

ANNA UNIVERSITY:: CHENNAI 600 025
NON-AUTONOMOUS COLLEGES AFFILIATED TO ANNA UNIVERSITY
REGULATIONS – 2021
M.TECH.TEXTILE TECHNOLOGY
(WITH SPECIALIZATION IN TEXTILE CHEMISTRY)
CHOICE BASED CREDIT SYSTEM
I TO IV SEMESTERS CURRICULA AND SYLLABUS
SEMESTER I

SL. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIOD PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	TY4101	Textile Dyes and Auxillaries	PCC	4	0	0	4	4
2.	TY4102	Textile Chemical Processing	PCC	4	0	0	4	4
3.	TX4151	Polymer and Fibre Physics	PCC	3	0	0	3	3
4.	MA4158	Statistical Applications in Textile Engineering	FC	4	0	0	4	4
5.	RM4151	Research Methodology and IPR	RMC	2	0	0	2	2
6.		Professional Elective I	PEC	3	0	0	3	3
7.		Audit Course – I *	AC	2	0	0	2	0
PRACTICALS								
8.	TY4111	Production Process Laboratory	PCC	0	0	4	4	2
9.	TX4161	Advanced Textile Testing Laboratory	PCC	0	0	6	6	3
TOTAL				22	0	10	32	25

*Audit Course is Optional

SEMESTER II

SL. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIOD PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	TY4201	Technology of Textile Coloration	PCC	3	0	0	3	3
2.	TY4202	Advanced Finishing Technology	PCC	2	0	2	4	3
3.	TY4203	Textile Effluent Management	PCC	2	0	2	4	3
4.		Professional Elective II	PEC	3	0	0	3	3
5.		Professional Elective III	PEC	3	0	0	3	3
6.		Professional Elective IV	PEC	3	0	0	3	3
7.		Audit Course – II *	AC	2	0	0	2	0
PRACTICALS								
8.	TY4211	Product Development Laboratory	PCC	0	0	8	8	4
TOTAL				16	0	12	28	22

*Audit Course is Optional

SEMESTER III

SL. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIOD PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.		Professional Elective V	PEC	3	0	0	3	3
2.		Professional Elective VI	PEC	3	0	0	3	3
3.		Open Elective	OEC	3	0	0	3	3
PRACTICALS								
4.	TY4311	Project Work I	EEC	0	0	12	12	6
TOTAL				9	0	12	21	15

SEMESTER IV

SL. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIOD PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
PRACTICALS								
1.	TY4411	Project Work II	EEC	0	0	24	24	12
TOTAL				0	0	24	24	12

TOTAL NO. OF CREDITS: 74**FOUNDATION COURSES (FC)**

S. NO	COURSE CODE	COURSE TITLE	PERIODS PER WEEK			CREDITS	SEMESTER
			Lecture	Tutorial	Practical		
1.	MA4158	Statistical Applications in Textile Engineering	4	0	0	4	1

PROFESSIONAL CORE COURSES (PCC)

S. NO	COURSE CODE	COURSE TITLE	PERIODS PER WEEK			CREDITS	SEMESTER
			Lecture	Tutorial	Practical		
1.	TY4101	Textile Dyes and	4	0	0	4	1
2.	TY4102	Textile Chemical	4	0	0	4	1
3.	TX4151	Polymer and Fibre Physics	3	0	0	3	1
4.	TY4111	Production Process Laboratory	0	0	4	2	1
5.	TX4161	Advanced Textile Testing Laboratory	0	0	6	3	2
6.	TY4201	Technology of Textile Coloration	3	0	0	3	2
7.	TY4202	Advanced Finishing Technology	2	0	2	3	2
8.	TY4203	Textile Effluent Management	2	0	2	3	2
9.	TY4211	Product Development Laboratory	0	0	8	4	2
TOTAL CREDITS						29	

LIST OF PROFESSIONAL ELECTIVE COURSES

SEMESTER I, ELECTIVE I

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	TY4001	Textile Costing and Process Optimization	PEC	3	0	0	3	3
2.	TX4072	Functional Dyes	PEC	3	0	0	3	3
3.	TX4071	Characterization of Textile Polymers	PEC	3	0	0	3	3

SEMESTER II, ELECTIVE II

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	TY4002	Chemical Processing of Manmade Fibres	PEC	3	0	0	3	3
2.	TY4003	Non Woven and Specialty Textiles	PEC	3	0	0	3	3
3.	TY4004	Advanced Instruments for Textile Wet Processing	PEC	3	0	0	3	3

SEMESTER II, ELECTIVE III

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	TY4005	Coated and Laminated Textiles	PEC	3	0	0	3	3
2.	TY4006	Bioprocessing of Textiles	PEC	3	0	0	3	3
3.	TY4007	High Performance Fibres	PEC	3	0	0	3	3

SEMESTER II, ELECTIVE IV

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	TY4008	Eco-Friendly dyes, Chemicals and Processing	PEC	3	0	0	3	3
2.	TY4009	Technical Textiles	PEC	3	0	0	3	3
3.	TX4075	Textile Reinforced Composites	PEC	3	0	0	3	3

SEMESTER III, ELECTIVE V

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	TY4010	Advanced Wet Processing Machinery	PEC	3	0	0	3	3
2.	TY4011	Design of Textile Experiments	PEC	3	0	0	3	3
3.	TY4012	Home Textiles	PEC	3	0	0	3	3

SEMESTER III, ELECTIVE VI

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	IL4005	Total Quality Management	PEC	3	0	0	3	3
2.	TX4074	Sustainability in textile industry	PEC	3	0	0	3	3
3.	TX4073	Protective Clothing	PEC	3	0	0	3	3

RESEARCH METHODOLOGY AND IPR COURSES (RMC)

S. NO	COURSE CODE	COURSE TITLE	PERIODS PER WEEK			CREDITS	SEMESTER
			Lecture	Tutorial	Practical		
1.	RM4151	Research Methodology and IPR	2	0	0	2	1
TOTAL CREDITS						2	

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S. NO	COURSE CODE	COURSE TITLE	PERIODS PER WEEK			CREDITS	SEMESTER
			Lecture	Tutorial	Practical		
1.	TY4311	Project Work I	0	0	12	6	
2.	TY4411	Project Work II	0	0	24	12	
TOTAL CREDITS						18	

AUDIT COURSES - I (AC)

REGISTRATION FOR ANY OF THESE COURSES IS OPTIONAL TO STUDENTS

SL. NO	COURSE CODE	COURSE TITLE	PERIODS PER WEEK			CREDITS
			L	T	P	
1.	AX4091	English for Research Paper Writing	2	0	0	0
2.	AX4092	Disaster Management	2	0	0	0
3.	AX4093	Constitution of India	2	0	0	0
4.	AX4094	நற்றமிழ் இலக்கியம்	2	0	0	0

SUMMARY

Sl. No.	Name of the Programme: M.TECH. TEXTILE TECHNOLOGY(WITH SPECIALIZATION IN TEXTILE CHEMISTRY)					
	SUBJECT AREA	CREDITS PER SEMESTER				CREDITS TOTAL
		I	II	III	IV	
1.	FC	04	00	00	00	04
2.	PCC	16	13	00	00	29
3.	PEC	03	09	06	00	18
4.	RMC	02	00	00	00	02
5.	OEC	00	00	03	00	03
6.	EEC	00	00	06	12	18
7.	Non Credit/Audit Course	✓	✓	00	00	
8.	TOTAL CREDIT	25	22	15	12	74

Tentative

TY4101	TEXTILE DYES AND AUXILIARIES	L T P C 4 0 0 4
UNIT I	MODIFICATION OF SURFACE TENSION	12
Auxiliaries: Importance and functions; Surfactants: Mode of action and classification of surfactants – cationic, anionic, nonionic and amphoteric surfactants.		
UNIT II	PREPARATORY PROCESS	12
Auxiliaries associated with De-sizing, scouring, Bleaching of cellulosic fibres, Protein fibres and synthetic fibres.		
UNIT III	DYEING PROCESS	12
Auxiliaries associated with Dyeing with Direct Dyes, Reactive, Vat, Azoic colors, Sulphur dyes, Acid dyes, Metal complex dyes, Basic and Disperse dyes.		
UNIT IV	PRINTING PROCESS	12
Auxiliaries associated with printing: Direct Style of Printing, Discharge style of Printing, Resist style of printing.		
UNIT V	FINISHING PROCESS	12
Auxiliaries used in Resin Finishing, Stiff finishing, soft finishing, Water repellent, Water Proof, Flame retardant, Soil release.		
		TOTAL: 60 PERIODS

REFERENCES:

1. John Shore, "Colourants & Auxiliaries" Wiley and Sons Ltd, New York, Volume I & II, 1999.
2. Chakraborty, J.N, "Fundamentals and Practices in colouration of Textiles", Woodhead Publishing India, 2009, ISBN-13:978-81-908001-4-3
3. Shennai.V.A, "Organic Textile Chemicals", Sevak Publication, Bombay, 1995
4. Vaidya.A.A, "Chemistry of Textile auxiliaries", Wheeler Publishing, New Delhi, 1999
5. W D Schindler P J Hauser., "Chemical Finishing of Textiles", Woodhead publishing Ltd, 2004.
6. Mathews Kolanjikombil., "Dyeing of Textile substrates III –Fibres, Yarns and Knitted fabrics", Woodhead publishing India , 2021
7. Trotman E. R., "Dyeing and Chemical Technology of Textile Fibres", Charles Griffin & Co. Ltd., U.K., 1984, ISBN : 0 85264 165 6.
8. Dr. N N Mahapatra., "Textile dyeing", Woodhead publishing India, 2018

TY4102	TEXTILE CHEMICAL PROCESSING	L T P C 4 0 0 4
UNIT I	DE-SIZING	12
Necessity for Desizing and grey preparation - Mechanism of Desizing– important Desizing chemicals for grey fabrics and their chemistry – Efficiency of Desizing. Scouring : Mechanism of Scouring -surface tension and the mode of action of surface-active compounds - theory of detergency – important Scouring agents for Textile fibres and their chemical actions – practical problems in the Scouring of cotton and its blends		

UNIT II BLEACHING 12

Mechanism of Bleaching - important Bleaching agents for Textile fibres and their chemical actions -chemistry of peroxide bleach and use of per-acetic acid for synthetic fibres – concept of full bleach and half bleach- Application of OBA to textile materials. Mercerization: Mechanism of Mercerization -influencing parameters on Mercerization quality of textile materials — methods of Mercerization –evaluation of Mercerization.

UNIT III ELEMENTS OF DYE CHEMISTRY 12

Classification of dye stuffs according to their chemical constitution/ structure and specific applications VBT and MO Theory of colour - interaction of dye molecules with polymeric chains – Fick 's first and second Laws of diffusion – Adsorption theory – Study about natural dyes and their application to fibres like cotton, wool and silk.

UNIT IV PRINTING 12

Printing methods and styles – Dye selection for Printing –Study about Printing thickeners and other Printing auxiliaries. Importance of various after treatment for printing materials. Printing of cellulosic, silk, polyester and nylon materials.

UNIT V FINISHING 12

Necessity for Finishing – important mechanical finishes like heat setting, anti-shrink, calendaring, Finishing chemicals for textile fibres and their chemistry –assessment methods for finished materials.

TOTAL :60 PERIODS

REFERENCES:

1. Burkinshaw S.M., "Chemical Principles of Synthetics Fibre Dyeing", Blackie, 1995, ISBN :0751400432.
2. Clifford Preston, "The Dyeing of Cellulosic fibres", Dyer Company Publications Trust,1986,ISBN :9780901956439.
3. LueasJ.etal, "Colour Measurement-Fundamentals Vol.1",Eurotex,1996
4. ShoreJ.,"Cellulosics Dyeing",SDC,1995,ISBN:0901956686.
5. Trotman E. R., "Dyeing and Chemical Technology of Textile Fibres", Charles Griffin & Co. Ltd., U.K., 1984, ISBN : 0 85264 165 6.
6. W D Schindler P J Hauser., "Chemical Finishing of Textiles", Woodhead publishing Ltd, 2004.
7. L.W.C Miles "Textile Printing", Soceity of Dyers and Colourists, 2003, ISBN 0901956791
8. Mathews Kolanjikombil "Pretreatment of Textile Substrates", Woodhead publishing India, 2019

TX4151

POLYMER AND FIBRE PHYSICS

**L T P C
3 0 0 3**

UNIT I BASIC CONCEPTS 9

Synthetic fibre forming polymers, definition, terms and fundamental concepts of polymerization; molecular architecture in polymers-configuration and conformation, molecular weight and its influence on fibre formation

UNIT II POLYMER PROPERTIES 9

Glass transition temperature (Tg), factors affecting Tg, WLF equation; rubber elasticity; melting and crystallization, polymer solutions- solubility parameter and its significance to fibre spinning.

UNIT III FLUID FLOW AND MASS TRANSFER 9

Newton's law of viscosity, velocity distribution in flow systems Newtonian and non- newtonian fluids; mass transfer operations: Fick's law of diffusion, solid-liquid extraction and drying operations with application to polymer chips.

UNIT IV VISCOELASTICITY **9**
Deformation of elastic solid, viscoelasticity and its measurement, non-linear viscoelasticity, yield behavior of solids and breaking phenomena

UNIT V PROPERTIES OF FIBRES **9**
Mechanical properties of natural and synthetic fibres; moisture sorption behavior of natural and synthetic fibres; Thermal, Frictional and optical properties of fibres

TOTAL: 45 PERIODS

REFERENCES:

1. Billmeyer, "Textbooks of Polymer Science", 3rd ed., Wiley, 1984.
2. Sperling, "Introduction to Physical Polymer Science", Wiley, 1986.
3. Odian, "Principle of Polymerization", 3rd ed., Wiley, 1991
4. Gordon, "High Polymers", Addison-Wesley, 1963.
5. Gupta.V.B. and Kothari V.K., "Man Made Fibre Production", Chapman and Hall, 1985
6. Kothari V.K., "Textile Fibres: Developments and innovations", IAFL Publication, 2000
7. Hongu T. and Philips G., "New Fibres", Wood Head Publishing Ltd, 1997
8. Xiangwu Zhang, "Fundamentals of Fiber Science", DEStech Publications, Inc, 2014
9. Donald G. Baird, Dimitris I. Collias, "Polymer Processing: Principles and Design", Wiley Edition, 2014.
10. Walczak Z.K., "Processes of Fiber formation", Elsevier Science, 2002
11. V R Gowariker., NV Viswanathan., Jayadev Sreedhar., "Polymer science"., New age International Publishers, 2020

MA4158 STATISTICAL APPLICATIONS IN TEXTILE ENGINEERING **L T P C**
4 0 0 4

COURSE OBJECTIVES:

- To understand the basics of random variables and point estimation with emphasis on the standard distributions.
- To apply the small and large sample tests through Tests of hypothesis.
- To understand the concept of analysis of variance and use it to investigate non- parametric model.
- To monitor a process and detect a situation when the process is out of control.
- To apply the concept of analysis of variance and use it to investigate factorial dependence.

UNIT I PROBABILITY DISTRIBUTION AND ESTIMATIONS **12**
Applications of Binomial, Poisson, Normal, t, Exponential, Chi-square, F and Weibull distributions in textile engineering - Point estimates and interval estimations of the parameters of the distribution functions.

UNIT II HYPOTHESIS TESTING **12**
Sampling distribution - Significance tests applicable to textile parameters – Normal test, t - test, Chi - square test and F - test - p-values - Selection of sample size and significance levels with relevance to textile applications - Acceptance sampling.

UNIT III ANALYSIS OF VARIANCE AND NON-PARAMETRIC TESTS **12**
Analysis of variance for different models – Non - parametric tests - Sign test - Rank test - Concordance test.

UNIT IV PROCESS CONTROL AND CAPABILITY ANALYSIS **12**
Control charts for variables and attributes - Basis, Development, Interpretation, Sensitizing rules, Average run length - Process capability analysis.

UNIT V DESIGN AND ANALYSIS OF EXPERIMENTS 12
 2^k full-factorial designs - Composite designs - Robust designs - Development of regression Models - Regression coefficients - Adequacy test - Process optimizations.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able to

- Analyze the performance in terms of probabilities, distributions and point estimation achieved by the determined solutions.
- Apply the basic principles underlying statistical inference (estimation and hypothesis testing).
- Demonstrate the knowledge of applicable large sample theory of estimators and tests.
- Identify the applicable sample theory of estimators and tests.
- Obtain a better understanding of the importance of the methods in modern industrial processes.

REFERENCES:

1. Douglas C. Montgomery, "Design and analysis of experiments", 8th Edition, John Wiley & Sons, Singapore, 2013.
2. Leaf G.A.V., "Practical Statistics for the Textile Industry, Part I and II", the Textile Institute, Manchester, 1984.
3. Montgomery D.C., "Introduction to Statistical Quality Control", 6th Edition, John Wiley and Sons, Singapore, 2009.
4. Ronald D. Moen, Thomas W. Nolan, Lloyd P. Provost, "Quality improvement through planned experimentation", 3rd Edition, McGraw-Hill, 2012.

RM4151 RESEARCH METHODOLOGY AND IPR L T P C
2 0 0 2

UNIT I RESEARCH DESIGN 6
 Overview of research process and design, Use of Secondary and exploratory data to answer the research question, Qualitative research, Observation studies, Experiments and Surveys.

UNIT II DATA COLLECTION AND SOURCES 6
 Measurements, Measurement Scales, Questionnaires and Instruments, Sampling and methods. Data - Preparing, Exploring, examining and displaying.

UNIT III DATA ANALYSIS AND REPORTING 6
 Overview of Multivariate analysis, Hypotheses testing and Measures of Association. Presenting Insights and findings using written reports and oral presentation.

UNIT IV INTELLECTUAL PROPERTY RIGHTS 6
 Intellectual Property – The concept of IPR, Evolution and development of concept of IPR, IPR development process, Trade secrets, utility Models, IPR & Bio diversity, Role of WIPO and WTO in IPR establishments, Right of Property, Common rules of IPR practices, Types and Features of IPR Agreement, Trademark, Functions of UNESCO in IPR maintenance.

UNIT V PATENTS 6
 Patents – objectives and benefits of patent, Concept, features of patent, Inventive step, Specification, Types of patent application, process E-filing, Examination of patent, Grant of patent, Revocation, Equitable Assignments, Licences, Licensing of related patents, patent agents, Registration of patent agents.

TOTAL:30 PERIODS

REFERENCES:

1. Cooper Donald R, Schindler Pamela S and Sharma JK, "Business Research Methods", Tata McGraw Hill Education, 11e (2012).
2. Catherine J. Holland, "Intellectual property: Patents, Trademarks, Copyrights, Trade Secrets", Entrepreneur Press, 2007.
3. David Hunt, Long Nguyen, Matthew Rodgers, "Patent searching: tools & techniques", Wiley, 2007.
4. The Institute of Company Secretaries of India, Statutory body under an Act of parliament, "Professional Programme Intellectual Property Rights, Law and practice", September 2013.

TY4111**PRODUCTION PROCESS LABORATORY****L T P C
0 0 4 2****LIST OF EXPERIMENTS**

1. Scouring of cotton fabric in laboratory using different machines.
2. Bleaching of cotton fabric in laboratory using different machines.
3. Dyeing of cotton fabric in laboratory model jigger using reactive dyes to match a given sample
4. Dyeing of Polyester/ Cotton fabric in laboratory model jigger using Disperse/Reactive dyes
5. Dyeing of knitted cotton fabric in laboratory model winch using reactive dyes and to determine their fastness properties.
6. Dyeing of cotton woven fabric in laboratory model padding mangle and to determine the best mangle expression.
7. Pigment printing woven fabric using table screen printing and determine the appropriate fastness properties.
8. Dry cleaning for different types of fabric using Garment washing Machine
9. Correction recipe predication from computer colour matching
10. Measurement of delta-E

TOTAL: 60 PERIODS**LIST OF EQUIPMENTS REQUIRED**

1. Dye Bath
2. Miniature Jigger
3. Miniature Winch
4. Miniature Kier
5. Padding Mangle (Manual &Pneumatic)
6. Soft flow Dyeing machine
7. Infrared dyeing machine
8. High Temperature Dyeing Machine
9. Tumble Dryer
10. Table screen printing machine
11. Steamer
12. Garment washing machine.

TX4161**ADVANCED TEXTILE TESTING LABORATORY****L T P C
0 0 6 3****LIST OF EXPERIMENTS**

1. Determination /Analysis of Molecular weight determination using GPC
2. Rheological studies using viscometer
3. Determination of MFI
4. Determination /Analysis of Birefringence measurement
5. Determination /Analysis of Creep and Stress relaxation of filament

6. Determination / Analysis of DSC Thermogram of different fibres
7. Determination / Analysis of Thermograms using TGA
8. Analysis - FTIR and NMR graphs
9. Determination / Analysis of crystallinity by XRD
10. Determination of residual formaldehyde in fabrics
11. Evaluation of Flame retardant finish
12. Evaluation of Water repellent finish
13. Evaluation of conductivity of fabrics
14. Determination of surface tension of liquids
15. Determination / Analysis of contact angle for porous substrates

TOTAL: 90 PERIODS

TY4201	TECHNOLOGY OF TEXTILE COLORATION	LT P C
		3 0 0 3

UNIT I	COLOUR AND COLOUR VISION	9
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Definition of colour and its classification – Structure and function of the eye – Detail study about rods and cones – Modeling the colour vision process – Tests for defective colour vision. Study about metamerism

UNIT II	MODERN MEASUREMENT OF COLOUR	9
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Detail study about colour measuring instruments like Spectro-photometer – Color eye – Derivation of KM equation and its application. Colour difference equations and application

UNIT III	COMPUTER COLOUR MATCHING	9
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Derivation the equation for Evaluation of depth and relative depth – Evaluation of fastness test results– Evaluation of whiteness and yellowness–Recipe formulation and correction. Development in CCM. Problem and solution to measure OBA treated materials

UNIT IV	THE INFLUENCE OF FIBRE STRUCTURE ON DYEING	9
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Dyeing properties related to the inherent physical structure of the fibre– The relationship between preparation and the physical properties of man-made fibres – The interaction between dyes & fibre forming polymers. Methods to find out nature of bonding in dyes materials. Study about four types of adsorption isotherms

UNIT V	DYEING MODELS	9
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Mechanisms of reactions of reactive groups – Kinetics of hydrolysis of reactive groups – Methods to avoid hydrolysis and to get better fixation. Methods to improve dye ability of textile materials such as crafting, cationisation, solvent treatment etc

TOTAL: 45 PERIODS

REFERENCES

1. Shah.H.SandR.S.Gandhi, 'Instrumental colour measurements and computer aided colour matching for textiles', Mahajan book distributors,Ahmedabad,1990
2. Ashish Kumar Chaudry, "Colour Science". Mahajan book distributors,Ahmedabad,1990
3. Peters.A.TandFreemanH.S "Physico-chemical principles of colour chemistry",Blackie,1995.
4. AllanJohnson, The Theory of colouration of textiles,SDC,1989.
5. Wyszeccki.G., and W.S.Stile,'Colour science, concept and methods, Quantitative data

UNIT I **6**
Commercial importance of finishing – Advances in Resin finishing, Mechanism of creasing, Types of Resins. Anti crease, wash and wear, durable press resin finishing. Causes & remedies of strength losses of Resin finished fabric. Mechanism of Chlorine retention. Formaldehyde Release from Resin finished goods. Study about eco friendly method of anti crease finishing

UNIT II **6**
Concept of Flame proof & flame retardancy. Concept of pyrolysis, Flame retardant finishes for cotton, Concept of waterproof and water repellent Finishes, Durable water repellent finishes on cotton, Mildew proof finishes and Rot proof finishing.

UNIT III **6**
Soil Release Finishing: Mechanism of soil retention & soil release. Various soil releases finishes for cotton, Polyester and its blends. Detail study of antistatic finishes. Anti pilling Finishing: chemical and mechanical methods to produce anti pilling finish.

UNIT IV **6**
Detail study about mechanical finishing of textile materials like calendaring, compacting, Sanforising, Beach finishing. Object of Heat setting. Various methods of heat setting and mechanism of heat setting. Foam Finishing. Detailed study of various techniques of foam application. Drawbacks of foam finishing.

UNIT V **6**
Mechanism in the weight reduction of PET by using alkali; microencapsulation techniques in finishing process, Detail study of the process to produce silk like Polyester. Felting of wool, Study about cationic, reactive and silicon emulsions softeners. Brief study about stiffening of textile materials

TOTAL: 30 PERIODS

LABORATORY

Application of finishing agent and characterization of fabrics

1. Formaldehyde and non formaldehyde finishing.
2. Flame proof & flame retardancy using THPC.
3. waterproof and water repellent
4. Soil Release and Antistatic agent
5. Weight reduction of PET using alkali
6. Felting of wool
7. Softeners & Stiffness

TOTAL: 30 PERIODS

REFERENCES

1. Fiscus G . and Grunenwald D. "Textile finishing: A complete guide", Hightex, Blackwells Bookshop, Leeds,U.K,2004.
2. Lewin and Sello, "Functional finishes-Part A& Part B",CRC Press,1994,ISBN:0824771184.
3. Microencapsulation in finishing, Review of progress of Colouration, SDC,2001.
4. Perkins W.S., "Textile colouration and finish in", Carolina Academic Press,U.K,2001

TY4203

TEXTILE EFFLUENT MANAGEMENT

L T P C
2 0 2 3

UNIT I REGULATORY BODY

6

Industrial policy of India; pollution monitoring and control; functions and activities of Ministry of environment; Central and State pollution control boards; environmental clearance and guidelines for industries; environment impact assessment; fiscal incentives for environmental protection; environmental auditing.

UNIT II WASTE WATER TREATMENT

6

Waste water characteristics; waste water treatment- objectives, methods and implementation considerations; recycling of effluents.

UNIT III CHARACTERISATION

6

Identification and reduction of pollution sources in textile wet processing; pollution control in man – made fiber industry; analysis of textile processing effluents –colour, odour, pH, total solids, suspended solids, total dissolved solids, BOD, COD, total alkalinity, chloride, sulphates, calcium and chromium; tolerance limits for effluents; bio-degradability of textile chemicals and auxiliaries,

UNIT IV ECO FRIENDLY TEXTILE PROCESSING

6

Technical regulations on safety and health aspects of textile materials – banned dyes and chemicals; eco labeling, eco friendly textile processes - machines and specialty chemicals; natural dyes and environmental considerations.

UNIT V WASTE MANAGEMENT

6

Need for solid and hazardous waste management in textile industry, types and sources of solid and hazardous wastes, storage, collection and transport of wastes, waste processing technologies, waste disposal, Waste recycling, circular economy, zero liquid discharge.

TOTAL: 30 PERIODS

LABORATORY

Measurement of

1. Water hardness
2. Colour of effluent
3. pH
4. BOD and COD
5. Chromium content
6. Formaldehyde content on the fabric
7. Amines of banned dyes.
8. Mixed salt characterization (RO Reject Management System)

TOTAL: 30 PERIODS

REFERENCES

1. ChritieR., "Environmental aspects of textile dyeing", Woodhead Publishing Ltd,2007, ISBN:1845691156.
2. CooperP., "Colour in Dye house Effluent", Woodhead Publishing Ltd.,1995,ISBN:0901956

TY4211

PRODUCT DEVELOPMENT LABORATORY

L T P C
0 0 8 4

LIST OF EXPERIMENTS

Reverse engineering of textile products with an emphasis on testing protocols – Four each for a student

TOTAL: 120 PERIODS

LIST OF EQUIPMENTS REQUIRED

1. Dyebath	-1no.
2. Miniature Jigger	-1no.
3. Miniature Winch	-1no.
4. Miniature Kier	-1no.
5. Padding Mangle	-1no.
6. Vacuum ironing and steam iron box	-1no.
7. Steamer	-1no.
8. Garment Washing machine	-1no.
9. High temperature dyeing machine	-1no.
10. Curing Chamber	-1no.

TY4311

PROJECT WORK I

L T P C
0 0 12 6

OBJECTIVES

The course aims to enable the students to

- identify the problem/process relevant to their field of interest that can be carried out
- search databases and journals to collect and analyze relevant data
- plan, learn and perform experiments to find the solution
- prepare project report

TOTAL : 180 PERIODS

Individual students will identify a problem relevant to his/her field of study, collect and analyze literature, design, and carry out experiment, collect data, interpret the result and prepare the project report.

OUTCOMES:

At the end of the course the students will be able to

- CO1 Identify the research/industrial problems
- CO2 Collect and analyze the relevant literature
- CO3 Design, conduct experiment and analyse the data
- CO4 Prepare project report

TY4411

PROJECT WORK II

L T P C
0 0 24 12

OBJECTIVES

The course aims to

- Train students to analyze the problem/ think innovatively to develop new methods/product /process
- make them understand how to find solutions/ create products economically and in an environmentally sustainable way
- enable them to acquire technical and experimental skills to conduct experiment, analyze the results and prepare project report
- enable them to effectively think about strategies to commercialize the product .

TOTAL : 360 PERIODS

Individual students will identify a problem relevant to his/her field of study, collect and analyze literature, design, and carry out experiment, collect data, interpret the result and prepare the project report.

COURSE OUTCOMES

At the end of the project the student will be able to

CO1 Formulate and analyze problems for developing new methods/solutions/processes.

CO2 Plan and conduct experiments to find solutions in a logical manner

CO3 Analyze the results, interpret and prepare project report/know the strategies for commercialization

TY4001

TEXTILE COSTING AND PROCESS OPTIMIZATION

L T P C
3 0 0 3

UNIT I FUNDAMENTALS OF COSTING

9

Cost concept; Classification of cost, elements of cost.; Methods of costing; Unit and operating costing, preparation of cost sheet; Estimation of cost of production and component of total cost. Profit planning, job order, batch process, conversion cost. Inventory costing

UNIT II COSTING IN SPINNING INDUSTRY

9

Elements of cost – Ascertainment of Clean Cotton Cost – Cost Statements Quantity and value of total cotton/ Man-made fiber issued input, wastage and output in each processing cost center up to yarn stage- Net Mixing Cost- Waste multipliers for each cost center mixing wise Cost Centre wise conversion cost, Selling price of various wastes. Power cost estimation, Yarn realization statement, Decision making using Contribution per frame shift among various counts of yarn production.

UNIT III COSTING IN WEAVING INDUSTRY

9

Elements of cost Calculation of Yarn requirements for weaving –computation of value loss and net realization, Cost Statements– Cost centre wise conversion cost from winding to weaving, Sort wise cost of production of Grey Cloth sort wise stock accounting of Grey cloth, Cost of Sizing material, Cost of sales of cloth sold in grey stage and sales realization

UNIT IV COSTING IN KNITTING AND GARMENT INDUSTRY

9

Elements of cost –Calculation of garment weight of different sizes, Dia-determination, Setting the knitting program, Dyeing program, Consumption of fabric per garment. Estimating of cost of process loss in Compacting, Bleaching, Raising, Shearing, Printing and Dyeing. Estimating the Knitting rates, Calculation of CMT charges. Cost sheet with Profit margins and foreign quotes.

UNIT V COST CONTROL AND COST REDUCTION

9

Introduction, Process of Cost Control and Cost Reduction, Cost Reduction Programme and its implementation, Methods and Techniques-Value analysis and Value Engineering, Just -In-Time (JIT), Activity Based Costing(ABC).

TOTAL : 45 PERIODS

REFERENCES:

1. Cost control and costing in spinning mills–SITRA, Edition 1992.
2. Cost control and accounting for Textile industry–TAIRO, Edition 1990.
3. Kalyanaraman.A.R. "Energy Conservation in Textile Industries", SITRA, 1985.
4. V.Dudeja "Textile Industry Management" (ATIRA), 1985.
5. Modern production Technologies edited by M.L.Gulrajani, The Textile Association (India) Publications, 1983
6. Bhavé P V and Srinivasan V, "Cost accounting in textile mills", ATIRA monograph, Ahmedabad, India, 1974
7. Varma H K, "Costing in Textile Industry", Dhanpat Rai publications, New Delhi, 1965
8. Shinn William, "Elements of Textile Costing" School of Textiles, North Carolina state, 1965
9. Jain IC, "Cost accounting-An introduction", Prentice hall, New Delhi, 2001
10. Ratnam T V, "Cost control and costing in spinning mills", Seshan printers, Coimbatore, India, 1992
11. Nathalie Evans, "Costing for the Fashion Industry" Bloomsbury Publishing, 2011

TX4072

FUNCTIONAL DYES

L T P C
3 0 0 3

UNIT I BASICS OF DYES

9

General survey of dyes; chemical structure of dyes, general properties of dyes, chromophores and dye classes for textile application

UNIT II DYES USED IN TEXTILES

9

Dyeing technology; standardization of textile dyes: dyes for cellulosic fibres, polyamides, polyesters and acrylic fibres; optical brightening agents: chemistry and evaluation of OBA

UNIT III FUNCTIONAL DYES

9

Functional dyes: dyes for leather; fur; paper; hair; food and inks – introduction, chemical structure and requirements

UNIT IV APPLICATION OF FUNCTIONAL DYES

9

Dyes used for imaging, invisible imaging, displays, electronic materials and biomedical applications; solar cells

UNIT V TOXICOLOGY AND HEALTH ASPECTS

9

Toxicity and environmental assessment; regulatory and legislative aspects

TOTAL: 45 PERIODS

REFERENCES:

1. McLaren K., "The Color Science of Dyes & Pigments", Adam Hilger Ltd., 1983, ISBN 0-85274-426-9.
2. Venkataraman K., "The Chemistry of Synthetic Dyes", Elsevier., 2012, ISBN 97801-271-70084
3. Choudhury A. K. R., "Modern Concepts of Colour and Appearance", Oxford and IBH Publishing Ltd, 2000.
4. G. Buxbaum (Ed.) Industrial Inorganic Pigments, Second, Completely Revised
5. Edition, 1998 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.
6. Willy Herbst, Klaus Hunger, Industrial Organic Pigments- Production, Properties, Applications Third, Completely Revised Edition (With Contributions by Gerhard Wilker, Heinfred Ohleier and Rainer Winter) 2004 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim
7. Advances in Color Chemistry – Vol I, Peters A. T.
8. Advances in Color Chemistry – Vol II, Peters A. T.
9. Non-Textile Dyes, Freeman H. S.
10. Robert A. Charvat ., "Coloring of Plastics: Fundamentals", John Wiley & Sons, 2005

TX4071

CHARACTERIZATION OF TEXTILE POLYMERS

L T P C
3 0 0 3

UNIT I MOLECULAR WEIGHT

9

Polymer solution thermo dynamics; molecular weight and molecular dimensions by end group analysis, osmometry, light scattering, viscometry, gel permeation chromatography, high performance liquid chromatography

UNIT II MOLECULAR STRUCTURE CHARACTERISATION

9

Infrared, NMR, UV-visible, Raman spectroscopy, mass spectroscopy

UNIT III	THERMAL PROPERTIES	9
Thermal properties by differential scanning calorimetry, differential thermal analysis, thermo gravimetry, thermo-mechanical analyzer, dynamic mechanical and dielectric analysis		
UNIT IV	MICROSCOPY	9
Optical and electron microscopy; TEM, SEM, AFM, X-ray scattering from polymers, birefringence		
UNIT V	OTHER PROPERTIES	9
Crystallinity by density measurements, surface area, pore volume measurements by B.E.T. method, porosimetry, surface energy measurements and particle size measurement.		

TOTAL: 45 PERIODS

REFERENCES:

1. Sperling, "Introduction to Physical Polymer Science," Wiley, 1986.
2. Campell D. and White J.R, "Polymer characterization, Physical Techniques", McGraw – Hill, New York, 1969.
3. Stamm M., "Polymer surfaces and Interfaces", Springer 1st ed., 2008.
4. Gupta V.B. and Kothari V.K., "Man Made Fibre production," Chapman and Hall, 1985.
5. Billmeyer, "Textbooks of Polymer Science," 3rd ed., Wiley, 1984
6. V R Gowariker., NV Viswanathan., Jayadev Sreedhar., "Polymer science"., New age International Publishers, 2020

TY4002	CHEMICAL PROCESSING OF MANMADE FIBRES	L T P C
		3 0 0 3

UNIT I	PREPARATORY PROCESSES	9
Various Preparatory processes for manmade textile -Heat setting of synthetic fabrics –effects of heat setting on dyeing. Mass Colouration of Polyester, Nylon, Acrylic and polypropylene, Advantages & Disadvantages of Mass Colouration; Difference between Mass Colouration and Dyeing.		
UNIT II	DYEING	9
Polyester Dyeing: carrier, HTHP and thermosal methods of dyeing. Practical problems and their solutions. Stripping of dyed PET. Dyeing of nylon. Dyeing with acid dyes-High temperature dyeing .Low temperature dyeing of Nylon66– Dyeing with disperse dyes. Barriness of dyeing. Dyeing of Acrylic Fibres: – Dyeing with cationic dyes– stripping of cationic dyes, dyeing with disperse dyes, dyeing of acrylic blends, differentially dye able acrylic fibres.		
UNIT III	BLENDED DYEING	9
Dyeing of Polyester Blends: Various shop floor practices of dyeing of polyester /cellulosic blended fabrics. Practical problems and their solutions. Various shop floor practices of dyeing of polyester/ wool blended fabrics. Practical problems and their solutions. Dyeing of polyester with cationic dyes. Dyeing of Micro polyester fabric. Dyeing of polyamide cellulosic blends – polyamide/wool blends, polyamide/ polyester blends-Stripping of Nylon dyed material. Practical problems and remedies in Nylon Dyeing. Dyeing of unmodified and modified polypropylene.		
UNIT IV	PRINTING	9
Printing of synthetic and blended fabrics with different dye classes - Direct, resist and discharge styles of printing-Transfer printing of polyester and blends.		
UNIT V	FINISHING	9
Different functional and easy care finishes on synthetics and blends like anti-stat, soil-release, soil-resistant, flame-retardant.		

TOTAL: 45PERIODS

REFERENCES

1. Vaidya,A.A.,and Datye,K.V.,“Chemical processing of Synthetic Fibres and Blends”,John Wiley and Sons,NewDelhi,.1999
2. Shore,J.“BlendDyeing”,SDC,London,1998
3. Mittal.R.M.&Trivedi.S.S,ChemicalProcessingofpolyesterandblends–ATIRA.1998
4. C.Duckworth,Engineering inTextile colouration, Dyers company publications trust,U.K.1983.
5. Burkinshaw.S.M.,Chemical principles of syntheticfibredyeing,Blackie,1995.
6. Gulrajani,M.L.,“PolyesterDyeing”,IIT,NewDelhi,1995.

TY4003

NON WOVEN AND SPECIALITY TEXTILES

L T P C

3 0 0 3

UNIT I WEB FORMING AND BONDING

9

Classifications of Non-woven fabrics - Raw materials. Principles of web forming – Role of cross lapper. Web bonding techniques - chemical, mechanical, thermal, air-bonding, spun bonding, needle punching, hydro entanglement processes.

UNIT II STRUCTURE AND EVALUATION

9

Structure of Non-woven fabrics - Macro structure, Structural elements - their arrangement, bonding and binding. Homogeneity of nonwoven. Evaluation of Non-woven fabrics. End uses and Techno-economics. Felts and in the process of Felting – technical considerations of felting. Decorative techniques in non-woven production.

UNIT III FABRIC PRODUCTION

9

Classification and Definition - Preparatory processes. Fabric Production – Conventional shuttle looms, Endless Tape Looms, Circular Hose Pipe looms. Shuttleless Looms – Catch thread and flat knitting edge looms; Multicolor Needle Jacquard looms.

UNIT IV UNCONVENTIONAL FABRICS

9

Production of Industrial Tapes, Elastic Tapes, Zip fastener tapes; Woven and printed labels. Stretch fabrics - classification and its production; Elastomeric stretch fabrics; Braided fabrics; - Tubular structures - Braiding Machine; Nets and Laces - Types and description of Lace Machines - Knitting of laces - Tricot Lace Machines. Flocked fabrics –The process of flocking.

UNIT V CARPETS

9

Carpets-Non-pile carpet weaves and their looms. Tufted carpets and their production–Pile surfaced carpet weaves and their looms. Needle felt floor coverings.

TOTAL: 45PERIODS

REFERENCES

1. Gulrajani.M.L.,“Nonwovens”,TheTextileAssociation(India)publication1996.
2. Birrell.V.,TheTextile Arts,Harper&BrothersPublications,NewYak,1999.
3. DeniseMusk,MachineKnitting,B.T.BatsfordLtd,London,1999
4. Wilhelm Albrechtetal.,"Nonwoven fabrics",WILEYVCH VerlagGmbh & Company, Germany, 2003.
5. Russel.S,"Handbook of Nonwovens",The Textile Institute Publication,2007.
6. Irsak.C,"NonwovenTextiles"TextileInstitute",Manchester,1999
7. Krcma.R.,ManualofNon-wovens,TextileTradePress,Manchester1993.

UNIT I**9**

UV– VIS spectroscopy- Theory, Franck- Condon principle, Electronic transitions, Deviations from Beer's law– Instrumentation (block diagram only)- Applications. Infra red spectroscopy– Theory, Fundamental vibrations, Hook's law– Instrumentation (block diagram only)- Finger print region – Vibrations involved in H₂O and CO₂ -Applications.

UNIT II**9**

NMR spectroscopy– Theory, Relaxation Process – Instrumentation (block diagram only) – Chemical shift – Internal standard – TMS – Shielding and De- Shielding Effects – Factors influencing Chemical shift - Applications. Mass spectroscopy: Theory, Instrumentation (block diagram only) – Ionization Techniques – Electron impact ionization, Chemical ionization and Desorption techniques. Nitrogen rule, Mc Lafferty re arrangement.

UNIT III**9**

Potentiometric measurements– Ion selective electrodes– Glass electrode – Determination of pH– Buffers– Types of potentiometric titrations– Applications of Potentiometric measurements. Thermal Methods: Thermo gravimetry– Factors affecting thermo gravimetric curves– Instrumental and sample characteristics– Instrumentation (block diagram only)– Applications. Differential Thermal Analysis– Introduction– Factors affecting DTA curves– Environmental, Instrumental and Sample factors– Instrumentation (block diagram only)– Applications.

UNIT IV**9**

Chromatographic Techniques – Introduction – classification – Theory, Instrumentation and Applications of Paper Chromatography, Thin Layer Chromatography, Column Chromatography, High Performance Liquid Chromatography and Gas – Liquid Chromatography.

UNIT V**9**

Errors, Precision and Accuracy: Definitions, Significant figures – Types of Errors – Methods of expressing accuracy and precision , Confidence limits.

TOTAL: 45 PERIODS**REFERENCES:**

1. Rouessac,F., "Chemical analysis – modern international method and techniques", Wiely, New Delhi,1999.
2. Day, R.A., and Unerwood, A.L., "Qualitative inorganic analysis, 5th edition", Prentice-Hall of India, New Delhi,2004
3. Bona,M., "Modern control Techniques in textile finishing and making up", Eurotex, Blachwells Bookshop, London,2001
4. Banwell,G.C., "Fundamentals of molecular spectroscopy", TMH,2003.

UNIT I POLYMERS USED IN COATING**9**

Natural Latex &synthetic rubbers, synthetic polymers: polyurethanes, poly (vinyl chloride), polyacrylate elastomers, silicone elastomers, poly (Tetrafluoroethylene), polyethylene, chlorinated and chlorosulponated polyethylenes, foams for laminates; textile substrate for coating

UNIT II METHODS OF COATING**9**

Knife coating, roll coating, dip coating, transfer coating, gravure coating, rotary screen printing, calendaring, hot melt coating, foam coating, lamination by adhesives, welding.

UNIT III	END USES OF COATING I	9
Breathable textiles, microporous coatings and films, hydrophilic coatings, smart temperature responsive breathable coatings; synthetic leather, architectural textiles, fluid containers, tarpaulins, automotive applications, carpet backing, flocking, fusible interlinings.		
UNIT IV	END USES OF COATING II	9
Thermochromic fabrics, temperature adaptable fabrics, fabrics for chemical protection, camouflage nets, high visibility garments, intumescent coating, metal and conducting polymer coated fabrics, coating with hydrogel and shape memory polymers		
UNIT V	CHARACTERIZATION OF COATED TEXTILES	9
Tensile strength, elongation, adhesion, tear resistance, weathering behavior, microbiological degradation, yellowing, testing standards		
		TOTAL: 45 PERIODS

REFERENCES

1. Walter Fung, "Coated and Laminated Textiles", Woodhead Publishing Ltd, UK, 2002, ISBN 978-1-85573-576-7.
2. Carr C M, "Chemistry of the Textile Industry", Blackie Academic & Professional, UK, 1995.
3. Smith W C, "Smart textile Coatings and Laminates", Woodhead Publishing Ltd, UK, 2010, ISBN 978-1-84569-379-4.
4. Brown P J and Stevens K, "Nanofibers and Nanotechnology in Textiles", Woodhead Publishing Ltd, UK, 2007, ISBN 978-1-84569-105-9.
5. Ashish Kumar Sen, "Coated Textiles: Principles and Applications", CRC Press, New York, 2008, ISBN 978-1-42005-345-6.

TY4006	BIO PROCESSING OF TEXTILES	LTPC
		3 0 0 3

UNIT I	INDUSTRIAL BIO-TECHNOLOGY	9
Industrial microbial products–applications, primary metabolites and secondary metabolites, Enzymes & Proteins– sources and applications, cell and enzyme immobilization, Industrial plant products– production of enzymes and poly sacchrides.		
UNIT II	ENVIRONMENTAL BIO-TECHNOLOGY	9
Detailed study about pollution and its control in textile processing industries. Waste watert reatment systems– Anaerobic & Aerobic systems, Bio-degradation– Micro organism in pollution control; Biomass production; waste as renewable sources of energy– Production of biogas production of hydrocarbon– Hydrogen fuel.		
UNIT III	ENZYMES USED IN TEXTILE INDUSTRY	9
Enzymes for desizing, scouring & bleaching Enzyme activity – initiation, propagation and termination reactions – reaction conditions – properties of substrates and results of enzyme treatment. Enzyme activity of amylo glucosidase, pectinase, glucose oxiclase, peroxidases and other enzymes used for bleaching decolourisation of textiles using laccases. Bio- Polishing enzymes such as cellulases. Bio- washing enzymes using cellulase proteases for scouring of animal fibres, degumming of silk and modification of wool properties.		
UNIT IV	EVALUATION OF ENZYME TREATED FABRICS	9
Weight loss, Whiteness index, Absorbency, Tensile strength, Handle of fabric and Abrasion resistance. SEM analysis and other structure related studies.		

UNITV BIO-PROCESSING IN TEXTILES 9

Bio-bleaching, combined bio - processing, bio washing, bio polishing, Denim fading, antiodour and antimicrobial finishes, biofinishing and other applications.

TOTAL: 45 PERIODS

REFERENCES

1. Betrabet S. M.BTRA Seminar, Book of papers(Jan1994)
2. Tyndall R. M and Raligh N.C. AATCC Book of papers(1991)
3. AsfertL.O and Videback. TIntl Textile Bulletin–Dyeing/Printing/Finishing(1990)
4. Cavaco-Paulo,Gubitz, Textile Processing With Enzymes, WoodHead Publishing Ltd, UK, 2003.
5. Ignacimuthu. S& Tata Mc GrawS.J,“Basic Bio-Technology”,-Hill Publications,1995

**TY4007 HIGH PERFORMANCE FIBRES L T P C
3 0 0 3**

UNIT I METODS OF PRODUCTION 9

Fundamentals of high performance fibres; comparison of regular and high performance fibres; fibre forming process; manufacturing, properties and applications-aramid fibres, high performance polyethylene

UNIT II INDUSTRIAL APPLICATION FIBRES 9

Manufacturing, properties and applications-glass fibres, basalt fibres; carbon fibres, ceramic fibres

UNIT III BIODEGRADABLE FIBRES, PROTEIN FIBRES 9

Manufacturing, properties and applications-alginate fibres; chitosan fibres; regenerated protein fibres–silk, wool, casein, soy bean fibre; synthetic biodegradable fibres

UNIT IV CHEMICAL RESISTANT FIBRES 9

Manufacturing, properties and applications of chemical resistance fibres–chlorinated fibres, fluorinated fibres, PPS, PEEK and PEI; thermal resistant fibres–semi carbon fibres, PBI, PBO

UNIT V SPECIALTY FIBRES 9

Manufacturing, properties and applications-hollow fibres, profile fibres blended and bi-component fibres, film fibres; functionalization of fibres–methods and applications

TOTAL: 45 PERIODS

REFERENCES

1. Hearle J. W. S.,“High Performance Fibres”, Woodhead Publishing Ltd., Cambridge, England,2001.
2. Hongu T. and Phillips G.O., “New Fibres”, Woodhead Publishing Ltd., England,1997.
3. Kothari V. K., “Textile Fibres: Development and Innovations”, Vol. 2, Progress in Textiles, IAFL Publications,2000.
4. Peebles L.H., “Carbon Fibres”, CRC Press, London,1995

**TY4008 ECO-FRIENDLY DYES, CHEMICALS AND PROCESSING L T P C
3 0 0 3**

UNIT I IMPACT OF TEXTILE PROCESS CHEMICALS ON ECOLOGY 9

Pollution - definition - Types - Impact of pollution on environment- Pollution capability of chemicals and products used in processing - pollution load at every stages of processing – Pollution associated with various colouration process - Need for eco-friendly processing- Important issues in exports- Red listed chemicals - Possible sources of contamination of various red listed chemicals-German Laws – Ban on amines and Azo dyes-List of banned amines and chemicals.

UNIT II ECO STANDARDS 9
 Need for Eco - standards. Eco standards – European & USA. Permissible limits (norms) of chemicals, pH, colour fastness and heavy metals by different eco-standards such as MST, OEKOTEX, CLEANFASHION, STEILMANN & - Eco-labeling and labels - Eco- auditing - Eco-management - ISO 14000 – SA 8000 - Natural Textiles – Organic Cotton – GOTS & organic exchange certification –APEO , NPEO & OPEO Limitations

UNIT III ECO TESTING 9
 Toxic substances used in processing and safe alternatives- Principles and procedures involved in the estimation of pH, pesticides, Residual formaldehyde, carcinogenic dyes, chlorinated phenols, phthalates, organo tin and heavy metals, – Consequences of presence of above compounds in Textiles – permissible limits – eco testing of antimicrobial finish with triclosan.

UNIT IV ECO FRIENDLY PROCESSING 9
 Eco-friendly dyeing of sulphur dyes- Eco-friendly per-acetic acid bleaching - Eco friendly pigment printing & discharge Printing. Organic stabilizer– Application of Diazo sensitizer in screen preparation– Application of Eco-friendly preservatives– Non PVC, Non Phthalate, Plastizol inks, Formaldehyde free dye fixing agents. Enzymes and their role. Application of Enzymes in Desizing, Scouring & Peroxide killing on cotton material, Degumming of silk - Application of Enzymes in finishing – eco friendly crease recovery finish, stone wash effect by Bio-polishing

UNIT V CLEAN TECHNOLOGIES FOR FUTURE 9
 Clean technology – Sustainable development – Ozone bleaching, RF drying, Microwave assisted dyeing, Ultrasonic assisted processing, Supercritical CO2 dyeing, importance of energy & water conservation – Energy audit - Basics & application scope of Nano technology in textiles - Occupational diseases & safety measures in Textile units.

TOTAL: 45PERIODS

REFERENCES:

1. Chavan R.B., Radhakrishnan J., Environmental Issues - Technology Options for Textile Industry, IIT Delhi Publication,1998
2. Reife A and Freeman H.S., Environmental Chemistry of dyes and pigments, Wiley,2001,ISBN:0471589276
3. Asokan R.,Eco-Friendly Textile Wet Processing, NCUTE Publications, NewDelhi,2001
4. Eco friendly Textiles: Challenges to the Textile Industry, Textiles Committee, Mumbai,1996.

**TY4009 TECHNICALTEXTILES L T P C
 3 0 0 3**

UNIT I INDUSTRIAL TEXTILES 9
 Design and characteristics required in textiles for transport applications; applications of textile reinforced composites in transport sector; quality requirement of yarns used in fishing industry like nets, ropes; conveyor belts, power transmission belts.

UNIT II MEDICAL AND HYGIENE TEXTILES 9
 Design and characteristics required in textiles for medical and hygiene applications; antimicrobial, disposable and reusable products; textiles in sportswear

UNIT III PROTECTIVE TEXTILES 9
 Garment design and choice of materials in protection from hazards due to mechanical, extreme climate, nuclear, biological, chemical and flame

UNIT IV GEO TEXTILES**9**

Use of geo textiles infiltration, drainage, separation and reinforcement application in construction; type of fibre and fabric to be used in such applications; Evaluation of geo textiles; use of textile materials in permanent and temporary civil construction - tents, awnings,

UNIT V FILTRATION AND INSULATION MATERIALS**9**

Sound and thermal insulation materials; Filtration basics, Filters deployed for air and water pollutants and evaluation of filtration efficiency.

TOTAL: 45 PERIODS**REFERENCES**

1. Horrocks A.R. and Anand S.C., -Handbook of Technical Textiles II, The Textile Institute, Manchester, 2000, ISBN:1855733854.
2. Anand S.C., -Medical Textiles II, Textile Institute, Manchester, 2001, ISBN:185573494X.
3. Adanur S., -Wellington search and book of Industrial textiles II Technomic publishing co. inc., 1995, ISBN : 1 – 56676 – 340 – 1.
4. Pushpa Bajaj and Sengupta A.K., - Protective clothing I, the Textile Institute, 1992, ISBN 1-870812 –44-1.
5. Scott R.A., -Textiles for protection I, Wood head Publishing Ltd, Cambridge, UK, 2005, ISBN1-85573-921-6.
6. Fung W, -Coated and laminated textiles II, Wood head Publishing Ltd, Cambridge, UK. 2002, ISBN1-85573-576-8.
7. Anand S.C, Kennedy J.F., Mirafat M. and Rajendran S., -Medical textiles and biomaterials for health care II, Wood head Publishing Ltd, Cambridge, UK. 2006, ISBN 1-85573-683-7.
8. Fung W. and Hard castle, -Textiles in automotive engineering I, Wood head Publishing Ltd, Cambridge, U K, 2001, ISBN1-85573-493-1.
9. John N.W.M., -Geo Textile II, Blackie and Sons Ltd, London, U.K. 1987, ISBN 0-412- 01351-7.
10. Allison Mathews and Martin Hardingham, - Medical and Hygiene Textile Production –A hand book I, Intermediate Technology Publications, 1994.
11. David Arvil, -An Innovative Approach to Spun bond Agricultural Crop Cover II, Journal of Industrial Textiles, Vol.30, No.4, April (2001)311-319.
12. Jurg Rupp, -Creating a garden with needle – punched fabrics II, Nonwovens and Industrial Textiles, 2 (2002)49-50.

TX4075**TEXTILE REINFORCED COMPOSITES****L T P C
3 0 0 3****UNIT I REINFORCEMENTS****9**

Introduction– composites– classification and application; reinforcements- fibres and its properties; preparation of reinforced materials and quality evaluation; preforms for various composites

UNIT II MATRICES**9**

Preparation, chemistry, properties and applications of natural matrices, thermoplastic and thermoset resins; mechanism of interaction of matrices and reinforcements; optimization of matrices

UNIT III COMPOSITE MANUFACTURING**9**

Classification; methods of composites manufacturing for both thermoplastics and thermosets- Hand layup, Filament Winding, Resin transfer moulding, prepregs and autoclave moulding, pultrusion, vacuum impregnation methods, compression moulding; post processing of composites and composite design requirements

UNIT IV TESTING 9

Fibre volume and weight fraction, specific gravity of composites, tensile, flexural, impact, compression, Interlaminar shear stress and fatigue properties of thermo set and thermoplastic composites.

UNIT V MECHANICS 9

Micromechanics, macro mechanics of single layer, macro mechanics of laminate, classical lamination theory, failure theories and prediction of inter laminar stresses using at ware

TOTAL: 45 PERIODS

REFERENCES

1. BorZ.Jang, "Advanced Polymer composites", ASM International, USA, 1994.
2. Carlsson L.A. and Pipes R.B., "Experimental Characterization of advanced composite Materials", Second Edition, CRC Press, New Jersey, 1996.
3. George Lubin and Stanley T. Peters, "Handbook of Composites", Springer Publications, 1998.
4. Mel. M. Schwartz, "Composite Materials", Vol. 1&2, Prentice - Hall PTR, New Jersey, 1997.
5. Richard M. Christensen, "Mechanics of composite materials", Dover Publications, 2005.
6. Sanjay K. Mazumdar, "Composites Manufacturing: Materials, Product, and Process Engineering", CRC Press, 2001

**TY4010 ADVANCED WET PROCESSING MACHINERY L T P C
3 0 0 3**

UNIT I YARN DYEING MACHINES 9

Advances in continuous processing of cotton and wool materials- - Advances in heating systems hank and yarn dyeing machines (cheese and warp) - importance of winding in yarn dyeing — calculation of winding density - detailed maintenance schedule for cheese dyeing machines.

UNIT II FABRIC DYEING MACHINES 9

Advances in Beam dyeing- Advances in soft flow, overflow, jet dyeing machines— Developments in jiggers,— Detail maintenance schedule for beam dyeing, jet dyeing and jiggers.

UNIT III DRYING MACHINES 9

Detail study and developments in vertical drying ranges - RF dryer, yarn dryer, tubular & open width knitted fabric dryer, Tumble dryer, devellat bed screen printing machines. Principle and working of fully automatic flat bed screen printing Equipments in balloon padding, hydro extractor, rope opener, maintenance schedule for the above machines. Heating systems for hot air stenters, Clip & pin type of stenters; Jig stenters — over feeding system and its importance - Hot flue dryer—float dryer— maintenance schedule for the above machines.

UNIT IV PRINTING MACHINES 9

Developments in preparation of screens for roller, rotary, machine—with programmer line diagram and its advantages- developments in agers- Developments in garment printing machines - various practical problems & possible remedies, Transfer printing machines and dyeing.

UNIT V FINISHING MACHINES 9

Developments in finishing machineries — Calenders, sanforising machine, Back-filling machine, maintenance schedule for the above machineries. Shop floor problems & possible remedies in finishing department, Sandblasting machine, Peach finishing, Raising, Shearing machines.

TOTAL: 45 PERIODS

REFERENCES:

1. Darye.K.V. and Vaidya.A.A., Chemical Processing of Synthetic fibres and blends, John Wiley & Sons, New York. 1995
2. R.S. Bhagwat, "Development in Textile Processing Machines" Colour Publications pvt. Ltd, 2000.

TY4011**DESIGN OF TEXTILE EXPERIMENTS****L T P C
3 0 0 3****UNIT I EXPERIMENTAL DESIGN FUNDAMENTALS 9**

Importance of experiments, experimental strategies, basic principles of design, terminology, ANOVA, steps in experimentation, sample size, normal probability plot, linear regression model.

UNIT II SINGLE FACTOR EXPERIMENTS 9

Completely randomized design, Randomized block design, Latin square design. Statistical analysis, estimation of model parameters, model adequacy checking, pair wise comparison tests, in respect of textile process, machine and quality parameters.

UNIT III MULTIFACTOR EXPERIMENTS 9

Two and three factor full factorial experiments, 2^K factorial Experiments, Confounding and Blocking designs; application in textile experiments.

UNIT IV SPECIAL EXPERIMENTAL DESIGNS 9

Fractional factorial design, nested designs, Split plot design, Introduction to Response Surface Methodology, Experiments with random factors, rules for expected mean squares, approximate F-tests for textile applications.

UNIT V TAGUCHI METHODS 9

Steps in experimentation, design using Orthogonal Arrays, data analysis, Robust design- control and noise factors, S/N ratios, parameter design, case studies related to textile engineering.

TOTAL: 45 PERIODS**REFERENCES**

1. Montgomery, D.C., Design and Analysis of experiments, John Wiley and Sons,2003.
2. Nicolo Belavendram, Quality by Design; Taguchi techniques for industrial experimentation, Prentice Hall, 1995.
3. Phillip J.Rose, Taguchi techniques for quality engineering, McGraw Hill,1996.
4. Leaf G.A.V., -Practical Statistics for the Textile Industry, Part I and III, The Textile Institute, Manchester, 1984,ISBN:0900739517.

TY4012**HOMETEXTILES****L T P C
3 0 0 3****UNIT I HOME FURNISHING 9**

Development in Textile Furnishing–Type of Furnishing Materials–Woven and Non woven Selection of facilities– Colours– Design – Textile wall hanging – Cession Cushion covers– Kitchen Textile – Apron-Dish cloth– Bread Bag– Pot Holders– Table mats– Upholstery application : Fixed upholstery –Non-stretch loose covers–Stretch covers.

UNIT II FLOOR COVERINGS 9

Recent development– Hand floor covering, Resilient Floor Soft floor Rugs- Cushion and pads. Care – Tufted - Needle felt backing woven.. Woven carpet manufacture – wilton weaving, Shedding mechanism-Aximinister. Tuftedcarpet Manufacture Broadloommachinery, Handtufting, Thermo-bonded products Unconventional methods for making carpets – Bonding knitted carpet, Stitch bonding flocking.

UNIT III CURTAIN SAND DRAPERIES 9

Advances in Home decoration– Draperies– Choice of Fabrics– Curtains– Developments in Finishing of Draperies– Developments in tucks and pleats- uses of Drapery Rods, Hooks, Tape Rings and pins. Table Textiles– Table cloths– colour– Woven Printed, Jacquard , embroidered types, non-woven types.Table mats– Colour–Woven-Printed jacquard, Embroidered.

UNIT IV BEDLINERS 9

Advances in the production –Different types: – Sheets – Blankets – Blanket Covers – Comforts – Comfort Covers – Bed Spreads – Mattress and Mattress Covers – Pads – Pillows. General: Hand /machine embroidered scarves- Stoles –Shawls–Made ups used in hospitals, Textiles care labeling Design aids.

UNIT V TOWELS 9

Types– Bathrobes– BeadTowel– KitchenTerry– Napkins.Construction:weave– Pileheight Pattern Dyeing and Finishing.Window Textile Sun Filters –Reflective textile. Velour Type of Velvet– Jacquard– Dodderly– Plain Pointed Manufacturing Methods– Construction.

TOTAL: 45 PERIODS

REFERENCE:

1. Wingatel.B.,&MohlerJ.E.,Textile Fabrics & Their Selection, Prentice HallInc, NewYork,1984.
2. Donserkery K.G. ,Interior Decoration in India, D.B.Taraporval Sons and Co. Pvt Ltd.,1973
3. Alexander N.G. Designing Interior Environment, Mass Court Brace Covanorich, Newyork,1972.

**IL4005 TOTAL QUALITY MANAGEMENT L T P C
3 0 0 3**

OBJECTIVE:

- To facilitate the understanding of Quality Management principles and process.

UNIT I INTRODUCTION 9

Introduction - Need for quality -Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby- Barriersto TQM- Customer focus- Customer orientation, Customer satisfaction, Customer complaints, Customer retention.

UNITII TQM PRINCIPLES 9

Leadership-QualityStatements,Strategicqualityplanning,QualityCouncils Employee involvement Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal -Continuous process improvement - PDCA cycle, 5S, Kaizen – Supplier partnership- Partnering, Supplier selection, Supplier Rating.

UNITIII TQM TOOL SAND TECHNIQUES I 9

These ventraditional tools of quality-New management tools-Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking –Reason to benchmark, Benchmarking process -FMEA-Stages, Types.

UNITIV TQM TOOLS AND TECHNIQUES II 9

Quality Circles - Cost of Quality - Quality Function Deployment (QFD) - Taguchi quality loss function-TPM-Concepts, improvement needs –Performance measures.

UNITV QUALITY MANAGEMENT SYSTEM 9

Introduction— Benefits of ISO Registration— ISO 9000 Series of Standards— Sector-Specific Standards— AS 9100, TS16949 and TL 9000- ISO 9001 Requirements—Implementation— Documentation— Internal Audits— Registration- environmental management SYSTEM: Introduction— ISO 14000 Series Standards— Concepts of ISO 14001—Requirements of ISO14001— Benefits of EMS.

TOTAL: 45PERIODS

OUTCOME:

Upon completion of this course the student shall be able to

- Understand the concept and importance of total quality management.
- Know about the principles of total quality management.
- Know about the tools and techniques in total quality management.
- Understand the quality circle and cost of quality.
- Understand the quality management system.

REFERENCES:

1. Dale H. Besterfield, Carol B. Michna, Glen H. Besterfield, Mary B. Sacre, Hemant Urdhware she and Rashmi Urdhware she, "Total Quality Management", Pearson Education Asia, Revised Third Edition, Indian Reprint, Sixth Impression, 2013.
2. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th Edition, First Indian Edition, Cengage Learning, 2012.
3. Janakiraman. B and Gopal. R.K., "Total Quality Management-Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.
4. Suganthi. Land Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt.

TX4074

SUSTAINABILITY IN TEXTILE INDUSTRY

L T P C
3 0 0 3

UNIT I INTRODUCTION TO SUSTAINABILITY

9

Sustainability; Concepts and terminologies in sustainable approach; principles of sustainability; importance and application of sustainable approaches in textile industry

UNIT II SUSTAINABILITY IN TEXTILE INDUSTRY

9

Supply chain in textile industry; sustainable cotton, wool, and synthetic fibre production and processing

UNIT III SUSTAINABILITY IN PROCESSING

9

Enzyme biotechnology, plasma technology in textiles; waterless dyeing technologies, low liquor dyeing; sustainability in effluent treatment, water saving, zero hazardous chemicals.

UNIT IV RECYCLING

9

Textile recycling: polymer, fibre, yarn and fabric; consumer perception of recycled textile products

UNIT V ECO DESIGNING AND ECOLABELLING

9

Eco-design, building eco-design through supply chain; sustainability for credit rating; environmental management systems; standards for labelling, textile labels and environmental labelling; life cycle analysis of textiles

TOTAL: 45 PERIODS

REFERENCES

1. Peter P Rogers., "An Introduction to Sustainable Development", Glen Educational Foundation, Inc, 2008, ISBN 978-1-84407-520-1.
2. Blackburn R S., "Sustainable Textiles", Woodhead Publishing Limited, 2009, ISBN 978-1-84569-453-1.
3. Marim I. Tobler. Rohr., "Handbook of Sustainable Textile Production", Woodhead Publishing Limited, Cambridge, 2011, ISBN 0-85274-426-9.
4. Miraftab M and Horrocks R., "Eco-Textiles", Woodhead Publishing Limited, Cambridge 2007, ISBN 978-1-42004-444-7.
5. Youjiang Wang, "Recycling in Textiles", Woodhead Publishing Limited, Cambridge, 2006, ISBN 1-85573-952-6.

6. Chavan R B and Radhakrishnan J, "Environmental Issues - Technology Options for Textile Industry", IIT Delhi Publication, 1998.
7. Cavaco-Paulo and Gübitz G M, "Textile Processing with Enzymes", Woodhead Publishing Ltd., UK, 2003, ISBN 978-1-85573-610-8.

TX4073

PROTECTIVE CLOTHING

**L T P C
3 0 0 3**

UNIT I FIBRE REQUIREMENTS 9

Suitability and properties of high performance fibres for various protective clothing – chemical composition and physical structure

UNIT II YARN AND FABRIC REQUIREMENTS 9

Types of yarns, woven, knitted and nonwoven fabric structures used for protective garments, methods of production, effect of structure on their performance

UNIT III CLOTHING CONSTRUCTION 9

Method of construction of garments according to various protective end uses like protection against cold, ballistic protection; use of different fabric type (knitted, woven, and nonwoven), coated, laminated in different places; use of inter lining and composites; 3D structures; high tech textiles–wearable electronics; protective garments for industrial and apparel end uses

UNIT IV FINISHING OF PROTECTIVE CLOTHING 9

Types of finishes - fire retardant finishes, water repellent finishes, anti - microbial finishes; chemical finishes against radiation and chemicals; method of application of finishes; protective finishes for health care garments

UNIT V QUALITY EVALUATION 9

Evaluation of protective fabrics - desirable properties of protective textiles, method of testing for thermal protective performance, abrasion and wear resistance, evaluation of resistance to mildew, ageing, sunlight, chemical, electrostatic and electrical resistivity, impact properties; ASTM standards for protective garments

TOTAL: 45 PERIODS

REFERENCES

1. Adanur S., "Wellington sears handbook of Industrial textiles" Technomic publishing co. inc., 1995, ISBN : 1 – 56676 – 340 – 1
2. Pushpa Bajaj and Sengupta A.K, "Protective clothing", the Textile Institute, 1992, ISBN 1-870812 – 44-1
3. Chellamani K.P. and Chattopadhyay D., "Yarns and Technical Textiles", SITRA, 1999.
4. Mukhopadhyay S.K. and Partridge J.F., "Automotive Textiles", Textile Progress, Vol29, No1/2, 1999, ISBN:1870372212
5. Horrocks A.R. and Anand S.C., "Handbook of Technical Textiles", The Textile Institute, anchester, 2000, ISBN: 1855733854.
6. Anand S.C., "Medical Textiles", Textile Institute, Manchester, 2001, ISBN:185573494X.
7. Scott R.A., "Textiles for protection", Woodhead Publishing Ltd., Cambridge, UK, 2005, ISBN 1-85573-921-6.
8. Saville B.P., "Physical testing of textiles", Woodhead Publishing Ltd., Cambridge, UK, 1999, ISBN 1-85573-367-6.
9. Long A.C., "Design and manufacture of Textile Composites", Woodhead Publishing Ltd., Cambridge, UK, 2005, ISBN 1-85573-744-2.
10. Fung W, "Coated and laminated textiles", Woodhead Publishing Ltd, Cambridge, UK, 2002, ISBN 1-85573-576-8.

11. Anand S.C., Kennedy J.F., Miraftab.M and Rajendran.S., "Medical textiles and biomaterials for health care", Woodhead Publishing Ltd, Cambridge, UK,2006, ISBN 1-85573-683-7.
12. Fung W. and Hardcastle, "Textiles in automotive engineering", Woodhead Publishing Ltd, Cambridge, UK, 2001, ISBN 1-85573-493-1.
13. John N.W.M., "Geo Textile", Blackie and Sons Ltd, London, U.K. , 1987, ISBN 0-412-01351-7.
14. Allison Mathews. and Martin Hardingham, "Medical and Hygiene Textile Production – A hand book" Intermediate Technology Publications, 1994.

Tentative

AUDIT COURSES

AX4091

ENGLISH FOR RESEARCH PAPER WRITING

**L T P C
2 0 0 0**

COURSE OBJECTIVES:

3. Teach how to improve writing skills and level of readability
4. Tell about what to write in each section
5. Summarize the skills needed when writing a Title
6. Infer the skills needed when writing the Conclusion
7. Ensure the quality of paper at very first-time submission

UNIT I INTRODUCTION TO RESEARCH PAPER WRITING

6

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

UNIT II PRESENTATION SKILLS

6

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts, Introduction

UNIT III TITLE WRITING SKILLS

6

Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check

UNIT IV RESULT WRITING SKILLS

6

Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions

UNIT V VERIFICATION SKILLS

6

Useful phrases, checking Plagiarism, how to ensure paper is as good as it could possibly be the first-time submission

TOTAL: 30 PERIODS

COURSE OUTCOMES

- CO1 – Understand that how to improve your writing skills and level of readability
- CO2 – Learn about what to write in each section
- CO3 – Understand the skills needed when writing a Title
- CO4 – Understand the skills needed when writing the Conclusion
- CO5 – Ensure the good quality of paper at very first-time submission

REFERENCES:

1. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011
2. Day R How to Write and Publish a Scientific Paper, Cambridge University Press 2006
3. Goldbort R Writing for Science, Yale University Press (available on Google Books) 2006
4. Highman N, Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book 1998.

AX4092

DISASTER MANAGEMENT

**L T P C
2 0 0 0**

COURSE OBJECTIVES:

- Summarize basics of disaster
- Explain a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- Illustrate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.

- Describe an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
- Develop the strengths and weaknesses of disaster management approaches

UNIT I INTRODUCTION 6

Disaster: Definition, Factors and Significance; Difference between Hazard And Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

UNIT II REPERCUSSIONS OF DISASTERS AND HAZARDS 6

Economic Damage, Loss of Human and Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.

UNIT III DISASTER PRONE AREAS IN INDIA 6

Study of Seismic Zones; Areas Prone To Floods and Droughts, Landslides And Avalanches; Areas Prone To Cyclonic and Coastal Hazards with Special Reference To Tsunami; Post-Disaster Diseases and Epidemics

UNIT IV DISASTER PREPAREDNESS AND MANAGEMENT 6

Preparedness: Monitoring Of Phenomena Triggering a Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological And Other Agencies, Media Reports: Governmental and Community Preparedness.

UNIT V RISK ASSESSMENT 6

Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival

TOTAL : 30 PERIODS

COURSE OUTCOMES:

- CO1: Ability to summarize basics of disaster
 CO2: Ability to explain a critical understanding of key concepts in disaster risk reduction and humanitarian response.
 CO3: Ability to illustrate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
 CO4: Ability to describe an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
 CO5: Ability to develop the strengths and weaknesses of disaster management approaches

REFERENCES:

1. Goel S. L., Disaster Administration And Management Text And Case Studies", Deep & Deep Publication Pvt. Ltd., New Delhi, 2009.
2. Nishitha Rai, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "NewRoyal book Company, 2007.
3. Sahni, Pardeep Et. Al. , " Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi, 2001.

COURSE OBJECTIVES:

Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional
- Role and entitlement to civil and economic rights as well as the emergence nation hood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

UNIT I HISTORY OF MAKING OF THE INDIAN CONSTITUTION

History, Drafting Committee, (Composition & Working)

UNIT II PHILOSOPHY OF THE INDIAN CONSTITUTION

Preamble, Salient Features

UNIT III CONTOURS OF CONSTITUTIONAL RIGHTS AND DUTIES

Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.

UNIT IV ORGANS OF GOVERNANCE

Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.

UNIT V LOCAL ADMINISTRATION

District's Administration head: Role and Importance, □ Municipalities: Introduction, Mayor and role of Elected Representative, CEO, Municipal Corporation. Pachayati raj: Introduction, PRI: Zila Pachayat. Elected officials and their roles, CEO Zila Pachayat: Position and role. Block level: Organizational Hierarchy(Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.

UNIT VI ELECTION COMMISSION

Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners - Institute and Bodies for the welfare of SC/ST/OBC and women.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization
- of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party[CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of 1956.

SUGGESTED READING

1. The Constitution of India, 1950(Bare Act), Government Publication.
2. Dr.S.N.Busi, Dr.B. R.Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M.P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

UNIT I	சங்க இலக்கியம்	6
	1. தமிழின் துவக்க நூல் தொல்காப்பியம் - எழுத்து, சொல், பொருள்	
	2. அகநானூறு (82) - இயற்கை இன்னிசை அரங்கம்	
	3. குறிஞ்சிப் பாட்டின் மலர்க்காட்சி	
	4. புறநானூறு (95,195) - போரை நிறுத்திய ஔவையார்	
UNIT II	அறநெறித் தமிழ்	6
	1. அறநெறி வகுத்த திருவள்ளுவர் - அறம் வலியுறுத்தல், அன்புடைமை, ஒப்புரவறிதல், ஈகை, புகழ்	
	2. பிற அறநூல்கள் - இலக்கிய மருந்து - ஏலாதி, சிறுபஞ்சமூலம், திரிகடுகம், ஆசாரக்கோவை (தூய்மையை வலியுறுத்தும் நூல்)	
UNIT III	இரட்டைக் காப்பியங்கள்	6
	1. கண்ணகியின் புரட்சி - சிலப்பதிகார வழக்குரை காதை	
	2. சமூகசேவை இலக்கியம் மணிமேகலை - சிறைக்கோட்டம் அறக்கோட்டமாகிய காதை	
UNIT IV	அருள்நெறித் தமிழ்	6
	1. சிறுபாணாற்றுப்படை - பாரி முல்லைக்குத் தேர் கொடுத்தது, பேகன் மயிலுக்குப் போர்வை கொடுத்தது, அதியமான் ஔவைக்கு நெல்லிக்கனி கொடுத்தது, அரசர் பண்புகள்	
	2. நற்றிணை - அன்னைக்குரிய புன்னை சிறப்பு	
	3. திருமந்திரம் (617, 618) - இயமம் நியமம் விதிகள்	
	4. தர்மச்சாலையை நிறுவிய வள்ளலார்	
	5. புறநானூறு - சிறுவனே வள்ளலானான்	
	6. அகநானூறு (4) - வண்டு நற்றிணை (11) - நண்டு கலித்தொகை (11) - யானை, புறா ஐந்திணை 50 (27) - மான்	
	ஆகியவை பற்றிய செய்திகள்	

1. உரைநடைத் தமிழ்,
 - தமிழின் முதல் புதினம்,
 - தமிழின் முதல் சிறுகதை,
 - கட்டுரை இலக்கியம்,
 - பயண இலக்கியம்,
 - நாடகம்,
2. நாட்டு விடுதலை போராட்டமும் தமிழ் இலக்கியமும்,
3. சமுதாய விடுதலையும் தமிழ் இலக்கியமும்,
4. பெண் விடுதலையும் விளிம்பு நிலையினரின் மேம்பாட்டில் தமிழ் இலக்கியமும்,
5. அறிவியல் தமிழ்,
6. இணையத்தில் தமிழ்,
7. சுற்றுச்சூழல் மேம்பாட்டில் தமிழ் இலக்கியம்.

TOTAL : 30 PERIODS

தமிழ் இலக்கிய வெளியீடுகள் / புத்தகங்கள்

1. தமிழ் இணைய கல்விக்கழகம் (Tamil Virtual University)
- www.tamilvu.org
2. தமிழ் விக்கிப்பீடியா (Tamil Wikipedia)
- <https://ta.wikipedia.org>
3. தர்மபுர ஆதீன வெளியீடு
4. வாழ்வியல் களஞ்சியம்
- தமிழ்ப் பல்கலைக்கழகம், தஞ்சாவூர்
5. தமிழ்கலைக் களஞ்சியம்
- தமிழ் வளர்ச்சித் துறை (thamilvalarchithurai.com)
6. அறிவியல் களஞ்சியம்
- தமிழ்ப் பல்கலைக்கழகம், தஞ்சாவூர்