

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-I

1. ADVANCES IN YARN MANUFACTURING TECHNOLOGY – I

Lectures	:	3 hrs/week
Assignment	:	1 hr/week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 marks

1) A critical study of factors affecting opening, cleaning and blending in blowroom. Role of air currents in blowroom. Critical design aspects of modern blowroom machinery. Research Papers – i) Survey of blow room practice – F. T. Peirce ETAL. Journal of Textile Institute – 1954 ii) The development of cleaning ranges in adoption to changing properties of raw materials – F Leifield, ITB 1/90.

2) Basic theories of carding. Critical design aspects in different zones of modern card. Role of air currents in card. Design developments of card wires. Conditions of fibre transfer. Transfer efficiency and quality. Factors affecting transfer efficiency. Configuration and disorder of fibres in a card sliver. Nep formation / removal in card. Research Papers – i) Some theoretical and experimental data relating to the design of high sped cards – V. V. Krylov, Tech. of Textile industry USSR 1962 No. 2. ii) Fibre arrangement in card sliver – W. E. Morton and R. S. Summers – JTI 1949.

3) Importance of combing preparation. Critical design aspects in various components of a comber. Researches on combing preparation. Fibre fractionation at comber, factors affecting fractionation in a comber. Design developments in modern comber. Research Papers – i) Effect of hooks in laps on fractionation on cotton combing – R. G. Owalekar – TRJ 1969. 2. ii) Fractionating efficiency of comber - R. G. Owalekar – 7th Joint Technological Conference – P-108.

4) Theories of drafting. Causes for irregularity in drafted strand. Role of fibre friction in drafting – Drafting force – Definition, Measurement and study of factors affecting

drafting force. Design significance of modern drawframes and speed frames. Research Papers – i) Fibre motion in roller drafting – Gar Faster – JTI 1956. ii) A study of the theory of drafting force in roller drafting process – Ismail Dogu – TRJ - 1971. iii) Reiter manual on Auto levellers and setting

5) Auto levelling: - Concept and necessity. Types of auto levellers, their applications and evaluation.

6) Fibre Blending – Importance – Methods of blending and analysis. Blend intimacy and measures of blend variation, significance of developments in blending techniques. Research Papers – i) A measure of fibre distribution in blended yarns and its application to the determination of the degree of mixing achieved in different processes – AE DE barr & P. G. Walker – JTI 1957.

Note: Term work for this subject will be based on above syllabus.

REFERENCE BOOKS:-

- 1) The Textile Institute Publication - Manual of Textile Technology – Short Staple Spinning Series
Vol.I – The Technology of short staple spinning by W. Klein.
Vol.-II – A Practical Guide to Opening & Carding by W. Klein.
Vol.III – A Practical Guide to Combing & Drawing – W. Klein.
Vol.VI - Man-made fibre spinning – W.Klein
- 2) Series publications of NCUTE Training Programs
- 3) 'Fundamentals of Spun Yarn Technology' by Carl A. Lawrence.
- 4) 'Spun Yarn Technology' by Eric Oxtoby.
- 5) Yarn Production-Theoretical Aspects by P.Grosberg & C.lype.
- 6) Textile Progress Series by Textile Institute,Manchester.

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-I

2. ADVANCES IN FABRIC MANUFACTURING TECHNOLOGY-I

Lectures	:	3 hrs/week
Assignment	:	1 hr/week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 marks

1) Technological significance in the design development of automatic winding machine with respect to unwinding accelerator, auto speed, yarn tensioners, various splicers, clearers & fault removal, contamination clearers, yarn guide drum & winding unit, length & diameter measurement etc.

2) Influence of winding process on yarn quality, package build. Various package quality for different application such as weaving, knitting, dyeing etc. Research articles based on unwinding yarn tension, yarn clearers, package build, speed & its variation, changes in yarn quality during winding.

3) Modern electronic control system & their role in optimizing quality & productivity. Techno-economical aspects of winding.

4) Technological significance in the design developments of beam and sectional warping machine with respect to creels, design, tensioners, drum design, Drive, geometrical aspects of machines. Modern Electronic control systems.

5) Influence of warping process on yarn quality, beam build. Research articles based on yarn tension, speed, beam build etc.

6) Technological significance in the design development of sizing machine with respect to creel saw box, pre-drying, drying, and headstock. Modern quality control systems

such as temperature, size pick up, stretch control, moisture control, PLC Drive etc. Synthetic ingredients & their suitability.

7) Influence of process parameters on yarn quality and processing behaviour

8) Automation in sizing process, size recipe formulation & re-circulation. Modern electronic control systems. Research articles based on tension, stretch, size recipe & machine design etc.

9) Knitting: Study of design, functional and constructional aspects of different zones of circular knitting machines, such as yarn feeding zone, loop forming zone and fabric takedown zone. Effect of machine and material parameters on fabric quality. Geometrical aspects of knitting fabrics. Such as wale and coarse density, stitch length, Run in ratio, Tightness factor. Study of research articles on robbing back, yarn tension, Spirality, dimensional stability, fibre fly generation, barriness, shrinkage, effect of yarn quality parameters, yarn lubrication, Prediction of fabric dimensional properties, effect of processing on fabric dimensional characteristics.

Note: Term work for this subject will be based on above syllabus.

REFERENCE BOOKS:-

1. Modern Preparation & Weaving Machinery by A. Ormerod.
2. Manual of Non Woven by Dr. Radko Krma.
3. Geotextiles by N.W.M. John.
4. Warp Sizing by J.B. Smith.
5. Textile Maths Vol-III by J.E. Booth.
6. Circular Knitting – by Chandra sekhar Iyer.
7. Circular Knitting Technology – IIT, Delhi, Publication.

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-I

3. THEORY OF TEXTILE STRUCTURES – I

Lectures	:	3 hrs/week
Assignment	:	1 hr/week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 marks

1. A brief review of fibre structure and morphology, Structures of different fibres and their effect on fibre properties.
2. Tensile properties of fibres – Effects of variability – Elastic recovery – Time effects – fibre stress and deformation other than tensile – Bending and bending fatigue – shear properties – loop strength and knot strength – Torsional properties, Model theory of visco elasticity, rubber elasticity.
3. Theories of mechanical properties – variety of approaches – structural effect in various fibres – Theories of time dependence. Thermo mechanical response of fibres.
4. Nature and mechanism of Heat setting of fibres – physics of heat setting – Heat setting and structural parameters – Mechanism of heat setting – Thermodynamic Argument of heat setting – multiple sequence – structural model.
5. Characteristics of different yarn structures – structural parameters – fibre configuration in yarn – Ideal migration, characterization of migration behaviour, theory of migration, migration in spun yarns. Yarn structure in relation to the aesthetic and tactile qualities of apparel fabrics.

6. Twist in yarn – geometry of twisted yarns – yarn size and twist factor – contraction because of twist – twist and fibre packing in yarn – (ideal and real) – effect of twist on yarn diameter and volume – Twist and yarn bending measurement of yarn diameter.

Note: Term work for this subject will be based on above syllabus.

REFERENCE BOOKS:-

1. Fibre Science – Edited by J.M. Preston, Published by The Textile Institute, Manchester.
2. Cotton Testing by Steadman,
3. Physical Testing of Textiles by B.P. Saville
4. Physics of Fibres – An Introductory Survey – Woods H.J. published by The Institute of Physics – London, 1955.
5. Physical Properties of Textile Fibres – Morton W.E. and Hearle J.W.S. published by The Textile Institute Manchester.
6. Fibre Microscopy – Stores J.L. – published by London National Trade Press.
7. Structure / Property relationship in Textile Fibres – Textile Progress Vol.20, No.4 – The Textile Institute, Manchester.
8. Textile Fibres Yarns and Fabrics – Kaswell E.R. published by Reinhold Publishing Corporation – New York, 1954.
9. Structural Mechanics of fibres, yarns & fabrics by Hearle, Grosberg and Backer.
10. Textile Yarn by Martindale and Goswami.

M. TEXT. (TEXTILE TECHNOLOGY) SEMESTER - I

4. ADVANCED COMPUTER PROGRAMMING AND APPLICATIONS

Lectures	:	3 hrs/week
Assignment	:	1 hr/week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 marks

Unit-I

Object-oriented Programming using C++

Introduction to object oriented programming, basic program construction, variable types, loops & decisions, structures, functions, objects & classes, arrays, polymorphism, operator overloading, function overloading, inheritance [8]

Unit-II

Relational Databases

Relational Model, Database Users, Roles of Database Administrator, keys, Domain Constraints, Referential Integrity, Structured Query Language (SQL), Database recovery methods [8]

Unit-III

E-Commerce

The scope of electronic commerce, definition of electronic commerce, E-commerce and the trade cycle, Electronic markets, Electronic data interchange, Internet Commerce, Business Strategy in E-commerce, The value chain, supply chain, Porter's value chain model. Inter organization value chains, Business to business E-commerce, Inter organizational transaction, the credit transaction trade cycle. Advantages & disadvantages of Electronic markets. Application of E-commerce in textile industries. [6]

Unit-IV

ERP and Its Related Technologies

Introduction to ERP, Basic ERP concepts, Justifying ERP Investments, RISK of ERP, Benefits of ERP. ERP and Related Technologies, Business Process Reengineering (BPR), Product Life Cycle Management, Supply Chain Management (SCM), Customer Relationship Management (CRM). Use of ERP in Textile Industry. [6]

Unit-V

SAP

Architecture of SAP R/3, SAP Integrated- Analysis, Implementation, and Design, Three-Tier Architecture, Need of Multi-tier Architecture, Integrating Environments. [4]

Unit-VI

Business Intelligence System

Technical Architecture overview, Back room Architecture, Presentation Server Architecture, Front room Architecture, Metadata, Standard Reports, Dashboards and Scorecards [6]

REFERENCE BOOKS:

- 1) Object Oriented Programming with C++ - E. Balagurusamy.
- 2) Database System Concept by Henry F. Korth, Abraham Silberschatz, Sudarshan (McGraw Hill Inc.)
- 3) E-Commerce – David Whiteley, TmH.
- 4) ERP Demystified - Alexis Leon, TMH
- 5) Enterprise Resource Planning – Alexis Leon, TMH.
- 6) SAP R/3 SAP Architecture, Administration, Basis, ABAP Programming with MM and SD Modules – Dreamtech Press
- 7) The Data Warehouse Lifecycle Toolkit By Ralph Kimball, Ross, 2nd edition, Wiley Publication

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-I

5. FUNCTIONAL & HIGH PERFORMANCE FIBRES (ELECTIVE –I)

Lectures	:	3 hrs/week
Assignment	:	1 hr/ week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

- I) Introduction to High Performance Fibres.
- II) Aramids: - Manufacturing, properties of fibres, and applications.
- III) Gel spun high performance polyethylene fibres:-Manufacture, fibre characteristics and applications,
- IV) Carbon Fibres: Introduction, PAN and pitch based carbon fibres, physical properties and applications.
- V) Glass Fibres: fibre manufacture, properties and Applications
- VI) Ceramic Fibres: Introduction, silicon carbide based fibres, Alumina based fibres. Single crystal oxide fibres.
- VII) Chemical resistant fibres and thermally resistant fibres: Chlorinated fibres: PVDC, Fluorinated Fibres: PTFE, PVF, PVDF & FEP, Poly (etheretherketones): PEEK, Poly (phenylene sulphide): PPS, Poly (ether imide) : PEI, semi-carbon fibres: oxidized acrylic, poly benzimidazole, PBI Polybenzoxazoles, PBO.

Note: Term work for this subject will be based on above syllabus.

REFERENCE BOOKS :-

1. High Performance Fibres by J. W. S. Hearle
2. Carbon Fibres by Donnet & Bansal
3. Hand book of Fibres Science & Technology : High Technology Fibres edited by Manachem Lewin & Jack Preston
4. New Fibres by Hongu and Phillips.
5. Kevlar Aramid Fibres by yang.

M. TEXT. (TEXTILE TECHNOLOGY) SEMESTER - I (ELECTIVE-I)
5. TEXTILE REINFORCED COMPOSITE MATERIALS

Lectures	:	3 Hrs / Week
Assignment	:	1 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

1. General introduction

Meaning and types of composite materials, design of composite materials, the concept of load transfer.

2. Fibers and matrices

Reinforcements: carbon fibers, glass fibers, organic fibers, silicon carbide, Strength of reinforcements: thermal stability, compressive strength, fiber fracture and flexibility, A statistical treatment of fiber strength.

Matrices: polymer matrices, metal matrices, ceramic matrices.

3. Fiber architecture:

Volume fraction and weight fraction, fiber packing arrangements, clustering of fibers and particles.

Long fibers: laminates, woven, braided and knitted fabric arrays, characterisation of fiber orientations in a plane.

Short fibers: fiber orientation distributions in three dimensions, fiber length distributions.

4. Fabrication:

Liquid resin impregnation routes, pressurized consolidation of resin prepregs, injection mouldings of thermoplastics, hot press mouldings of thermoplastics, powder blending and consolidation, physical vapour deposition diffusion bonding of foils, Layered ceramic composites, reactive processing, carbon/carbon composites, powder based routes.

5. The interface region:

Bonding mechanisms: absorption and wetting, inter diffusion and chemical reaction, electrostatic attraction, mechanical keying, residual stresses.

6. Bond strength:

Measurements of bond strength: single fiber pull out strength, single fiber push out and push down strength.

Control of bond strength: coupling agents and environmental effects, toughness reducing coatings, interfacial chemical reaction and diffusion barrier coatings.

7. Strength of composites:

Failure mode of long fibers like axial tensile failure, transverse tensile failure, shear failure, failure in compression.

Failure of laminae under off-axis loads. Strength of laminates like tensile cracking, interlaminar stresses and edge effects.

Basic concepts of fracture mechanics, interfacial fracture and crack deflection.

Contributions to work of fracture like Matrix deformation, fiber fracture, interfacial debonding and frictional sliding.

Subcritical crack growth like fatigue and stress corrosion cracking.

8. Thermal behavior of composites: Thermal stresses and strains, thermal expansivities, thermal cycling of unidirectional composites, thermal cycling of laminates, basics of matrix and fiber in relation to creep, axial creep of long fiber composites, transverse creep and discontinuously reinforced composites.

Thermal conduction mechanism like heat transfer, conductivity of composites and interfacial thermal resistance.

9. Applications: minesweeper hull, sheet processing rolls, helicopter rotor blade, and golf driving club, racing bicycle, diesel engine piston, microelectronics housing, aircraft brakes and gas turbine combustor can.

Term Work

Assignments / Seminars / Mini Projects based on above topics.

REFERENCE BOOKS :-

1. Introduction to Composite Materials, Clyne and Hull
2. Fabre reinforced composites by P. K. Mallick
3. Composite materials: Engineering & science by F. L. Mathew & R. D. Rawlings.
4. Micro structural Characterization of fibre reinforced composites by John Summerscales.
5. New millennium fibres by T. Hongu & G. O. Phillips.
6. Effects of mechanical & Physical properties on fabric hand by H. M. Behery.
7. 3-D Textile reinforcements in composite materials by Prof. A. Miravete
8. Mechanics of Textile & Laminated composites by A. E. Bogdanovich & C. M. Pastore.
9. Textile Testing & Analysis by B. J. Collier.
10. Handbook of Technical Textiles by A. R. Horrocks & S. C. Anand.

M. TEXT. (TEXTILE TECHNOLOGY) SEMESTER - I ELECTIVE-I

5. ENGINEERING OF APPAREL FABRICS AND GARMENTS

Lectures	:	3 Hrs / Week
Assignment	:	1 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

1. Handle and making-up performance of fabrics and garments

Fabric Objective Measurement (FOM) of fabric handle and making-up performance, other methods, Effects of fibre properties, Effects of yarn properties, Effects of fabric properties, Effects of dyeing and finishing (chemical and mechanical) treatments

2. Wrinkling of fabrics and garments

The measurement of wrinkle and crease recovery, Surface smoothness after repeated laundering, Factors affecting fabric wrinkling and recovery, Factors affecting wrinkling during wear, Effects of fibre properties, Effects of yarn and fabric parameters, Effects of fibre, yarn and fabric processing parameters

3. Pilling of fabrics and garments

Effects of fibre composition and properties, Effects of yarn structure and properties, Effects of fabric structure and properties, Effects of fibre, yarn and fabric processing parameters

4. Bagging of fabrics and garments

The measurement of bagging, Effects of fibre properties, Effects of yarn properties, Effects of fabric properties, Effects of garment construction, Effect of finishing, Fabric bagging prediction and modelling

5. Fabric and garment drape

Drape measurement, Engineering fabric drape, Empirical prediction of drape, Modelling fabric and garment drape, Drape models in CAD and Internet systems

6. Appearance issues in garment processing

Seam appearance, Appearance issues in fusing, Appearance issues in garment dyeing, Appearance issues in pressing, Storage and packaging

Durability of fabrics and garments

Abrasion resistance, Fabric and garment strength, Effects of dyeing and finishing on fabric strength, Modelling and predicting fabric strength

7. Physiological comfort of fabrics and garments

Different aspects of clothing physiological comfort, Tactile comfort, Assessment of tactile comfort, Thermophysiological comfort, Liquid water transport properties of fabrics and clothing, Garment fit and ease of body movement, Pressure comfort, Effects of colour and surface texture, Effect of garment design, Effects of garment sizing and fit, Fashion and prejudice

8. Flammability of fabrics and garments

Burning mechanisms, Index for burning behaviour of textiles, Effects of fibre composition, structure and properties, Effects of yarn structure and properties, Effects of fabric structure and properties, Effects of fibre, yarn and fabric processing parameters, Effect of garment design, Test methods and standards for textiles and apparel

9. Waterproofing and breathability of fabrics and garments

Measurement of waterproofing and breathability, Engineering fabric and garment breathability, Fabric finishes, Construction of shower proof garments, Comparative fabric and garment properties

10. Ultraviolet protection of fabrics and garments

Measurement of UV protection, Effects of fibre properties, Effects of yarn properties, Effects of fabric structure and properties, Effects of dyeing, finishing and other chemical treatments

11. Laundry performance of fabrics and garments

Laundering, Care labels, Effects of fibre composition, structure and properties, Effects of sewing thread linear density, Effects of fabric structure and properties, Effects of colouration and finishing, Effect of garment design, Test methods and standards related to laundering and care labeling.

12. Applications of artificial intelligence in fabric and garment engineering

Expert systems, artificial neural networks (ANNs)

Term Work

Assignments / Seminars / Mini Projects based on above topics.

REFERENCE BOOKS :-

1. Engineering apparel fabrics and garments, J. Fan and L. Hunter, Woodhead Publishing Limited, 2009
2. Engineering textiles: Integrating the design and manufacture of textile product, Y. E. El Mogahzy, Woodhead Publishing Limited, 2009
3. The Apparel Industry, Richard M Jones
4. Ergonomics in the garment industry, Dr Gordana Colovic, Woodhead Publishing India Pvt. Ltd., 2014

M. TEXT. (TEXTILE TECHNOLOGY) SEMESTER - I (ELECTIVE-I)

5. NANO FIBRE TECHNOLOGY

Lectures	:	3 Hrs / Week
Assignment	:	1 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

1. Nano fiber production

Introduction, principles of electrostatic atomization, Electrospaying and electrospinning by the capillary method, Electrospaying and electrospinning by the charge injection method, Solution electrospinning, Melt electrospinning.

2. Types and processing of structured functional nanofibers:

Core-shell, aligned, porous and gradient nanofibers, Core-shell nanofibers, Aligned nanofibers, Porous nanofibers Gradient nanofibers, Applications of structured functional nanofibers.

3. Continuous yarns from electrospun nano fibers:

Using electrospun nanofibers: background and terminology, controlling fiber orientation, producing noncontiguous or short yarns, producing continuous yarns

4. Producing polyamide nanofibers by electrospinning:

Introduction, The electrospinning process, Properties of electrospun nanofibers, measuring the effects of different spinning conditions and the use of high molecular weight polymers on the properties of electrospun nanofibers, Improving the properties of electrospun nanofibers

5. Controlling the morphologies of electrospun nanofibres:

Introduction, The electrospinning process and fibre morphology, Polymer concentration and fibre diameter, Fibre bead formation and fibre surface morphology, Controlling fibre

alignment and web morphologies, Bicomponent cross-sectional nanofibres, Future trends.

6. Processing of composite functional nanofibers:

Formation of polymer and polymer composite nanofibers, Formation of polymer and nano particle composite nanofibers, Formation of polymer and inorganic salt composite nanofibers, Examples and applications of composite functional nanofibers

7. Carbon nanotube and nanofibre reinforced polymer fibres:

Introduction, Synthesis and properties of carbon nanotubes, Developing nanotube/nanofibre–polymer composites, Adding nanotubes and nanofibres to polymer fibres, Analysing the rheological properties of nanotube/nanofibre–polymer composites, Analysing the microstructure of nanotube/nanofibre polymer composites, Mechanical, electrical and other properties of nanocomposite fibres, Future trends

8. Nanofilled polypropylene fibres:

Introduction, Polymer layered silicate nanocomposites, the structure and properties of layered silicate, polypropylene nanocomposites, Nanosilica filled polypropylene nanocomposites, Calcium carbonate and other additives

9. Applications:

Filtration applications, drug delivery applications, tissue engineering, in lithium-ion batteries, sensor applications, clothing for protection against chemical and biological hazards, food processing, sound absorption, electromagnetic wave attenuation and bioreactor , water purification, microelectronics

10. Developments in nanofibers: Background, Nanotechnology, materials and nanofiber, Creation of new industries, Researches and global developments of nanofiber

Term Work

Assignments / Seminars / Mini Projects based on above topics.

REFERENCE BOOKS :-

1. Nanofibers and nanotechnology in textiles, Edited by P. J. Brown and K. Stevens, Wood head Publishing Limited Cambridge, England, 2007
2. Functional nanofibers and their applications, Edited by Qufu Wei, Wood head Publishing Limited, 2012

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-I

SEMINAR - I

Practical	:	1 hr/ week
Term Work	:	50 Marks
Subject Total	:	50 Marks

Seminar-I should be based on the literature survey on any topic relevant to textile technology (should be helpful for selecting a probable title of dissertation). Each student has to prepare a write up of about 15 pages of "A4" size sheets and submit it in duplicate as the term work. The student has to deliver a seminar talk in front of the faculty members of the department and his/her classmates. The faculty members, based on the quality of the work and preparation and understanding of the candidate, shall do an assessment of the seminar internally – jointly.

Some marks should be reserved for the attendance of the student in the seminars of the others students.

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-II

1. ADVANCES IN YARN MANUFACTURING TECHNOLOGY – II

Lectures	:	3 hrs/week
Assignment	:	1 hr/week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 marks

1) Basic stages in spinning & their influence on final product. Design developments in various components of ring frame, such as drafting, spindles, ring, travellers & drives etc. Spinning geometry of ring frames. Twist flow in ring frame. Twist / tension interaction and end breaks. Mechanisms of end breaks. Generation and control of hairiness in ring spinning – development of compact spinning. Research Papers – i) Spinning geometry and its significance – W. Klein ITB 2/90. ii) Latest trends in cots and aprons – Mr. P. K. Basu JTA 1999. iii) Ring traveller interaction & spinning performance – R. R. Salhotra – NCUTE on Ring frame. iv) Design aspects of high speed rings, spindles & travellers – Sudhir Sharma NCUTE programme.

2) Yarn Conditioning – Concepts and theory of yarn conditioning at lower temperatures. Study of effect of yarn conditioning on yarn properties and processing behaviour. Design principles of various yarn conditioning machines used in the industry.

3) Rotor spinning – Technical developments in rotor spinning machine – Modification in the design of spinning unit – developments in rotor drives – yarn monitoring. Automation in rotor spinning machines. Structure and properties of yarn produced. Research Papers – i) Auto coro 360 with fancynation new concepts for fancy yarns – Waltrand jansen – ATJ 2004. ii) Developments in rotor spinning – Dr. R. Chattopadhyay – Advances in yarn manufacturing technology – IIT publication. iii) New spinning technologies – Dr. S. M. Ishtiaque – Advances in yarn manufacturing technology – IIT publication.

4) Air jet spinning – Technical developments in air jet spinning – Structure and properties of air jet spun yarns, Evolution of vortex spinning, critical review of both systems. Research Papers – i) A new spinning technology air vortex spinning – Dr. J. Hayavadana et al Man made textiles in India 2005. ii) Structure & properties of air jet yarns – Jasesh J. et al – TRJ 1990.

5) Friction Spinning – Technical developments in friction spinning – structure & properties of friction spun yarn. Evolution of different spinning technologies based on friction spinning system. Research Papers – i) Yarn tension in friction spinning – H. Stalder & H. Soliman – ITB 3/86. ii) Mechanism of OE friction spinning – Dr. J. Lunenschloss – ITB 3/85.

6) Texturising – Critical evaluation of different texturising system – Significance of developments in false twist and air texturising technologies. Factors influencing the properties of false twist & air textured yarns.

Note: Term work for this subject will be based on above syllabus.

REFERENCE BOOKS:-

1) The Textile Institute Publication - Manual of Textile Technology – Short Staple Spinning Series

Vol.I – The Technology of short staple spinning by W. Klein.

Vol.-IV – A Practical Guide to Ring spinning by W. Klein.

Vol.V – New Spinning Systems – W. Klein.

Vol.VI - Man-made fibre spinning – W.Klein

2. Series publications of NCUTE Training Programs.

3. Textile Progress Series by Textile Institute, Manchester

4. Fundamentals of Spun Yarn Technology by Carl A. Lawrence

5. Yarn Production-Theoretical Aspects by P.Grosberg & C.lype.

6. Yarn Texturising Technology by Hearle.

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-II

2. ADVANCES IN FABRIC MANUFACTURING TECHNOLOGY-II

Lectures	:	3 hrs/week
Assignment	:	1 hr/week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 marks

1. Limitation of shuttle loom with respect to loom speed, picking, shuttle checking, sley motion, energy consumption.
2. Theory of weft insertion by projectiles, developments in torsion rod picking motion, geometrical aspects of torsion rod, energy for picking, projectile flight & checking, developments in projectile weaving machines.
3. Theory of weft insertion by rapiers, developments in rapier heads, positive, rapiers, developments in rapier drives, developments in rapier weaving.
4. Theory of weft insertion in air and water jet picking, developments in machine design, nozzles.
5. Design developments in high speed shedding devices, cam, dobby and jacquard motions, developments in cam beat-up.
6. Developments in warp let off and take-up motions, motorized electronic take-up & let off.
7. Control systems – weft feeders, warp & weft monitor systems, selvedge, colour control, lubrication clearing, drive, intelligent monitoring system. Yarn quality and preparation requirements for high speed weaving.
8. Non wovens- Raw material characteristics & effect on fabric properties, characteristics of needle punched, adhesive bonded, thermal bonded & spun bonded non-wovens, process variables and their effect on structure & proportion of non-wovens. Developments in non-woven machines.
9. Technical Textiles – Market overview & growth projection, products, Filtration- dry & wet filtration, mechanism of separation, requirements for good filtration, fibre & fabric selection, automotive textiles – scope, products, applications,

requirements & design for pneumatic tyres, airbag & belts methods of production & properties.

10. Engineering approach to fabric formation, shed geometry pick spacing, bumping conditions, fabric cover.

Note: Term work for this subject will be based on above syllabus.

REFERENCE BOOKS :-

- 1) Weaving Technology & Operation by Allan Ormerod.
- 2) Shuttleless Weaving Machines by – Svaty.
- 3) Principles of Weaving by Robinson & Marks.
- 4) Weaving Handbook - Sulzer publication
- 5) Handbook of Technical Textiles

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-II

3. THEORY OF TEXTILE STRUCTURE – II

Lectures	:	3 hrs/week
Assignment	:	1 hr/week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 marks

- 1. Extension behavior of continuous filament yarns** - analysis for small & large extension, analysis with lateral forces. Energy Method of prediction of load-elongation curve.
Rupture behaviour of continuous filament yarns – Rupture behaviour of low and high twist yarn, extension of continuous filament yarn. Effect of permanent extension, buckling and migration on tensile behavior of continuous filament yarn.
Qualitative explanation of strength of staple yarns. Traditional and modified approach of rupture behavior of staple yarn.
- 2. Yarn Engineering** – Translation of fibre properties in to yarn properties in case of single component spun yarn and blended yarns- Prediction of yarn strength from fibre properties using different techniques.
- 3 Fabric geometry** – The geometrical properties of plain cloths – Pierce geometry of woven cloth – The geometry of jammed condition – geometry & non – plain fabrics, structure of non woven fabrics and it's relation to end use behavior.
- 4 The tensile properties of woven cloths** – geometrical changes during, extension of cloth – The load extension modulus – the generalized modulus of a fabric.

5. **The buckling of fabrics** – buckling of elastic materials, more complex forms of buckling. Compressional resilience – terms and definitions, significance, factors influencing compressional resilience, measurement of compressional resilience.
6. **Shear and drape of fabrics** – nature of shear – shear properties – experimental study of drape – subjective assessment of drape – nature of fabric deformation in drape.
7. **Fabric soiling** – Soil removal – Laundering & dry cleaning – mechanics of soiling – evaluation of soiling characteristics of fibres – electrostatic properties of fibres and soiling-soil removal characteristics of fibres and fabrics – General considerations of laundering and dry cleaning.

Note: Term work for this subject will be based on above syllabus.

REFERENCE BOOKS:-

1. Physical Testing of Textiles by B.P. Saville
2. Textile Fibres Yarns and Fabrics – Kaswell E.R. published by Reinhold Publishing Corporation – New York, 1954.
3. Structural Mechanics of fibres, yarns & fabrics by Hearle, Grosberg and Backer.
4. Physical Testing and quality control, Textile progress, Vol.23, No.1/2/3, by K. Slater.
5. Mario Bona – Textile Quality (Euratex Series).
6. Testing & Quality Management by Dr.V.K. Kothari (IIT-Delhi)

M. TEXT. (TEXTILE TECHNOLOGY) SEMESTER - II

4. DESIGN OF EXPERIMENTS & STATISTICAL APPLICATIONS IN TEXTILES

Lectures	:	3 hrs. / Week
Assignment	:	1 hr. / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 marks

1. Analysis of Variance:

One-way analysis of variance, mathematical model, ANOVA table & examples.

Two-way analysis of variance one observation per cell & with m observation per cell, Mathematical models, ANOVA tables & examples.

2. Design of Experiments:

Basic Designs: CRD & examples as one-way, RBD & examples as two-way.
LSD & examples of LSD.

3. Factorial Experiments:

2^n factorial experiments: Introduction, Analysis of 2^n factorial experiments.

Examples for 2^n factorial experiments.

Introduction of 3^n and higher order factorial experiments.(No examples)

Introduction of fractional factorial experiments.(No examples)

Introduction of response surface designs (No examples)

Taguchi techniques for reduction and optimization in design of experiments (No examples)

4. Linear programming Problem:

Introduction, formulation of LPP, graphical and simplex methods for finding solutions of LPP. Examples.

5. Transportation Problem:

Introduction, methods for finding initial and optimum solutions of transportation problem. Examples.

6. Assignment problem:

Introduction, method for solving assignment problem. Examples.

7. Network Analysis:

Programme Evaluation and Review Techniques (PERT): Introduction, Slack time critical path, Probability of completion of projects. Examples.

Critical path method (CPM): Introduction, Time estimates, Floats, Critical path. Examples.

Note: Term work for this subject will be based on above syllabus.

REFERENCE BOOKS:-

- 1) Modern Elementary Statistics by J. Freund.
- 2) Mathematical Statistics by J. Freund.
- 3) Probability & Statistics for engineers by Johnson.
- 4) Applied Statistics & probability for engineers by Montgomery.
- 5) Experimental Designs by Cochran & Cox.
- 6) Design of Experiments by Montgomery.

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-II (ELECTIVE-II)

5. PROJECT PREPARATION, APPRAISAL & IMPLEMENTATION

Lectures	:	3 hrs/week
Assignment	:	1 hr/week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 marks

- 1) **Overview** – Capital expenditure, Phase of capital budgeting, Project development cycle, Objectives of investment, decision-making, Risk & return.
- 2) **Identification of investment opportunities** – Governmental regulatory framework – Generation & screening of project ideas – Project identifications for an existing company.
- 3) **Market & demand analysis** – Information required for market & demand analysis – demand forecasting methods – market planning.
- 4) **Technical Analysis** – Material inputs & utilities – Manufacturing process / technology – Plant capacity – location & site – structures & civil works – Machineries & equipments – Project charts & layouts – Work schedule – Need for tendering alternatives.
- 5) **Financial Analysis** – Cost of Project – Means of finance – Estimation of Sales & Production – Cost of production – Working capital requirement & financing – Profitability projections – Break even point – Project cost flow statements – Projected balance sheet – Multi – year projection.
- 6) **Time value of money** – Future value of single amount, Future value of an annuity – Present value of single amount – Present value of an annuity.

- 7) **Cost of Capital** – Basic concepts – Cost of debt – cost of preference capital – cost of Equity Capital – Weighted average cost of capital – Marginal cost of capital-Cost of capital for a new company.
- 8) **Appraisal criteria** – Urgency, Payback period – Accounting, Debt service coverage ratio, Rate of Return, Net present value – Internal rate of return – Annual capital charge – Investment appraisal in practice.
- 9) **Analysis of Risk** – Types & measurement of project risk – Analytical derivation or simple estimation – Sensitivity Analysis – Scenario analysis – Selection of a project- Risk analysis in practice.
- 10) **Project implementation** – Forms of project organization – Project planning – project control – Human aspects of project management – Pre-requisites for successful project implementation.
- 11) **Review** – Initial review, performance evaluation.

Note: Term work for this subject will be based on above syllabus.

REFERENCE BOOKS:-

- 1) Textile Project Management by A. Ormerod, The Textile Institute Publication.
- 2) Goal Directed Project Management by E.S. Andersen, K.V. Grude & Tor Hang, Coopers & Cybranl Publication.
- 3) Project, Planning Analysis, Selection Implementation & Review by Prasanna Chandra, Tata McGraw Hill Publishing Co. Ltd.,
- 4) Industrial Organisation & Engg. Economics T.R. Banga & S.C. Sharma, Khanna Publishers, Delhi.

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-II (ELECTIVE-II)

5. GEO-TEXTILES & GEO-SYNTHETICS

Lectures	:	3 Hrs / Week
Assignment	:	1 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

1. Overview of geo textiles, types of geo textile, development of Geo textiles, functions of Geo textiles.
2. Raw materials used fibre properties for geo textiles, production of Geo textiles. Such as wovens, non-wovens, knitted, grids, mats, ties, cellular Geo textiles, webs, stripes, bio degradable geo textiles, and their properties for different functions and test methods.
3. Types of soils, their characteristics, testing of soil.
4. Filtration and erosion control application. Principles, Erosion control for inland waterways, coastal erosion protection, scour protection, rain fall erosion control.
5. Drainage application: structural drainage, fin drains, land drainage etc.
6. Separation application: Unpaved Road, Paved road, Railways.
7. Soil Reinforcement application. Steep faced embankment, slope stabilization, retaining walls, Geo Textiles pile capping.
8. Growth of Geo textiles, potential of geo textiles in India.
9. Durability and creep: Soil induced degradation, chemical pollution, Temperature resistance, sunlight degradation, stress relaxation.
10. The design principles of geosynthetics: Introduction, past practice in geosynthetic design, Present practice in geosynthetic design, possible future practice in geosynthetic design
11. The material properties of geosynthetics: Introduction, Physical properties, Mechanical properties, Hydraulic properties, Endurance properties, Degradation
12. The durability of geosynthetics: Introduction, Mechanisms of degradation, Synergistic effects, accelerated testing methods

13. National and international standards governing geosynthetics: Why standardization, Types of standard, Standards development organizations, Geosynthetic standards

14. Multifunctional uses of geosynthetics in civil engineering: Introduction, Composite geosynthetics, Smart geosynthetics, Active geosynthetics

15. Quality assurance for geosynthetics: Introduction, Definitions, Responsibilities, Design aspects, Manufacturing quality control, Installation and construction, Benefits, Costs

Term Work

Assignments / Seminars / Mini Projects based on above topics.

REFERENCE BOOKS :-

1. Geo Textile by NWM John.
2. Geo synthetics world by J. N. Mandal.
3. Designing with Geo synthetics by R. M. Koerner.
4. Periodicals on Non Woven & Geo Textiles.
5. Geotextiles by Dr P.K.Banerjee
6. Geotextiles by BTRA (Private circulation)
7. Geosynthetics in civil engineering, Edited by R. W. Sarsby, Published by Woodhead Publishing Limited in association with The Textile Institute, 2007

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-II (ELECTIVE-II)

5. TEXTILE PRODUCT ENGINEERING

Lectures	:	3 Hrs / Week
Assignment	:	1 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

1. General overview of innovation and textile product development

Innovation and new product development in textiles, Introduction: incremental change versus disruptive innovation, Forces for innovation, organizing for disruptive innovation, the textile industry and innovation, Trends in textile innovation: wearable electronics, biomedical, biomimetic and nano-textiles, Case studies in innovation in textile manufacture

2. Practical aspects of innovation in the textile industry

Introduction and practical aspects of innovation, Meeting the needs of customers better than the competition, Innovation as a driver of new strategic issues in the apparel industry, Future trends in innovation

3. Textile product development and definition

Introduction, Nylon to Tactel, Sustainability, Future trends

4 New product developments in knitted textiles

Introduction, Seamless knitwear, Printing on knitwear, Computer aided knitwear design (CAD) and virtual knitwear

5. Fabrics and new product development

Introduction, Market demand, Functionality responses, Environmental sustainability responses, sensing textiles responses,

6. New product development in automotive upholstery

Introduction, The automotive textile market, key drivers and supply chain, New product development process for automotive upholstery, Novel materials and processes in automotive upholstery, Future developments in automotive upholstery

7. Nanotechnology innovation for future development in the textile industry

Introduction, Nanotechnology in the textile industry, Adoption of nanotechnology for textile applications

8. New product development in interior textiles : Introduction, New product development of interior textiles – basics and general procedures, Case studies, Learning experiences for successful new product developments of interior textiles, Future trends in interior textiles

9. New product development for e-textiles

Introduction, Integration of electronics and fabrics, E-textiles product development challenges

10. Customer co-creation: moving beyond market research to reduce the risk in new product development

Introduction, Challenges of identifying customer needs in the product development process

11. Product Engineering: Objectives and Scope of product development in textiles and clothing. performance and serviceability concepts in textiles. Effect of changes in fibre, yarn type and fabric construction and finishing on performance and serviceability of textile products.

12. Consideration of a good product design. Product development procedure -Selection of product, Product analysis, Product design procedure- Preliminary design, Maintainability, Reliability and Redundancy, Final design.

13. Product life cycle.

14. Market Research, Material Research, Equipment and process research

15. Simulation of specified properties or structures leading to design – Special yarns, Woven fabrics, Non – woven fabrics, Simulation of material, Texture by using computer graphics, Concept of overall designing procedure.

16. Case studies related to product development of textiles.

Term Work

Assignments / Seminars / Mini Projects based on above topics.

REFERENCE BOOKS :-

1. New product development in textiles: Innovation and production, Edited by L. Horne, Published by Woodhead Publishing Limited in association with The Textile Institute, 2012
2. Hand book of Textile Design Principles, Process and Practice by Jacquie Wilson, Textile Institute Publication.
3. The Design Logic of Textile Products, Textile progress vol. 27, No. 3, T Matuo and M. N. Suresh. The Textile Institute Publication.
4. Engineering Design by George Dieter.
5. Proceedings of the Seminar – Non woven Technology, Market and Product Potential, IIT, New Delhi, December 2006

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-II (ELECTIVE-II)

5. CLOTHING SCIENCE

Lectures	:	3 Hrs / Week
Assignment	:	1 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

1. Clothing classification systems

General clothing classification, Harmonised clothing classification systems, Classification of functional clothing

2. Introduction to clothing biosensory engineering

Consumer trends, Definition of sensory comfort, Human–clothing–environment system, Clothing biosensory engineering

3. Psychology and sensory comfort

Perception of comfort, Psychological research techniques, Comfort sensory descriptors, Psychophysics, Scales of measurement, Scales to measure direct responses, Wear trial techniques

4. Clothing sizing systems

Clothing size and designation systems: a chronological review, European and international sizing systems, ISO clothing sizing systems, European designation of clothing sizes, The JUS clothing sizing system

5. Planning and organization of clothing production

Production planning and organization within a company, Clothing-design analysis and activity planning, Key documentation

6. Planning of clothing design, pattern making and cutting

Constructing garment patterns, Pattern-pieces and their preparation, Pattern cutting-markers, Designating cutting-markers, Defining fabric and other parameters, Technological requirements when arranging pattern-pieces within a cutting-marker, Cutting-marker efficiency, Fabric losses outside the cutting-marker, Determining fabric consumption

7. Planning clothing manufacturing

Analysis of clothing manufacture requirements and selection of appropriate equipment, Joining technologies, Work analysis, Identifying work methods, Selecting processing equipment, Types of sewing machine, Determining standard time, Planning manufacturing operations, Planning clothing assembly

8. Clothing production management

Determining production capacity needs, Production planning, Production scheduling, Production monitoring and control, Costs in production planning and management, controlling production planning and management

9. Quality requirements for clothing materials

Quality requirements for textile materials for clothing, Physical characteristics: types, methods of measurement and tolerances, Performance characteristics: types, methods of measurement and minimum quality standards, Visible faults, Care labelling of clothing and textile products, Ecological labelling of clothing and textile products

10. Product development in the apparel industry

Product-development models and product-development process, Variations in apparel product development: demand-led product development, Apparel product-development technologies, Apparel product standards, specifications, quality assurance and product technical package, Apparel product life-cycle management (PLM) and supply-chain relationships, Measures for apparel product development, Future trends in apparel product development, Case studies: PD tools and technologies

11. Role of fabric properties in the clothing-manufacturing process

Fabric properties and performance, Garment make-up process and fabric properties, Low-stress mechanical properties and make-up process, Control system, Fabric tailorability, buckling and formability, Sewability

12. Fabric sourcing and selection

Fabric sourcing, Fabric inspection

13. Garment-finishing techniques

Garment finishing for functionality, Knitwear finishing, Denim garment finishing, Pressing (factors and equipment)

Term Work

Assignments / Seminars / Mini Projects based on above topics.

REFERENCE BOOKS :-

1. Design of clothing manufacturing: A systematic approach to planning, processes scheduling and control, Jelka Geršak, Published by Woodhead Publishing in association with The Textile Institute, 2013
2. Garment Manufacturing Technology Edited by Rajkishore Nayak and Rajiv Padhye, Published by Woodhead Publishing in association with The Textile Institute, 2015
3. Apparel Machinery and Equipments, R.Rathinamoorthy and R. Surjit, Woodhead Publishing India Pvt. Ltd, 2015
4. Clothing biosensory engineering, Edited by Y. Li and A.S.W. Wong, Published by Woodhead Publishing Limited in association with The Textile Institute, 2016

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-II

SEMINAR - II

Practical	:	1 hr/ week
Term Work	:	50 Marks
Subject Total	:	50 Marks

Seminar - II shall be based on tentative topic on dissertation such as review paper on some specific well defined area/specialized stream of Textile Technology. Each student has to prepare a write up of about 15 pages of "A4" size sheets and submit it in duplicate as the term work. The student has to deliver a seminar talk in front of the faculty members of the department and his/her classmates. The faculty members, based on the quality of the work and preparation and understanding of the candidate, shall do an assessment of the seminar internally – jointly. Some marks should be reserved for the attendance of the student in the seminars of the others students.

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-III

SEMINAR - III

Practical	:	1 hr/ week
Term Work	:	50 Marks
Subject Total	:	50 Marks

Seminar – III shall be based on the work carried out for dissertation. This may cover the point right from various areas considered and analysis, the relevance feasibility and scope of work for finally selected topic, alternative solution and appropriate solution. Each student has to prepare a write up of about 20 pages of “A4” size sheets and submit it in duplicate as the term work. The student has to deliver a seminar talk in front of the faculty members of the department and his classmates. The faculty members of the department shall do an assessment, based on the quality of the work and preparation and understanding of the candidate. Some marks should be reserved for the attendance of the student in the seminars of the others students.

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-III

DISSERTATION

Practical	:	4 hrs/ week
Term Work	:	100 Marks
Subject Total	:	100 Marks

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.

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-IV

SEMINAR - IV

Practical	:	1 hr/ week
Term Work	:	50 Marks
Subject Total	:	50 Marks

Seminar – IV shall be based on the progress of the dissertation work carried out. This may cover the various practicals / survey work done. Each student has to prepare a write up of about 20 pages of “A4” size sheets and submit it in duplicate as the term work. The student has to deliver a seminar talk in front of the faculty members of the department and his classmates. The faculty members of the department shall do an assessment, based on the quality of the work and preparation and understanding of the candidate. Some marks should be reserved for the attendance of the student in the seminars of the others students.

M.TEXT.(TEXTILE TECHNOLOGY) SEMESTER-IV
DISSERTATION

Practical	:	4 hrs/ week
Term Work	:	50 Marks
Oral Exam.	:	200 Marks
Subject Total	:	250 Marks

The dissertation submitted by the student on topic already approved by university authorities on the basis of initial synopsis submitted by the candidate shall be according to following guidelines – Format of dissertation report – The dissertation work report shall be typed with double space on A4 bond paper. The total number of pages shall not be more than 150 and not less than 60. Figures, graphs, annexures etc. be added as per requirement. The report should be written in the following format.

1. Title page
2. Certificate
3. Acknowledgement
4. Index
5. Abstract
6. Introduction
7. Literature survey
8. Plan of work
9. Results and discussions
10. Conclusions
11. References
12. Annexure

D.K.T.E.SOCIETY'S TEXTILE & ENGINEERING INSTITUTE, ICHALKARANJI.**Equivalence of subject at M.Text. to Revised M.Text. Course.****M.TEXT.- T.T. (TEXTILE TECHNOLOGY) SEMESTER-I**

SR. NO.	COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	REVISED SUBJECTS
1.	M.Text.(TT)	Advances in Yarn Manufacturing Technology-I	I	Advances in Yarn Manufacturing Technology-I
2.	M.Text.(TT)	Advances in Fabric Manufacturing Technology-I	I	Advances in Fabric Manufacturing Technology-I
3.	M.Text.(TT)	Theory of Textile Structures-I	I	Theory of Textile Structures-I
4.	M.Text.(TT)	Advanced Computer Applications in Textiles	I	Advanced Computer Program Applications
5.	M.Text.(TT)	Elective-I 1) High Performance Fibres 2) Technical Textiles	I	Elective-I 1) Functional & High Performance 2) Textile Reinforced Composites
6	M.Text. (TT)	Seminar-I	I	Seminar-I

M.TEXT.- T.T. (TEXTILE TECHNOLOGY) SEMESTER-II

SR. NO.	COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	REVISED SUBJECTS
1.	M.Text.(TT)	Advances in Yarn Manufacturing Technology-II	II	Advances in Yarn Manufacturing Technology-II
2.	M.Text.(TT)	Advances in Fabric Manufacturing Technology-II	II	Advances in Fabric Manufacturing Technology-II
3.	M.Text.(TT)	Theory of Textile Structures-II	II	Theory of Textile Structures-II
4.	M.Text. (TT)	Statistics for Textile Mill Management	II	Design Of Experiments & Statistical Applications In Textiles
5.	M.Text.(TT)	Elective-II 1) Project Preparation, Appraisal & Implementation 2) Management of Textile Production	II	Elective-II 1) Project Preparation, Appraisal & Implementation 2) Textile Product Engineering
6.	M.Text.(TT)	Seminar-II	II	Seminar-II

M.TEXT.- T.T. (TEXTILE TECHNOLOGY) SEMESTER-III

SR. NO.	COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	REVISED SUBJECTS	SEMESTER
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1.	M.Text.(TT)	Seminar-III	III	Seminar-III	III
2.	M.Text.(TT)	Dissertation	III	Dissertation	III

M.TEXT.- T.T. (TEXTILE TECHNOLOGY) SEMESTER-IV

SR. NO.	COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	REVISED SUBJECTS	SEMESTER
1.	M.Text.(TT)	Seminar-IV	IV	Seminar-IV	IV
2.	M.Text.(TT)	Dissertation	IV	Dissertation	IV

D.K.T.E.SOCIETY'S TEXTILE & ENGINEERING INSTITUTE, ICHALKARANJI.

Equivalence of subject at M.Text. to Revised M.Text. Course.

M.TEXT.- T.T. (TEXTILE TECHNOLOGY) SEMESTER-I

SR. NO.	COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	REVISED SUBJECTS	SEM-ESTER
1.	M.Text.(TT)	Advances in Yarn Manufacturing Technology-I	I	Advances in Yarn Manufacturing Technology-I	I
2.	M.Text.(TT)	Advances in Fabric Manufacturing Technology-I	I	Advances in Fabric Manufacturing Technology-I	I
3.	M.Text.(TT)	Theory of Textile Structures-I	I	Theory of Textile Structures-I	I
4.	M.Text.(TT)	Advanced Computer Applications in Textiles	I	Advanced Computer Programming & Applications	I
5.	M.Text.(TT)	Elective-I 1) High Performance Fibres 2) Technical Textiles	I	Elective-I 1) Functional & High Performance Fibres 2) Textile Reinforced Composite Materials	I
6	M.Text. (TT)	Seminar-I	I	Seminar-I	I

M.TEXT.- T.T. (TEXTILE TECHNOLOGY) SEMESTER-II

SR. NO.	COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	REVISED SUBJECTS	SEM-ESTER
1.	M.Text.(TT)	Advances in Yarn Manufacturing Technology-II	II	Advances in Yarn Manufacturing Technology-II	II
2.	M.Text.(TT)	Advances in Fabric Manufacturing Technology-II	II	Advances in Fabric Manufacturing Technology-II	II
3.	M.Text.(TT)	Theory of Textile Structures-II	II	Theory of Textile Structures-II	II
4.	M.Text. (TT)	Statistics for Textile Mill Management	II	Design Of Experiments & Statistical Applications In Textiles	II
5.	M.Text.(TT)	Elective-II 1) Project Preparation, Appraisal & Implementation 2) Management of Textile Production	II	Elective-II 1) Project Preparation, Appraisal & Implementation 2) Textile Product Engineering	II
6.	M.Text.(TT)	Seminar-II	II	Seminar-II	II

M.TEXT.- T.T. (TEXTILE TECHNOLOGY) SEMESTER-III

SR. NO.	COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	REVISED SUBJECTS	SEMESTER
1.	M.Text.(TT)	Seminar-III	III	Seminar-III	III
2.	M.Text.(TT)	Dissertation	III	Dissertation	III

M.TEXT.- T.T. (TEXTILE TECHNOLOGY) SEMESTER-IV

SR. NO.	COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	REVISED SUBJECTS	SEMESTER
1.	M.Text.(TT)	Seminar-IV	IV	Seminar-IV	IV
2.	M.Text.(TT)	Dissertation	IV	Dissertation	IV