, **2000.**
2. Ed. M. Raheel, Modern Textile Characterization Methods", Marcel Dekker, Inc., **1996.**
3. Ed. G.V. Rao and G.V.S. Raju, "Engineering with Geosynthetics", Tata McGraw Hill Publishing Co. Ltd., New Delhi, **1990.**
4. S.K. Mukhopadhyay and J.F. Partridge, "Automotive Textiles", The Textile Institute, Vol. 29, **1999.**