MAHARSHI DAYANAND UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATIONS
B.Tech 2nd YEAR TEXTILE TECHNOLOGY(TT)
3rd SEMESTER
Proposed 'F' Scheme w.e.f 2010-11

Course No.	Course Title	Teaching Schedule				Marks of Class work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
TT-201-F	Textile Raw Materials (common with TC/FAE)	3	1	-	4	50	100	-	150	3
TT-203-F	Yarn Manufacture-I	3	1	-	4	50	100	-	150	3
TT-205-F	Weaving Preparation	3	1	-	4	50	100	-	150	3
TT-207-F	Fabric Manufacture-I	3	1	-	4	50	100	-	150	3
ME-217-F	Thermal science(common to TC and TT)	3	1	-	4	50	100	-	150	3
HUM-201-F	Engineering Economics (Common to CSE, ME, ECE, BME, EE, EEE, E&I, I&C, IT, CE, TT, FAE, TC)	3	1	-	4	50	100	-	150	3
	Practicals									
TT-209-F	Spinning Practical-I	-	-	3	3	50	-	50	100	4
TT-211-F	Weaving Practical-I	-	-	3	3	50	-	50	100	4
ME-219-F	Machine Drawing	-	-	2	2	50	-	50	100	4
TT-213-F	Fibre Microscopy & Identification	-	-	2	2	50	-	50	100	4
Total		**18**	**6**	**10**	**34**	**500**	**600**	**200**	**1300**	

TT-201-F TEXTILE RAW MATERIALS (COMMON WITH TC/FAE)

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Exam duration	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

General definitions and important terminologies related to textiles; Classification of fibres; Essential and desirable properties of textile fibres and their role in final products; Advantages and disadvantages of natural and manmade fibres. Flow charts showing processes involved in textile industry.

Cotton: Geographical distribution, structure and properties (physical and chemical); Different Varieties including organic as well as Bt cotton and their properties; Applications.

Unit II

Bast and leaf fibres such as jute, hemp, sisal and ramie etc: Geographical distribution, extraction, properties and their uses.

Varieties of natural silk, rearing of silk worm, properties and uses of various types of silk; silk reeling, throwing and weighing.

Unit III

Varieties, sorting and grading of wool, chemical and physical properties of wool, processes involved in the removal of impurities from raw wool; numbering systems of woollen and worsted yarns.

General principles of manufacturing of man made fibres.

Unit IV

Brief outline of the manufacturing processes of important man-made fibres, viz. rayons (Viscose and Acetate), polynosic, tencel, nylons, polyester, acrylics, polypropylene, polyolefins, polyacrylonitrile and some technical speciality fibres like spandex/lycra etc (only flow charts); their Important physical and chemical properties and applications.

Reading List

Title	**Author**
Handbook of Textile Fibres	J Gordon Cook
Textile Fibres	HVS Murthy
Manmade Fibres	RW Moncrieff
Manufactured Fibre Technology	V B Gupta & V K Kothari

TT-203-F YARN MANUFACTURE-I

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Exam duration	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT I

Introduction to spinning processes through flow charts and brief description of each process.
Objectives of ginning, Pre-ginning and post-ginning operation and their significance, description and working of knife roller, McCarthy and saw gin, cotton contamination
Objectives of blow room, Objectives of mixing and blending, different methods of blending, their advantages and disadvantages,

UNIT II

Principles involved in different methods of selection of cotton for mixing, various types of opener, cleaner and mixer, their construction and working, Lap forming mechanism, Blow room accessories, tinting, application of additional spin finish, Selection of blow room lines for different cotton and man-made fibres. Production and efficiency level attainable in blow room,

UNIT III

Performance assessment of Blow room, Lap rejection, causes of lap defects and their remedies, Design of cone drums. Calculations related to blow room, Modern development in blow room.
Objectives of carding, introduction to roller and clearer card, Principle of carding, stripping and brushing action, design and construction of carding machine, Design criteria for a high production card, Different zones in carding machine,

UNIT IV

Analysis of carding forces, Mechanics of nep and hook formation and their control. Carding of micro denier and dyed fibres, flexible and metallic card clothing, Design wire point for different material, Shirley pressure point system, Auto levelling at card, Performance assessment of Carding, Calculations related to carding, Modern development in carding.

Reading List

Title	**Author**
Cotton Ginning, Textile Progress Vol.24 No.2	I Doraiswamy, P Chellamani
Spun Yarn Technology, Vol I& II	A Venkatasubramani
Short Staple Spinning Volume-I, II, III & IV	W Klein
Spinning of Manmade & Blends on Cotton Systems	KR Salhotra
Technology of Carding	R Chattopadhyay

TT-205-F WEAVING PREPARATION

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Exam duration	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Introduction to passage of material through weaving processes by flow charts and their objectives.

Winding - Process description, Objectives, types of winding, (Random & Precision), their principle and comparison.

Devices used on winding machines: Tensioners - Objective, principle, types, performance assessment; Clearers - Objectives, types, their principle, performance assessment; other devices with their objectives.

Unit II

Yarn faults and their classification systems, Phenomenon of patterning and Anti patterning methods. Knots and splices; Brief idea of types of Splicers and their principle. Definitions of wind, Traverse Ratio, Coil angle, wind angle, Net winding Rate, gain and their related calculations. General calculations for efficiency and production, package faults in winding, modern developments in winding.

Pirn winding: Objective and process description in brief.

Unit III

Warping: Process description, objectives, Direct and sectional warping, principle of working, relative merits and demerits, application area. Components of warping machines with objectives; types of creel, steps of section formation, Differences between warpers' and weavers' beam. Package faults, modern developments in warping. Calculations pertaining to direct and sectional warping including production and efficiency

Sizing: Process description and objectives of sizing. Passage of material through a Slasher Sizing machine

Unit IV

Different zones of slasher sizing machine: creel, size box and its components, drying zone and head stock and their details. Size box controls, Sizing parameters: definition and relation, Sizing ingredients and their types; Size recipe for common yarns like cotton, polyester, viscose, nylon, acrylic. Factors affecting size add on. Package faults in sizing. Calculations related to production and efficiency. Developments in Slasher sizing machine.

Other sizing techniques like HPS, Single end sizing, foam sizing, sinter roller sizing, and cold sizing

Leasing, Drawing-in and tying in: Objectives and process description.

Reading List

Title	**Author**
Yarn Winding	NCUTE Publication
Weaving: Technology and Operations	Ormerod
Yarn Preparation for Handloom weaving	B K Behera
Textile Mathematics Vol. III	JE Booth
Textile Sizing	Goswami, Anandjiwala, Hall
Sizing: Materials, Methods, Machines	Ajgaonkar, Talukdar, Wadekar
Sizing	J B Smith

TT-207-F FABRIC MANUFACTURE-I

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Exam duration	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT I

Brief introduction to weaving processes and loom. Classification of looms: Plain loom, automatic shuttle loom and shuttle-less looms. Definitions of primary, secondary and auxiliary motions of a loom

Shedding motion on the loom:

Tappet shedding: types of tappet shedding (poisitive and Negative), Negative tappet shedding – relative throw of cams, Heald shaft reversing motion.

Dobby Shedding: Negative Dobby shedding – mechanism of Keighley dobby, preparation of pattern chain for it.

Jacquard shedding: Mechanism of single lift-single cylinder, Double lift-single cylinder, Double lift-Double cylinder. Jacquard harness: different harness ties, e.g. Straight, Pointed and Border Tie, card punching for Jacquard.

UNIT II

Types of shed-Bottom closed, Semi-open, Center closed and open-sheds, their advantages and uses, comparison of Tappet, Dobby and Jacquard shedding.

Picking motion on the loom:

Types of picking: conventional picking mechanisms: over-pick and under-pick, shuttle checking, checking devices, Calculations for power requirement for picking, shuttle flight time.

Study of picking mechanism as simple elastic system, nominal and actual picker displacement curves, Shuttle retardation curve during checking

Beat-up motion on the loom: Sley motion, Factors affecting sley motion, Sley eccentricity and its effects, Kinematics of loom sley in normal conditions.

Loom timings for shedding, picking and beat-up motions.

UNIT III

Cloth control: Take-up motion – Objective, types, Five and seven-wheel take-up mechanisms, their comparison. Changes in Pick density, change places, expression for Pick density, Calculation of periodicity in pick variation due to faulty teeth or wheel eccentricity, Shirley take-up.

Temples - Function, types.

Warp control: Objective, types. Let-off mechanisms (negative friction type, Bartlett let-off).

Warp stop motion: Objective, types. Mechanical and electrical warp stop motion.

UNIT-IV

Weft stop motion: Objective, types, side weft fork and center weft fork motion.

Warp protector motion: Objective, types, Loose Reed, Fast Reed warp protector motion.

Automatic pirn change mechanism: Objective, feeler and types of feeler, change mechanism. Bobbin loader and loom winder.

Weft mixing and weft patterning: four-box motion, pick at will.
Loom drive; rpm, efficiency and production calculations

Reading List

Title	**Author**
Principles of Weaving	R Marks & ATC Robinson
Weaving: Conversion of yarn to Fabric	Lord and Mohammed
Weaving: Technology & Operations	Ormerod
Weaving: Machines, Mechanisms, Management	Ajgaonkar et al
Woven Fabric Production – I, II	NCUTE Publications
Weaving Mechanism, I & II	NN Banerjee

ME- 217-F THERMAL SCIENCE (Common to TT & TC)

L	T	P
3	1	-

Sessional	: 50 Marks
Theory	: 100 Marks
Total	: 150 Marks
Duration of Exam	: 3 hrs.

NOTE: Examiner will set 9 questions in total, with two questions from each section and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each section.

Unit I

Basic Concepts and First Law of Thermodynamic: Macroscopic and Microscopic Approaches, Thermodynamic system, Thermodynamic properties, Equilibrium, State, Path, Process and Cycle, Quasi-static, Reversible and Irreversible Processes, Concept of Thermodynamic Work and Heat, Zeroth Law of Thermodynamic and its utility, First Law of Thermodynamics, Internal Energy and Enthalpy, PMMFK, Limitation of First Law, Steady Flow Energy Equation, First Law applied to Non-Flow Process, Steady Flow Process and Transient Flow process, Throttling process and Free Expansion Process

Unit II

Second Law of Thermodynamic and Entropy: Kelvin- Plank and Clausius Statement and their Equivalence, PMMSK, Carnot Cycle, Carnot Heat Engine, Carnot Theorem and its Corollaries, Entropy, Clausius Inequality, Principal of Entropy Increase, Temperature Entropy Plot, Entropy Change in different Processes, Third Law of Thermodynamics, Availability, Ir-reversibility

Unit III

Pure Substance and Air Conditioning: Pure Substance and its properties, Phase and Phase Transformation, Saturated and Superheated steam, Solid-Liquid-Vapour Equilibrium, T-V, P-V, P-T plot during Steam Formation, T-S and H-S Diagrams, Dryness fraction, Throttling and Separating Calorimeter, Psychrometric Chart, Psychrometric Terms, System of Humidification in Textile Industry, Cooling and Dehumidification, Heating and Humidification, Air Conditioning System

Unit IV

Fuel and Steam Generator: Different types of Fuels, Calorific Value, Bomb Calorimeter, Combustion Equation of Fuel, Orsat Appratus, Boiler Efficiency and Heat Losses in Boiler, Heat Balance Sheet, Boiler Drought, Height of Chimney, and High pressure Boilers

Reading List

Title	Author
Heat Engineering	VP Vasaandani & DS Kumar
The Theory & Practice of Heat Engines	DA Wrangham
Thermodynamics applied to Heat Engines	EH Lewit
Air Conditioning in Textile Mills	SP Patel & K Subramaniyan
Engineering Thermodynamics	P K Nag
Thermodynamics and Thermal Engineering	J Selwin Rajadurai

HUM-201-F ENGINEERING ECONOMICS

(Common to CSE, ME, ECE, BME, EE, EEE, E&I, I&C, IT, CE, TT, FAE, TC)

L	T	P
3	1	-

Class Work	:	50 Marks
Theory	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3 Hrs.

NOTE: Examiner will set 9 questions in total, with two questions from each section and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each section.

Section-A

Definition of Economics - various definitions, Nature of Economic problem, Production possibility curve Economic laws and their nature. Relation between Science, Engineering, Technology and Economics.

Concepts and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility - its practical application and importance.

Section-B

Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve, Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & applications of the concept of elasticity of demand.

Meaning of production and factors of production; Law of variable proportions, Returns to scale, Internal and External economics and diseconomies of scale.

Section-C

Various concepts of cost - Fixed cost, variable cost, average cost, marginal cost, money cost, real cost opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.

Meaning of Market, Types of Market - Perfect Competition, Monopoly, Oligopoly, Monopolistic Competition (Main features of these markets)

Section-D

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices.

Nature and characteristics of Indian economy (brief and elementary introduction), Privatization - meaning, merits and demerits. Globalisation of Indian economy - merits and demerits. Elementary Concepts of VAT, WTO, GATT & TRIPS agreement.

TEXT BOOKS:

1. Principles of Economics: P.N. Chopra (Kalyani Publishers).
2. Modern Economic Theory – K.K. Dewett (S.Chand)

REFERENCE BOOKS:

1. A Text Book of Economic Theory Stonier and Hague (Longman's Landon)
2. Micro Economic Theory – M.L. Jhingan (S.Chand)
3. Micro Economic Theory - H.L. Ahuja (S.Chand)
4. Modern Micro Economics : S.K. Mishra (Pragati Publications)
5. Economic Theory - A.B.N. Kulkarni & A.B. Kalkundrikar (R.Chand & Co.)
6. Indian Economy: Rudar Dutt & K.P.M. Sundhram

TT-209-F SPINNING PRACTICAL-I

L	T	P			
-	-	3	Class work	:	50
			Examination	:	50
			Total	:	100
			Exam duration	:	4 hrs

Practice in handling and operation of blow room, study of constructional details of machinery in blow room, Calculating speeds of different machine parts, Blow/inch of Kirschner beater, Production calculation of blow room, various control points and change places, Practice in checking of the quality of lap.

Familiarity with carding machine, constructional details, change places and speed calculation of a carding machine, Effect of various machine parameters in production and quality of sliver, checking the quality of sliver, Finding out individual draft and total draft in carding machine. Flat speed and its impact, Study of coiling mechanism, coils/layer. Setting points according to type of material.

TT-211-F WEAVING PRACTICAL-I

L	T	P			
-	-	3	Class work	:	50
			Examination	:	50
			Total	:	100
			Exam duration	:	4 hrs

Study of winding, warping, slasher sizing: primary components and their functioning, operation, settings, related calculations, production, efficiency, package types, faults and their remedies.

Drawing-in process: Process description, drafting/denting plans

Pirn winding: objective and functioning in brief.

Introduction to loom and its primary parts, passage of material through it.

Study of shedding (negative cam, dobby, jacquard), picking and beat-up mechanisms in shuttle looms: construction, working and related calculation/settings.

ME-219-F MACHINE DRAWING (Common to TT & TC)

L	T	P		
	-	2	Sessional	: 50 Marks
			Theory	: 50 Marks
			Total	: 100 Marks
			Duration of Exam	: 4 hrs

Technical terminology and drawing conventions, Conventional representation of spring, gears, and bearings etc., Screw threads – forms of threads, triangular and square. Riveted joints: forms and proportion of rivets joints, lap and butt joints, Shaft coupling- muff, flange and flexible coupling.

Bearings – journal, bush, thrust and pivot bearings. Gears and train of gears, Cams: construction and linkage.

TT-213-F FIBRE MICROSCOPY & IDENTIFICATION (COMMON to TT, TC and FAE)

L	T	P			
-	-	2	Class work	:	50
			Examination	:	50
			Total	:	100
			Exam duration	:	4 hrs

Principle of microscopy, Microscopic identification of fibres, preparation and mounting of specimen for longitudinal view, Cross-section cutting. Microtomy - cork method, metal plate method, Hardy's Microtome, Mountants and reagents for fibre microscopy; Identification of fibre by burning as well as solubility tests. Standard scheme of analysis of homogenous fibre blends by physical and chemical methods, Qualitative and quantitative determination of components.

Preparation of reagents used for chemical analysis.

MAHARSHI DAYANAND UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATIONS
B.Tech 2nd YEAR TEXTILE TECHNOLOGY (TT)
4th SEMESTER
Proposed 'F' Scheme w.e.f 2010-11

Course No.	Course Title	Teaching Schedule				Marks of Class work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
TT-202-F	Man-Made Fibre Production	3	1	-	4	50	100	-	150	3
TT-204-F	Yarn Manufacture-II	3	1	-	4	50	100	-	150	3
TT-206-F	Fabric Manufacture-II	3	1	-	4	50	100	-	150	3
TT-208-F	Fabric Structure	3	1	-	4	50	100	-	150	3
TT-210-F	Computer Aided Designing	3	1	-	4	50	100	-	150	3
MA-201-F	Applied Statistics & Operations Research	3	1	-	4	50	100	-	150	3
	Practicals									
TT-212-F	Spinning Practical-II	-	-	3	3	50	-	50	100	4
TT-214-F	Weaving Practical-II	-	-	3	3	50	-	50	100	4
TT-216-F	Fabric Analysis	-	-	2	2	50	-	50	100	4
TT-218-F	Computer Aided Textile Designing	-	-	2	2	50	-	50	100	4
Total		**18**	**6**	**10**	**34**	**500**	**600**	**200**	**1300**	

TT-202-F MAN-MADE FIBRE PRODUCTION (COMMON WITH TC)

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Exam duration	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT 1

General definitions related to man-made/manufactured fibres. Introduction to manufacturing processes of these fibres. Study of various spinning systems: melt, wet & dry spinning – basic principles. Brief details of spinning head, spinneret, quench chamber, drying chamber & coagulation bath. Spin finish application.

UNIT – II

Regenerated fibres: Viscose rayon – detailed manufacturing process with reactions at each stage. Polynosics, Super high wet modulus rayons, Brief manufacturing processes of lyocell and tencel fibres.

UNIT – III

Polyacrylonitrile: Addition of comonomers, continuous suspension, polymerization technique. Solution spinning techniques, Coagulation bath variables, Macrovoid generation and their remedies, Effect of spinning variables on structure and properties of gel and final fibres.

Polypropylene: Polymerisation technique (suspension & gas phase), Superactive catalysts, spinning of filaments, Major drawbacks and their possible remedies.

UNIT – IV

Polyethylene terephthalate: Polymerisation technique (batch & continuous), side reactions, degradation reactions – their control, Production of filament yarns and staple fibres, Brief description of manufacturing technique of high tenacity polyethylene terephthalate.

Nylon 6 & nylon 66: Polymerisation techniques in VK tube (batch & continuous), side reactions, Integrated continuous process for nylon 66, Filament spinning technique.

TT-204-F YARN MANUFACTURE-II

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Exam duration	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT I

Objectives of draw frame, Principle of roller drafting and weighting in draw frame, Concept of Ideal drafting and drafting wave, drafting forces, drafting roller arrangements, doubling, blending and hooks removal at draw frame, coiling systems. Principle of roller setting, Processing of cotton and man-made fibre on draw-frame, Auto-levelling, Roller lapping – reasons and remedies, Performance assessment of Draw frame, Calculation related to Draw frame, modern developments in draw frame.

UNIT II

Objectives of lap preparation, system of lap preparation, study of sliver lapper, ribbon lapper and super lapper machines, Modern concept of lap preparation, Configuration of fibre feed and its effect on quality of product, Objective of Combing, noil percentage and fractionation efficiency of comber, Different types of comber, Detailed study of the Nasmith type comber, Timing diagram for combing operation.

UNIT III

Timing and setting of comber for different classes of cotton, control of noil percentage, Type of feed, Influence of type of feed on noil extraction and cleanliness of sliver, Performance assessment of Combing, Calculations related to combing, Recent developments in combing, Objectives of speed frame, conventional and modern roving processes, Mechanism of drafting, twisting and winding.

UNIT IV

Basic principle of designing of cone drum, Differential motions, Building motions, their objects and types, Roving tension, coil spacing, drafting systems, common defects in roving packages, their causes and remedies, Processing of man-made fibres on speed frame, Performance assessment of Speed frame, Calculations related to speed frame, Recent developments in speed frame.

Reading List

Title	Author
Spun Yarn Technology, Vol I& II	A Venkatasubramani
Short Staple Spinning Vol I, II, III & IV	W Klein
Spinning of Manmade & Blends on Cotton System	KR Salhotra
Manual of cotton spinning (Drawframes, Combers and speedframes)	Frank Charnley
Cotton Spinning	WS Taggart
Cotton Drawing & Roving	GR Merrill

TT-206-F FABRIC MANUFACTURE-II

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Exam duration	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Definitions of Knitting and Knitted fabrics, stitch. Differences between woven and knitted fabrics, Classification of knitting, differences between weft and warp knitting, characteristics of weft knit and warp knit structures.

Weft Knitting: Classification of weft knitting machines. General description of weft knitting machines viz. Flat and Circular, primary knitting elements, types of Knitting Needles (Latch, bearded and compound), their knitting cycle, comparison and use.

Unit II

Knit, Tuck and Float Stitches, their formation in machine, properties and applications. Basic weft knitted structures (Plain, Rib, Interlock, Purl) and their properties. Description of machines: Non sinker and sinker single jersey, Rib and Interlock double jersey and Purl knitting machine along with knitting cycle, design of cams.

Unit III

Warp Knitting: Classification of warp knitting machines. Description and knitting cycle of Raschel and Tricot machines, Prominent structures like Tricot, Lock knit, Reverse Lock knit, Satin, Sharkskin and their uses.

Patterning: Patterning Devices and their mechanism: multi-cam track, pattern wheel jacquard, pattern cylinder and electronic jacquard.

Unit IV

Knitted Fabric Geometry and calculations: Tight and distorted knitted structure geometry. Derivations of formulae and calculations for fabric width, Tightness factor, Stitch density, Areal density, Fabric cover and knitting machine production.

State of Knitted fabrics: Dry, Wet and Finished relaxed.

Characteristics of yarns used for knitting.

Major Knitted fabric faults, their causes and remedies.

Developments in knitting technology

Reading List

Title	**Author**
Knitting Technology	Ajgaonkar
Warp Knitting Production	S Ray, Melliand
Knitting Technology	David J Spencer
Circular Knitting	Iyer, Chandrasekhar

TT-208-F FABRIC STRUCTURE (COMMON WITH FAE)

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Exam duration	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Basic Concepts: Importance of fabric structure, Classification of fabrics, Notation of Weave, drafting plan, peg plan and denting.

Simple Weaves: plain weave and its derivatives, ornamentation,

Unit II

Twill weave and its derivatives, ornamentation, effect of twist on prominence of twill lines, Sateen and Satin and their extensions. Crepe weave, diamond,

Unit III

mockleno, Cork-screw, honey comb, huck-a-back, bedford cords, welt and pique fabrics.

Unit IV

Decorative Weaves: Extra warp and weft figuring, Backed cloth, Double cloth, treble and multiply belting structures.
Draft, peg plan and denting plan for all simple and decorative weaves, Particulars of common varieties of these fabrics.

Reading List

Title	**Author**
Textile Design and Colour	Watson
Watson's Advanced Textile Design	W Watson
Grammer of Textile Design	H Nisbet
Woven Cloth Construction	Marks and Robinson

TT-210-F COMPUTER AIDED DESIGNING (COMMON WITH TC)

L	T	P			
3	1	-	Class work	:	50
			Exam	:	100
			Total	:	150
			Exam Duration:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Fundamentals of CAD: Definition, History , Hardware and Software requirements of CAD, Design Process, Application, Use, Creating the manufacturing Data base and benefits of CAD.

Hardware in CAD: Introduction, Design workstation, Graphics terminal, input and output devices, central processing unit and secondary storage.

Unit II

Computer Graphics Software and Database – Introduction, Software configuration of a graphic system, functions of a graphic package, transformations, Database structure and content, wire frame versus solid modeling, CAD features and CAD integration. Drawing aids, free hand sketching, Enhancement drawing. Feature based design process.

Unit III

Introduction to Computer Graphics: Computer Graphics and its applications, Computer Graphics Hardware and Software. Two dimensional graphics primitives – Point and Lines, Line drawing algorithms: DDA, Bresenham's; Circle drawing algorithms: midpoint circle drawing algorithm, Bresenham's circle drawing algorithm.

Unit IV

Introduction to Software Packages:

Introduction to Auto-CAD: Features, Basic Drawing Techniques: Drawing Line, Circle, Rectangle, Arc, Polyline, Ellipse, Elliptical Arc, Polygons, Donuts, Corner rounding, Chamfering, Displacing, Duplicating, Removing Objects.

Introduction to Corel Draw: Features and basic drawing techniques.

Introduction to Photoshop: Features and basic drawing techniques.

Reading List

Title	**Author**
Computer Aided Design & Manufacturing	Mikcle P Groover, Emory W. Zimmers Jr
Computer Graphics Principles & Practices	James D Foley, Andeies Van Da Shvan K Feiner Steven, John F Hughes
Computer Graphics	Donald Mearn & M Pauline Baker
Mastering AUTOCAD 2004 & AUTOCAD LT 2004	George Omura

MA-201-F APPLIED STATISTICS & OPERATIONS RESEARCH (COMMON WITH TC)

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Exam duration	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Measures of Dispersion: Range, quartile deviation, standard deviation, moments, skewness and Kurtosis (definition, properties and associated numerical only)

Regression and Correlation: Karl Pearson's coefficient of correlation, rank correlation and line's of regression, curve fitting (linear, parabolic, and exponential)

Unit II

Theory of Probability: The concept of probability, additive and multiplicative laws of probability (Statements and associated numerical only)

Probability Distributions: Random variate, mathematical expectation, theorems on expectation, discrete and continuous probability distributions (definition and problems only). Univariate Binomial, Poisson and Normal distribution (properties and applications)

Unit III

Sampling Theory: Population and sample, types of sampling, sampling distribution of means and proportions (definition only)

Tests of Hypothesis and Significance: Definition of statistical hypothesis, null hypothesis, type I and type II errors and level of significance. Tests of significance for large and small samples (discussion) problem based on X^2 test for goodness of fit, t-test, F-test and Analysis of variance (one way and two way classifications)

Unit IV

Operations Research: Linear programming problem (formulation and solution by graphical approach only). Transportation problem including time minimizing problems, Basic Assignment problem, sequencing problems (n jobs, 2 machines and n jobs, m machine problems)

Project scheduling by PERT/CPM: Definition of network, critical path, floats, finding of critical path and floats.

Reading List

Title	**Author**
Mathematical Statistics	Ray and Sharma
Business Statistics	Gupta & Gupta
Theory and problems of probability and Statistics	Murray P Spiegel
Operation Research	P.K. Gupta, Manmohan
Operations Research for Management	Gupta & Sharma
Higher Engineering Mathematics	B.S. Grewal

TT-212-F SPINNING PRACTICAL-II

L	T	P			
-	-	3	Class work	:	50
			Examination	:	50
			Total	:	100
			Exam duration	:	4 hrs

Practice in handling, operation, setting and gauging draw frame, Lap former, comber and simplex. Study of constructional details of machines: various control and change places etc. Practice in checking the quality of comber lap, sliver and waste analysis, common fault and remedies, Calculations pertaining to gearing, speeds, constant, draft and production etc.

TT-214-F WEAVING PRACTICAL-II

L	T	P			
-	-	3	Class work	:	50
			Examination	:	50
			Total	:	100
			Exam duration	:	4 hrs

Study of construction, working and related calculation/settings of secondary and auxiliary motions in shuttle looms (negative let-off, 5 & 7 wheel take-up, warp protector, warp and weft stop, automatic pirn change)

Study of weft knitting process: Specifications, path of yarn, construction, operation of circular and flat bed weft knitting machines, primary knitting elements and their working, yarn feed, stop motions, patterning possibilities. Weft knitted fabric sample preparation.

TT-216-F FABRIC ANALYSIS

L	T	P			
-	-	2	Class work	:	50
			Examination	:	50
			Total	:	100
			Exam duration	:	4 hrs

Basic principles involved in analysis of woven fabric and estimation of data for cloth reproduction. Identification of materials, type of yarns used in their construction, weave analysis, sett and cover factor. Warp Count, Weft Count and weight calculations for simple and compound woven structures, Specifications for standard woven fabrics.

TT-218-F COMPUTER AIDED TEXTILE DESIGNING (COMMON WITH TC)

L	T	P			
-	-	2	Class work	:	50
			Examination	:	50
			Total	:	100
			Exam duration	:	4 hrs

Introduction to graphical representations: live graphics, pixel graphics, Graphic systems and peripherals. Graphic standards/formats, file conversion initiatives, drawing simple geometric figures. Implementation of various aspects and commands of Corel Draw including 2D and 3D graphic design, other Design Software (Textile and Garments) and drawing objects such as Line, Circle, Arc, Ellipse, Elliptical Arcs, Xlines, Rays, Multiline, Polylines, Rectangles, Polygones, Donuts and Spline etc.

Introduction to Textile Design Software, Uses of various tools, Selection and creation of motifs, uses of colour tools, knowledge of repeats, selection and creation of fancy yarns, selction and creation of different types of weaves, Development of dobby and jacquard designs using CAD software.

MAHARSHI DAYANAND UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATIONS
B.Tech 3rd YEAR TEXTILE TECHNOLOGY (TT)
5th SEMESTER
Proposed 'F' Scheme w.e.f 2011-12

Course No.	Course Title	Teaching Schedule				Marks of Class work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
TT-301-F	Structure & Properties of Fibres (Common with TC)	3	1	-	4	50	100	-	150	3
TT-303-F	Yarn Manufacture-III	3	1	-	4	50	100	-	150	3
TT-305-F	Fabric Manufacture-III	3	1	-	4	50	100	-	150	3
TT-307-F	Textile Testing-I (Common with TC)	3	1	-	4	50	100	-	150	3
TT-309-F	Textile Chemical Processing-I	3	1	-	4	50	100	-	150	3
TT-311-F	Garment Manufacturing Technology (Common with TC)	3	1	-	4	50	100	-	150	3
	Practicals									
TT-313-F	Spinning Practical-III	-	-	3	3	50	-	50	100	4
TT-315-F	Weaving Practical-III	-	-	3	3	50	-	50	100	4
TT-317-F	Textile Testing Practical-I (Common with TC)	-	-	2	2	50	-	50	100	4
TT-319-F	Patterning Cutting & Making-UP (Common with TC)	-	-	2	2	50	-	50	100	4
Total		**18**	**6**	**10**	**34**	**500**	**600**	**200**	**1300**	

TT-301-F STRUCTURE AND PROPERTIES OF FIBRES (COMMON WITH TC)

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT – I

Structure of fibres: Morphology and order in fibre structure. Theories of fine structure of fibres. Methods of determination of molecular structures (crystallinity and orientation, crystal size etc.) by X-Ray methods.

Mechanical properties: Mechanism of deformation in fibres. Principles of elasticity and viscoelasticity.

Phenomenological approach – stress-strain, creep and stress-relaxation behaviour of fibres. Simple spring and dashpot models simulating fibres.

UNIT – II

Moisture properties: Absorption in fibres, hysteresis. Quantitative analysis of moisture absorption, Pierce's theory. Swelling, heat of sorption.

UNIT – III

Optical properties: Polarization and refractive index. Birefringence and its measurement. Absorption and dichroism.

Thermal properties: Molecular motions and transition phenomenon. First order and second order transition phenomenon. Thermal expansion behaviour. Concept of heat setting and pleating. Specific heat of fibres – theoretical and actual.

UNIT – IV

Electrical properties: Di-electric properties and its measurement. Effect of frequency and temperature on dielectric constant. Electrical resistance and its measurement. Static electricity and measurement of static charge in fibres.

Frictional properties of fibres – nature and measurement.

Reading list

Title	**Author**
Physical properties of fibres	Morton and Hearle

TT-303-F YARN MANUFACTURE-III

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT – 1

Objective, principle and mechanism involved in drafting, twisting and winding. Ordinary and high draft systems. Concept of twist multiplier and yarn contraction due to twisting. Types of builds. Limitations of large package spinning.

UNIT – II

Design and types of spindle, ring and traveler. Studies on control of yarn tension in high speed ring frame. Mechanism of package formation. Types of spinning waste and system of waste collection.

UNIT – III

Limitation of ring spinning and factors responsible for loss in efficiency. Processing of man-made fibre on ring-frame. Recent developments in ringframe. Concept of average count and 20s conversion. Yarn faults and their remedies, Causes of end breakage and its control.

UNIT – IV

Objective of doubling. Different systems of doubling. Study of ring doubler, two for one twister. Requirements of feed package for yarn plying. Fancy yarns. Sewing threads, core spun yarn and other speciality yarns.

Objective of reeling. Types of reeling. Construction and working of reel. Yarn bundling.

Reading List

Title	**Author**
Cotton Ring Spinning	GR Merrill
Cotton Spinning	WS Taggart
Manual of Cotton Spinning	DeBarr & Catling
Process Control in Spinning	ATIRA
Essential Elements of Practical Cotton Spinning	TK Pattabhiram
Spinning of Manmade and their blends on cotton system	K R Salhotra

TT-305-F FABRIC MANUFACTURE-III

L	T	P
3	1	-

Classwork	:	50
Examination	:	100
Total	:	150
Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT – I

Principle and working of:

Modern Shedding mechanisms - crank, matched cam, electronic dobby, electronic jacquard, e-shedding

Beat up mechanisms - matched cam beatup, Multi link crank beat up

UNIT – II

Principle and working of take up (mechanical & electronic take up) and let off (mechanical & electronic let off) mechanisms used in shuttleless looms

Introduction to Shuttleless weaving:

Restrictions as well as merits of Shuttle weaving; types of shuttleless looms, their development, typical speeds, production rates and application domain

UNIT – III

Projectile weaving machine:

Principle of weft insertion, typical specification & features of modern projectile looms. Merits, demerits and standard application domain

Torsion bar picking - construction, working, settings, mechanics

Path of weft, function of each component, projectile types, projectile circulation, weft transfer to projectile, projectile brake

Sequence of weft insertion, typical timings, projectile velocity calculation

Types and features of shedding, beat up, take up and let off motions used in projectile looms; standard manufacturers,

UNIT – IV

Rapier Weaving Machine:

Principle of weft insertion, typical specification & features of modern rapier looms; Merits, demerits and standard application domain

Classification of rapier looms, brief description of each type under classification.

Gabler and Dewas system of weft insertion and their comparison.

Path of weft in modern rigid and flexible rapier looms, function of each component in the path, sequence of weft insertion

Rapier heads, negative and positive weft transfer at shed center, their comparison

Typical timings, synchronous and asynchronous rapier movement, calculation of rapier/weft velocities, figure of merit
Rapier drives: Eccentric and cam drive systems, working of some standard drive mechanisms
Types and features of shedding, beat up, take up and let off motions used in rapier looms; standard manufacturers

Reading List

Title	**Author**
Hand Book of Weaving	Sabit Adanur
Weaving: Technology & Operations	Ormerod
Weaving: Machines, Mechanisms, Management	Ajgaonkar et al
Weaving:	Mark & Robinson
Woven Fabric Production Vol-II	NCUTE

TT-307-F TEXTILE TESTING-I (COMMON WITH TC)

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT – I

Introduction to textile testing - aim and scope.

Statistical Quality control in Textiles: tolerance limit, their setting, Control charts, Types of control charts – X-R chart, P chart, nP chart. Uses of Normal, Binomial and Poisson distribution in textiles

Sampling techniques: General requirements, squaring, cut squaring and zoning methods for sampling of raw material. Sampling techniques for yarns and fabrics for specific tests; Routine sampling techniques used in the textile industry.

UNIT – II

Hygrometry and moisture relations of textiles: Terms and definitions, relation between R.H. and regain of textile materials; equilibrium regain, hysteresis. Measurement of regain – Principle, construction and operation of equipments; Official regain and concept of correct invoice weight.

Measurement of physical characteristics, viz. length, fineness of cotton and other fibres including principle, construction, operation and calibration of the equipment in common use.

UNIT – III

Measurement of physical characteristics viz. maturity and foreign matter of cotton and other fibres including principle, construction, operation and calibration of equipments in common use,

Grading of different cottons,

Nep testing of cotton,

Fibre friction: Theories and measurement of friction of single fibre and fibre assemblies during drafting.

UNIT – IV

Yarn numbering systems, conversion methods, and measurement of yarn number, Measurement of twist in continuous filament, spun and plied yarns.

Evenness testing of yarns, Nature and causes of irregularities, principles and methods of evenness testing: evaluation and interpretation of evenness measurements, length variance curves and their associated equipment.

Reading List

Title	**Author**
Principles of Textile Testing	JE Booth

Physical Properties of Textile Fibres	WE Morton & JWS Hearle
Handbook of Textile Testing & Quality Control	Hamby & Grover
Textile Physics	RCD Kaushik

TT-309-F TEXTILE CHEMICAL PROCESSING-I

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT – I

Prepartory Processes: Sequence of chemical processing of textiles, natural and added impurities in textiles. Various preparatory processes for cotton e.g singing, various types of desizing, scouring, bleaching, mercerization etc. Silk degumming, bleaching of polyester, acrylic including optical whitening.

UNIT – II

Dyeing: Introduction to dyeing of natural fibres/fabrics with various dye classes eg. Direct, Reactive, Acid, Basic and vat dyes.

UNIT – III

Introduction to processing machinery eg. Padding mangles, Jigger, Jet dyeing machine and garment dyeing machine.

UNIT – IV

Introduction to dyeing of synthetic materials: Polyester, nylon, acrylic with dyes eg. Disperse, modified basic dyes, significance of dyeing parameters. Indigo dyeing of denim- its continous range.

Reading List

Title	**Author**
Technology of Textile Processing Vol.2,3,4,6 and 10	Shenai VA
Mercerising	Marsh JT
An Introduction to Textile Finishing	Marsh JT
Dyeing & Chemical Technology of Textile Fibres	Trotman ER
Instrumental Colour Measurement	Shah & Gandhi

TT-311-F GARMENT MANUFACTURING TECHNOLOGY (COMMON WITH TC)

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT – I
Concepts of Fashion: various terms used- fashion cycle, fad, style etc.

UNIT – II
Planning, drawing and reproduction of the marker, requirements of marker-planning, marker efficiency, methods of marker planning and marker use – normal marker, planning and computerized marker planning, requirement of spreading process, nature of fabric packages,
Objectives and methods of cutting straight knife, band knife, notches, drills, computer controlled knives, Die cutting, Laser cutting, Plasma cutting, Microprocessor based machinery in pattern construction and planning, marking and cutting processes.

UNIT – III
Sewing: Properties of seams, seam types, stitch types, sewing machine feed mechanism, sewing machine needles, sewing threads, sewing problems.
Introduction to Sewing Machinery: Basic sewing machines and associated work aids.
Automation in Garment Industry, Information Technology in Garment Industry

UNIT – IV
Pressing: Purpose of pressing, pressing equipment and methods
General description to alternative methods of joining materials and the use of components, trimmings to care labeling in garment manufacturing.

Reading List

Title	**Author**
Fashion from Concept to Consumer	Emilio Puc
The Technology of Clothing Manufacture	Harold Carr & B Latham
The Apparel Industry in India	ILA Kanti

TT-313-F SPINNING PRACTICAL-III

L	T	P
-	-	3

Classwork	:	50
Examination	:	50
Total	:	100
Duration of exam:		4 hrs

Practice in handling, Operating, setting and gauging ring frame and doubling frame. Study of constructional details of machinery: various control, change places etc. Practice in checking the quality of single and double yarn. Calculations pertaining to gearing, speeds, constant, drafts, tpi and production etc

TT-315-F WEAVING PRACTICAL-III

L	T	P
-	-	3

Classwork	:	50
Examination	:	50
Total	:	100
Duration of exam:		4 hrs

Study of construction, working and related calculation/settings of shedding (matched cam, electronic dobby and jacquard), beat-up (matched cam, multi link crank), let-off (positive) and take-up mechanisms used in shuttle-less looms.

Projectile loom: study of salient features, construction & working of torsion bar picking mechanism, path of weft, different components in the path and their working, weft transfer, projectile circulation, sequence of weft insertion, timings, related calculations, shedding, beat-up, secondary and auxiliary motions, selvedge mechanism, settings/operation.

Tape loom: study of salient features, picking mechanism, selvedge mechanism, beam formation, weave design input through CAD, operation.

TT-317-F TEXTILE TESTING PRACTICAL-I (COMMON WITH TC)

L	T	P
-	-	2

Classwork	:	50
Examination	:	50
Total	:	100
Duration of exam:		4 hrs

Measurement of fibre length and its distribution, fineness, maturity, moisture content and strength etc using different methods and instruments. Fibre diameter and its variability, cleanliness of cotton, testing of Neps in card web, sliver, roving and yarns. Analysis and interpretation of test results.

Measurement of hank of sliver roving and count of yarn and their variability. Single yarn strength and elongation; Lea strength measurement. Use of statistical techniques for evaluation of experimental results.

TT-319-F PATTERN CUTTING AND MAKING-UP (COMMON WITH TC)

L	T	P			
-	-	3	Classwork	:	50
			Examination	:	50
			Total	:	100
			Duration of exam:		4 hrs

Sewing machine – Parts of sewing machine, threading, working, defects and remedies, oiling and maintenance of sewing machine. Practice of sewing on paper and fabric. Tools and equipment used in clothing construction.

Practice of different types of machines – lock stitch over-lock, buttonhole, butting attaching, feed off the arm, double needle lock stitch, etc.

Measurement size and introduction to methods of pattern making – drafting, flat pattern and draping.

Drafting of child's basic bodice block and sleeve block. Adaptation of child's basic bodice block to an A-line frock.

Stitching: Neckline variations, Pocket variations, Darts, pleats, tucks, gathers and placket variations.

MAHARSHI DAYANAND UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATIONS
B.Tech 3rd YEAR TEXTILE TECHNOLOGY (TT)
6th SEMESTER
Proposed 'F' Scheme w.e.f 2011-12

Course No.	Course Title	Teaching Schedule				Marks of Class work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
TT-302-F	Modern Methods of Yarn Production	3	1	-	4	50	100	-	150	3
TT-304-F	Fabric Manufacture-IV	3	1	-	4	50	100	-	150	3
TT-306-F	Textile Testing-II (Common with TC)	3	1	-	4	50	100	-	150	3
TT-308-F	Mechanics of Textile Machinery	3	1	-	4	50	100	-	150	3
TT-310-F	Textile Chemical Processing-II	3	1	-	4	50	100	-	150	3
HUM-312-F	Merchandising & Export Management (Common with TC)	3	1	-	4	50	100	-	150	3
	Practicals									
TT-314-F	Spinning Practical-IV	-	-	3	3	50	-	50	100	4
TT-316-F	Weaving Practical-IV	-	-	3	3	50	-	50	100	4
TT-318-F	Textile Testing Practical-II (Common with TC)	-	-	2	2	50	-	50	100	4
TT-320-F	Textile Chemical Processing Lab	-	-	2	2	50	-	50	100	4
Total		**18**	**6**	**10**	**34**	**500**	**600**	**200**	**1300**	

TT-302-F MODERN METHODS OF YARN PRODUCTION

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT – I

Causes leading to the advent of unconventional systems of spinning; Basic Principle of Open-end Spinning systems; Variables for classification of unconventional methods of yarn production; Different Classifications of unconventional methods of yarn production; Principle involved in each group of classification. Introduction to Rotor Spinning

UNIT – II

Principle and Engineering design of various parts of rotor spinning, effect of rotor machine variables and fibre properties on the properties of rotor spun yarns.
Limitations of rotor spinning, advances in rotor spinning,

UNIT – III

Study of other spinning systems, viz. Friction and Air-jet etc; Mechanism of yarn formation, Structure, properties and end uses of yarns spun on these systems,
Various developments in these systems

UNIT – IV

Electrostatic, air-vortex, Wrap, Twist less, Self-twist and other non conventional methods of yarn production: Structure, properties and end uses of these yarns,
Potential and limitations of various spinning technologies

Reading List

Title	**Author**
Spinning in 70's	PR Lord
Spun Yarn Technology	E Oxtoby
Short Staple Spinning	W Klein
Textile Research Journal	
Journal of Textile Institute	
Textile Progress	

TT-304-F FABRIC MANUFACTURE-IV

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit.

UNIT – I

Selvedges - types, mechanism, features

Airjet weaving machine:

Principle of weft insertion, typical specification & features of modern air jet looms; Merits, demerits and standard application domain

Path of weft, function of each component, sequence of weft insertion, typical timings

Types, design, working of accumulators and main nozzles

UNIT – II

Airjet weaving machine:

Types of air-guide systems, their design and comparison

Types, spacing, arrangement, blowing action of relay nozzles; stretch nozzle

Air supply to nozzles, blowing sequence and timing control (Automatic Pick Control systems); Calculation of weft velocity, number of relay nozzles and timings of different nozzles

Quality of air required; Air drag theory, factors affecting air drag force

Weft breaks in air jet looms - reason and control devices

Types and features of shedding, beat up, take up and let off motions used in modern air jet looms; standard manufacturers

UNIT – III

Water jet weaving machine:

Principle of weft insertion, typical specification & features of modern water jet looms; Merits, demerits and standard application domain

Path of weft, function of each component, sequence of weft insertion, typical timings, calculation of weft velocity

Nozzle and jet pump design, working and settings.

Quality of water required, water extraction from fabric in loom

Types and features of shedding, beat up, take up and let off motions used in modern water jet looms; standard manufacturers.

Developments in shuttle less weaving as applicable from time to time

UNIT – IV

Multiphase weaving:

Classification: Warp- and weft-directional multiphase looms and their principle.

Weft-directional multiphase looms: different methods of shedding, picking and beat-up, advantages and disadvantages; Circular looms – classification, working, uses and limitations.
Warp directional multiphase looms: Principle of drum type weaving machines; Sulzer M8300 – specification, features, working, advantages and limitations

Reading List

Title	**Author**
Hand Book of Weaving	Sabit Adanur
Weaving: Technology & Operations	Ormerod
Weaving: Machines, Mechanisms, Management	Ajgaonkar et al
Weaving:	Mark & Robinson

TT-306-F TEXTILE TESTING-II (COMMON WITH TC)

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Mechanical behaviour of textiles. Terms and definitions, expressing the results, quantities and units. Mechanical conditioning and recovery properties of textiles.

Experimental methods: Principle of CRL, CRT and CRE type tensile testing machines - various instruments, Working of Tensojet and Tensorapid, Factors affecting the results of tensile testing. Evaluation and interpretation of tensile test results. Constant Tension winding test for yarns.

UNIT-II

Fabric Strength Testing: Tensile, tearing and bursting strength tests; principles and operation of equipment,

Fabric bending, shearing and drape esting: Principle, terminology and measurement.

UNIT-III

Serviceability, wear and abrasion: Definitions, methods for measuring abrasion resistance and evaluation of results. Fabric pilling, creasing and crease recovery testing.

Methods of tests for fabric dimensional and other physical properties; thickness, weight, crimp, shrinkage, Dimensional stability, Fabric shrinkage. Seam slippage.

UNIT-IV

Comfort and water related testing: Thermal comfort, Water vapour permeability, Moisture transport, air permeability, wettability, shower-proofness, water-proofness and flame-resistance.

Introduction to Fabric Handle Measurement by FAST and KAWABATA.

Reading List

Title	**Author**
Principles of Textile Testing	JE Booth
Handbook of Textile Testing & Quality Control	Elliot B Grover & DS Hamby
Physical Testing of Textiles	B P Saville
Textile Fibres, Yarns and Fabrics	ER Kaswell
Textile Testing	JH Skinkle

TT-308-F MECHANICS OF TEXTILE MACHINERY

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT – I

Designing of cone drum for Scutcher and speed frames, Roller weighting at different stages of spinning, Inertia a carding engine, Epicyclic wheel trains used in textile machinery, Differential motions used in speed frames.

Types of motions: Simple, compound and modified harmonic motion. Static and dynamic balancing, Balancing of rotating masses, balancing of reciprocating masses, balancing machines, speed frame balancing

UNIT – II

Introduction to machine vibration, ring frame vibration, loom vibrations

The physics and theory of spinning balloon, Yarn tension in ring spinning,

Power requirements: for operating various motions and for machines as a whole, at various stages of spinning.

UNIT – III

Introduction to Brakes and clutches, Sliding contact bearings, friction in journal bearings Classification and use of ball and roller bearings, Equivalent bearing load and load-life relationship, Type of Bearings used in various stages of spinning machinery

Types of cams and followers, cam terminology, types of motion of the follower, analysis of motion of the follower for cams with specified contours

Design of cam and tappet profiles for textile machinery

UNIT – IV

Mechanics of Winding tension and tension variation and other weaving preparatory mechanisms, Velocity profile of shuttle during acceleration and retardation, picking force, Kinematics of sley for shuttle and shuttle less looms, Warp and Fabric Tension under Normal and Bumping conditions and their measurement, Excess tension theory, Power requirements for operating various motion and for machines as a whole, at various stages of weaving.

Reading List

Title	**Author**
Textile Mathematics Vol. 1, 2 and 3	J E Booth
Principles of Mechanism	F Dyson
Mechanics for Textile Students	W A Hanton

Textile Mechanics Vol 1, 2 & 3	K Slater
Manual of Cotton Spinning Vol 5	A F De Barr & M Catling
Short Staple Spinning Series	W Klein
Cotton Spinning	K Pattabhiram
Principles of Weaving	Marks & Robinson
Mechanisms of Weaving	W T Fox

TT-310-F TEXTILE CHEMICAL PROCESSING-II

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT – I

Printing: Introduction to printing methods viz. block, roller and screen printing (Table, Flat bed and rotary screen printing), and style such as Direct, discharge and resist style, transfer printing.

UNIT – II

Printing of natural and synthetic fibre fabrics, printing with kerosene.

UNIT – III

Introduction to mechanical finishing of natural and synthetic fibre/fabrics eg. Raising, antishrinkage, calendars, heat setting, milling etc.

UNIT – IV

Introduction to chemical finishing biopolishing, softening, stenters and mangles, easy care finishing of cotton, low liquour application technique in finishing including foam finishing, wash down effects on denim garments.

Reading List

Title	**Author**
Technology of Textile Processing Vol.2,3,4,6 and 10	Shenai VA
Mercerising	Marsh JT
An Introduction to Textile Finishing	Marsh JT
Dyeing & Chemical Technology of Textile Fibres	Trotman ER
Instrumental Colour Measurement	Shah & Gandhi

HUM-312-F MERCHANDISING & EXPORT MANAGEMENT (COMMON WITH TC)

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT – I

Fundamentals of Marketing Management. Type of Marketing –Target marketing and Mass Marketing. Concept and definition of Market Segmentation. Basis and variables of market segmentation. Niche Marketing and Micro marketing.

Explanation of various concept of marketing with example. – production concept, product Concept, Selling concept, marketing concept and societal concept.

Need of New product development. Various stages involved in new product development.

Concept of product life cycle, behavior of sales and profit during various stages of product life cycle. Strategy to be followed at various stages of product life cycle.

UNIT – II

Marketing mix - Concept and definition.. Variables of market mix - 4Ps. Product, Price Promotion and Place.

Various factors affecting the pricing decision of a product

Distribution channel and various functions performed by the distribution channel.

Promotion mix – Importance of promotion mix. Various kinds of promotion mix.

Scope of application and their relative merits and demerits.

UNIT – III

Export Management. – Concept and definition. Importance of export

Terms of payment of in Export Marketing. Letter of credit and their relative merits and demerits.

Various kinds of document to be prepared and maintained by the exporters

Pre shipment and post shipment finance. Brief discussions on various steps involved in Export.

UNIT – IV

Merchandising – concept and definition.

Various activities involved in merchandising - Product line Planning, Development and Presentation. Brief idea on different steps involved in product line planning and development. Various functions performed by merchandisers in organization with special reference to an apparel production firm. Visual Merchandising, Role of information technology in merchandising

Reading List

Title	**Author**
Marketing : An Introduction	Kotler Philip & Armstrong, Gray

Marketing Management	Kotler Philip
Marketing Management	Saxena, Rajan
International Marketing	Oak Onkvisit & JJ Shaw
International Marketing	PR Eateora

TT-314-F SPINNING PRACTICAL-IV

L	T	P
-	-	3

Classwork	:	50
Examination	:	50
Total	:	100
Duration of exam:		4 hrs

Study of drafting, twisting and winding operations of Rotor and air-jet spinning machines; Familiarity with established processing parameters for producing carded, combed, blended, folded and fancy yarns.

Case studies pertaining to waste analysis, estimation of the total productivity, actual efficiency levels and causes of loss of efficiency in different spinning preparatory departments, viz. blowroom, card, comber, draw-frame and simplex. Study of blow-room and card performance, Nep count in card web. Checking of comber waste,

Assessment and control of variability before yarn formation, Practice in handling and setting of the various spinning preparatory machines. Workload measurements in spinning preparatory, Oiling and maintenance schedules, Idea of time and motion study.

TT-316-F WEAVING PRACTICAL-IV

L	T	P
-	-	3

Classwork	:	50
Examination	:	50
Total	:	100
Duration of exam:		4 hrs

Rapier loom: study of salient features, path of weft, different components in the path and their working, weft transfer at shed center, timings, rapier displacement curves, related calculations, shedding, beat-up, secondary and auxiliary motions, colour mixing, selvedge mechanism, settings/operation.

Air jet loom: study of salient features, path of weft, different components in the path and their working, air supply, timings, related calculations, shedding, beat-up, secondary and auxiliary motions, selvedge mechanism, settings/operation.

Water jet loom: study of salient features, path of weft, different components in the path and their working, jet pump and nozzle, timings, related calculations, shedding, beat-up, secondary and auxiliary motions, selvedge mechanism, settings/operation.

TT-318-F TEXTILE TESTING PRACTICAL –II (COMMON WITH TC)

L	T	P			
-	-	2	Classwork	:	50
			Examination	:	50
			Total	:	100
			Duration of exam:		4 hrs

Use of Microscopes for testing of yarns for appearance, twist and diameter. Measurement of evenness by conventional and modern testing instruments. Interpretation of results and construction of X & R Charts.

Fabric testing for dimensions, construction, weight, thickness, crimp, cover, shrinkage and air permeability.

Fabric testing for load, elongation, tensile, bursting and tearing strength, Abrasion, flexural rigidity, crease-recovery and draping qualities of fabrics.

TT-320-F TEXTILE CHEMICAL PROCESSING LAB

L	T	P			
-	-	2	Classwork	:	50
			Examination	:	50
			Total	:	100
			Duration of exam:		4 hrs

Pre-treatments such as desizing, scouring and bleaching. Dyeing of cotton, rayon, wool and synthetic fibres with different dyes, e.g. direct, reactive, vat, acid and disperse. Printing of cotton fabrics. Application of finishing agents such as starches, resins, etc.

MAHARSHI DAYANAND UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATIONS
B. Tech FINAL YEAR TEXTILE TECHNOLOGY (TT)
7th SEMESTER
'F' Scheme w.e.f 2012-13

Course No.	Course Title	Teaching Schedule				Marks of Class work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
TT-401-F	High Performance Fibres	3	1	-	4	50	100	-	150	3
TT-403-F	Multifibre Spinning	3	1	-	4	50	100	-	150	3
TT-405-F	Waste Management & Pollution Control OR Production Planning & Quality Management	3	1	-	4	50	100	-	150	3
TT-407-F	Engineering of Textile Structures-I	3	1	-	4	50	100	-	150	3
TT-409-F	Textile Costing	3	1	-	4	50	100	-	150	3
HUM-411-F	Finance, Material and Human Resource Management	3	1	-	4	50	100	-	150	3
TT-413-F	Spinning Practical – V	-	-	3	3	50	-	50	100	4
TT-415-F	Weaving Practical – V	-	-	3	3	50	-	50	100	4
TT-417-F	Mill Practice	-	-	-	-	100	-	200	300	4
TT-418-F	Seminar	-	-	2	2	-	-	-	-	-
TT-419-F	Project Work (Mid Term Evaluation)	-	-	2	2	100	-	-	100	Viva
Total		**18**	**6**	**10**	**34**	**600**	**600**	**300**	**1500**	

MAHARSHI DAYANAND UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATIONS
B. Tech FINAL YEAR TEXTILE TECHNOLOGY (TT)
8th SEMESTER
'F' Scheme w.e.f 2012-13

Course No.	Course Title	Teaching Schedule				Marks of Class work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
TT-402-F	Post Extrusion Operations	3	1	-	4	50	100	-	150	3
TT-404-F	Spinning Technology	3	1	-	4	50	100	-	150	3
TT-406-F	Complex Textiles	3	1	-	4	50	100	-	150	3
TT-408-F	Engineering of Textile Structures-II	3	1	-	4	50	100	-	150	3
TT-410-F	Technical Textiles OR Global Scenario of Textile Industry	3	1	-	4	50	100	-	150	3
CSE-412-F	Computer Network & Applications	3	1	-	4	50	100	-	150	3
TT-414-F	Textile Colour & Design	-	-	3	3	50	-	50	100	4
TT-416-F	Computer Networking Practical	-	-	3	3	50	-	50	100	4
TT-418-F	Seminar	-	-	2	2	200	-	-	200	-
TT-420-F	Project Work	-	-	2	2	100	-	100	200	Viva
Total		**18**	**6**	**10**	**34**	**700**	**600**	**200**	**1500**	

SEVENTH SEMESTER

TT-401-F HIGH PERFORMANCE FIBRES

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT – I

Introduction to high performance fibres: fully aromatic polyamide or aramid fibres; Liquid crystals. Kevlar: manufacture, structure, properties and applications. Dry-jet wet spinning, Polyarylate fibres viz. Vectran - manufacture, properties and applications.

UNIT – II

Ordered polymeric fibres; Aromatic heterocyclic rigid rod polymeric fibres like PBO – their production, structure properties and applications.

Flexible chain high performance fibres: Ultra high molecular weight polyethylene; gel spinning and melt spinning / drawing. Routes for fibre manufacture. Manufacturing, structure, properties and applications these fibres

UNIT – III

Carbon fibres: Different precursors for carbon fibres like viscose rayon, PAN and pitch; Pre-oxidation, carbonization and graphitization. Chemical and physical changes in structure during these processes: Structure, properties and applications of carbon fibre.

Brief introduction to the manufacturing methods, properties and applications of nano fibres

UNIT – IV

Optical fibres: Definition, working principle and working method, different types of losses in optical fibres and their remedies; different materials used for manufacturing of optical fibres, different types of optical fibres. Manufacturing process of optical fibres and their applications

Meta-aramid fibres-Nomex: production, properties and applications.

Reading list

Title	**Author**
High Performance Fibres	P. Bajaj & A. K. Sengupta
High Technology Fibres (Part A, B, C, D)	M. Lewin & J. Preston
High Performance Fibres	J. W. S. Hearle

TT-403-F MULTIFIBRE SPINNING

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Brief idea about characteristics of man-made fibres their importance during spinning,
Blending and its objective, Different indices of blending, selection of blend constituents, different technique of blending, Processing of man-made fibres and blends in blowroom, carding, drawframe, simplex and ringframe on cotton spinning system.

UNIT-II

Spinning of long staple fibres, spinning of dyed fibres, Structure and properties of ring spun blended yarns, spinning of man-made fibres on woollen and worsted system,

UNIT-III

Woollen, Semi-worsted and worsted systems of spinning: Brief idea of scouring, carbonizing, carding, combing, gilling, flyframe and ring spinning.

UNIT-IV

Jute and flax spinning: understanding of various processes like batching, carding, drawing, roving and spinning of hessian and sacked yarn.
Manufacturing of spun silk
Cotton Waste: Types, classification and end-uses, study of machines and methods employed in the production of waste yarn (coiler system and condenser system).

Reading List

Title	**Author**
Spinning of man-mades and blends on Cotton system	KR Salhotra
Wool Hand Bookm Vol.II	Werner Von Bergei
British Wool Manual	H Spibey
Shoddy & Mungo Manufacture	NC Gee
Worsted	Alan Brearley
Jute-Fibre to Yarn	RR Atkinson

TT-405-F PRODUCTION PLANNING AND QUALITY MANAGEMENT

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Scope and function of Production Management, Macro & Micro level Production planning in textile mill, Objectives of production planning, Functions involved in planning and control. Concept of Productivity and productivity measurements, Factors affecting productivity of an organization

UNIT-II

Work study- scope and objective of work study with special reference to textile industry. Steps involved in Method Study. Objectives and Technique of Work Measurement, Various steps involved in Time Study and Determination of standard time, Applications of Snap Study in Textile Industry, Strategy for obtaining output from human resource

UNIT-III

Concept of Quality & Quality Management System (Q.M.S), Overview of Quality Management System Standard- ISO 9000, Formulation of Quality Policy, Quality Objective and Quality plan, Implementation Procedure of Q.M.S with special reference to Textile industry. Documentation of quality management Quality Audit, Types of audit, Technique of conducting audit, Concept of Total Quality Management, Tools for T.Q.M,- Kaizen, Cost of Quality., Quality circle, 5s , J.I.T. Brief Idea on Total Productive Maintenance.

UNIT-IV

Concept of Environment management system, Importance of Environment Management System in an organization, Linkage between Quality and Environment management system in an organization .Various steps involved in implementing Environment Management System. Initial Environment Review – objective and methodology. Environment Management Programme

Reading List

Title	**Author**
Production and Operation management	S.N.Charry
Production and Operation management	N.G. Nair
ISO14000Guide	Casico Joseph
Quality management hand book	Walsh Oren

TT-405-F WASTE MANAGEMENT AND POLLUTION CONTROL

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Definition of Waste and Pollutant: Classification of wastes and pollutants; Importance of waste management and pollution control. Environmental impact assessment, definition & need, introduction to environmental impact assessment methodology, unit processes.

UNIT-II

Textile effluents and their characterization, methods of effluent treatment, disposal of effluents, reuse of water in a process house, fiber and polymer waste, recovery and recycling of monomer. Modifications of polymer waste. Recovery and recycling of monomers, Modifications of polymer waste and its utilization, Waste Management approaches, Statistical interpretation of data on waste of different sections of textile industry;

UNIT-III

Toxicity of intermediates dyes, processing aids-bleaching, dyeing, printing and finishing auxiliaries etc, Analytical methods for various pollutants. Formaldehyde, Pentachlorophenol, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Minimization, Optimization and Standardization of waste in textile industry

UNIT-I

Source of water: Factors contributing water pollution and their effect, water pollution parameters, physical, biological, chemical standards for quality of treated water. Effluent treatment methods and control, basic principles-Unit operations (sedimentation, precipitation, filtration, and incineration), specific pollutants, Pollution of air, causes, effect, monitoring and control, Source of noise pollution, its effect and control .Legislation- salient provisions of water act, Air act, Environment protection act, Environment Impact Assessment: Basic principles, purpose, components, methodology and constraints

Reading List

Title	**Author**
Basic course in environmental studies	S. Deswal & Anupama Deswal.
Environment impact Assessment	Mc. Graw Hill by Caeter L.W
Environment Pollution & Control	H.S. Bhatia
Textile management	V.D.Dudeja.
Water and effluent in textile mills	P.B.Jhala

TT-407-F ENGINEERING OF TEXTILE STRUCTURES-I

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Types of yarns; Influence of fiber parameters on yarn structure

Yarn Geometry- Idealized yarn geometry, relationship of yarn number and twist factor. Packing of fibers in yarn, Twist contraction, Limit of twist, Significance of twist and forms of twist

UNIT-II

Ideal Packing, Hexagonal close packing and other forms, Packing factors and its measurement,

Fiber Migration- mechanism of migration, Condition for migration to occur, Frequency of migration, Migration in blended yarns

UNIT-III

Translation of fiber properties into yarn properties, Extension of continuous filament yarn for small strains and large strains, Prediction of breakages

UNIT-IV

Mechanics of blended yarns, Hamburger model and later modifications

Spinnability of textile fiber-relation with end breakage rate, Dynamic, Bending and torsional behavior of fibers and yarns

Reading List

Title	**Author**
Structural Mechanics of Fiber, Yarn and Fabrics	JWS Hearle, P Grosberg & S Bracker
Structure of Yarn	Witold Zurek

TT-409-F TEXTILE COSTING

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

General cost concepts: Definition and concepts of cost accounting, cost accountancy and costing. Objectives of cost accounting, Rules for application of cost accounting, Cost Classification: Variability (behavioral classification), Functional areas (functional Classification), Responsibility (controllable and uncontrollable cost), Traceability/indentify-ability (direct and indirect cost), The accounting period charged to revenue (product cost and period costs), Relevance to decision-making (relevant and irrelevant costs), Break even equation, Other cost concepts like Shut down cost, Research cost Development cost, Joint cost. Elements of cost in textile industry, Total cost component, preparation of cost sheet.

UNIT-II

Costing Methods and Techniques: concepts of different costing methods like Job costing, Contract (Terminal) costing, batch costing, Process costing, Unit Costing, Operation costing, Service costing, Multiple (Composite) Costing. Concept of different costing techniques like Absorption Costing, Standard Costing, Marginal Costing, Uniform Costing and Budgetary control Costing.

Inventory cost/Inventory Evaluation in textile industry: Basic concepts, different methods of pricing material issues, First-in First-out (FIFO): concept, advantages, disadvantages, Suitability. Last-in First-out (LIFO): concept, advantages, disadvantages, Suitability. Stores ledger account based on LIFO & FIFO.

UNIT –III

Cost control in textile industry under different situation. Method of calculation clean cotton cost.

Costing for a spinning mill: General concept, Cost of Setting up a Spinning Mill, Profit Computation of Spinning Mill Setup, Costing for a POLY/COTTON PLANT with auto-doffing and link to Auto Conner

UNIT-IV

Factors influencing costing of fabrics

Garment Costing, Calculation cost of Fabric Consumption. Cost related with Trims and Accessories. Costing of Shirts, Cost related with Sea and Air Freight. Cost related with Dispatch and Containerization.

Reading List

Title	**Author**
Cost Accounting, Principles and practice	B.M. LALL NIGAM, I.C.JAIN
Cost Accounting in Textile Mills	P.V.BHAVE, V. SRINIVASAN

HUM-411-F FINANCE, MATERIAL AND HUMAN RESOURCE MANAGEMENT

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Financial Management: Objectives and scope, sources of finances.

Accounting procedure: Definition of accounting, book keeping and accounting, Double Entry book keeping and financial statement, Meaning and Importance of double entry book-keeping, Accounting principles, accounting conventions, Specimen and purpose of balance sheet, Trading and Profit and Loss Account, Journal and ledger rules.

UNIT-II

Capital Structure: Meaning: Essentials of an ideal/optimum Capital Structure, Difference between capital, Capitalization and Capital Structure.

Management of Working Capital: Definition; Nature Classification of Working Capital – (i) Permanent working Capital and (ii) Variable Working Capital; Factors affecting requirement of working capital, Presentation of cash flow statements and its benefits.

UNIT-III

Personal Management and HRD, Job Analysis: Meaning and Importance; Processes of Job Analysis, Job Description and Job Specification.

UNIT-IV

Materials Management: Definition and Objectives: Inventory Management.

Inventory Control: Techniques of Inventory control- ROL, FOR Value Analysis, ABC Analysis, VED Analysis; Factors affecting Inventory Control, Ordering Costs, Carrying Costs, Stock-out costs, Buffer Stock, Stock Turnover & Lead Time

Reading List

Title	**Author**
Accounting for Managers	Paresh Shah
Financial Accounting	D K Goyal
HRM	R S Dwivedi
Accounting Principles	Robert N Anthony & S James Reece
Financial Accounting	S M Shukla
Cost Mgt Accounting & Control	Hansen & Mowen
Financial Accounting	P C Tulsiyan

Financial Management	I M Pandey
H R M	Gary Dessler
H R and Personnel Management	K Aswathappa
Material Management	P Gopala Krishnan

TT-413-F SPINNING PRACTICAL –V

L	T	P			
-	-	3	Class work	:	50
			Examination	:	50
			Total	:	100
			Duration of exam	:	4 hrs

Practical approach to identify, analyze and resolve Quality and Operational related problems arises in Ring, Rotor and Air jet Spinning – their origin, remedial and preventive measures. Comparison of Norms and their Statistical Interpretation, Measurement of productivity in ring and rotor spinning, Causes of efficiency losses in ring and rotor spinning. Studies on analysis of waste in ring frame.

Studies on major maintenance activities of ring frame and their effects on quality and operation of ring frame. Brief idea on various important spare parts in ring frame and their life and replacement /reconditioning frequency

Setting of process and machine parameters of conventional and modern ring frame
Snap study in ring frame and ring doubling section. Determination of end breakage rate in ring frame and ring doubling section, To study the various parts of TFO and their functions, adjustment of various process and machine parameters.
Yarn costing, contribution various machines to the production cost.

Case studies pertaining to disciplinary actions taken against workers and grievance handling mechanism

TT-415-F WEAVING PRACTICAL-V

L	T	P			
-	-	3	Class work	:	50
			Examination	:	50
			Total	:	100
			Duration of exam	:	4 hrs

Theory of colour; primary, secondary and tertiary colours, Complementary colours, Colour in combination, Colour and weave effect, Proportion, rhythm and decorative qualities in textile design. Contrast and harmony in textile and colour
Product design and developments in weaving and knitting, Design preparation through CAD
Practice in motion study, time study and work-load measurement.

TT-417-F Mill Practice 6 Weeks (300)

L	T	P			
-	-	-	Class work	:	100
			Examination	:	200
			Total	:	300
			Duration of exam	:	Viva

Each student, individual or in association with some other students at the end of the Third B.Tech course will observe and collect the general and technical information pertaining to machinery, raw materials used, yarns and fabrics produced by the textile mills, in which he/she/they are undertaking 6 weeks' practical training with the approval of the Director, TITS.

Each student will have to submit a written/typed report duly approved and signed by the guide to the Head of the department.

TT-419-F Project Work (Mid-Term Evaluation)

L	T	P			
-	-	2	Class work	:	100

EIGHTH SEMESTER

TT-402-F POST EXTRUSION OPERATIONS

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Drawing process: Objectives, neck drawing process, NDR, MDR and LDR, Drawing process of polyester and nylon; Spin-draw processes and staple lines; Different types of heating; Influence of drawing on structure and properties of fibres

Heat setting process: Types of setting – temporary and permanent setting, effect of temperature, tension and water on setting process. Influence on setting of structure and properties of fibres. Thermal heating, settability and measurement of degree of set

UNIT-II

Texturing process: Principle of texturing, Types of texturing processes. Principle and brief description of stuffer box crimping, knit-de-knit texturing, hi-bulk acrylic yarns, Solvent texturing – method, principle and properties of yarns.

UNIT-III

Twist texturing principle, processes and machine. Material, machine and process variables affecting twist texturing process and yarns. Structural geometry of textured yarns, Faults in twist textured yarns and their remedies. Evaluation of twist textured yarns.

UNIT-IV

Air-jet texturing: principles and mechanism of air-jet texturing. Material, machine and process variables affecting the air-jet textured yarn properties; different types of jets, baffle elements and their description; properties of air-jet textured yarns and their importance. Evaluation of air-jet textured yarns.

Reading List

Title	**Author**
Yarn Texturing Technology	Hearle, Hollick & Wilson
Modern Yarn Production	G R Wray
Manufactured Fibre Technology	Gupta & Kothari

TT-404-F SPINNING TECHNOLOGY

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Irregularity of drafted material: random, periodic and quasi-periodic irregularities; Law of addition of irregularities, Effect of doubling on irregularities.

Cause and control of drafting wave, roller nip movement, roller speed variation, roller slippage and their effect on yarn irregularities

UNIT-II

Effect of warp and weft yarn irregularity on cloth appearance, Understanding Uster spectrogram

Causes of yarn irregularity; Influence of raw material, process and machine variables on irregularity

Scope of process control in spinning, Key variables for process control in spinning, Control of mixing quality and cost, Yarn realization and its control,

UNIT-III

Control of waste and cleaning in blow room, carding and combing;

Measurement and analysis of productivity of a spinning mill, Means to improve productivity (By machine efficiency and end breakage rate at ring spinning or by machine productivity at preparatory section)

Prediction of yarn quality parameters from fibre quality parameter

UNIT-IV

Control of yarn quality: Count (within and between bobbin), strength and their variability, Machinery audit and its implementation, Role of ambient temperature and humidity, Yarn fault and their control, Different types of package defects and their control.

Reading List

Title	**Author**
Manual of Cotton Spinning Vol IV	GAR Foster
Process Control in Spinning	AR Garde and T A Subramanian
Maintenance Management in Spinning	TV Ratnam et al
Textile Research Journal	
Indian Textile Journal	
Indian Journal of Fibre & Textile Research	
Joint Technological Conferences	

TT-406-F FABRIC MANUFACTURE-V

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-1
Special Woven Fabric Structures:
Damask Fabrics, Brocade, Terry pile structure, warp pile, weft pile fabrics
Special gauge and leno structures

UNIT-II
Non woven fabrics:
Characterization, classification, application areas in general, production trends
Methods of web preparation – longitudinally, crosswise and random oriented webs; web formation technologies and machineries

UNIT-III
Web Reinforcement Techniques:
Needle punching - principle, needle loom, needling parameters, felting needles, applications
Spunlacing - principle, machinery, properties, applications
Stitch bonding – principle, applications
Chemical bonding - principle, adhesive types, forms, principle of adhesion, production techniques, applications

UNIT-IV
Thermal bonding - principle, binder types, forms, calendar bonding, hot air bonding, applications
Spun bonding - principle, machineries, applications
Melt blown - principle, applications
Non woven fabric structure-properties
Braiding, tufting – principle, uses.

Reading List

Title	**Author**
Watson's Textile Design & color	W Watson
Watson's Advanced Textile Design	W Watson
Grammar of Textile Design	Nisbet
Woven Fabric Production–II	NCUTE Publication
Handbook of nonwovens	Russell
Nonwoven Fabrics	Albrecht, Fuchs

Non Woven	M.L.Gulrajani, The Textile Institute
Manual of Nonwoven	R Krcma
Innovations in Textile Sc. &Tech (Non woven)	V.K. Kothari

TT-408-F ENGINEERING OF TEXTILE STRUCTURES- II

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Elements of fabric geometry, Cloth setting theories: Ashenhurst's, Armitage's, Law's, Brierlay's theories. Fabric cover, cover factor and their significance, Relationships between cover and weight per unit area of fabric, Peirce's fabric geometry

UNIT-II

Flexible and Elastic thread models.
Mechanism of simple deformations: Tensile, Bending, Shear, Compression and Friction.

UNIT-III

Theory of fabric properties involving complex deformations: Buckling, Tearing, Creasing, Drape and Abrasion.
Handle of fabrics. Constituent properties and Objective measurement of handle by KES and FAST

UNIT-IV

Thermal Comfort: Thermal comfort in humans, Flow of Heat, air and moisture through woven fabrics.
Fabric properties and apparel performance, Tailorability and Formability for apparel fabrics

Reading List

Title	**Author**
Structure of fibres, yarns and fabrics	Hearle, Backer and Grosberg
Textile properties	Kaswell
HESC standard evaluation	S. Kawabata
(Textile Machinery Society of Japan, 2nd edition, 1984, pp 130-141)	
Woven Textile Structures: Theory and applications	B K Behera and P K Hari
Structure and mechanics of woven fabrics	J. Hu

TT-410-F TECHNICAL TEXTILES

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

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

Geotextile: Mechanics of reinforcement, Separation, filtration and drainage of soils by geotextile. Types: woven, nonwoven, Geonets, Geogrids etc. Fiber and fabric construction details of Geotextile in typical applications like road construction, river embankment, earth quake proof building

Medical textiles: Textiles in various medical applications.; Medical fibers and their properties, Hygiene and non implantable medical textile, Biotextiles, application oriented design of typical medical textile(e.g. porous graft or trashed tube).Materials used and design procedure for wounds dressing, scaffolds, Sutures etc.

UNIT-III

Automotive Textiles: Fibres used for automotive applications-upholstery, carpets, preformed parts, tires, safety devices, filters and engine compartment items. Brief description for the manufacture and application of these devices or parts

Protective clothing: Thermal protection. Ballistic protection, Protection from electromagnetic radiations and hazards, Protection against micro-organisms, chemicals and pesticides

UNIT-IV

Composites: Type of fibers and resins used, Methods of construction, Type of preforms and their properties, typical applications, 3 dimensional fabrics and triaxially braided materials for composites.

Filtration: Principles and some mathematical models of wet and dry filtrations. Characteristics properties of fibers and fabrics in selective examples of filtration

Ropes and Cordage: Method of production. Application oriented structure and production of ropes, cordages and twines.

Reading List

Title	**Author**
Handbook of Technical Textiles	A. Richard Horrocks, Subhash C. Anand
Technical Textile yarns: Industrial and medical applications;	R. Alagirusamy, A. Das
Progress in Textiles: Science & Technology Volume 2 – Textile Fibres: Developments & Innovations	V K Kothari
Progress in Textiles: Science & Technology Volume 3 – Technical Textiles	V K Kothari
Technology, Development and Applications Technical Textile	NCUTE series

TT-410-F GLOBAL SCENARIO OF TEXTILE INDUSTRY

L	T	P			
3	1	-	Class work	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Sectors of textile industry viz. organized mill sector, decentralized small-scale sector.
Sectors based on technology: Handloom, Power loom, Garment, Cotton, Silk, Wool, Jute and Synthetic Fibers, Indian cotton: production, quality and global competition. Major textile producing countries, their production capacities and varieties of products

UNIT-II

Raw material producing countries, production quality and quantity and cost comparison
Machinery suppliers and their comparative studies

UNIT-III

Changing scenario of Indian Textile Industry in the wake of WTO Agreement, Strengths and weaknesses of the Indian Textile Industry in the global scenario, Research and technology support to the Indian Textile Industry. Research trends and emerging technologies and their impact on the future of the industry

UNIT-IV

Marketing trends and export prospects. Demand and supply scenario, Fashion trends and consumer preferences. Channels of distribution and procurement of textile goods and raw materials

Reading List

Title	**Author**
Textile Industries	Murphy WS
Textile Industry, "Technical Conference On Textile Industry: Atlanta, 19778	IEEE Publication
India's Textile Industry	Srinivasan, Kastury
World Textiles: Investment Innovation, Invention – Annual World Conference on World Textiles and Investment Innovation Invention"	The Textile Institute, Manchester
Textile Journals, Magazines and Topical Reports	

CSE-412-F COMPUTER NETWORK AND APPLICATIONS

L	T	P			
3	1	-	Classwork	:	50
			Examination	:	100
			Total	:	150
			Duration of exam	:	3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Introduction, Network structure and architecture, OSI reference model and services, Topology design, Protocols and media for data transmission, IEEE LAN standards, HQLC, ALOHA, Slotted ALOHA.

UNIT-II

Client Server architecture, Example Networks – APRANET, MAP and TOP, USENET, CSNET, BITNET AND SNA, Network communication device – Routers, Bridges, HUBS, Switch, Gateways, Modem, Repeater, etc. Introduction to advanced communication techniques, ISDN, ATM, TOKEN Based Protocol, CSMA/CD, Mobile communication

UNIT-III

Multimedia Hypertext Markup Language, www. Search Engines, Basic concept in E-commerce and E-mail, EDI, Electronic Payments, Digital Signatures, Network Security, Firewall.

UNIT-IV

TCP/IP: Introduction, Layers of TCP/IP, Protocols, Internet Protocol, Transmission Control Protocol ,User Datagram Protocol, IP Addressing, IP address classes, Subnet Addressing, Internet Control Protocols, Application Layer, Domain Name System, FTP, HTTP

TT-414-F TEXTILE COLOUR & DESIGN

L	T	P			
-	-	2	Class work	:	50
			Examination	:	50
			Total	:	100
			Duration of exam	:	4 hrs

To show colour mixtures according to light theory and pigment theory of colour; To draw the Oswald's colour circle; To draw the chromatic circle and fill-up the colours. To show the arrangement of the primary, secondary and intermediate colours in the Brewster's theory; To modify a pigment colour by mixing with another colour; To modify a pigment colour by mixing with white (tints); To modify a pigment colour by mixing with black (shades); To obtain coloured greys of a colour; To produce monochromatic contrast; To produce polychromatic contrast of the following kinds:

a) Contrast of hue
b) Contrast of tone.

To produce harmony of analogy of a colour; To produce harmony of contrast of a colour, To produce floral, geometrical, abstract and border designs; Enlargement and reduction of designs. Simple Weave and colour effects. Compound colour and weave effects – stripe colour and weave effect, Check colour and weave effect, Special colour and weave effect, figured colour and weave effect; Placement of figures and motifs – half drop, double ½ drop, diamond base, ogee base, rectangular, horizontal, vertical etc.

CSE-416-F COMPUTER NETWORKING PRACTICAL

L	T	P			
-	-	2	Classwork	:	50
			Examination	:	50
			Total	:	100
			Duration of exam	:	4 hrs

Introduction to hub, routers, gateways, various types of cabling in networking, various types of topologies design for computer network. IP configuration and addressing for networking etc, Also Network Configuration

TT-418-F SEMINAR

L	T	P			
-	-	2	Classwork	:	200

Each student will have to deliver a talk on the topic in the weekly period allotted to this subject, either pertaining to his project work or any topic assigned by Head of the Department.
The performance of the speaker would be judged in the class by a Board of Examiners.

TT-420-F PROJECT WORK

L	T	P			
-	-	2	Classwork	:	100
			Examination	:	100
			Total	:	200
			Duration of exam	:	4 hrs

Each student individually, or an association with some other students will carry out project of an experimental and/or theoretical nature in one of the main branches of textile technology and present his findings in a systematic manner in the report form duly approved and signed by his Supervisor/Guide (to be nominated by the Head of Department/Institution). Each candidate would submit 3 typed copies of Project Report to the Head of the Department/Institution at least 15 days before the commencement of Second Semester Examination. One copy of the project report will be returned to the candidate after viva-voce examination. The original Report and a carbon copy will be retained by the concerned Department/Institution and the Supervisor respectively.