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 I SEMESTER 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
PRACTICALS								
7.	TY4211	Product Development Laboratory	EEC	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

LIST OF PROFESSIONAL ELECTIVES

SEMESTER I, ELECTIVE I

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	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	CATE GORY	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	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	TY4005	Textile Coating and Lamination	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	CATE GORY	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	CATE GORY	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	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	TY4013	Total Quality Management	PEC	3	0	0	3	3
2.	TY4074	Sustainability in textile industry	PEC	3	0	0	3	3
3.	TX4073	Protective Clothing	PEC	3	0	0	3	3

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	
	AX4091	English for Research Paper Writing	2	0	0	0
	AX4092	Disaster Management	2	0	0	0
	AX4093	Constitution of India	2	0	0	0
	AX4094	நற்றமிழ் இலக்கியம்	2	0	0	0

TY4101	TEXTILE DYES AND AUXILIARIES	L T P C 4 0 0 4

COURSE OBJECTIVES:

- To provide the knowledge on classification and types of textile auxiliaries
- To provide the knowledge on importance and basic functions of textile auxiliaries
- To enable the students to know about the chemistry of textile auxiliaries

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

COURSE OUTCOMES:

Upon completion of the course, the students will be able to know about role of auxillaries in

- Modification of surface tension
- Preparatory Process
- Dyeing Process
- Printing Process
- Finishing Process.

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, NewDelhi,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 CHEMICALPROCESSING** **L T P C**
4 0 0 4

COURSE OBJECTIVES:

- To enable the students to study about the mechanism of Preparatory process
- To enable the students to study about elements of dye chemistry
- To enable the students to study the about Printing methods & styles and the
- Necessity of Finishing

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 :60PERIODS

COURSE OUTCOMES

Upon completion of this course the student shall be able to know the mechanism

- Desizing
- Bleaching
- Dye chemistry
- Printing
- Finishing

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

COURSE OBJECTIVES:

To enable the students to learn about

- Fibre forming polymer characteristics and their related models and models describing fibre structure.
- Conducting of experiments to characterize the polymers and fibres

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

COURSE OUTCOMES:

Upon completion of this course, the student shall
CO1: Be able to understand the synthesis of polymers
CO2: Be able to correlate the properties of polymers
CO3: Be able to understand rheological characteristics
CO4: Know about viscoelastic behavior of polymers
CO5: Be able to correlate the properties of fiber

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”, Addision-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-filling, 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

COURSE OBJECTIVES

- To enable the students to know about the preparatory and Dyeing processes for natural & Manmade fibres in suitable machines
- To enable the students to know about the Printing process.

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.

COURSE OUTCOMES:

Upon completion of this course the student shall be able to know about the

CO1: Preparatory for natural & manmade fibres in suitable machines

CO2: Dyeing processes for natural fibres in suitable machines

CO3: Dyeing processes for manmade fibres in suitable machines

CO4: Types of printing process

CO5: Colour matching and its importance

TX4161 ADVANCED TEXTILE TESTING LABORATORY LT P C
0 0 6 3

COURSE OBJECTIVES:

To enable the students to learn about

- Characteristics of textile materials and their related models to describe their properties .
- Conducting experiments to characterize the polymers and fibres

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 repellant 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

COURSE OUTCOMES:

Upon the completion of this course the student will be able to

CO1: Understand and analyze the characteristics of textile materials using advanced characterizing techniques

CO2: Analyze the graphs, charts of TGA, FTIR spectrometer and X-ray Diffractometer

CO3: Evaluate fabric finishes and nature of fabrics

CO4: Determine the property of liquids

CO5: Characterize the porous substrates

TY4001	TEXTILE COSTING AND PROCESS OPTIMIZATION	L T P C 3 0 0 3

COURSE OBJECTIVES:

To enable the students to know about the

- Textile Costing in manufacturing
- Cost control and reduction

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

COURSE OUTCOMES:

Upon Completion of This Course, the student shall be able to

CO1: Fundamentals of Costing
CO2: Costing in spinning industry
CO3: Costing in Weaving industry
CO4: Costing in Knitting and Garment Industry
CO5: Cost control and reduction

REFERENCES:

1. Cost control and costing in spinning mills–SITRA,Edition1992.
2. Cost control and accounting for Textile industry–TAIRO,Edition1990.
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. Bhave 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 Corolina state,1965
9. Jain IC,”Cost accounting-An introduction”, Prentice hall, NewDelhi, 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

COURSE OBJECTIVES:

To enable the students to

- Recall the basics of dyes and their use in textile industry
- Define functional dyes and recognize their use
- Understand the application of functional dyes
- Know the importance of toxicity and health aspects of dyes

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

COURSE OUTCOMES:

Upon completion of this course the student shall be able to understand
CO1: Chemical structure and properties of dyes
CO2: Dyesused in textiles
CO3: Functional dyes, their chemical structure and requirements
CO4: Applications of the functional dyes in different industries
CO5: Toxicity and health issues

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 Edition, 1998 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.
5. Willy Herbst, Klaus Hunger, Industrial Organic Pigments- Production, Properties, Applications Third, Completely Revised Edition (With Contributions by Gerhard Wilker, HeinfredOhleier and Rainer Winter) 2004 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim
6. Advances in Color Chemistry – Vol I, Peters A. T.
7. Advances in Color Chemistry – Vol II, Peters A. T.
8. Non-Textile Dyes, Freeman H. S.
9. Robert A. Charvat ., “Coloring of Plastics: Fundamentals”, John Wiley & Sons, 2005

TX4071 CHARACTERIZATION OF TEXTILE POLYMERS L T P C
3 0 0 3

COURSE OBJECTIVE:

- To enable the students to learn about characterization of polymers used in the production of textile fibres

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

COURSE OUTCOMES:

Upon completion of this course, the student shall be able to

CO1: Determine the molecular weight using various techniques

CO2: Interpret molecular structure obtained from various analytical instruments

CO3: Determine the thermal properties using various instruments

CO4: Understand microscopy

CO5: Understand the properties of textile polymers

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”, Springer1st ed., 2008.
4. Gupta V.B. and Kothari V.K., “Man Made Fibre production,” Chapman and Hall, 1985.
5. Billmayer, “Textbooks of Polymer Science,” 3rd ed., Wiley, 1984
6. V R Gowariker., NV Viswanathan., Jayadev Sreedhar., “Polymer science”., New age International Publishers, 2020

AUDIT COURSES

AX4091 ENGLISH FOR RESEARCH PAPER WRITING L T P C
2 0 0 0

COURSE OBJECTIVES:

- Teach how to improve writing skills and level of readability
- Tell about what to write in each section
- Summarize the skills needed when writing a Title
- Infer the skills needed when writing the Conclusion
- 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. NishithaRai, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "'NewRoyal book Company,2007.
3. Sahni, PardeepEt.Al. ," Disaster Mitigation Experiences And Reflections", Prentice Hall OfIndia, New Delhi,2001.

AX4093 CONSTITUTION OF INDIA L T P C
2 0 0 0

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 Revolutionin1917and 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.

AX4094	நற்றமிழ்இலக்கியம்	L T P C 2 0 0 0

UNIT I **சங்க இலக்கியம்** **6**

1. தமிழின்துவக்கநூல்தொல்காப்பியம்
– எழுத்து, சொல், பொருள்
2. அகநானூறு(82)
- இயற்கைஇன்னிசைஅரங்கம்
3. குறிஞ்சிப்பாட்டின்மலர்க்காட்சி
4. புறநானூறு(95,195)
- போரைநிறுத்தியஔளவையார்

UNIT II **அறநெறித்தமிழ்** **6**

1. அறநெறிவகுத்ததிருவள்ளுவர்
- அறம்வலியுறுத்தல், அன்புடைமை, ஒப்புறவுஅறிதல், ஈகை, புகழ்
2. பிறஅறநூல்கள்- இலக்கியமருந்து
– ஏலாதி, சிறுபஞ்சமூலம், திரிகடுகம், ஆசாரக்கோவை
(தூய்மையைவலியுறுத்தும்நூல்)

UNIT III **இரட்டைக்காப்பியங்கள்** **6**

1.கண்ணகியின்புரட்சி
- சிலப்பதிகாரவழக்குரைகாதை
2. சமூகசேவைஇலக்கியம்மணிமேகலை
- சிறைக்கோட்டம்அறக்கோட்டமாகியகாதை

UNIT IV **அருள்நெறித்தமிழ்** **6**

1. சிறுபாணாற்றுப்படை
   - பாரிமுல்லைக்குத்தேர்கொடுத்தது, பேகன் மயிலுக்குப் போர்வை கொடுத்தது, அதியமான்ஔவைக்குநெல்லிக்கனிகொடுத்தது, அரசர் பண்புகள்
2. நற்றிணை
   - அன்னைக்குரியபுன்னைசிறப்பு
3. திருமந்திரம் (617, 618)
   - இயமம்நியமம்விதிகள்
4. தர்மச்சாலையை நிறுவிய வள்ளலார்
5. புறநானூறு
   - சிறுவனேவள்ளலானான்
6. அகநானூறு (4) - வண்டு
   நற்றிணை (11) - நண்டு
   கலித்தொகை (11) - யானை, புறா
   ஐந்திணை 50 (27) - மான்
   ஆகியவைபற்றியசெய்திகள்

UNIT V **நவீனதமிழ்இலக்கியம்** **6**

1. உரைநடைத்தமிழ்,
   - தமிழின்முதல்புதினம்,
   - தமிழின்முதல்சிறுகதை,
   - கட்டுரைஇலக்கியம்,
   - பயணஇலக்கியம்,
   - நாடகம்,
2. நாட்டுவிடுதலைபோராட்டமும்தமிழ்இலக்கியமும்,
3. சமுதாயவிடுதலையும்தமிழ்இலக்கியமும்,
4. பெண் விடுதலையும் விளிம்பு நிலையினரின் மேம்பாட்டில் தமிழ் இலக்கியமும்,
5. அறிவியல்தமிழ்,
6. இணையத்தில்தமிழ்,
7. சுற்றுச்சூழல் மேம்பாட்டில் தமிழ் இலக்கியம்.

TOTAL: 30 PERIODS

<u>தமிழ்இலக்கியவெளியீடுகள் / புத்தகங்கள்</u>

1. தமிழ்இணையகல்விக்கழகம் (Tamil Virtual University) - www.tamilvu.org
2. தமிழ்விக்கிப்பீடியா (Tamil Wikipedia) -https://ta.wikipedia.org
3. தர்மபுரஆதினவெளியீடு
4. வாழ்வியல்களஞ்சியம் - தமிழ்ப்பல்கலைக்கழகம், தஞ்சாவூர்
5. தமிழ்கலைக்களஞ்சியம் - தமிழ்வளர்ச்சித்துறை (thamilvalarchithurai.com)
6. அறிவியல்களஞ்சியம் - தமிழ்ப்பல்கலைக்கழகம், தஞ்சாவூர்