

**M.D. UNIVERSITY
ROHTAK**

SYLLABUS

FOR

PRE-Ph.D (TEXTILES)

**MAHARSHI DAYANAND UNIVERSITY,
ROHTAK SCHEME OF STUDIES AND
EXAMINATION**

**TEXTILE TECHNOLOGY
Pre-Ph.D 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		
	Textile Technology									
PhD-TT-102	Research Methodology	3	1	-	4	20	80	-	100	3
PhD-TT-104	SEMINAR	-	-	2	2	100	-	-	100	
	Elective Subject	3	1	-	4	20	80		100	3
Total		6	2	2	10	140	160	-	300	

- NOTE:** i) Research Methodology paper is common for all streams
ii) Class work consists of two assignments of 10 marks each.
iii) Candidates will have to attempt five questions of each consisting of 16 marks
iv) Q1 will be compulsory with objective type of questions
v) Seminar topic will be chosen as pre-project work

**MAHARSHI DAYANAND UNIVERSITY,
ROHTAK SCHEME OF STUDIES AND
EXAMINATION**

**TEXTILE CHEMISTRY
Pre-Ph.D 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		
	Textile Chemistry									
PhD-TC-102	Research Methodology	3	1	-	4	20	80	-	100	3
PhD-TC-104	SEMINAR	-	-	2	2	100	-	-	100	
	Elective Subject	3	1		4	20	80		100	3
Total		6	2	2	10	140	160	-	300	

- NOTE:**
- i) Research Methodology paper is common for all streams
 - ii) Class work consists of two assignments of 10 marks each.
 - iii) Candidates will have to attempt five questions of each consisting of 16 marks
 - iv) Q1 will be compulsory with objective type of questions
 - v) Seminar topic will be chosen as pre-project work

**MAHARSHI DAYANAND UNIVERSITY,
ROHTAK SCHEME OF STUDIES AND
EXAMINATION**

**FASHION AND APPARELENGINEERING
Pre-Ph.D 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		
	Fashion and Apparel Engineering									
PhD-FAE-102	Research Methodology	3	1	-	4	20	80	-	100	3
PhD-FAE-104	SEMINAR		-	2	2	100	-	-	100	
	Elective Subject	3	1		4	20	80		100	3
Total		6	2	2	10	140	160	-	300	

- NOTE:**
- i) Research Methodology paper is common for all streams
 - ii) Class work consists of two assignments of 10 marks each.
 - iii) Candidates will have to attempt five questions of each consisting of 16 marks
 - iv) Q1 will be compulsory with objective type of questions
 - v) Seminar topic will be chosen as pre-project work

PhD TT-102 Research Methodology

L	T	P
3	1	-

Class work	:	20
Examination	:	80
Total	:	100

Exam duration: 3 Hrs

Course contents are same as in other streams

PhD TT-104 SEMINAR

L	T	P
-	-	2

Class work	:	100
Examination	:	-
Total	:	100
Exam duration:	:	-

Each student will have to deliver a talk on the topics, in the weekly period allotted to the subject pertaining to his/her project work or any topic assigned by Head of the Department.

The performance of the speaker would be judged in the class by Board of Examiners.

PhD TC-102 Research Methodology

L	T	P
3	1	-

Class work	:	20
Examination	:	80
Total	:	100

Exam duration: 3 Hrs

Course contents are same as in other streams

PhD TC-104 SEMINAR

L	T	P
-	-	2

Class work	:	100
Examination	:	-
Total	:	100
Exam duration:	:	-

Each student will have to deliver a talk on the topics, in the weekly period allotted to the subject pertaining to his/her project work or any topic assigned by Head of the Department.

The performance of the speaker would be judged in the class by Board of Examiners.

PhD FAE-102 Research Methodology

L	T	P
3	1	-

Class work	:	20
Examination	:	80
Total	:	100

Exam duration: 3 Hrs

Course contents are same as in other streams

PhD FAE-104 SEMINAR

L	T	P
-	-	2

Class work	:	100
Examination	:	-
Total	:	100
Exam duration:	:	-

Each student will have to deliver a talk on the topics, in the weekly period allotted to the subject pertaining to his/her project work or any topic assigned by Head of the Department.

The performance of the speaker would be judged in the class by Board of Examiners.

**MAHARSHI DAYANAND UNIVERSITY,
ROHTAK SCHEME OF STUDIES AND
EXAMINATION**

TEXTILE TECHNOLOGY

Pre-Ph.D Scheme w.e.f 2012-13 (List of Electives)

Course No.	Course Title	Teaching Schedule				Marks of Class work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theor y	Practical		
	Textile Technology									
PhD-TT-101	Developments in Fibre Production	3	1	-	4	20	80	-	100	3
PhD-TT-103	Structure & Properties of Fibres	3	1	-	4	20	80	-	100	3
PhD-TT-105	Developments in Texturing	3	1	-	4	20	80	-	100	3
PhD-TT-107	Theory & Design of Spinning Machinery	3	1	-	4	20	80	-	100	3
PhD-TT-109	Theory & Design of Weaving Machinery	3	1	-	4	20	80	-	100	3
PhD-TT-111	Modern Technology of Fabric Production	3	1	-	4	20	80	-	100	3
PhD-TT-113	Structural Engineering of Fibre Assemblies	3	1	-	4	20	80	-	100	3
PhD-TT-115	Unconventional Spinning Systems	3	1	-	4	20	80	-	100	3
PhD-TT-117	Technical Textiles	3	1	-	4	20	80	-	100	3
Total		3	1	-	4	20	80	-	100	

- NOTE:** i) Only one paper will be chosen from the above courses
ii) Class work consists of two assignments of 10 marks each.
iii) Candidates will have to attempt five questions of each consisting of 16 marks
iv) Q1 will be compulsory with objective type of questions

**MAHARSHI DAYANAND UNIVERSITY,
ROHTAK SCHEME OF STUDIES AND
EXAMINATION**

TEXTILE CHEMISTRY

Pre-Ph.D Scheme w.e.f 2012-13(List of Electives)

	Textile Chemistry									
PhD-TC-101	Chemistry of Dyes	3	1	-	4	20	80	-	100	3
PhD-TC-103	Textile Chemicals & Analytical Methods	3	1	-	4	20	80	-	100	3
PhD-TC-105	Advances in Theory of Dyeing	3	1	-	4	20	80	-	100	3
PhD-TC-107	Modern Methods of Dyeing & Printing	3	1	-	4	20	80	-	100	3
PhD-TC-109	Advances in Textile Finishing & Allied Processes	3	1	-	4	20	80	-	100	3
Total		3	1	-	4	20	80	-	100	

- NOTE: i) Only one paper will be chosen from the above courses**
ii) Class work consists of two assignments of 10 marks each.
iii) Candidates will have to attempt five questions of each consisting of 16 marks
iv) Q1 will be compulsory with objective type of questions

**MAHARSHI DAYANAND UNIVERSITY,
ROHTAK**
SCHEME OF STUDIES AND EXAMINATION
FASHION AND APPAREL ENGINEERING
Pre-Ph.D Scheme w.e.f 2012-13(List of Electives)

Course No.	Course Title	Teaching Schedule				Marks of Class work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theor y	Practical		
	FASHION & APPAREL ENGINEERING									
PhD- FAE- 101	Advanced Garment Designing Concept	3	1	-	4	20	80	-	100	3
PhD- FAE- 103	Modern Technology of Apparel Production and Management	3	1	-	4	20	80	-	100	3
Total		3	1	-	4	20	80	-	100	

- NOTE: i) Only one paper will be chosen from the above courses**
ii) Class work consists of two assignments of 10 marks each.
iii) Candidates will have to attempt five questions of each consisting of 16 marks
iv) Q1 will be compulsory with objective type of questions

PhD-TT-101 DEVELOPMENTS IN FIBRE PRODUCTION

L T P
3 1 -

Class work : 20
Examination : 80
Total : 100
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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit-I

Advances in fibre extrusion processes and discussion on structure and properties of the product, Introduction to high performance fibres, fully aromatic polyamide or aramid fibres; Liquid crystals – types, characteristics and spinning, Kevlar: manufacture, structure, properties and applications. Dry-jet wet spinning; Polyarylate fibres viz. Vectran - manufacture, properties and applications,

Unit-II

Ordered polymeric fibres: Aromatic hetrocyclic rigid rod polymeric fibres like PBO – their production by liquid crystal spinning, 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.
Spinfinishes: Requirement, components, application procedures, properties and evaluation.

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

PhD-TT-103 STRUCTURE AND PROPERTIES OF FIBRES

	T	P	Class work	:	20
3	1	-	Examination	:	80
			Total	:	100
			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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

UNIT-I

Study of fibre structure by X-rays, IR Spectroscopy, optical and electron microscopy, Determination of degree of crystallinity, orientation, crystal size and morphology, structure of fibres, morphology and order in fibre structure, Theories of fine structures of fibres.

Frictional properties – Theory of friction and lubrication and its application to fibres, Measurement of friction

UNIT -II

Mechanical properties: Theories of elasticity, Thermodynamics analysis of deformation, Rubber elasticity of long chain molecules and molecular network and its applicability to fibres, Theories of viscose-elasticity.

Stress relaxation, creep, stress-strain relations, Temperature of visco-elasticity as applied to natural fibres. The Boltzman supervision principle and Nutting's Power Law and their application to fibres.

Optical properties: Refractive index and birefringence in relation to orientation, Refractive index, density and swelling, Absorption and Dichroism.

UNIT – III

Equilibrium absorption of water: Relation between regain and relative humidity. Heats of sorption: Measurement, Effects of evolution of heat. Rate of absorption of moisture: The diffusion equations and its solution, the interaction of moisture and heat changes. Factors affecting rate of conditioning. The retention of liquid water: Theoretical estimate of water retention. Relation between suction, capillary size and humidity,

Swelling: Transverse, axial and volume swelling, Analytical relationship of transverse, axial and volume swelling, swelling of different fibres at various humidities

Theories of moisture absorption: Hysteresis effect, Quantitative theories of absorption, Relationship between absorption, swelling and elastic properties.

UNIT - IV

Di-electric properties: Effects of frequency and temperature on dielectric constant, Electrical resistance of fibre, Static electricity and its measurement.

Thermal properties: Thermal expansion and contraction. Melting, second order transitions and decomposition, Heat-setting of fibres, Specific heat of fibres, Thermal conductivity of fibres.

Reading List

Title

Author

Physical properties of Textile Fibres
Manufactured Fibre Technology

JWS Hearle and Morton
Gupta & Kothari

PhD-TT-105 DEVELOPMENTS IN TEXTURING

L T P
3 1 -

Class work : 20
Examination : 80
Total : 100
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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit-I

Texturing process: Definitions, principle of texturing, Types of texturing processes. Principle and brief description of all texturing processes with emphasis on stuffer box crimping, knit-de-knit texturing, hi-bulk acrylic yarns, BCF yarns and processes etc.,

Unit-II

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

Unit-III

Air-jet texturing: principles and mechanism of loop formation and entanglement in air-jet texturing. Material, machine and process variables affecting the air-jet textured yarn properties; different types of jets their description – advantages and disadvantages, baffle elements and their description.

Unit-IV

Properties of air-jet textured yarns and their importance. Evaluation of air-jet textured yarns. Properties of twist textured yarns and their evaluation methods. Solvent texturing – method, solubility parameter and its importance; principle and properties of yarns produced by solvent texturing method.

Reading List

Title

Author

Yarn Texturing Technology
Modern Yarn Production
Manufactured Fibre Technology

Hearle, Hollick & Wilson
G R Wray
Gupta & Kothari

PhD-TT-107 THEORY AND DESIGN OF SPINNING MACHINERY

L	T	P	Class work	:	20
3	1	-	Examination	:	80
			Total	:	100
			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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit-I

Effect of modern harvesting and cultivation method & ginning on cotton fibre, Need for redesigning of Blow Room Machine, Modern theories of opening & cleaning .Principles of operation of modern opening & cleaning machines, Concept of cleaning field & its application – Vario-set cleaning & Cleanogram, Pneumatic transport of fibres, Design of ducting system. Description of compact blow room line,

Unit-II

Principle of carding & stripping action .Geometry of metallic wire clothing and its effect on carding action, Theory of carding- Classical Theory, Strang & Kaufman Theory and Neo classical Theory, Concept of carding force & factors affecting carding force, Condition of Fibre shedding, Analysis of load on various sections of cylinder, Theoretical investigation of transfer efficiency & various factor affecting the transfer efficiency. Developments in design of Card

Unit-III

Concept of drafting force, Factors affecting drafting force. Role of frictional field in roller drafting in controlling the fibre movement, Vasilayer's model to explain the role of apron in drafting system to reduce the irregularity, Analysis of spectrogram, Merchant's theory of hook removal, Principle of action of auto leveler and auto leveler sensitivity checking and adjustment

Unit-IV

Modern Developments of simplex, Mechanism of Electro-pneumatic building motion in Simplex, Modern developments in comber
Modern developments in Ring & Traveler, Determination of Winding tension in ring frame, relation between winding tension & Balloon tension, Spinning geometry & its importance
Tension profile of yarn in ballooning zone in ring frame, Probability of node formation and use of anti node balloon control ring

Reading List

<u>Title</u>	<u>Author</u>
Advances in Technology of Yarn Production	R. Chattopadhyay
Technology of Carding	R. Chattopadhyay
Spun Yarn technology	E Oxtoby

PhD-TT-109 THEORY AND DESIGN OF WEAVING MACHINERY

L	T	P	Class work	:	20
3	1	-	Examination	:	80
			Total	:	100
			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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Theory, measurement and control of yarn tension during unwinding from ring bobbin/cones/cheese in winding machine.

Warp tension variation during weaving, bumping condition, excess tension theory, stable and disturbed weaving conditions

Unit II

Developments in design and operation of modern winding, warping and sizing machines, Theory and design principles of automatic controls in modern sizing machines, Sizing parameters, factors affecting size pick up in sizing, Expression for drying capacity of drier in sizing machine and factors affecting the same

Unit III

Kinematics of loom sley, elastic model of shuttle picking system, shuttle checking
Design problems of conventional weaving.

Principles underlying shuttle less weaving mechanisms and their functioning: projectile, water-jet; developments.

Unit-IV

Principles underlying shuttleless weaving mechanisms and their functioning: air-jet, rapier, multiphase; developments.

Reading List

<u>Title</u>	<u>Author</u>
Hand Book of Weaving	Sabit Adanur
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
Principles of Weaving	R Marks & ATC Robinson
Weaving: Conversion of yarn to Fabric	Lord and Mohammed

PhD-TT-111 MODERN TECHNOLOGY OF FABRIC PRODUCTION

L T P
3 1 -

Class work : 20
Examination : 80
Total : 100
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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Introduction to Non-woven fabrics: characterization, classification, non-woven field – its uses and future growth. Web preparation: requirements, orientations, types – their technology and machineries, properties of different web types.

Unit II

Needle Punching: technology, machineries, needling parameters, felting needle, needle parameters, developments, needle-punched fabric structure-properties, factors affecting structure-properties, applications. Spun-lacing: technology, machineries, fabric structure-properties and factors affecting the same, applications. Stitch-bonding and web stitching techniques: technology, applications. Spun Bonding and melt blown techniques: technology, machineries, and applications.

Unit III

Chemical bonding: technology, binders – their types and properties, binder application techniques, fabric structure-properties, factors affecting structure-properties, applications.

Thermal bonding: technology, binders – their types and properties, machineries (hot calendaring, hot-air systems), fabric structure-properties, factors affecting structure-properties, applications.

Unit IV

Weft knitting: manufacturing of single jersey, rib, purl and interlock weft knit fabrics and properties of these fabrics.

Warp knitting: manufacturing of tricot and raschel fabrics and properties of these fabrics.

Reading List

Title

Nonwoven Textiles
Manual of Nonwovens
Handbook of Nonwovens
Handbook of Nonwoven Filter Media
Nonwoven
Pages of International Conference on Nonwoven
Knitting Technology
Knitting Technology
Warp Knitting Production
Handbook of Warp Knitting Technology

Author

Radko Krecma
Radko Krecma
S Russell
I M Hutten
P Madhavmoorthy & G Sundershetty
M L Gulrajani
D J Spencer
D B Ajgaonkar
S Raz
B J Gajjar

PhD-TT-113 STRUCTURAL ENGINEERING OF FIBRE ASSEMBLIES

L T P
3 1 -

Class work : 20
Examination : 80
Total : 100
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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit.

Unit I

Elements of yarn geometry, Geometry of helix and its application to yarn structure, Geometry of folded yarns. Translation of fibre properties into yarn behavior, Theories of yarn irregularity and blend irregularity, Theories of yarn structures under tension, compression, bending and shearing

Unit II

Fibre migration characteristics of spun and continuous filament yarns; Concept of similar yarns; Effect of blend composition properties of constituent fibres and on the behaviour of blended yarns

Unit III

Theories of cloth setting; Geometry of woven fabrics based on the assumption of flexible rigid threads. Application of fabric geometry in fabric weaving and processing; Later modifications to Peirce's fabric geometry; Use of weavability graphs.

Mechanism of simple deformations: Tensile, Bending, Shear; Theory of Fabric properties involving complex deformations: Buckling, Tearing, Creasing, Drape and abrasion.

Unit IV

Flow of Heat, Air and Moisture through fabrics; Comfort and Handle of Fabrics; Constituent properties and Objective measurement of handle by KES and FAST. Tailorability and Formability for apparel fabrics

Reading List

<u>Title</u>	<u>Author</u>
Structural Mechanics of Fibre, Yarns & Fabrics	JWS Hearle, P Grosberg & S Backer
Structure of Yarn	W Zurek
Textile Properties	Kaswell
Journal of Textile Institute	
Textile Research Journal	

PhD-TT-115 UNCONVENTIONAL SPINNING SYSTEMS

L T P
3 1 -

Class work : 20
Examination : 80
Total : 100
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 (16 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;
Principle and engineering design of rotor spinning, effect of rotor machine variables and fibre properties on the properties of rotor spun yarns.

Unit-II

Limitation of rotor spinning, advances in rotor spinning,
Study of other unconventional spinning systems, viz. friction spinning, air-jet spinning etc;
Advances in these systems.

Unit-III

Structure & properties of yarns spun by various unconventional spinning systems; effect of raw material and machine variables on yarn characteristics; Plying of these yarns.
Electrostatic, air-vortex spinning; Mechanism of yarn formation, properties and end uses of yarns spun on these systems.

Unit-IV

Other unconventional spinning systems, viz. Self twist, Twist less, Integrated, Disc, Parafil, Wrap etc – their working principles, properties and end use of yarns spun on these system.

Reading List

<u>Title</u>	<u>Author</u>
Spinning in 70 ^s	P R Lord
Spun Yarn Technology	E Oxtoby
Short Staple Spinning	W Klein
Textile Research Journal	
Journal of Textile Institute	
Textile Progress	

PhD-TT-117 TECHNICAL TEXTILES

L T P
3 1 -

Class work : 20
Examination : 80
Total : 100
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 (16 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. Geotextiles: Mechanics of reinforcement, filtration and drainage of soils by geotextiles. Typical applications, Determination of soil particle size and pore size distribution, relations between soil particle and size and pore size distribution for hydraulic applications

Unit II

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

Unit III

Rigid composites: Three dimensional fabrics and triaxially braided materials for composites. Filtration: Principles and some mathematical models of wet and dry filtrations. Characteristics properties of fibres and fabrics in selective examples of filtration

Unit IV

Ropes and Cordages: Methods of production. Application oriented structure and production of ropes, cordages and twines. Protective clothing: Thermal protection. Ballistic protection, Protection from electromagnetic radiation and static hazards, Protection against micro-organisms, chemicals and pesticides

Reading List

Title

Nonwoven Textiles
Manual of Nonwovens

Author

Radko Krecma
Radko Krecma

PhD-TC-101 Chemistry of Dyes

L T P
3 1 -

Class work : 20
Examination : 80
Total : 100
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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Advances in chemistry of dye intermediates and unit organic processes applied for their application. Colour and chemical constitution, Stereoisomerism

Unit II

Chemistry of various synthetic dyes for application on textile fibres, novel chromophores and reactive groups, newer application techniques, Developments in dye chemistry

Unit III

Photochemistry of dyes, Solvent dyes, optical brightening agents and pigments. Azo ban, the forbidden amines, anomalies and testing.

Unit IV

Natural dyes- concept and practice, classification, technology for production and application of natural dyes on textiles

Reading list

Title

Industrial Dyes
Colour Chemistry
Unit Processes in Organic Synthesis
Journal of the Society of Dyers & Colorists
Colouration Technology

Author

Klaus Hunger
R L M Allen
P H Groggins

- International Journals

PhD-TC-103 Advances in Theory of Dyeing

L	T	P
3	1	-

Class work	:	20
Examination	:	80
Total	:	100
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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Thermodynamics of dyeing, concept of Free energy, Surface chemistry, Kinetics of dyeing

Unit II

Classification of fibres and dyes, Intermolecular forces related to dyeing, dye-fibre bonds, adsorption at surfaces, mechanism of direct, reactive, acid, disperse and other dyes on specific fibres.

Unit III

Influence of fibre structure on dyeing, effect of processes on fibre properties before dyeing and during dyeing, Solubility parameter, and cohesive energy density. Interaction between dyes and polymers

Unit IV

Dye sorption, diffusion and rate of dyeing. Measurement of diffusion, dyeing with ionized dyes on substrates containing charged sites.

Reading list

Title

Theory and Coloration of Textiles
Theory of Coloration of Textiles

Author

C L Bird & W S Boston
Alan Johnson

PhD-TC-105 Textile Chemicals & Analytical Methods

L	T	P
3	1	-

Class work	:	20
Examination	:	80
Total	:	100
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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Colloidal and Surface chemistry as applied to textile chemicals, Preparation and properties of anionic, cationic and nonionic surface-active agents

Unit II

Chemistry of Thermoplastic and thermosetting resins, Mechanism of crease resistance

Unit III

Theory & Instrumentation techniques and application of absorption chromatography, Absorption spectroscopy, Mass spectroscopy

Unit IV

Evaluation of dyes and finishes, merits and demerits

Reading list

Title

Textile Auxiliaries and Finishing Chemicals
Basic concepts of Analytical chemistry

Author

A A Vaidya, S S Trivedi
S M Khopkar

PhD-TC-107 Modern Methods of Dyeing & Printing

L	T	P
3	1	-

Class work	:	20
Examination	:	80
Total	:	100
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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Advances in preparatory processes, time and energy saving techniques, Combine preparatory processes, Processing of textured man-made fibres

Unit II

Rapid dyeing techniques, Foam dyeing and other advanced dyeing techniques. Dyeing using Supercritical carbon dioxide

Unit III

Developments in transfer printing of natural as well as synthetic dyes, Digital printing – Inkjet printing and Xerography

Unit IV

Concept of continuous processing, Developments in dyeing and printing machineries

Reading list

Title

Engineering in Textile Coloration

Review of Progress in Coloration

International Dyer

Author

C. Duckworth

-International Journals

PhD-TC-109 Advances in Textile Finishing & Allied processes

L	T	P	Class work	:	20
3	1	-	Examination	:	80
			Total	:	100
			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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Concepts of antireseal finish, Esterification and etherification, Developments in resins, problem of formaldehyde release. Polycarboxylic acids for wrinkle recovery finish, merits and demerits. DP rating

Unit II

Burning behaviour of polymers and ways to affect flame retardancy, Condensed phase and gas phase mechanisms of FR. Classification, application and developments in flame retardants. Test methods for fire resistance. Soil release finish-theory and practice, advances and evaluation

Unit III

Minimum application techniques, CAV, Foam finishing technology, Developments in finishing machineries

Unit IV

Air and water pollution, disposal of waste and effluents and related processes, Modern ETP, Analysis of waste water

Reading list

<u>Title</u>	<u>Author</u>
Chemical finishing of textiles	W D Schindler & P J Hauser (Woodhead Publishing Ltd.)
Handbook of Fibre Science and Technology: Chemical Processing of fibre and fabrics Vol II Part-B Technology of Finishing	Lewin & Sello (Marcel Dekker Publication) V A Shenai

PhD-FAE-101 Advanced Garment Designing Concepts

L T P
3 1 -

Class work : 20
Examination : 80
Total : 100
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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Textile Design function, Geometrical Principles of apparel Construction, Use of basic design elements in motif, pattern, fabric and garment design generation. Geometry of patterns, Placement of patterns by various combining techniques via translation, rotation etc. to create fabric design.

Unit II

Techniques of design generation by weaving, dyeing and Printing e.g. brocades, Ikat, batik, kalamkari, Home fashion textiles, Quilt Designing- Types of fabrics, weddings, geometrical and resist dyed quilts patterns, Bed sheet designing-cut and spread techniques, Towels and Carpets.

Unit III

Requirements and advantages of computer assisted technologies in garment industry. Introduction to CAD/ CAM and CIM, Fashion illustration and portfolio presentation via Patterns insertions and modifications, special effects brushes, color modifications etc., Fashion marketing concept, Fashion Promotion Mix.

Unit IV

Usage of Computer in Body Size-chart generation, Pattern making, Spreading, Cutting, Sewing & assembling, Finishing operations in garment industry via study of commercial machine models used in industry. Introduction to management planning and information, Management Information System, ERP (Enterprise resource Planning), PLM (Product Life Management) software for fashion articles

E- Retailing, Usage of computers as Quick response strategies in fashion Industry.

Reading List

<u>Title</u>	<u>Author</u>
CAD in clothing and Textiles	Winifred Aldrich
Computers in fashion Industry	Patric Taylor
Adobe Photoshop for fashion Design	Susan L
The Technology of Clothing Manufacture	Harold Carr & B Latham
Geometry of patterns	Stanley Bezuszka
Fabric, form and flat pattern Cutting	Winifred Aldrich

PhD-FAE-103 Modern Technology of Apparel Production and Management

L T P
3 1 -

Class work : 20
Examination : 80
Total : 100
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 (16 marks). Students have to attempt 5 questions in total at least one question from each unit

Unit I

Introduction to nonwovens, Fibre preparation processes. Web formation processes. Web bonding processes. Finishing processes. Knitting and knitwear: Manufacturing of single jersey, rib, purl and interlock weft knit fabrics. Properties of these fabrics, Manufacturing of Tricot and Rashal fabrics and properties of these fabrics, Knitwear manufacturing, their design, properties and application

Unit II

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

Unit III

Basic concepts of production & operation, Macro and micro level planning with special reference to apparel industry, Production scheduling & control, PERT/CPM Management Information system, Concept of ERP and its application

Unit IV

Application of Industrial Engineering in Apparel industry, Method of conducting Work study, Time study and method study with special reference to apparel industry, Ergonomics in garment industry. Social accountability and its impact, Implementation of SA-8000 in Industry

Reading List

Title

Author

Nonwoven Textiles	Radko Krecma
Manual of Nonwovens	Radko Krecma
Handbook of Nonwovens	S Russels
Knitting Technology	DJ Spencer
Knitting Technology	DB Ajgaonkar
The Technology of Clothing Manufacture	Harold Carr & B Latham
Production and Operation Management	NG Nair
Production and Operation Management	S N Charry
Production Management	KC Batra
Production and Operation Management, Concept, Model and Behaviour	E Adams
Industrial Engineering & Production Management	Martland Telsang