MAHARSHI DAYANAND UNIVERSITY, ROHTAK
SCHEME OF STUDIES AND EXAMINATION
B.TECH (TEXTILE CHEMISTRY) SEMESTER-VII (2012-13)
'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		
TC 401-F	Textile Chemical Testing	3	1	-	4	50	100	-	150	3
TC 403-F	Textile Finishing-II	3	1	-	4	50	100	-	150	3
TT 405-F	Production Planning & Quality Management OR Waste Management & Pollution Control (common with TT)	3	1	-	4	50	100	-	150	3
TC 407-F	Wet Processing Machinery	3	1	-	4	50	100	-	150	3
TC 409-F	Theory of Coloration and Computer Colour Matching	3	1	-	4	50	100	-	150	3
HUM411-F	Finance, Material and Human Resource Management (common with TT)	3	1	-	4	50	100	-	150	3
TC 413-F	Colour Measurement & CCM lab	-	-	3	3	50	-	50	100	4
TC 415-F	Textile Finishing Lab	-	-	3	3	50	-	50	100	4
TC 417-F	Mill Practice	-	-	-	-	100	-	200	300	Viva
TC 418-F	Seminar	-	-	2	2	-	-	-	-	-
TC 419-F	Project Work (Mid Term Evaluation)	-	-	2	2	100	-	-	100	Viva
Total		**18**	**6**	**10**	**34**	**600**	**600**	**300**	**1500**	

B.TECH (TEXTILE CHEMISTRY) SEMESTER-VIII (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 (common with TT)	3	1	-	4	50	100	-	150	3
TC 404-F	Developments in Textile Chemical Processing	3	1	-	4	50	100	-	150	3
TC 406-F	Process Control in Chemical Processing	3	1	-	4	50	100	-	150	3
TC 408-F	Knitting & Knit Processing OR Eco-friendly Processing and Manufacturing of Textiles	3	1	-	4	50	100	-	150	3
TT 410-F	Technical Textiles OR Global Scenario of Textile Industry (Common with TT)	3	1	-	4	50	100	-	150	3
CSE 412-F	Computer Network & Applications (common with TT)	3	1	-	4	50	100	-	150	3
TT 414-F	Textile Colour & Design (common with TT)	-	-	3	3	50	-	50	100	4
CSE 416-F	Computer Networking Practical (common with TT)	-	-	3	3	50	-	50	100	4
TC 418-F	Seminar	-	-	2	2	200	-	-	200	Viva
TC 420-F	Project Work	-	-	2	2	-	-	200	200	Viva
Total		**18**	**6**	**10**	**34**	**600**	**600**	**300**	**1500**	

TEXTILE CHEMISTRY

SYLLABUS

SEVENTH SEMESTER

TC 401-F Textile Chemical Testing

L	T	P			
3	1	-	Classwork	:	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

I Introduction to textile chemical testing – aim and scope. Quantitative chemical analysis of textile fibres and their blends. Quantitative estimation of bleaching agents (hypochlorite, chlorite and peroxide) and dyes.

II Colour fastness of dyes on textiles (wash, light, rubbing, hot press, perspiration, etc). International standards (AATCC, ISO, ASTM, BIS). Evaluation of Wet treatments

III Estimation of mechanical and chemical degradation of cotton, wool, silk and polyester (aldehyde and carboxyl group estimation in cellulosics, amino group estimation of protein fibres, fluidity/viscosity measurement, critical dissolution time, etc).

IV Evaluation of various chemicals, auxiliaries used in wet processing plants. Analysis of fresh water and effluent. Measurement of viscosity of chemical ingredients, printing paste, instruments used in chemical analysis.

Reading List

Title	Author
Analytical Methods for a Textile laboratory	JW Weaver
Technology of Textile Processing	VA Shenai
An Introduction to Textile Bleaching	JT Marsh
AATCC Technical Manual Vol.-76	

TC 403-F Textile Finishing-II

L	T	P			
3	1	-	Classwork	:	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

I Principles and practice of finishing on cotton, wool, silk and rayon. Finishing materials, their functions and applications. Concepts of Permanent and semi-permanent finish. Dimensional stability finish, Mechanism of creasing and theory of anticrease finish, low and no formaldehyde cross linking agents, application of BTCA, CA, etc.

II Concept and mechanism of Flame retardandcy, Flammability of textile fibres. Flame retardant and proof finishes on natural fibres, synthetics and blends, temporary and durable finishes, phosphorylation and phosphonylation, LOI., etc. Water repellent finishes, Chemistry and application of silicone emulsion. Other water repellents.

III Soil release finish – mechanism of soiling, steps of soil release and theory, different soil release finishes, soil repellency, fluorocarbons and Teflon finishe. Antimicrobial finishing, chemistry of various antimicrobial finishes and application.

IV Rot and mildew proofing, classification of insects attack on wool. Chemicals required for rot and mildew proof finishes.
Methods of evaluation of various finishes on textile material.

Reading List

Title	Author
Chemical finishing of textiles	W.D.Schindler & P.J.Hauser (Woodhead Publishing Ltd.,UK)
Textile Auxiliaries and Finishing Chemicals	AA Vaidya, SS Trivedi
Technology of Textile Finishing	VA Shenai

TT 405-F Production Planning & Quality Management (common with TT)

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

OR

TT405-F **Waste Management & Pollution Control (common with TT)**

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

TC 407-F Wet Processing Machinery

L	T	P			
3	1	-	Classwork	:	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

I Functional design of various Preparatory machines e.g. Singeing, Scouring, Mercerisation, Kiers and J Boxes, Open width wshers, continuous bleaching and steamers.

II Colouration machines for Fibres, lap, Tow and Yarn dyeing machines.

III Fabric dyeing machines - Jigger, winches, pressure beam, Various types jet (fully flooded, partially flooded, TSF) dyeing machines. Mangles.

IV Cylinder dryers, stenter, garment dyeing machines, rotary, flat-bed printing machines, calendars, raising and anti shrinkage range, Molten Metal dyeing machine.

Reading List

Title	Author
Textile Wet Processing Machinery	NB Peefel
Engineering in Textile Colouration	C Duckworth

TC 409-F Theory of Coloration & Computer Colour Matching

L	T	P			
3	1	-	Classwork	:	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

I Evolution of theories of dyeing. Fundamentals of kinetics and thermodynamics of dyeing. Diffusion of dyes. Methods for measurement of diffusion coefficient. Effect of fibre structure on dyeability and diffusion of dyes.

II Thermodynamic parameters like affinity and heat of dyeing. Thermodynamics of dyeing cotton with direct dye. Glass transition temperature and its influence on dyeing.

III Source of natural light, sources of artifical light, CIE illuminants, Absorption & scattering of light. Beer-Lambest law, Kubelka-Munk's Equation. Spectrophotometric curves and their relationship to pre-received colour. Instruments for the measurement of the colour of transparent and opaque objects. Principles of spectrophotometry. Colorimeters.

IV Munsell's system of colour specification. Relationship of hue, value and chroma. The 1931 CIE system. CMC. Additive and substractive mixing. Standard observer colour matching functions. Tristimulus values. Chromaticity coordinates. Metamerism. Whiteness & Yellowness Index, Computer aided Colour matching and recipe prediction.

Reading List

Title	Author
Textile Chemistry	RH Peters
Instrumental Colour	Shah & Gandhi
Theory of Coloration	CL Bird
CCM (Computer Colour Matching)	AD Sule
Cellulose Dyeing	John Shore
Technology of Textile Processing	VA Shenai

HUM 411-F Finance, Material and Human Resource Management (common with TT)

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

TC 413-F Colour Measurement & CCM Lab

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

Principles and working of various instruments for measuring colour in solution form and for measuring reflectance of light from coloured fabrics. Colourimetric determination of substances in mixed solutions. Tests by Beer's law. Use of colour measurement to measure rate of dyeing, affinity, diffusion coefficients, etc.

Computer colour matching, Familiarisation with the principles and working of computer colour matching instrument. Making of database of dyes, shade matching, shade correction, colour difference, measurement, shade sorting, measurement of whiteness and yellowness index, etc on the CCM instrument.

TC 415-F Textile Finishing Lab

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

Finishing of textiles to obtain different effects, e.g. crease resistance, water repellency, flame retardancy, softening, stiffening, soil release, etc. Heat setting and its evaluation. Dyed goods finish, printed goods finish, carbonising and newer chemical finishes. Simultaneous dyeing and finishing.

TC 417-F Mill Practice
(300)

TC 418-F Seminar 2(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.
A Board of Examiners would judge the performance of the speaker in the class.

TC 419-F Project Work (Mid-term evaluation) 2(100)

EIGHTH SEMESTER

TT 402-F Post Extrusion Operations (common with TT)

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

TC 404-F Developments in Textile Chemical Processing

L	T	P			
3	1	-	Classwork	:	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

I Developments in pretreatment: Quick response pretreatment, continuous open width processing, use of environment friendly enzymes, vacuum and steam impregnation etc. Other developments like solvent scouring, hot mercerization, etc.

II Developments in dyeing and dyes: New forms of dyes, i.e. encapsulated, polymeric, pearl and granular forms. New direct, reactive and disperse dyes. Dyeing of microfibre fabrics. Continuous dyeing, right-first-time approach, Super critical CO_2 dyeing.

III Developments in printing: Use of CAD, automated colour kitchens, Kerosene substitutes, Novel printing techniques like Jet printing, Xerox printing, transfer printing of cotton etc.

IV Developments in finishing, Zero formaldehyde easy-care finishes, polysiloxanes based softeners, chlorine free shrink-resist treatment of wool. Breathable water-proof fabrics. Finishing of microfibre fabrics.

Reading List

Title
Coloration Technology
Review of Progress in Coloration
AATCC Review

TC 406-F Process Control in Chemical Processing

L	T	P			
3	1	-	Classwork	:	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

I Introduction to Process Control. Quality of Grey Fabric, its specification, stitching of greige pieces. Process control parameters and norms for Singeing, Desizing, Scouring, Mercerizing, Bleaching.

II Control measures in Dyeing, Printing and their developments, Washing Process, Finishing – Stenter, Sanforizing, Curing chamber.

III Equipments(application of Tacho meter, pH meter, Twaddle meter, Baume meter, etc) for process control parameters. Testing involved at various stages in processing (with reference to Fabric, Chemicals/ Auxiliaries, Dyes).

IV Quality Assurance in Chemical Processing, TQM, Six Sigma. Monitoring and on line process control devices. Water pollution in wet processing, Quantitative measurement of effluents, ETP (Effluent Treatment Plant), Textile norms.

Reading List

Title
ATIRA/BTRA norms books and Journals

TC 408-F Knitting & Knit Processing

L	T	P			
3	1	-	Classwork	:	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

I General description of knitting elements (needles, feeder, cam etc), layout of flat and circular weft knitting machines. Classification of knitting,

characteristics of warp and weft knit fabrics. Basic weft knit structures, properties and structure of plain fabrics.

II Structure and properties of Rib, Interlock, end purl fabrics. Fundamental stitches: knit, tuck, float and their uses. Basic calculations for fabric weight (gsm) and cover.

III Concept for knit processing, Tubular and open-width process routes, singeing, mercerizing. Twin soft flow machines for wet-treatment of knitted fabrics. Hydro-extraction and slitting, drying, compaction.

IV Typical recipes for different chemical processes of knits, processing of specialty fibre knitted fabrics like spandex fibre blends, Tencel etc.

Reading List

Title	Author
Knitting Technology	DJ Spencer
Knitting Technology	DB Ajgaonkar
International Dyer (Journal)	

OR

TC 408-F Eco-friendly Processing & Manufacturing of Textiles

L	T	P			
3	1	-	Classwork	:	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

I Emerging concepts in eco-friendly chemical processing – trends and practices, Newer dyes of novel chromophore and high fixation capability, low salt dyeing, natural dyes – merits and demerits, naturally coloured cotton.

II Eco-friendly chemicals for pretreatments, Coloration and finishing operations. Problems of heavy metals and AOX. Bio-technology applications in wet processing, plasma treatment and ultrasound applications.

III Environment friendly processes, low liquor ratio wet-treatments and machinery, Ultra filtration and reverse osmosis processes for textile waste water treatment. Recovery of chemicals from wash liquor.

IV Eco-friendly fibres – PLA (Polylactic acid) – production , properties and application, bamboo fibres, Chitosan fibre, Alternative to viscose process –

spinning of solutions of cellulose derivatives, use of new solvents, Tencel. Recovery and utilization of polyester, nylon and acrylic wastes.

Reading List
Title
Coloration Technology
Review of Progress in Coloration
AATCC Review

TT 410-F Technical Textiles (common with TT)

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

OR

TT 410-F Global Scenario of Textile Industry (common with TT)

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

CSE 412-F Computer Network & Applications (common with TT)

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

TT 414-F Textile Colour & Design (common with TT)

L	T	P			
-	-	3	Classwork	:	50
			Examination	:	50
			Total	:	100
			Exam duration	:	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 (common with TT)

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

TC 418-F Seminar 2(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.

TC 420-F Project Work 2(200)

Each student individually, or in association with some other students will carry out project of an experimental and/or theoretical nature in one of the main branches of textile chemistry 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.