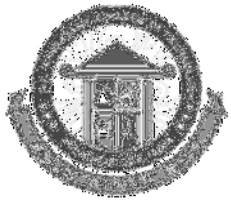
K.S. Rangasamy College of Technology

(Autonomous Institution)



Curriculum & Syllabus

of

B. Tech. Textile Technology

(For the batch admitted in 2017 – 18)

R 2014

Courses Accredited by NBA, Accredited by NAAC with 'A' Grade,
Approved by AICTE, Affiliated to Anna University, Chennai.

KSR Kalvi Nagar, Tiruchengode – 637 215.
Namakkal District, Tamil Nadu, India.

Vision :

To be the Centre of Excellence in textile education, training, research and service.

Mission:

To enlighten the students about the latest technology in textile & garment through innovative educational practices and multi disciplinary research.To engage with the industry through consultancy as solution providers.

Program Educational Objectives (PEOs):

I. Graduates are competent in textile production processes and be able to identify problems and suggest suitable solutions.

II. Graduates use latest tools and technology for the production of textile materials and serve society in an ethical manner.

III. Graduates will exhibit skills in their career and develop entrepreneurial culture through life-long learning.

Program Outcomes (POs):

a) an ability to apply knowledge of mathematics, science, and engineering in the field of textile and apparel,
b) an ability to design and conduct experiments on textile, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability,
d) an ability to function on multidisciplinary teams,
e) an ability to identify, formulate, and solve textile engineering problems,
f) an understanding of professional and ethical responsibility,
g) an ability to communicate effectively,
h) the broad education necessary to understand the impact of textile engineering solutions in a global, economic, environmental, and societal context,
i) a recognition of the need for, and an ability to engage in life-long learning,
j) a knowledge of contemporary issues in textile technology,
k) an ability to use the techniques, skills, and modern engineering tools for enhancing the production and quality in textile industry.
l) an ability to apply the principles of various manufacturing processes used in the textile industry.

K.S.Rangasamy College of Technology, Tiruchengode – 637 215	
Curriculum for the Programmes under Autonomous Scheme	
Regulation	**R 2014**
Department	**Department of Textile Technology**
Programme Code & Name	**TT: B.Tech. Textile Technology**

Semester I					
Course Code	Course Name	Hours/ Week			Cr
		L	T	P	C
	THEORY				
40 EN 001	Technical English	3	0	0	3
40 MA 001	Ordinary and Partial Differential Equations	3	1	0	4
41 CH 004	Chemistry for Textile Technologist - I	3	0	0	3
40 CS 001	Fundamentals of Programming	3	0	0	3
40 CE 001	Basics of Civil Engineering and Mechanics	3	1	0	4
40 ME 003	Engineering Drawing	2	0	3	4
	PRACTICAL				
40 CH 0P1	Chemistry Laboratory	0	0	3	2
40 CS 0P1	Fundamentals of Programming Laboratory	0	0	3	2
Total		17	2	9	25

Semester II					
Course Code	Course Name	Hours / Week			Cr
		L	T	P	C
	THEORY				
40 EN 002	Communication Skills	3	0	0	3
40 MA 002	Laplace Transform and Complex Variables	3	1	0	4
40 PH 005	Properties of Matter	3	0	0	3
41 CH 007	Environmental Science and Engineering	3	0	0	3
41 EE 003	Electrical Engineering	3	0	0	3
40 TT 201	Fibre Science	3	0	0	3
	PRACTICAL				
40 PH 0P1	Physics Laboratory	0	0	3	2
40 ME 0P2	Engineering Practices Laboratory	0	0	3	2
40 ME 0P3	Computer Aided Drafting Laboratory	0	0	3	2
Total		18	1	9	25

Semester III					
	THEORY				
40 MA 006	Fourier Transforms and Numerical Methods	3	1	0	4
40 ME 005	Elements of Mechanical Engineering	3	0	0	3
40 EI 001	Electronics and Instrumentation Engineering	3	0	0	3
40 CH 008	Chemistry for Textile Technologist - II	3	0	0	3
40 TT 301	Spun Yarn Technology I	4	0	0	4
40 PH 008	Applied Physics	3	0	0	3
	PRACTICAL				
40 EI 0P1	Electrical &Electronics Engineering Laboratory	0	0	3	2
40 TT 3P1	Fibre Analytical Laboratory	0	0	3	2
40 TT 3P2	Spun Yarn Technology Laboratory I	0	0	3	2
40 TP 0P1	Career Competency Development I	0	0	2	0
Total		19	1	11	26

Semester IV					
	THEORY				
40 ME 006	Strength of Materials	3	1	0	4
40 TT 401	Structure and Properties of Fibers	3	0	0	3
40 TT 402	Spun Yarn Technology II	3	0	0	3
40 TT 403	Fabric Manufacture I	3	0	0	3
40 TT 404	Knitting Technology	3	0	0	3
40 TT 405	Textile Chemical Processing I	3	0	0	3
	PRACTICAL				
40 TT 4P1	Spun Yarn Technology Laboratory II	0	0	3	2
40 TT 4P2	Fabric Manufacture Laboratory I	0	0	3	2
40 TT 4P3	Textile Chemical Processing Laboratory I	0	0	3	2
40 TP 0P2	Career Competency Development II	0	0	2	0
Total		18	1	11	25

K.S.Rangasamy College of Technology, Tiruchengode – 637 215	
Curriculum for the Programmes under Autonomous Scheme	
Regulation	**R 2014**
Department	**Department of Textile Technology**
Programme Code & Name	**TT: B.Tech. Textile Technology**

Semester V

Course Code	Course Name	Hours/ Week			Cr
		L	T	P	C
	THEORY				
40 MA 013	Statistics for Textile Industry	3	1	0	4
40 TT 501	Fabric Manufacture II	3	0	0	3
40 TT 502	Non woven Technology	3	0	0	3
40 TT 503	Textile Chemical Processing II	3	0	0	3
40 TT 504	Textile Quality Evaluation	3	0	0	3
40 TT 505	Fashion Design and Pattern Making	3	0	0	3
	PRACTICAL				
40 TT 5P1	Fabric Manufacture Laboratory II	0	0	3	2
40 TT 5P2	Textile Chemical Processing Laboratory II	0	0	3	2
40 TT 5P3	Textile Quality Evaluation Laboratory	0	0	3	2
40 TP 0P3	Career Competency Development III	0	0	2	0
Total		18	1	11	25

Semester VI

Course Code	Course Name	Hours / Week			Cr
		L	T	P	C
	THEORY				
40 HS 003	Total Quality Management	2	0	0	2
40 TT 601	Fabric Structure	3	0	0	3
40 TT 602	Garment Manufacturing Technology	3	0	0	3
40 TT 603	Apparel Marketing and Merchandising	3	0	0	3
40 TT 604	Technical Textiles I	3	0	0	3
40 TT E1*	Elective I	3	0	0	3
	PRACTICAL				
40 TT 6P1	Fabric Structure Laboratory	0	0	3	2
40 TT 6P2	Garment Construction Laboratory I	0	0	3	2
40 TT 6P3	Computer Aided Designing Laboratory	0	0	3	2
40 TP 0P4	Career Competency Development IV	0	0	2	0
Total		17	1	11	23

Semester VII

	THEORY				
40 TT 701	Production Planning and Control	3	0	0	3
40 TT 702	Financial Management and Costing in Textile and Apparel	3	0	0	3
40 TT 703	Industrial Engineering in Textile and Clothing Industry	3	0	0	3
40 TT 704	Technical Textiles II	3	0	0	3
40 TT E2*	Elective II	3	0	0	3
40 TT E3*	Elective III	3	0	0	3
	PRACTICAL				
40 TT 7P1	Apparel Planning Laboratory	0	0	3	2
40 TT 7P2	Garment Construction Laboratory II	0	0	3	2
40 TT 7P3	Industrial In-plant Training	0	0	3	2
40 TT 7P4	Project Work – Phase I	0	0	4	2
40 TT 0P5	Career Competency Development V	0	0	2	0
Total		18	0	15	26

Semester VIII

	THEORY				
40 TT 801	Supply Chain Management for Textile and Apparel Industry	3	0	0	3
40 TT E4*	Elective IV	3	0	0	3
40 TT E5*	Elective V	3	0	0	3
	PRACTICAL				
40 TT 8P1	Project Work - Phase II	0	0	16	8
Total		9	0	16	17

K.S.Rangasamy College of Technology, Tiruchengode – 637 215									
Curriculum for the Programme under Autonomous Scheme									
Regulation	**R 2014**								
Department	**Department of Textile Technology**								
Programme Code & Name	**TT: B.Tech. Textile Technology**								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
Elective I									
40 TT E 11	Fundamentals of Nano Science and Technology	3	0	0	3	50	50	100	
40 TT E 12	High Performance Fibres	3	0	0	3	50	50	100	
40 TT E 13	Textured Yarn Technology	3	0	0	3	50	50	100	
40 TT E 14	Process and Quality Control In Spinning	3	0	0	3	50	50	100	
40 TT E 15	Operational Research	3	0	0	3	50	50	100	
40 TT E 16	Theory of Textile Structures	3	0	0	3	50	50	100	
Elective II									
40 TT E 21	Shuttleless Weaving	3	0	0	3	50	50	100	
40 TT E 22	Application of Bio technology in Textile	3	0	0	3	50	50	100	
40 TT E 23	Warp Knitting Technology	3	0	0	3	50	50	100	
40 TT E 24	Computer Applications in Textile Industry	3	0	0	3	50	50	100	
40 TT E 25	Apparel Machinery and Equipment	3	0	0	3	50	50	100	
40 TT E 26	Export Documentation and Policies	3	0	0	3	50	50	100	
		3	0	0	3	50	50	100	
Elective III									
40 TT E 31	Process Control In Weaving and Chemical Processing	3	0	0	3	50	50	100	
40 TT E 32	Colour Science, Measurement and its applications	3	0	0	3	50	50	100	
40 TT E 33	Production and Application of Sewing Threads	3	0	0	3	50	50	100	
40 TT E 34	Protective Garments	3	0	0	3	50	50	100	
40 TT E 35	Textile Composites	3	0	0	3	50	50	100	
40 TT E 36	International Social Compliance	3	0	0	3	50	50	100	
Elective IV									
40 TT E 41	Mechanics of Textile Machinery	3	1	0	3	50	50	100	
40 TT E 42	Silk Technology	3	0	0	3	50	50	100	
40 TT E 43	Pollution Control in Textile Industry	3	0	0	3	50	50	100	
40 TT E 44	Home Textiles	3	0	0	3	50	50	100	
40 TT E 45	ERP and MIS in Apparel Industry	3	0	0	3	50	50	100	
40 TT E 46	Textile and Apparel Entrepreneurship	3	0	0	3	50	50	100	
Elective V									
40 TT E 51	Functional Finishes	3	0	0	3	50	50	100	
40 TT E 52	Medical Textiles	3	0	0	3	50	50	100	
40 TT E 53	Lean Six Sigma	3	0	0	3	50	50	100	
40 TT E 54	Production Operation Management	3	0	0	3	50	50	100	
40 TT E 55	Energy Management in Textile Industry	3	0	0	3	50	50	100	
40 TT E 56	Safety In Textile Industry	3	0	0	3	50	50	100	

K.S.Rangasamy College of Technology – Autonomous					R 2014		
40 EN 001 Technical English							
Common to all Branches							
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	50	50	100

Objectives	• To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts. • To help learners develop strategies that could be adopted while reading texts. • To help learners acquire the ability to speak effectively in English in real life and career related situations. • To train learners in organized academic and professional writing.
Course Outcomes	At the end of the course, the students will be able to 1. Comprehend the basic grammatical structures and generate new sentences in a given paradigm. 2. Explain and apply the enriched vocabulary in academic and professional contexts. 3. Identify the main idea and integrate it with supporting data to facilitate effective comprehension. 4. Infer, compare and summarize lexical & contextual meaning of various technical / general passages. 5. Recognize the basic phonetic units of language and execute it for better oral competency. 6. Recognize and interpret standard English Pronunciation & use it in diverse situations. 7. Find and classify different reading strategies and demonstrate better articulation / expression 8. Categorize words into different parts of speech and use them in different contexts. 9. Retrieve information from various sources and construct a well designed descriptive writing. 10. Indentify the key words of concepts and learn to write definitions.

Grammar and Vocabulary

Word formation with Prefixes and Suffixes Level -1 (50 words), Level -2 (100 words) – Synonyms and Antonyms (100 each)– Verbal Analogy- Finding the Odd man out- Alphabet Test- One word substitute- Sentence Patterns- Subject-Verb Agreement – Tenses – Active and Passive voice – Use of conditionals – Comparative Adjectives– Expanding Nominal Compounds (100) – Articles – Use of Prepositions (basic level – 25) Identifying Phrasal Verbs - Error Detection – Abbreviations and Acronyms (100 each).

Suggested Activities

Prefixes and suffixes– identifying the lexical and contextual meanings of words – correction of errors in the given sentences -providing a context for the use of tenses, sentence structures – using comparative forms of adjectives - Identifying phrasal verbs - 'if' clauses – the three main types, probable condition, improbable condition and impossible conditions.

Note: All examples should preferably be related to science and technology.

Listening skill

Extensive listening – Listening for General Content – Listening to fill up Gapped Texts – Intensive Listening – Listening for Specific Information: Retrieval of Factual Information – Listening to Identify Topic, Context, Function, Speaker's Opinion, Attitude, etc. – Global Understanding Skills and Ability to infer, extract gist and understand main ideas – Note-Taking: Guided and Unguided

Suggested Activities

Taking a quick glance at the text to predict the content – reading to identify main content and giving feedback in response to the teacher's questions – making a thesis statement about the text – scanning for specific information – sequencing of jumbled sentences using linguistic clues (e.g. reference words and repetition) and semantic clues following propositional development –fast reading drills – comprehending a passage and answering questions of varied kinds relating to information, inference and prediction.

Speaking skill

Verbal and Non-Verbal communication – Speech Sounds – Syllables – Word Stress (structural and content words) – Sentence Stress – Intonation – Pronunciation Drills, Tongue Twisters – Formal and Informal English – Oral Practice – Developing Confidence – Introducing Oneself – Asking for or Eliciting Information – Describing Objects – Expressing Opinions (agreement / disagreement) – Giving Instructions – (Road Maps)

Suggested Activities

Role play activities based on real life situations – discussing travel plan / industrial visits- giving oral instructions for performing tasks at home and at work (use of imperatives) -using appropriate expressions-defining / describing an object /device / instrument / machine – participating in a short discussion on a controversial topic – oral presentation

Reading skill

Exposure to different reading techniques – Reading for gist and global meaning – Predicting the content – Skimming the text – Identifying the topic sentence and its role in each paragraph – Scanning – Inferring / Identifying lexical and contextual meanings – Reading for structure and detail – Transfer of information / Guided Note-Making – Understanding Discourse Coherence.

Suggested Activities

Gap filling activity while listening to a text – listening intently to identify the missing words in a given text – listening to a brief conversation and answering questions – listening to a discourse and filling up gaps in a worksheet – taking notes during lecture – inferential comprehension and literal comprehension tasks based on listening to quizzes.

Note: The listening activities can be done using a worksheet in the Language Laboratory or in the class room using a tape recorder.

Writing skill

Introduction to the characteristics of technical style – Writing Definitions and Descriptions – Paragraph Writing (topic sentence and its role, unity, coherence and use of cohesive expressions) – Process Description (use of sequencing connectives) – Comparison and Contrast – Classifying the Data – Analyzing / Interpreting the data – Formal letter Writing (letter to the editor, letter for seeking practical training, and letter for undertaking project works in industries) – Editing (punctuation, spelling and grammar)

Suggested Activities

Writing a paragraph based on information provided in a tree diagram / flow chart / bar chart / pie chart / tables – formal letters – writing to officials (leave letter, seeking permission for practical training , asking for certificates, testimonials) – letter to the editor – informal letters (persuading / dissuading, thanking and congratulating friends / relatives) – sending e- mail – editing a passage (correcting the mistakes in punctuation, spelling and grammar)

Text book :

1.	Ashraf M Rizvi, 'Effective Technical Communication', 1st Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2005.

Reference(s) :

1.	M.Balasubramanian and G.Anbalagan, 'Performance in English', Anuradha Publications, Kumbakonam, 2007.
2.	Sharon J. Gerson, Steven M. Gerson, 'Technical Writing – Process & Product',3rd Edition, Pearson Education (Singapore) (p) Ltd., New Delhi, 2004.
3.	Mitra K. Barun, 'Effective Technical Communication – A Guide for Scientists and Engineers', Oxford University Press, New Delhi, 2006.
4.	R.S. Aggarwal, 'A Modern Approach to Verbal & Non – Verbal Reasoning', S.Chand & Company Ltd., New Delhi, Revised Edition, 2012.
5.	NPTEL Video Courses on Spoken English.

K.S.Rangasamy College of Technology – Autonomous								R 2014
40 MA 001 Ordinary and Partial Differential Equations								
Common to all Branches								
Semester	Hours / Week			Total	Credit	Maximum Marks		
	L	T	P	hrs	C	CA	ES	Total
I	3	1	0	60	4	50	50	100

Objectives	• To present methods of solving system of linear equations. • To develop the mathematical skills for solving ordinary and partial differential equations. • To acquire knowledge about the concept of vectors in two-dimensional and three dimensional spaces.
Course Outcomes	At the end of the course, the students will be able to 1. (i) Understand the types of matrix and find eigen values, eigen vectors and inverse of the matrix. (ii) Solve the system of linear equations. 2. Apply transformation techniques to reduce quadratic form into canonical form. 3. Solve linear differential equations with constant and variable coefficients. 4. (i) Find the solution of differential equations by the method of variation of parameters. (ii) Solve simultaneous differential equations. 5. Understand the concepts of curvature and evolutes. 6. (i) Analyze the maxima and minima of a function (ii) Expand the function of two variables as Taylor's series and find the Jacobians. 7. Construct partial differential equations and find the solutions of non-linear partial differential equations of first order. 8. Apply the appropriate method to solve Lagrange's linear equations and solve linear partial differential equations with constant coefficients. 9. Know about gradient, directional derivative, solenoidal and irrotational of a vector function. 10. Apply the notions of vector calculus to verify Green's, Gauss divergence and Stoke's theorems.

Matrices

Basic concepts – Addition and multiplication of matrices – Orthogonal matrices – Conjugate of a matrix – Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors – Cayley-Hamilton theorem (without proof) – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation – System of linear equations.

Ordinary Differential Equations

Introduction – Differential equations of first-order and first degree – Exact differential equations – Linear differential equations of second and higher order with constant co-efficient when the R.H.S is $e^{\alpha x}$, $\sin\alpha$ x or $\cos\alpha$ x, x^n n>0, $e^{\alpha x}x^n$, $e^{\alpha x}$ sinβx, and $e^{\alpha x}$ cosβx – Differential equations with variable co-efficients reducible to differential equations with constant co-efficients (Cauchy's form and Legendre's linear equation) – Method of variation of parameters – Simultaneous first-order linear equations with constant co-efficients.

Differential Calculus and Functions of Several Variables

Curvature – Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Involutes and evolutes – Taylor's series for a function of two variables – Maxima and minima of function of two variables – Constrained maxima and minima (Lagrange's method of undetermined multipliers) – Jacobians(Problems only).

Partial Differential Equations

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Non-linear partial differential equations of first order (Type I – IV) – Solution of partial differential equations of first order – Lagrange's linear equations – Linear partial differential equations with constant coefficients.

Vector Calculus

Introduction – Gradient of a scalar point function – Directional derivative – Angle of intersection of two surfaces – Divergence and curl(excluding identities) – Solenoidal and irrotational vectors – Green's theorem in the plane – Gauss divergence theorem – Stoke's theorem(without proof) – Verification of the above theorems and evaluation of integrals using them.

Text book:

1	Kreyszig E, "Advanced Engineering Mathematics", 9th Edition, John Wiley and Sons (Asia) Limited, New Delhi, Reprint 2012.

Reference(s):

1	Grewal B.S, "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, Delhi, 2013.
2	Bali N.P and Manish Goyal, "A Text book of Engineering Mathematics", 9th Edition, Lakshmi Publications Pvt Ltd, New Delhi, 2014.

K.S.Rangasamy College of Technology – Autonomous						R 2014		
41CH004 - Chemistry for Textile Technologist – I								
B.Tech - Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	50	50	100

Objectives	• To help the learners to analyze the hardness of water and its removal. • To familiarize the learners with the basics of electrochemistry, its applications, corrosion and its control. • To recall the basics of stereochemistry and reaction mechanism. • To emphasize the importance of chemical kinetics. • To endow with an overview of the potential of catalysis.
Course Outcomes	**At the end of the course, the students will be able to** 1. Recognize sources of water, quality parameter and hardness of water. 2. Analyze and appraise methods to overcome hardness. 3. Relate the basic tenets of electrochemistry to arrive at mathematic expression and outline its various applications. 4. Identify the types, mechanism, and factor influencing corrosion and describe its control measures. 5. Review of stereochemistry. 6. Explain the mechanism of elimination and substitution reactions. 7. Outline the basic concepts of rate of reaction. 8. Illustrate the methods to determine the order of reactions and derivation of rate constants. 9. Analyze and assess the theory of adsorption and its applications. 10. Describe the types of catalysis.

Water Treatment

Sources of water and its properties - Water quality parameter (EPA) - Hard and soft water - Hardness of water - Types - Units of hardness - ppm and mg/L - Estimation of hardness - EDTA method - Boiler feed water - Boiler problems - Internal treatment - Carbonate, Phosphate and Calgon conditioning. External treatment - Zeolite and deionization process - Desalination - Reverse osmosis and Electro dialysis.

Electrochemistry and Corrosion

Basics of electrochemistry - Reversible and irreversible cells - Nernst equation (problems) - EMF - measurement - EMF series - Applications - Types of electrodes - Reference electrodes - Conductometric titration. Corrosion - Types - Galvanic and differential aeration corrosion - Mechanism (Dry and wet) - Factors influencing corrosion - Corrosion control - Cathodic protection - Corrosion inhibitors. Electroplating of nickel and chromium.

Basic Concepts of Stereochemistry and Reaction Mechanism

Isomerism in organic compounds - Structural isomerism - Stereochemistry - Geometrical isomerism (Maleic and fumaric acids) - E, Z isomerism - Optical isomerism (Lactic and tartaric acids) - Optical activity - Chirality - d & l, R & S and D & L notations - Compounds containing chiral centers - Mechanism of E_1, E_2 and SN_1, SN_2 reactions.

Chemical Kinetics

Introduction of chemical kinetics - Reaction rate, factors affecting rate of reaction - Rate constant, order of reaction, molecularity, pseudo uni-molecular reactions - Derivation of rate constant of zero, first and second order reactions - Determination of order of the reactions (Concentration and graphical method).

Surface Chemistry and Catalysts

Surface chemistry - Adsorption - Types of adsorption - Isotherms - Freundlich, Langmuir and BET adsorption isotherms - Applications of adsorption. Catalyst - Types - Acid and base - Characteristics - Types of catalysis - Homogeneous and heterogeneous - Enzyme catalysis - Michaelis- Menten equation.

Text book:

1	Vairam S "Engineering Chemistry", Wiley India, Delhi, 2 nd Edition, 2013.

Reference(s):

1	Dara.S.S. 'A Text Book of Engineering Chemistry', S Chand & Co.Ltd., 2003
2	Bill Mayer F. W., 'Text Book of Polymer Science ', Wiley - New York, 3rd Edition, 1991.
3	Jain and Jain, Engineering Chemistry, Dhanpat Rai Publishing Company Pvt. Ltd., Delhi.15th Edition, 2008.

K.S.Rangasamy College of Technology – Autonomous R 2014								
40 CS 001 Fundamentals of Programming								
Common to BT, CE, EC, EE, EI,TT, ME, MC & NST								
Semester	Hours / Week			Total hrs	Credit	Maximum marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	50	50	100

Objectives	• To enable the students to provide comprehensive knowledge about the fundamental principles, concepts and constructs of modern computer programming • To enhance the competencies for the design, coding and debugging of computer programs. • To provide ample way to identify, formulate, and solve engineering problems.
Course Outcomes	At the end of the course, the students will be able to 1. Recognize the generation and application of computers 2. Analyze various problem solving techniques with categories of software 3. Recognize the concepts of tokens branching and looping statements 4. Affirm the concepts of arrays and strings 5. Identity the purpose of pointers with its associated features 6. Recognize the concepts of functions, recursion with its features 7. Comprehend basic concepts of structures and unions 8. Relate the concept of user defined data types and preprocessor 9. Annotate the concepts of console input and output features 10. Interpret the concept of file input and output features

Computer Fundamentals

Evolution of computers - Generations of computers - Applications of computers - Computer Memory and Storage – Algorithm – Flowchart - Pseudo code – Program control structures -Programming languages - Computer Software – Definition - Categories of Software.

Introduction TO C

An Overview of C – Data types – Identifiers - Variables- – Type Qualifiers - Constants – Operators - Expressions – Selection statements – iteration statements – jump statements, Arrays: Introduction - Types – Initialization, Strings: Strings: Introduction - Arrays of Strings – String and Character functions.

Pointers and Functions

Pointers: Introduction - Pointer Variables - The Pointer Operators - Pointer Expressions - Pointers and Arrays - Generating a Pointer to an Array - Indexing Pointers Functions: Scope of a Function – Library Functions and User defined functions - Function Prototypes – Function Categorization - Function Arguments - Arguments to main function - The return Statement - Recursion - Passing Arrays to Functions – Dynamic memory allocation – Storage class Specifiers.

Structures, Unions, Enumerations, Typedef and Preprocessors

Structures - Arrays of Structures - Passing Structures to Functions - Structure Pointers - Arrays and Structures within Structures - Unions – BitFields - Enumerations - typedef – The preprocessor and comments.

Console I/O and File I/O

Console I/O: Reading and Writing Characters - Reading and Writing Strings - Formatted Console I/O, File I/O: Streams and Files - File System Basics - fread( ) and fwrite( ) - Random Access I/O - fprintf( ) and fscanf( ) - The standard streams

Text book :

1	Herbert Schildt, “The Complete Reference C”, Fourth Edition, TMH.

Reference(s) :

1	Brian W. Kernighan and Dennis M. Ritchie, “C Programming Language”, Prentice-Hall.
2	E.Balagurusamy, “Programming in ANSI C”, TMH, New Delhi, 2002.

K.S.Rangasamy College of Technology – Autonomous R 2014								
40 CE 001 Basics of Civil Engineering and Mechanics								
Common to EE, CS, IT, EI & NST								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	1	0	60	4	50	50	100
Objectives	• To impart the fundamental knowledge about building materials and building component • To study the basics of engineering mechanics which includes statics, dynamics and properties of surfaces and solids							
Course Outcomes	At the end of the course, the students will be able to 1. Identify the construction materials required and describe its uses. 2. Discuss the objectives and types of surveying 3. Identify the components of substructure of a building 4. Identify the components of superstructure of a building 5. Apply the laws of mechanics 6. Illustrate the free body diagram of a system; determine the forces and various moments and couples 7. Compute the centroid and first moment of area of various sections 8. Apply the parallel and perpendicular axis theorem to find out the moment of inertia of various sections 9. Calculate the displacement, velocity and acceleration of particles 10. Analyse the relative motion and types of friction.							

Introduction and Civil Engineering Materials

Introduction – Construction Materials – Classification – Uses –Requirements: - Bricks-Stone – Cement – Sand – Concrete – Steel Sections, Surveying – Objectives and Types.

Building Components

Components: – Selection of site for building- Substructure- Bearing capacity of soil - Requirement of good foundation– Types of foundation- Superstructure– Technical terms: - Types – Brick masonry – Stone masonry.

Statics of Particles

Introduction to Mechanics - Laws of Mechanics – Lame's theorem - Parallelogram law of forces-system of forces - Free body diagram - Moment and Couples - Moment of force about a point and axis - Types of support and reaction.

Properties of Surfaces and Solids

Determination of areas – First moment of area and the centroid of section - Second moment of area - Rectangle, circle, triangle by integration – T section, I section and angle section by using standard formula - Parallel axis theorem and Perpendicular axis theorem.

Dynamics of Particles

Displacement, Velocity, Acceleration and their relationship - Relative motion – Frictional forces - Simple contact friction - Ladder friction - Rolling resistance – Belt friction.

Text book (s) :

1	M.S. Palanichamy, "Basic of Civil Engineering "Tata Mc Graw Hill Education Pvt. Ltd, 2008.
2	Kottiswaran.N, "Engineering Mechanics – Statics and Dynamics", Sri Balaji Publications, Coimbatore, 2006.

Reference(s) :

1	Dr. B.C. Punmia, Ashok K. Jain, Arun K. Jain " Basic Civil Engineering", Laxmi Publication, New Delhi, 2010.
2	Bansal, R.K., "Engineering Mechanics", Laxmi Publications Private Ltd, New Delhi, 2008.

K.S.Rangasamy College of Technology – Autonomous					R 2014		
40 ME 003 Engineering Drawing							
Common to CE, ME, MC & TT							
Semester	Hours / Week			Total hrs	Credit	Maximum Marks	
	L	T	P		C	CA	ES	Total
I	2	0	3	60	4	50	50	100
Objectives	• To enable the students with various concepts like dimensioning, conventions and standards related to working drawings in order to become professionally efficient • To impart the graphic skills for communicating concepts, ideas and designs of engineering products							
Course outcomes	At the end of the course, the student will be able to: 1. Use the drafting instruments and construct the conics 2. Draw the projection of points, straight lines and plane surfaces 3. Draw the projection of simple solids 4. Draw the true shape of section 5. Develop the lateral surfaces of prism, pyramid, cylinder and cone 6. Convert the pictorial views in to orthographic views 7. Sketch the three dimensional view of solids given orthographic views.							

Introduction to Engineering Drawing and Plane Curves

Use of drawing instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets –Lettering and dimensioning – Drawing sheet layouts - Title block – Line types - Construction of ellipse, parabola, and hyperbola by eccentricity method - Construction of cycloids –Construction of involutes of square and circle.

Projection of Points and Lines

Projection of points– Projection of straight lines in the first quadrant (lines parallel to both planes – Inclined to one plane and parallel to other – Inclined to both Planes).

Projection Plane Surfaces

Projection of Planes in the first quadrant (Inclined to one plane and parallel to other – Inclined to both Planes).

Projection of Solids

Projections of simple solids: prism, pyramid, cylinder and cone (Axis parallel to one plane and perpendicular to other, axis inclined to one plane and parallel to other).

Projection of Sectioned Solids

Section of simple solids : prism, pyramid, cylinder, cone and sphere in simple positions (cutting plane is inclined to the one of the principal planes and perpendicular to the other) - True shape of sections.

Development of Surfaces

Development of lateral surfaces of simple and sectioned solids: Prism, pyramid cylinder and cone.

Orthographic Projection

Introduction to orthographic projections –Conversions of pictorial views to orthographic views.

Isometric Projection

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated

Text book(s):	
1	Bhatt N.D., “Engineering Drawing”, Charotar Publishing House Pvt. Ltd., 53rd Edition, Gujarat, 2014.
2	Venugopal K., “Engineering Graphics”, New Age International (P) Limited, 2014.
Reference(s):	
1	Shah M.B. and Rana B.C., “Engineering Drawing”, Pearson Education, 2005.
2	Natarajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2014

K.S.Rangasamy College of Technology – Autonomous R 2014

40 CH 0P1 Chemistry Laboratory

Common to all Branches

Semester	Hours / Week			Total hrs	Credit	Maximum marks		
	L	T	P	45	C	CA	ES	Total
I	0	0	3		2	50	50	100

Objectives	• Test the knowledge of theoretical concepts. • To develop the experimental skills of the learners. • To facilitate data interpretation • To expose the learners to various industrial and environmental applications.
Course Outcomes	At the end of the course, the students will be able to 1. Estimate the hardness of water sample. 2. Estimate the alkalinity of water sample. 3. Estimate the chloride content in water sample. 4. Determine the dissolved oxygen in water. 5. Determine the molecular weight of polymer. 6. Estimate the mixture of acids by conductometry 7. Estimate the ferrous ion by potentiometry. 8. Estimate the strength of acid by pH metry and apply the knowledge of pH determination for health drinks, beverages, soil, effluent and other biological samples. 9. Estimateferrous ion by spectrophotometry. 10. Determine the corrosion by weight loss method.

List of Experiments

1. Estimation of hardness of water by EDTA method.
2. Estimation of alkalinity of water sample.
3. Estimation of chloride content in water sample (Argentometric method).
4. Determination of dissolved oxygen in boiler feed water (Winkler's method).
5. Determination of molecular weight of a polymer by viscometry method.
6. Estimation of mixture of acids by conductometric titration.
7. Estimation of ferrous ion by potentiometric titration.
8. Estimation of HCl beverages and other biological samples by pH meter.
9. Estimation of iron content by spectrophotometry method.
10. Determination of corrosion by weight loss method.

Lab Manual:

1	Vairam S "Engineering Chemistry", Wiley India, Delhi, 2 nd Edition, 2013

Reference:

1.	Mendham. J, Denney. R.C, Barnes. J.D and Thomas. N.J.K, "Vogel's text book of quantitative chemical analysis", 6th Edition, Pearson Education, 2004.

K.S.Rangasamy College of Technology – Autonomous R 2014

40 CS 0P1 Fundamentals Programming Laboratory

Common to BT, CE, EC, EE, EI,TT, ME, MC & NST

Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	0	0	3	45	2	50	50	100

Objectives

- To enable the students to apply the concepts of C to solve basic problems
- To apply the knowledge of library functions in C programming
- To implement the concepts of functions, structures and enumerator in C
- To implement the file handling operations through C

Course Outcomes

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

1. Perform basic calculations using MS-EXCEL.
2. Write a simple C program to read and display basic information.
3. Develop a C program using selection and iterative statements.
4. Demonstrate a C program to manage collection related data.
5. Interpret a C program to perform string manipulation functions.
6. Perform dynamic memory allocation using C.
7. Design and Implement different ways of passing arguments to functions.
8. Implement a C program to manage collection of different data using Structure or Enum.
9. Apply a C program to manage data using preprocessor directives.
10. Demonstrate a C program to store and retrieve data using file concepts.

LIST OF EXPERIMENTS

1. Implement basic calculations using MS EXCEL.
2. Implement a simple C program to read and display basic information.
3. Implement a C program using selection and iterative statements.
4. Implement a C program to manage collection related data.
5. Implement a C program to perform string manipulation functions.
6. Implement a C program to perform dynamic memory allocation.
7. Implement different ways of passing arguments to functions.
8. Implement a C program to manage collection of different data using Structure or Enum.
9. Implement a C program to manage data using preprocessor directives.
10. Implement a C program to store and retrieve data using file concepts.

Note: Programs specific to branches are to be taught and examined.

K.S.Rangasamy College of Technology –Autonomous R 2014								
40 EN 002 Communication Skills								
Common to all Branches								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100
Objectives	• To equip students with effective speaking and listening skills in English. • To help them develop soft skills and people skills which will make them excel in their jobs. • To enhance students' performance in placement interviews.							
Course Outcomes	At the end of the course, the students will be able to 1. Look for specific details and overcome speech barriers. 2. Pick key points by listening and improve casual conversational skills. 3. Understand different forms of communication with differences among them. 4. Know about formal speech and descriptive techniques, and use specific words in specific contexts. 5. Fine tune language for different conversational contexts and purposes. 6. Learn telephone etiquette by using language for assent and dissent. 7. Understand grammatical structures, its technical aspects and usage 8. Use discourse markers, enhance punctuation and learn discourse coherence 9. Comprehend content, generate different forms of template and enhance reference skills 10. Construct well-knit documents for job readiness and career competence							

The Listening Process

Barriers in Listening - Listening to academic lectures - Listening to announcements at railway stations, airports, etc - Listening to news on the radio / TV - Listening to casual conversation - Listening to live speech

Suggested activities

Listening to casual conversations, talks, interviews, lectures, specific information relating to technical content, statistical information, retrieving information, gapped texts-listening comprehension through video clippings and lectures.

Nature of Communication

Stages of communicationChannels of communication- Barriers to effective communication - Differences between spoken and written communication - Giving directions - Art of small talk-presentation skills - Taking part in casual conversation - Making a short formal speech-Describing people, place, and events.

Suggested activities

Motivating and conducting prepared speech – debate on topics of interest **-** conversation (dialogue based on particular situation by using pleasantries) – extempore - picture description (people, place, things and events)

Telephonic Conversational Skill

Using the telephone - Greeting and introduction - Making requests - Asking for permission, Giving / Denying permission - Giving information on the phone – Leaving messages on Answer Machines - Making / changing appointments - Making complaints – Reminding - Listening and Taking messages - Giving instructions & Responding to instructions

Suggested activities

Familiarizing the telephone etiquette and telephone jargon – use of role play cards – conversational practices – games for spelling out proper nouns, long words, numbers, etc., -- useful phrases for complaints or making appointments – providing the needed vocabulary and expressions for agreeing and disagreeing – video clippings of speeches to drill note taking – providing context for framing yes or no questions for making requests.

Remedial Grammar

Tenses - 'Do' forms – Impersonal Passive voice - Imperatives – using should form – Direct, Indirect speech – Discourse markers – SI Units - Numerical adjectives – Prepositions (intermediate level) - Phrasal verbs (usage)- Correct use of words - Use of formal words in informal situations - Commonly confused words – Editing.

Suggested activities

Providing various contexts to fill tense gaps (stories , demos, future plans etc.,) Technical context for impersonal passive structures – transformation drills for imperatives – elucidating suggestion and recommendation formats – contextual frames for preposition and phrasal verbs – editing exercises – standard paradigm for negative structures – use of SI units (25 common units to be taught) numerical adjectives in various contexts – providing examples and drill units for commonly confused words-exemplifying the structures for direct and indirect speech – monitoring the drill units for conversion of direct to indirect, imperatives to recommendations and vice versa – reinforcing skills for discourse markers.

Written Communication & Career Skills

Writing e-mails - Writing Reports – Lab Reports - Preparing Curriculum Vitae and cover letters - Facing an Interview - Flow Charts, Interpreting the data from Tables– Recommendations – Check List – Slide Preparation –Theme Detection – Deriving Conclusions from the passages – Situation Reaction Test – Statements - Conclusions-Statement and Courses of Action

Suggested activities

Deliberating the content, format and diction for drafting e-mails -- elucidating the structure and content for writing reports especially Accident and Lab Reports -- mentoring strategy to construe the difference between Résumé and CV , and preparing the wards for the recruitment -- building self confidence in facing an interview with flawless presentation and persuasion skills -- reinforcing the interpretative skills of transcoding flow charts and Tables by employing appropriate discourse markers -- inculcating the language and format of writing Recommendations and Checklists -- enforcing innovatively the Reasoning and Logical Detection in Verbal Ability for the effective equipment of grooming for the primary leg of the recruitment process.

Text book :

1.	Ashraf M Rizvi, 'Effective Technical Communication', 1st Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2005.

Reference(s) :

1.	P.Kiranmai Dutt, Geetha Rajeevan and CLN.Prakash, 'A Course in Communication Skills', by Ebek – Cambridge University Press India Pvt. Ltd., 2008.
2.	B. Jean Naterop, 'Telephoning in English' – Cambridge University Press India Pvt.Ltd., 2007.
3.	Jack. C. Richards, 'New Interchange Services (Student's Book)' – Introduction, Level – 1, Level – 2, Level – 3, Cambridge University Press India Pvt.Ltd., 2007.
4.	R.S. Aggarwal, 'A Modern Approach to Verbal & Non – Verbal Reasoning',S.Chand & Company Ltd., New Delhi, Revised Edition, 2012.
5.	NPTEL Video Courses on Communication Skills.

K.S.Rangasamy College of Technology – Autonomous R 2014								
40 MA 002 Laplace Transform and Complex Variables								
Common to MECH, CIVIL, MCT, EEE, EIE, CSE, IT, TT, BT & NST								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	1	0	60	4	50	50	100

Objectives	• To formulate and solve problems involving volume and surface area using multiple integrals • To give an ability to apply Laplace transform technique for solving engineering problems • To provide an overview of functions of complex variables and complex integration which helps in solving many complex problems • To identify the properties of coplanar and solid geometric shapes and use these properties to solve common applications
Course Outcomes	**At the end of the course, the students will be able to** 1. (i)Apply double integral to find area between two curves. (ii) Evaluate double integral by changing the order of integration and triple integral. 2. Study the concepts of Beta and Gamma functions. 3. Understand the concepts of Laplace transforms for some elementary functions, some special functions, periodic functions, derivatives and integrals. 4. Apply the techniques of inverse Laplace transform to solve linear ordinary differential equation and simultaneous differential equations. 5. Know about the construction of analytic and conjugate harmonic functions and their properties. 6. Employ conformal maps to determine images of curves and find the bilinear transformation. 7. Expand the functions as Taylor's and Laurent's series and evaluate the complex integrals. 8. Evaluate real definite integrals with suitable contours using Cauchy's residue theorem. 9. Understand the notions of plane, straight line and skew lines. 10. Relate the concepts between tangent planes and spheres.

Multiple Integrals

Double integration – Cartesian and polar coordinates – Change of order of integration – Area between two curves – Area as double integral – Triple integration in Cartesian coordinates.

Beta and Gamma functions**:** Relationship between Beta and Gamma functions – Properties – Problems.

Laplace Transform

Laplace transform – Conditions for existence – Transform of elementary functions – Basic properties – Derivatives and integrals of transforms – Initial and final value theorem – Transform of unit step function – Dirac's delta function – Transform of periodic functions. Inverse Laplace transform – Convolution theorem – Solution of linear ordinary differential equation with constant co-efficients – First order simultaneous equations with constant co-efficients.

Complex Variables

Functions of a complex variable – Analytic functions – Necessary conditions (Cauchy–Riemann equations) – Sufficient conditions (excluding proof) – Properties of analytic functions – Harmonic function – Conjugate harmonic functions– Construction of analytic functions– Conformal mapping: w = z + a, az, 1/z and bilinear transformation.

Complex Integration

Cauchy's Integral theorem (without proof) – Cauchy's integral formula – Taylor and Laurent series (without proof) – Classification of singularities – Cauchy's residue theorem – Contour integration – Circular and semi-circular contours (excluding poles on real axis).

Solid Geometry

Direction cosines – Plane – Straight lines – Coplanar – Point of intersection – Skew lines – Sphere – Tangent plane – Great circle – Orthogonal sphere.

Text book:

1	Kreyszig E, "Advanced Engineering Mathematics", 9th Edition, John Wiley and Sons (Asia) Limited, New Delhi, Reprint 2012.

Reference(s):

1	Grewal B.S, "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, Delhi, 2013.
2	Bali N.P and Manish Goyal, "A Text book of Engineering Mathematics", 9th Edition, Lakshmi Publications Pvt Ltd, New Delhi, 2014.

K.S.Rangasamy College of Technology – Autonomous R 2014								
40 PH 005 Properties of Matter								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100

Objectives	• To impart fundamental knowledge about atomic structure, chemical bonding and diffusion, thermal conductivity, surface tension, viscosity and friction, optics, static charges and dielectric properties. • To correlate the theoretical principles with application oriented studies.
Course outcomes	At the end of the course, the students will be able to 1. Remember atomic behaviour and the several chemical bonding in solids 2. Recognize the atomic model of diffusion. 3. Identify the methods to determine thermal conductivity for good and poor conductors of heat 4. Deduce the thermal conductivity expression for heat conduction through cylinders, bar and compound media 5. Understand and apply the properties of surface tension for capillarity 6. i)Recall viscosity parameters and determine coefficient of viscosity of liquids by different methods ii)Understand the factors influencing friction and applications 7. Understand the properties of light polarisation and its determination. 8. Understand photocells and judge the use of photosensors 9. Recognize the basic concepts of static electric charges 10. Comprehend different types of polarization in dielectric and analyze dielectric material based on frequency, temperature and breakdown voltage

Atomic Structure, Chemical Bonding and Diffusion

Introduction-Quantum states-Periodic table- Ionisation potential-electron affinity and electronegativity-bond energy- bond type and bond length- Ionic bonding-Coulomb attraction-The short range repulsion-Covalent bonding-Metallic bonding- Secondary bonding- Variation in bonding character and properties- Experimental determination of Fick's law of diffusion.

Thermal Conductivity

Modes of transmission of heat- Co-efficient of thermal conductivity-Rectilinear flow of heat along a b Determination of thermal conductivity: Lee's disc method for poor conductor, Searle's method for good conducto Conduction through compound media: bodies in series and parallel- Formation of ice on ponds-Conduction of he through thick pipes(cylinders)

Surface Tension ,Viscosity and Friction

Molecular forces-Rise of liquids in a capillary tube- Determination of surface tension by capillary rise method-Viscosity-Co-efficient of viscosity-streamline and turbulent flow- Reynold's number-Poiseuille's equation for the flow of liquid through a tube-Volume of liquid flowing out-Stoke's law-Terminal velocity-Experimental determination of co-efficient of viscosity for a liquid by Poiseuille's method-Comparision of viscosities-Ostwald viscometer-friction –factors influencing friction-rolling and sliding friction-hydrodynamic friction-stick slip phenomenon.

Optics

Laws of light- Properties of light: interference, diffraction, polarisation- Brewster's law-double refraction- Nicol prism- production of plane, circularly and elliptically polarized light—Quarter and half wave plate- Birefringence and plane polariscope-Photocells-Use of photosensors in textile field.

Static Charges and Dielectric Properties

Introduction-Electric charges-conductors and Insulators-Charging by Induction-Basic properties of charge-Electric dipole-Dipole in a uniform external field-Continuous charge distribution-Dielectrics-Electric dipole moment-Electric polarization-Dielectric constant-Electric susceptibility-Polarisation mechanisms-Electronic, Ionic, Orientation and space-charge polarizations-Variation of dielectric constant with temperature and frequency-dielectric breakdown mechanisms

Text Books

1	V.Raghavan, "Materials Science and Engineering", PHI publications- 2012 5th edition

References

1.	Dr.M.N.Avadhanulu, Dr.P.G.Kshirsagar, "A textbook of Engineering Physics", S.Chand & company- 2014 revised edition
2.	Gaur R.K, & Gupta S.L, "Engineering Physics", Dhanpat Rai and sons, New Delhi, 2004
3.	P.K.Palanisamy, "Physics of Materials", SCITECH Publications, Chennai.

K.S. Rangasamy College of Technology - Autonomous R 2014								
41CH007 - Environmental Science and Engineering								
Common to all Branches								
Semester	Hours / Week			Total hrs	Credit	Maximum marks		
	L	T	P	45	C	CA	ES	Total
II	3	0	0		3	50	50	100

Objectives	• To help the learners to analyze the importance of ecosystem and biodiversity. • To familiarize the learners with the impacts of pollution, control and legislation. • To enlighten the learners about waste and disaster management. • To endow with an overview of food resources and human health. • To enlighten awareness and recognize the social responsibility in environmental issues.
Course Outcomes	At the end of the course, the students will be able to 1. Recognize the concepts and issues related to environment and ecosystem. 2. Assess the importance of biodiversity 3. Analyze the source, effects, and control measures of pollution. 4. Imbibe the applications of Laws of environmental protection. 5. Appraise the methods of solid waste management. 6. Increase the awareness of disaster management and preparedness. 7. Instill the awareness on the impacts of food resources and its related problems. 8. Evaluate the problems related to population explosion and its related health issues. 9. Analyze the value of sustainable development. 10. Identify the issues related to environmental issues and civic responsibilities.

Environmental Studies, Ecosystem and Biodiversity

Environment- Segment - Environmental studies - Scope and multidisciplinary nature - Need for public awareness - Environmental ethics- Ecosystem - Structure and function - Ecological succession. Biodiversity - Values of biodiversity - Endangered and endemic species - Hot spots - India a mega biodiversity nation - Threats - Impact of biodiversity loss - Conservation - In-situ and ex-situ - Case studies.

Environmental Pollution and Legislation

Pollution - Sources, effects and control measures - Air, water, soil, noise, thermal, nuclear and marine - Major polluting industries of India - Land degradation - Impacts of mining. Environmental legislation in India- Environment protection act - Air pollution, water pollution, wildlife protection and forest conservation - Case studies.

Waste and Disaster Management

Waste - Solid waste - Sources, effects and control measures - Management techniques - e-waste - Effluent water treatment - Radioactive waste and disposal methods. Disaster management - Earth quakes - Landslides - Floods - Cyclones - Tsunami - Disaster preparedness - Response and recovery from a disaster - Disaster management in India - Case studies.

Food Resources, Human Population and Health

World food problems - Over grazing and desertification - Effects of modern agriculture - Fertilizer – Pesticide - Problems, water logging and salinity. Population - Population growth and explosion - Population variation among nations. Human rights - Value education - Women and child welfare - HIV/AIDS - Role of IT in environment and human health - Case studies.

Social Issues and the Environment

Unsustainable to sustainable development - Use of alternate energy sources - Energy Conversion processes - Biogas - Anaerobic digestion - Production and uses - Water conservation - Rain water harvesting - Water shed management - Resettlement and rehabilitation of people - Deforestation - Green house effect - Global warming - Climate change - Acid rain - Ozone layer depletion - Waste land reclamation. Consumerism and waste products - Role of an individual in conservation of natural resources - Case studies.

Text book(s):

1	Tyler miller. G, “Environmental Science”, 13th Edition Cengage Publications, Delhi, 2013.

Reference books:

1.	Gilbert M.Masters and Wendell P. Ela,”Environmental Engineering and Science”, Phi learning private limited, New Delhi, 3rd Edition, 2013. Learning private limited, New Delhi, 3rd Edition, 2013.
2.	Rajagopalan. R, “Environmental Studies” Oxford University Press, New Delhi, 2nd Edition, 2012.
3.	Deeksha Dave and Katewa. S.S, “Environmental Studies” 2nd Edition, Cengage Publications, Delhi, 2013.

K.S. Rangasamy College of Technology - Autonomous R 2014								
41 EE 003 Electrical Engineering								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100

Course Objectives	1. To determine the voltage, current, power in resistive elements of simple DC circuits by understanding the concept of series-parallel circuit reduction technique. 2. To determine the Impedance, Power and Power factor in series RL, RC and RLC circuits by understanding the concept of instantaneous, RMS and average value of Voltage/Current in an AC source. 3. To describe the application of Faraday's, Lenz's laws and Fleming's rules,and determine the performance of transformers. 4. To draw the characteristics of induction motors and identify the suitable electric drives to textile industries. 5. To impart the basic knowledge on power system and its components, simple house wiring layout, types and need for earthing, and energy conservation.
Course Outcomes	At the end of the course, the students will be able to 1. Identify the basic elements of electrical circuits and define important terms with their units. 2. Solve DC circuits using Ohm's & Kirchhoff's laws. 3. Characterize the single and three phase AC supply. 4. Calculate Impedance, Power and Power factor of single phase AC circuits. 5. Express the principle of electromagnetic induction and identify its usefulness in electrical engineering. 6. Explain the principle of operation of transformers and calculate its regulation and efficiency. 7. Describe the construction and working of single, three phase induction motors and identify their applications. 8. Choose the suitable electric drive and control schemes for textile industries. 9. Outline the components of various sub-systems in a power system. 10.Sketch the layout of simple house wiring by identifying the wiring materials and expressthe need for energy conservation.

DC Circuits

Basic elements – resistance, inductance and capacitance – Definitions and Units: Current, Voltage, Power and Energy – Ohm's law – Kirchhoff's laws – Simple Series and Parallel circuits.

AC Circuits

Introduction to AC circuits – Single and Three phase AC supply – Advantages of Three AC Phase system – Instantaneous, RMS and average value – Series RL,RC and RLC Circuits – Impedance, Admittance, Power and Power factor – Practical importance of power factor – Power & Energy Measurement.

Electromagnetic Induction

Faraday's law of Electromagnetic Induction, Fleming's rules and Lenz's law.

Transformers

Construction, Principle of operation, types, regulation and efficiency, all day efficiency - Current and Potential transformers.

Electrical Drives in Textile Industries

Three phase Induction motor–Construction, Principle of operation, types, Characteristics and applications– Speed Control methods – Starters –Single phase induction motor - Construction, Principle of operation, types, Characteristics and applications - Variable Frequency Drive – Introduction to Stepper motor and Servo motor –Selection of drives and control schemes for Textile industries.

Power Systems

Structure of power system – Generation system – Transmission System – Distribution system – Power system protection.

House Wiring

Wiring material and Accessories – Simple wiring layout – Earthing – Lightning Arrestor – UPS – Energy Conservation.

Text book(s):

1.	S. Sukhija, T.K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford University Press, 2012.
2.	M.Maria Louis, "Elements of Electrical Engineering", PHI, New Delhi, 2014.

Reference(s);

1.	V.K.Mehta, Rohit Mehta, "Principles of Electrical Engineering", S.Chand Publications, New Delhi, 2014.
2.	Edward Hughes, "Electrical and Electronic Technology", Pearson Education, 9th Edition, New Delhi, 2009.
3.	Del Tora "Electrical Engineering Fundamentals" Pearson Education, New Delhi, 2007
4.	S.P.Bihari and BhuPendraSehgal, "Basic Electrical Engineering – Made Easy", Cengage Learning
5.	Vedamsubramanyam, "Electric Drives: Concepts and Applications" Tata McGraw Hill Pvt. Ltd., New Delhi, 2004

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 201 Fibre Science								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100

Objectives	• To impart knowledge on production, properties and applications of natural and regenerated fibres.
Course outcomes	At the end of the course, the students will be able to 1. Define and explain staple fibre, filament, monomer, polymer, polymer bonding, inter polymer force of attraction and requirements for fibre forming polymers. 2. Classify the textile fibre and explain its essential and desirable properties. 3. Summarize the cultivation / extraction process, properties and applications of cotton, jute, linen and ramie fibres. 4. Describe the structure of cellulosic fibre, and explain the cultivation process, properties and application of sisal, coir, banana, BT cotton and organic cotton. 5. Explain the manufacturing, properties and applications of viscose rayon, cupromonium rayon, acetate rayon, bamboo, modal and lyocel fibres. 6. Discuss the manufacturing, properties and applications of high tenacity viscose rayon, high wet modulus viscose rayon and polynosic rayon. 7. Examine the structure of wool and silk and explain the production, properties and applications of protein, regenerated protein fibres. 8. Summarize the production, properties and applications of alginate fibre and chitin-chitosen fibres. 9. Identify the fibre by microscope, chemical, burning, staining, density and IR spectroscopic methods. 10. Identification of blend proportion of various fibres.

Introduction

Definition - staple fibre, filament, monomer, co-monomer and polymer; requirements of fibre forming polymers; classification of fibres; essential and desirable properties of fibres; types of polymers; intra polymer bonding, inter polymer forces of attraction.

Natural Cellulosic Fibres

Cultivation, properties and applications of cotton; extraction, properties and application of linen, jute, ramie, sisal, coir and banana fibres; BT and organic cottons; molecular, crystal and morphological structure of cellulosic fibres.

Regenerated Cellulosic Fibres

Production, properties and applications of viscose rayon, cuprammonium rayon, acetate rayon, bamboo, modal and lyocell fibres; Study of morphological and chemical structures of viscose, acetate rayon; high tenacity and high wet modulus viscose rayon, polynosic rayon.

Protein and other Regenerated Fibres

Chemical constitution and structure of wool and silk; production, properties and applications of wool, silk, soybean, casein, alginate, chitin and chitosan fibres; application of regenerated silk fibre.

Identification of Fibres

Fibre identification- microscope, chemical, burning, feeling, staining, density measurement methods, IR spectroscopic method; Identification of blend proportion.

Text book(s):

1	S.P.Mishra, “A text book of fibre science and technology”, New age international publishers, Chennai.
2	Morton W.E and Hearle J.W.S, “Physical properties of textile fibres”, Textile Institute, Manchester

Reference book(s):

1	E.P.G.Gohl and L.D.Vilensky, “Textile Science”, CBS Publishers, New Delhi.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40PH0P1 Physics Laboratory								
Common for ME,MC,CE,TT,BT& NST								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	0	0	3	45	2	50	50	100
Objectives	• To give exposure for understanding the various physical phenomena in mechanics, optics, materials science and properties of matter. • To correlate the theoretical principles with application oriented studies.							
Course Outcomes	1. Know the concept of parameters, such as stress, strain and elastic limit needed to achieve a given amount of deformation in the given material. (1- 3) 2. Grasp the knowledge of dependency of viscosity of a liquid on its density and velocity of liquid motion (4) 3. Imbibe the property of surface tension and capillarity action in fluid dynamics, which are due to the pressure of cohesion and adhesion that causes the liquid to work against gravity (5) 4. Understand the phenomenon of interference of light between the two reflected lights from a flat (glass plate) and spherical surfaces (Plano-convex lens) that produces puddles of Newton's rings, the application of which is an accurate measure of the size of any hollows and heights on a surface by counting the rings and knowing the wavelength of the illumination (6) 5. Comprehend the diffraction property of light through a spectrometer grating element which yields the wavelength of mercury spectral lines (7) 6. Know the concept of interference of light between two reflected lights from a thin air wedge. (8) 7. Understand the concept of a wave encountering an obstacle (particle) that is comparable in size to its wavelength, undergoing scattering (diffraction) by particles and to apply it find the wavelength of light and the particle size. (9) 8. Apply the knowledge of semiconductor thin films in conversion of optical energy into electrical energy, the application being the photovoltaic solar cells employed as one of the potential and perennial renewable energy source (10)							
Sl.No.	**List of Experiments**							
1.	Determination of Young's modulus of a steel bar by uniform bending method.							
2.	Determination of Young's modulus of a cantilever (Pin & Microscope method).							
3.	Determination of rigidity modulus of a wire by torsional pendulum.							
4.	Comparison of co-efficient of viscosity of two different liquids by Poiseuille's method.							
5.	Comparison of surface tension of two different liquids by capillary rise method.							
6.	Determination of radius of curvature of a plano convex lens using Newton's rings.							
7.	Determination of wavelength of mercury spectral lines using spectrometer grating element.							
8.	Determination of thickness of a fiber by air wedge.							
9.	Determination of wavelength of laser and particle size.							
10.	V-I characteristics of Solar cell.							
Lab Manual :								
"Physics Lab Manual", Department of Physics, KSRCT.								

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 ME 0P2 Engineering Practices Laboratory								
Common to ME,EEE,CSE,IT,EIE,NST								
Semester	Hours / Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	0	0	3	45	2	50	50	100
Objectives	• To provide exposure to the students with hands on experience on various basic engineering practices in Mechanical Engineering							
Course Outcomes	At the end of the course, the student will be able to: 1. Make a model of fitting like Square and V fitting using fitting tools 2. Make a model of carpentry like Dovetail joint, and cross lap joint using carpentry tools 3. Fabricate the models of sheet metal in sheet metal shop. 4. Prepare joints by arc welding 5. Construct electrical wiring circuit and demonstrate in electrical wiring section 6. Construct the water pipe line in plumbing shop							

Fitting

Safety aspects in Fitting, Study of tools and equipments, Preparation of models- Filing, Square, Vee.

Carpentry

Safety aspects in Carpentry, Study of tools and equipments, Preparation of models- Planning, Dove tail, Cross Lap.

Sheet Metal

Safety aspects in Sheet metal, Study of tools and equipments, Preparation of models- Scoope, Cone, Tray.

Welding

Safety aspects of welding, Study of arc welding equipments, Preparation of models -Lap, butt, T-joints. Study of Gas Welding and Equipments.

Electrical Wiring And Plumbing

Safety aspects of Electrical wiring, Study of Electrical Materials and wiring components, Wiring circuit for a lamp using single and stair case switches. Wiring circuit for fluorescent lamps, wiring circuit for 3 phase motor. Study of plumbing tools, assembly of G.I. pipes/ PVC and pipe fittings, Cutting of threads in G.I.Pipes/PVC by thread cutting dies.

Lab Manual :

1. “Engineering Practices Lab Manual”, Department of Mechanical Engineering, KSRCT.

K.S. Rangasamy College of Technology - Autonomous R 2014

40 ME 0P3 Computer Aided Drafting Laboratory

Common to MECH , CIVIL, MCT, TT

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	0	0	3	45	2	50	50	100

Objectives	• To impart the knowledge on use of drafting software to draw the conics, solids, isometric and orthographic views.
Course outcomes	At the end of the course, the student will be able to: 1. Construct special curves and conic sections using drafting software. 2. Draw the projection of solids using drafting software. 3. Draw the true shape of section of solids 4. Covert the pictorial views into orthographic views using drafting software. 5. Construct the isometric projections of objects using drafting software.

1. Study of capabilities of software for Drafting and Modeling - Coordinate systems (absolute, relative, polar, etc.) - Creation of simple figures like polygon and general multi-line figures.
2. Computer aided drafting of ellipse, parabola, involute and cycloid using B-Spline or Cubic Spline.
3. Computer aided drafting of front and top view of prism, pyramid, cylinder and cone.
4. Computer aided drafting of sectional views of prism, pyramid, cylinder and cone.
5. Computer aided drafting of front, top and side views of objects from the given pictorial views.
6. Computer aided drafting of isometric projection of an object.

Reference Book(s):

1	Bhatt N.D., “Engineering Drawing”, Charotar Publishing House Pvt. Ltd., 49th Edition, Anand, Gujarat, 2006.
2	D.M.Kulkarni,A.P.RAstogi, A.K.Sarkar, ”Engineering Graphics with Auto CAD”, PHI Private Limited, New Delhi, 2009.
3	Cencil Jenson, Jay D.Helsel, Desnnis R.Short, “Engineering Drawing & Design”, 7th Edition, Tata Mcgraw Hill Pvt. Ltd., New Delhi. 2012.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 MA 006 - Fourier Transform and Numerical Methods								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	1	0	60	4	50	50	100

Objective(s)	• To teach students how to use Fourier series and Fourier transform for engineering discipline. • To apply numerical techniques for solving system of linear equations. • To understand and apply the concepts of interpolation and numerical integration. • To solve initial value problems of ordinary differential equations numerically.
Course Outcomes	**At the end of the course, the students will be able to** 1. Apply Fourier transform technique and Parseval's identity for the continuous function. 2. Discuss the Fourier sine and cosine transforms and properties of Fourier transforms. 3. Obtain the Fourier series expansion for the periodic function 4. Understand the notions of half – range Fourier series and harmonic analysis. 5. i) Employ different techniques to approximate roots of algebraic and transcendental equations of higher degrees. ii) Solve the system of linear equations using direct methods 6. i) Solve the system of linear equations using indirect methods. ii) Find the largest Eigen value of a matrix of order 2x2 and 3x3. 7. Find the intermediate values from a set of tabular values of equal and unequal intervals of a function by using interpolation techniques. 8. Apply different integration techniques to evaluate single and double definite integrals. 9. Compute point wise solutions for initial value problem of first order ordinary differential equations using single step methods. 10. Compute point wise solutions for initial value problem of first order ordinary differential equations using multi step methods.

Fourier Transform

Fourier transform pair – Fourier transform of simple functions – Fourier sine and cosine transform – Properties – Convolution theorem – Parseval's identity – Problems

Fourier Series

Dirichlet's conditions – Fourier series – Odd and even functions – Half range Fourier series – Root mean square value of a function – Parseval's identity – Harmonic analysis

Solution of Equations and Eigenvalue Problems

Newton Raphson method – Regula-Falsi method – Gauss elimination method – Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel – Matrix inversion by Gauss Jordan method – Eigen values of a matrix by power method

Interpolation and Numerical Integration

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward interpolation– Romberg's method – Two and three point Gaussian quadrature – Single and double integrations using Trapezoidal and Simpson's 1/3 and 3/8 rules

Numerical Solution of Ordinary Differential Equations

Single step methods: Taylor's series method – Euler's and modified Euler's methods – Fourth order Runge – Kutta method for solving first order equations – Multistep methods: Milne's and Adam's predictor and corrector methods

Text book(s):

1	Gerald C.F and Wheatley P.O, "Applied Numerical Analysis", 6th Edition, Pearson Education Asia, New Delhi, 2002.
2	Kreyszig E, "Advanced Engineering Mathematics", 9thEdition, John Wiley & Sons (Asia) Limited, New Delhi, Reprint 2012.

Reference(s):

1	Grewal B.S, "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, New Delhi, 2012.
2	Veerarajan T, "Engineering Mathematics – III", Tata McGraw-Hill Publishing Company Limited, New Delhi.
3	Grewal B.S and Grewal J.S, "Numerical methods in Engineering and Science", 9th Edition, Khanna Publishers, New Delhi, 2007.
4	Kandasamy P, Thilagavathy K and Gunavathi K, "Numerical Methods", 3rd Edition, S.Chand & Company Ltd, New Delhi, 2003.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 ME 005 Elements of Mechanical Engineering								
B.Tech Textile Technology								
Semester	Hours / Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100

Objective(s)	• To impart the basic knowledge on mechanisms, power transmissions which are essential for understanding the textile machineries. • To acquaint the concept of thermodynamics, heat transfer and IC engines which are essential for understanding the textile processing.
Course Outcomes	**At the end of the course the students will be able to** 1. Explain the basic working principle of Four bar and single Slider Crank Mechanisms. 2. Generate the cam profile for radial cam with Simple Harmonic and Cycloidal motion. 3. Select the belt, chain and rope drive for power transmission applications and calculate the amount of power transmitted by the belt drive. 4. Classify and explain the types of gears, gear trains, clutches and brakes. 5. State the laws of thermodynamics and applied to open thermodynamic system. 6. Apply the second law of thermodynamics to heat engines and heat pumps. 7. Explain the concept of Conduction, Convection and Radiation in heat transfer. 8. Apply the principles of conduction in solving heat transfer problems. 9. Explain the operation of Internal Combustion engine. 10. Describe fuel supply and injection system in an internal combustion engine.

Basics of Mechanisms

Basic concepts of Link – Pair - Machine and Structure - Degree of freedom - Grashoff's Law. Inversions of Four bar and single Slider Crank Mechanisms. Cams – Types of cams & followers, Motions of the follower – Simple Harmonic Motion and Cycloidal motion – cam profile for radial cam.

Power Transmission

Types of drives - Belt drive: types - velocity ratio, ratio of tensions and calculation of power transmission - Rope drive - Chain drive - Gear drive: Terminology, classification of gears - gear trains: simple and compound gear trains - Clutches and brakes: Types, working principle and applications.

Thermodynamics – Laws and Entropy

Basic concepts – Thermodynamic systems – Laws of Thermodynamics: Zeroth law of Thermodynamics, First law of thermodynamics - Steady Flow Energy Equation – Application of SFEE to nozzle, boiler, turbine and compressor (simple problems). Second law of Thermodynamics – cyclic heat engine, heat pump, Carnot cycle (simple problems), Entropy.

Heat Transfer

Introduction – Modes of Heat Transfer: Conduction, Convection and Radiation – Laws of Conduction - Types of Convection – Laws of Radiation – Radiation Shields - Fourier law of heat conduction in simple and composite wall geometrics, types of boundary and initial conditions – Fins: types – fin efficiency (simple problems).

Internal Combustion Engines

Introduction - working principle of petrol and diesel engines - two and four stroke cycle engines – Comparison of two and four stroke engine – Fuel supply system – Ignition system – Calculation of Mechanical and Brake thermal efficiency - Layout of Automobile Vehicle.

Text Book(s):

1	Pravin Kumar, "Basic Mechanical Engineering", 1st Edition, Pearson India Education, Chennai, 2014.

Reference(s):

1	Rattan, S S " Theory of Machines", Tata McGraw-Hill, 2002.
2	Richard G Budynas , J.Keith Nisbett , " Shigley's Mechanical Engineering Design", 9th edition ,2011.
3	Cengel, YA and Boles, M.A, "Thermodynamics: An Engineering Approach", Mc Graw-Hill; 4th edition ,2002.
4	Yunus A.Cengel, " Heat Transfer: A Practical Approach", Mc graw-Hill, 2nd edition, 2002.
5	V.Ganesan ,"Internal Combustion Engines", Tata Mc Graw-Hill Education, 2002.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 EI 001 Electronics and Instrumentation Engineering								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100

Objective(s)	• Define the types of semiconductors. Sketch the schematic of diode, transistors and discuss the operation with the help of its characteristic curves and identify its application in textile industries. • Show how the Op-amp can be operated as linear combinational circuits and amplifiers by analyzing their operation with basic circuits. • Select and apply suitable instruments for measuring the physical quantity based on the inference of its operation and characteristics. • Discuss the working of resistive, inductive, capacitive, proximity, photo electric, piezo electric transducers to measure the non-electrical quantity in textile industries. • State the function of controllers. Explain the significance of ON-OFF, electrical and digital controllers to find the application areas of textile industries.
Course Outcomes	**At the end of the course, the students will be able to** 1. Draw the schematic diagram of PN-junction diode to discuss its forward, reverse operating regions and its applications. 2. Sketch the functional diagram of BJT and categorize its configuration based on its V-I characteristics and applications. 3. Analyze the Characteristics of Op-Amp for inverting and non-inverting configuration and apply to design basic application circuits. 4. Design the instrumentation amplifier circuit using Op-Amp and discuss its merits and demerits with other basic amplifiers. 5. Discuss the working of instruments used for measuring the Analog voltage, current, resistance and other electrical quantities. 6. Explain the working of instruments used for measuring the digital voltage and frequency. 7. Categorize the transducers based on the transduction principles used for measuring the physical quantity and its applications. 8. Select and apply a suitable transducer for measuring the physical quantity in textile industries. 9. Specify the importance and functions of controllers used in textile industries. 10. Suggest a specific controller to control and attain the specific requirements of textile process.

Semiconductor Devices

Basic semiconductor theory-Insulator, semiconductor, conductor-intrinsic and extrinsic semiconductor-PN junction diode-V-I characteristics-switching characteristics - applications of diode-Bipolar Junction Transistor-CB, CE and CC Configurations-Construction and working –Transistor as an amplifier -Applications of BJT.

Operational Amplifiers

Basics of Operational Amplifier-pin details-characteristics of ideal Operational Amplifier-Inverting and Non-inverting mode of Operational Amplifier-differential amplifier-applications of Operational Amplifier: adder-subtractor-multiplier-divider-integrator-differentiator- two stage and three stage Instrumentation amplifier-applications of instrumentation amplifier.

Indicating Instruments

Definitions of instrument, Functional block diagram of instrumentation, analog meters: AC & DC ammeter, AC & DC voltmeter, multimeter, loading effect, series and shunt type ohmmeters-CRO-Digital meters:dual slope, integrating, SAR voltmeters, digital multimeter, digital frequency meter.

Transducers

Principle of operation, construction details, characteristics and applications of resistive position transducer-strain gauge-RTD-thermistor-thermocouple-capacitive transducer-LVDT-Load cell-piezo electric & photo electric transducers-proximity sensors-pH measurement-humidity and conductivity measurement.

Control Systems

Introduction – open and closed loop system – Concept of transfer function – basic control action – Basic controller configuration – types of controllers: ON – OFF, Proportional, Integral, Derivative, PID controller – basic controller configuration – electronic controllers – digital controllers.

Text Book:

1	Kalsi.H.S, Electronic Instrumentation, Third Edition, Tata-Mc-Graw Hill, 2013.
2.	Sawhney, A.K., A Course in Electrical and Electronics Measurements and Instrumentation, Dhanpat Rai & Co. (P) Ltd, 2011.

Reference (s) :

1	Abhijit Majumdhar, Apurba Das, R.Alagirusamy, V.K.Gothari, Process control in textile manufacturing, wood head publishing limited, 2013.
2	Robert L. Boylestad, Louis Nashelsky, 'Electronic Devices and circuit theory', 11th Edition, Pearson, 2013.
3	Patranabis, D, Sensors and Transducers, PHI Ltd. New Delhi, 2010.
4	Murthy, D.V.S., Transducers and Instrumentation, Prentice Hall of India Pvt. Ltd., Second edition, New Delhi, 2010.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 CH 008 Chemistry for Textile Technologist - II								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100

Objective(s)	To familiarize the basic concepts of polymer and polymerization techniques. To gain knowledge on analytical skills in characterizing the polymer. To impart knowledge on preparation, properties and applications of fibres To explore into the field of oil, fat, soap and lubricants. To know about the characteristics and synthesis of selected dyes.
Course Outcomes	**At the end of the course, the students will be able to** 1. Describe the basic concepts, classification of monomer and polymer and mechanism of polymersation. 2. Explain the techniques of polymerization. 3. Describe the methods of determining molecular weight of polymers. 4. Analyze the characteristics of polymers 5. Explain the preparation, properties and applications of synthetic fibres 6. Describe the preparation, properties and applications of high performance fibres 7. Identify the chemical constitution and analysis of oil, fat and soaps. 8. Evaluate the types of lubricants, characteristics, mechanism and their uses. 9. State the theory of colour, constitution and classification of dyes. 10. Describe the chemistry and synthesis of selected dyes.

Polymerization

Introduction-basic concepts - criteria for monomer-classification of polymer- polymerization: Degree of polymerization- types of polymerization - mechanisms of polymerization (Free radical, Ionic, Zeigler-Natta)- polymerization techniques: Bulk. Solution, Suspension, Emulsion.

Characterization of Polymer

Molecular weight of polymer: number average, weight average and viscosity average. Determination of molecular weight of polymer by light scattering by end group analysis and Ubbelhode viscometer. Thermal characterization of polymer: glass transition temperature- melting point- principle and interpretation of DSC, TGA and DTGA.

Synthetic Fibres

Production, properties and application of synthetic fibres - Polyester, Polyamides (Nylon 6, Nylon 6 6), Polyethylene (HDPE), polypropylene, PAN; drawing; Electrospinning; false twist texturizing.

High Performance Fibres

Production, properties and application of aromatic polyamides (Kevlar and Nomex), carbon, glass fibre, basalt, PBO and HPPE fibres.

Oils, Fats, Soaps & Lubricants

Chemical constitution of oils and fats - analysis of oils and fats: acid, saponification and iodine values, determinations and significance. Definition and mechanism of lubrication, preparation of petrolubes, desirable characteristics – viscosity, viscosity index, carbon residue, oxidationstability, flash and fire points, cloud and pour point. Semisolid lubricant-greases, preparation of sodium, lithium, calcium and axle greases and uses, consistency test and drop point test. Solid lubricants-graphite and molybdenum disulphide.

Dyes

Theory of color and constitution: chromophore and auxochrome, classification of dyes based on application. Chemistry and synthesis of: azo dye, anthraquinone dye, xanthane dye.

Text book (s) :

1	Gowariker V.R., Viswanathan, N.V., Jayadev Sreedhar, 'Polymer Science' New Age Publication Ltd, New Delhi, 2003
2	S.P.Mishra, "A text book of fibre science and technology", New age international publishers, Chennai, 2000

Reference Books:

1	Jain and Jain, Engineering Chemistry, 15th Edition, Dhanpat Ral Publishing Company Pvt.Ltd. Delhi.
2	Wiley India, Engineering Chemistry, 2 nd Edition 2013, Beekam Printers, Delhi.
3	Bahl B.S, Arunbahl, 'Advanced Organic Chemistry', S. Chand & Co.,

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 301 Spun Yarn Technology I								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	4	0	0	60	4	50	50	100

Objective(s)	To enable the students to learn the theory of various operations carried out at different stages of pre spinning process, which would be helpful to them in understanding the influence of various parameters on quality of the yarn and productivity.
Course Outcomes	**At the end of the course, the students will be able to** 1. Describe the mechanism of ginning, its performance on yarn quality, control of nep and waste generation and classify yarn numbering systems. 2. Practice the sequence of spinning machinery, and explain the mechanism of blow room machineries and its latest developments. 3. Summarise the principle, mechanism and latest developments of carding machine. 4. Formulate the settings for maximum cleaning efficiency, nep removal and sliver uniformity. 5. Discuss the principle, settings, and types of drafting systems in modern draw frame. 6. Describe the mechanism of auto levellers in draw frame and compute draft and production. 7. Explain the mechanism of modern comber and its preparatory machines. 8. Formulate the settings for timing operations and nep removal efficiency and calculate draft and production. 9. Describe the principle, mechanism, settings and latest developments in speed frame. 10. Calculate twist, draft and production in speed frame.

Ginning and Blow Room

Ginning: preparatory processes for ginning, working of roller and saw gins; Effect of ginning performance on yarn quality. Yarn numbering system – direct, indirect systems and conversions.

Sequence of spinning machinery for producing carded, combed and blended yarns in short staple spinning.

Blow room: principle and description of opening, mixing and cleaning machines; Mechanism of lap formation; contamination removal; cleaning efficiency and control of nep and waste generation; Latest development in blow room machines.

Carding

Chute feed; basics of opening, cleaning and fiber individualization; Working of modern cards- speeds, setting and functions of different elements; card clothing and production calculation; concept of fiber transfer factor and hook formation; concept of auto leveling in carding; control of nep removal, Control of waste , cleaning efficiency; Latest developments in card.

Drawing

Ideal and actual drafting, drafting wave; Principle and working of modern draw frame; working of various drafting systems- concept of roller setting, roller weighing system and distribution of draft; Coiling; micro dust collection; web condensation; roller lapping; Stop motions; Draft and production calculation; Concept of auto leveller in draw frame; Latest developments in draw frame.

Combing

Preparatory process- sliver lap, ribbon lap and super lap machine; Comber: working principle, sequence and timing of operations in combing; comber settings; concept of piecing waves; asymmetric web condensation and optimum level of comber waste; Combing efficiency and nep removal efficiency; Draft and production calculations ; Latest development in comber.

Speed Frame

Principle and working of speed frame; Mechanism of winding and bobbin building; Bobbin lead and flyer lead; Speed frame setting; draft, twist, and production calculations; Latest development in speed frames.

Text book(s):

1	Klein W., Vol. 1, “The Technology of Short Staple Spinning”, The Textile Institute, Manchester, U.K., 1998.
2	Klein W., Vol. 3, “A practical guide to combing and Drawing”, 1987.

Reference(s) :

1	Klein W., Vol. 2, “A Practical Guide to Opening & Carding”, “The Textile Institute, Manchester, U.K., 1998.
2	Chattopadhyay R. (Ed), “Advances in Technology of Yarn Production”, NCUTE, IIT Delhi, 2002.
3	Chattopadhyay R, Salhotra K.R, “Spinning:Blow room, Carding” NCUTE Publications,1998.
4	Chattopadhyay R, Rangasamy R, “Spinning:Drawing, Combing & Roving” NCUTE Publications,1999.
5	K.P.Chellamani,”Ginning Technology”, SITRA Publications.
6	Carl A.Lawerence, “Fundamentals of Spun Yarn Technology”, CRC Press, 2003.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 PH 008 - Applied Physics								
Common to all Branches								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100
Objective(s)	1. To enhance students' knowledge of theoretical and modern technological aspects in physics 2. To enable the students to correlate the theoretical principles with application oriented studies							
Course Outcomes	**At the end of the course the students will be able to** 1. Explain the principle of laser emission and classification of lasers 2. Identify the applications of lasers. 3.Explain the propagation of lights in fibre optic cables, classification of fibre, splicing and their fabrication. 4. Describe the fibre optic communication link, its applications and light propagation losses. 5. Explain the production and detection of ultrasonic waves. 6. Identify the industrial and medical applications of ultrasonic waves. 7. Explain the development of quantum theory and its applications. 8. Describe the concepts of nuclear physics and identify the elementary particles. 9. Classify the sound and analyze its characteristics 10. Give suggestions for buildings with good acoustics							

Laser Technology

Introduction – Principle of spontaneous emission, stimulated absorption and emission – Einstein's co-efficient (derivation)-population inversion-pumping mechanisms – Types of lasers: Nd:YAG, Semiconductor laser (homo junction and hetero junction), CO_2 laser – Industrial applications: Lasers in welding, cutting, drilling and soldering- Medical applications: laser endoscopy,– Holography: Construction and reconstruction of hologram – Applications.

Fiber Optics and Sensors

Principles – cone of acceptance, numerical aperture (derivation)- Modes of propagation –Fabrication: Crucible-crucible technique - Classification: based on materials, modes and refractive index profile– Splicing – types of splicing- Losses in optical fiber – Light sources for fiber optics – Detectors – Fiber optical communication links(Block diagram) – Advantage of fiber optical cable over copper cables- Fiber optic sensors-principle-liquid level sensors- Temperature, Displacement, measurement.

Ultrasonics and Applications

Introduction-Properties-Production: Magnetostriction effect, magnetostriction generator- piezoelectric effect, piezoelectric generator – Ultrasonic detection- acoustical grating-Applications: Cavitation, cleaning, SONAR,– Non destructive testing: Pulse echo system, through transmission, resonance system- Medical applications: cardiology, neurology, ultrasonic imaging (A, B and TM- Scan).

Quantum and Nuclear Physics

Quantum physics: Introduction – de-Broglie hypothesis –Matter waves– Uncertainty principle, application: single slit experiment – wave function-physical significance-Schrodinger's wave equation: Time dependent and time independent – Particle in a box (one dimensional and three dimensional)–Microscopy: Scanning Electron Microscope.

Nuclear Physics: Introduction, atomic nucleus, nuclear force, nuclear density, atomic mass unit - mass defect - Binding energy-Nuclear fission-Energy released in fission- Stellar energy-elementary particles:Leptons, Hadrons: Mesons and Baryons

Acoustics

Introduction-Classification of sound – Characteristics of musical sound – sound intensity level – Weber-Fechner law – loudness level and intensity: Bel, Decibel–Reverberation – Reverberation time – Sabine's formula (derivation) – sound absorption coefficient measuring method -Absorption co-efficient (derivation)– Factors affecting the acoustics of buildings and their remedies - basic requirements for acoustically good halls - acoustical materials.

Text book:

1	V.Rajendran, Engineering Physics, Tata McGraw Hill Publishers, New Delhi, 2011

Reference(s) :

1.	Jeremy Bernstein, Paul M.Fishbane, Stephen Gasiorowicz, Modern Physics, Pearson Education, 2009.
2.	S.Kalainathan, A.Ruban kumar, Physics for Engineers, , RBA publications, Chennai, 2010.
3.	A.Arumugham, Engineering Physics, Anuradha Agencies, Chennai, 2005.

K.S. Rangasamy College of Technology - Autonomous R 2014

40 EI 0P1 Electrical and Electronics Engineering Laboratory

B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	0	0	3	45	2	50	50	100

Objective(s)	• Design an Op-Amp based Amplifiers and data converter circuits. • Ascertain the measurement parameters and analyze it with the known standards. • Measure and Record the Physical quantities measured in Textile processing Industries.
Course Outcomes	**At the end of the course, the students will be able to** 1. Apply basic circuital laws to verify the practical values of branch current and node voltage across different elements of the circuit with that of the theoretical values. 2. Acquire the electrical and mechanical characteristics of single and three phase AC machines by conducting suitable test. 3. Analyze the speed control of three phase induction motor by V/f method 4. Design an instrumentation amplifier to meet the specified gain requirements. 5. Sketch the output response of an integrator and differentiator for a specified input values. 6. Show how to measure voltage and current values in CRO. 7. Infer the relationship between measuring temperature and output voltage using thermocouple. 8. Calculate the pH values of the given solution. 9. Examine the relationship exists between output and physical quantity measured by LVDT. 10. Experiment the measurement of strain using strain gauge transducer.

LIST OF EXPERIMENTS

1. Verification of Ohm's Law and Kirchhoff's Laws
2. Load test on single-phase Transformer
3. Load test on single-phase induction motor
4. Load test on three-phase squirrel cage induction motor
5. Speed control of three phase induction motor by V/F method
6. Design of Instrumentation amplifier using Op-Amp.
7. Design of differentiator and integrator using Op-Amp.
8. Measurement of voltage and current using CRO.
9. Measurement of temperature using thermocouple.
10. Angular measurement using potentiometer.
11. Measurement of linear displacement using LVDT.
12. Measurement of strain using strain gauge transducer.

Lab Manual :

"Electrical and Electronics Lab Manual", Department of Electronics and Instrumentation Engineering, KSRCT.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 3P1 Fibre Analytical Laboratory								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	0	0	3	45	2	50	50	100
Objective(s)	Students will be familiar with the identification of fibers by physical and chemical test.							
Course Outcomes	1. View the given fibre using microscope 2. Measure regain of textile fibres 3. Calculate fibre blend proportion of the given sample by solubility method 4. Identify the given fibre by burning test 5. Identify the given fibre by solubility method 6. Compute the density of given fibre 7. Compute the amount of spin finish on polyester filament 8. Evaluate the fibre maturity using caustic soda swelling method 9. Measure creep of given filament 10. Measure stress relaxation of given filament							
	LIST OF EXPERIMENTS 1. Observation of longitudinal view of natural and synthetic fibers 2. Determination of fibre maturity using caustic soda swelling 3. Determination of moisture regain of fibers 4. Estimation of spin finish in man-made fibers through Soxhlet extraction 5. Determination of density of fibers 6. Observation of flammability characteristics (Burning test) of fibers 7. Identification of fibers through solubility tests 8. Determination of blend proportion of P/C blends 9. Determination of blend proportion of P/V blends 10. Determination of blend proportion of P/W blends 11. Determination of filament creep 12. Determination of stress relaxation behaviour of filament yarns.							

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 3P2 Spun Yarn Technology Laboratory I								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	0	0	3	45	2	50	50	100

Objective(s)	• To enable the students to handle the spinning machine and operate them practically. • To enables the students to learn material passage, parts of machines and production calculation
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain the basic working mechanism of ginning machine and calculate the speed of ginning machine. 2. State the principle of opening, cleaning and mixing of fibres in blow room 3. Demonstrate the mechanism of lap formation in scutcher. 4. Practice the working of cards with optimum settings. 5. Calculate the carding production and draft 6. Set the settings and practice the working of draw frame. 7. Calculate the draft and production in draw frame. 8. Demonstrate the working mechanism and timing and sequence operation in comber. 9. Demonstrate the working of modern speed frame machine. 10. Calculate the draft, twist, production and explain working of the builder motion in speed frame.
	LIST OF EXPERIMENTS 1. Passage of material through double roller McCarthy ginning machine and calculation of the speeds. 2. Passage of material through blow room and settings in blow room. 3. Calculation of speed, production and cleaning efficiency in blow room. 4. Passage of material through carding machine, production of sliver and calculation ofhank of sliver, draft, production in carding. 5. Measurement of settings between various carding elements in carding machine. 6. Passage of material through draw frame and production sliver and testing of drawn sliver hank. 7. Calculation of draft and production in draw frame 8. Passage of material and calculation of speed and setting in comber 9. Passage of material through speed frame,production of roving and testing of roving hank. 10. Calculation of draft and production in speed frame 11. Calculation of twist and twist constant in speed frame 12. Builder motion mechanism in speed frame

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2014
Department	**Textile Technology**	**Programme Code & Name**			**TT :B.Tech. Textile Technology**			
Semester III								
Course Code	**Course Name**	**Hours/Week**			**Credit**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CA**	**ES**	**Total**
40 TP 0P1	**Career Competency Development I**	**0**	**0**	**2**	**0**	**100**	**00**	**100**
Objective(s)	To enhance employability skills and to develop career competency							

Unit – 1	**Written Communication – Part 1**	**Hrs**
Usage of noun, pronoun, adjective (Comparative Forms), Verb, Adjectives, Adverb, Tenses, Articles and Preposition - Change of Voice - Change of Speech - Synonyms & Antonyms - One Word Substitution - Using the Same Word as Different Parts of Speech - Odd Man Out **Materials:** Instructor Manual, Word Power Made Easy Book		8
Unit – 2	**Written Communication – Part 2**	6
Analogies - Sentence Formation - Sentence Completion - Sentence Correction - Idioms & Phrases - Jumbled Sentences, Letter Drafting (Formal Letters) - Reading Comprehension(Level 1) - Contextual Usage - **Materials:** Instructor Manual, Word Power Made Easy Book		
Unit – 3	**Written Communication – Part 3**	4
Jumbled Sentences, Letter Drafting (Formal Letters) - Foreign Language Words used in English - - Spelling & Punctuation (Editing) **Materials:** Instructor Manual, News Papers		
Unit – 3	**Oral Communication – Part 1**	6
Self Introduction - Situational Dialogues / Role Play (Telephonic Skills) - Oral Presentations- Prepared -'Just A Minute' Sessions (JAM) **Materials:** Instructor Manual, News Papers		
Unit – 5	**Oral Communication – Part 2**	6
Describing Objects / Situations / People, Information Transfer - Picture Talk - News Paper and Book Review **Materials:** Instructor Manual, News Papers		
	Total	**30**

Evaluation Criteria

S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	50 Questions – 30Questions from Unit 1 & 2, 20 Questions from Unit 5, (External Evaluation)	50
2	Evaluation 2 Oral Communication 1	Self Introduction, Role Play & Picture Talk from Unit-3 (External Evaluation by English and MBA Dept)	30
3	Evaluation 3 Oral Communication 2	Book Review & Prepared Speech from Unit-4 (External Evaluation by English and MBA Dept)	20
		Total	**100**

Reference Books

1. Aggarwal, R.S. “A Modern Approach to Verbal and Non-verbal Reasoning”, Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications

Note :

- Instructor can cover the syllabus by Class room activities and Assignments(5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough work pages
- Each Assignment has 20 questions from Unit 1, 2 and Unit 5 and 5 questions from Unit 3 and 4
- Evaluation has to be conducted as like Lab Examination.

K.S. Rangasamy College of Technology - Autonomous					R 2014			
40 ME 006 Strength of Materials								
Common to CIVIL, MECH, MCT, TXT								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	1	0	45	4	50	50	100

Objective(s)	• Evaluate the engineering materials subjected to various loads. • Examine the stresses and strains developed in a material. • Analyse the bending moment and shear stress distributions in beams. • Derive and apply the bending and torsional equations in beams, shafts and springs. • Compute the stresses developed in cylindrical and spherical shells.
Course Outcomes	**At the end of the course, the students will be able to** 1. Estimate the stress intensity and deformation in solid bodies subjected to various types of loading. 2. Evaluate the elastic properties of materials and their significant effects in engineering applications. 3. Compute the principal stresses and strains by analytical and graphical methods. 4. Apply the concepts of shear force and bending moment diagrams in design of machine elements. 5. Estimate the stresses developed due to bending and shear in the design of machine members and structures. 6. Analyze the twist and strength of torsion members. 7. Compute the deflection and stress developed in helical spring. 8. Estimate the slope and deflection in determinate beams 9. Calculate the stresses, strains and deformation of the thin cylindrical and spherical vessels. 10. Apply the Euler's theory and Rankine formula for buckling load analysis in columns.

Stress, strain and deformation of solids

Rigid bodies and deformable bodies – Tension, compression and shear stresses – Deformation of simple and compound bars –Composite bars - Thermal stresses – Elastic constants – Volumetric strains – Strain energy due to axial force. Normal and shear stresses on any oblique planes – Principal stresses and their planes by analytical and Mohr's circle method.

Transverse bending on beams

Types of beams: Supports and loads – Shear force and bending moment in beams – Cantilever, simply supported and overhanging beams.

Stresses in beams

Theory of simple bending – Bending stress distribution – Symmetrical and unsymmetrical sections. Shear stress distribution.

Torsion

Torsion of solid and hollow circular shafts – Stepped shafts – Power transmission, strength and stiffness of shafts. Leaf spring – Stresses and deflection in close coiled helical spring.

Deflection of Beams

Slope and deflection in beams - Double integration method - Moment area and Macaulay's method for statically determinate beams.

Thin cylinders, Spheres and Columns

Thin cylindrical shellssubjected to internal pressure – Circumferential and longitudinal stresses anddeformation. Thin spherical shells subjected to internal pressure – Stresses and deformation. Columns – End conditions – Equivalent length of a column – Euler equation – Slenderness ratio – Rankine formula.

Text book (s):

1	R.K.Bansal, "Strength of Materials", 5th edition, Laxmi Publications (P) Limited, New Delhi, 2013.

Reference(s):

1	Beer and Johnston, "Strength of Materials", CSB Publisher 2010.
2	E.P. Popov, "Introduction to Mechanics of solids", Prentice Hall Publication 2009.
3	Timoshenko and Young, "Strength of Materials", CSB Publisher 1998.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 401 Structure and Properties of Fibers								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	50	50	100

Objective(s)	To study the fibre structure and its important properties such as moisture absorption, mechanical properties, optical properties, frictional properties, thermal and electrical properties.
Course Outcomes	**At the end of the course, the students will be able to** 1. Elaborate the models of fibre structures. 2. Examine the fibre structure by various characterization techniques. 3. Selection of fibres based on its moisture and heat of sorption properties for various end uses. 4. Influence of various factors on moisture and heat of sorption. 5. Selection of fibres based on its mechanical properties for various applications. 6. Influence of various factors on mechanical properties of fibres. 7. Determine the molecular orientation of fibre and its influencing factors. 8. Importance of friction in various fibre processing. 9. Choose and justify the fibres for various thermal end uses. 10. Selection of fibres based on its electrical properties for various applications.

Structural Investigation of Fibres

Models of fibre structure-fringed micelle and fringed fibril models; Investigation of fibre structure- X-rays, SEM, TEM, IR spectroscopy, FTIR, AFM, NMR and density measurements.

Moisture Absorption Properties of Fibres

Definitions- humidity, moisture content and regain; moisture hysteresis and molecular explanation; moisture absorption behaviour of natural and manmade fibres; Influence of fibre structure, humidity, temperature and hydrophilic groups on regain; absorption in crystalline and amorphous region.

Heat of sorption-Integral and differential, factors influencing heat of sorption; Conditioning of fibres- mechanism of conditioning, conditioning time, factors influencing rate of conditioning; swelling- types.

Mechanical Properties of Fibres

Tensile and elastic property- definitions related to tensile property, work of rupture; stress strain curves of various fibres, influence of moisture and temperature on tensile characteristics; Weak-link effect; Elastic recovery and its relation to stress and strain of various fibres; Mechanical conditioning of fibres and fatigue.

Time dependent effects- creep and stress relaxation phenomena; dynamic mechanical properties of fibres; characterization of visco elastic behavior-Voight and Maxwell models; flexural and torsional rigidity of fibres-measurements, derivation of flexural and torsional rigidity, shear modulus.

Optical and Frictional Properties of Fibres

Refractive index measurement- Beckeline and compensator methods, interference microscopy and refractometer; factors influencing birefringence- density, regain and orientation; absorption and dichroism; reflection and luster.

Friction: various influencing factors- load, area of contact, speed, state of surface and moisture; directional frictional effect of wool.

Thermal and Electrical Properties of Fibres

Thermal property- specific heat, thermal conductivity; structural changes in fibres on heating- irreversible shrinkage, thermal transitions, secondary transitions and melting; heat setting;sticking and bonding.

Electrical property- mass specific resistance; influence of moisture, temperature and impurities on resistance; Dielectric constant-factors influencing dielectric properties of fibre; Static electricity – induction, measurement, problems and elimination techniques.

Text book(s):

1	Morton W.E. and Hearle J.W.S, “Physical properties of textile fibres”, published by the textile institute Manchester, 2008.

Reference(s) :

1	Meredith R., “Mechanical Properties of Textile Fibres”, North Holland, Amsterdam, 1986.
2	Mukhopadhyay S.K., “Advances in fibre science” The Textile Institute, 1992.

K.S. Rangasamy College of Technology - Autonomous R 2014

40 TT 402 Spun Yarn Technology II

B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	50	50	100

Objective(s)	To enable the students to learn the • Theory of yarn formation by different spinning systems • Effect of process parameters used in the spinning system on yarn quality.
Course Outcomes	**At the end of the course, the students will be able to** 1. Describe the mechanism of modern ring frame and their components. 2. Practice the working of builder motion, auto doffing and production calculations. 3. Summarize the principle, mechanism and working of compact spinning systems. 4. Compare the properties of compact yarn with ring yarn. 5. Discuss the raw material requirement and preparation for rotor spinning and summarize its working mechanism. 6. Compare the yarn quality, yarn structure and properties of ring yarn with rotor yarn and discuss the influence of process parameters on rotor spinning performance. 7. Compare the principle and operation of DREF II and DREF III spinning systems, and analyze the properties of ring spun yarn with friction yarn. 8. Compare the principle and mechanism of air jet and air vortex spinning techniques, and analyze the properties and application of air jet and air vortex yarns. 9. Describe the principle of yarn production in self twist, wrap, core, siro and solo spinning systems. 10. Summarize the twist level, methods of plying and count calculation in ply yarn and discuss the fancy yarn production.

Ring Spinning

Principles and working of ring spinning machine; drafting system- components, their functions and specifications, types of top roller loading; functions of yarn guide, balloon control ring, separators; types of rings and travellers; spindle size, spindle drives; working principle of builder motion; auto doffing mechanism; control of end breakage rate; power consumption; control of hard waste.

Compact Spinning

Principle of compacting, different methods of condensed yarn manufacture, comparison of condensed yarn properties with that of ring yarn.

Rotor Spinning

Raw material requirement and preparation; principle of operation - feeding, opening, cleaning, drafting, twisting and winding; process parameters influencing spinning performance and yarn quality; yarn structure, properties of ring and rotor spun yarns; limitations; latest developments in rotor spinning.

Friction Spinning

Principle of opening, cleaning, drafting, twisting and winding in DREF II and DREF III spinning; structure and properties of friction spun yarns.

Air-Jet and Air-Vortex Spinning

Raw material requirement, principles of drafting, twisting and winding in air-jet and air-vortex spinning; structure, properties and applications of air-jet and air-vortex yarns.

Other Spinning Systems

Principle of yarn production in self-twist, wrap, core, siro and solo spinning systems.

Yarn Plying and Fancy Yarns

Merits of plying; methods of plying-TFO, ring twisting; selection of twist level for plying; calculation of resultant count of plied yarns; Fancy yarns-types and production methods.

Text book(s):

1	Klein W., Vol. 4 -5, “A Practical Guide to Ring Spinning” and “New Spinning Systems" The Textile Institute, Manchester, 1987
2	Mahendra Gowda, “New Spinning Systems”, NCUTE Publications, 2006

Reference(s) :

1	Lawrence C.A. and Chen K.Z, “Rotor Spinning”, Textile Progress, Vol. 13, No.4, Textile Institute, U.K., 1981.
2	Carl A.Lawerence, “Fundamentals of Spun Yarn Technology”, CRC Press, 2003.
3	Lord P.R., “Handbook of yarn production”, WoodHead publishing, 2003.
4	Salhotra K.R, Alagirusamy, Chattopadhyay R,“Ring Spinning, Doubling and Twisting”, NCUTE Publications 2000.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 403 Fabric Manufacture I								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	50	50	100

Objective(s)	To impart basic knowledge on • Principle of preparation of yarn for weaving through various preparatory processes • Selection and control of process variables during weaving preparatory
Course Outcomes	**At the end of the course, the students will be able to** 1. State the sequence of weaving preparatory processes for various types of woven fabrics. 2. Categorize the different types of winding machines and its supply and end packages. 3. Explain working principles of various types of cone, cheese and precision winding machines. 4. Identify package faults and put forward remedial measures and calculate the production efficiency 5. Describe principle and working of weft winding machines 6. Identify the weft package defects and put forward remedial measures and calculate the production and efficiency of weft winding machines. 7. Explain principle and working of ordinary and modern beam warping machines. 8. Express the working principle of sectional warping machine, beam defects and remedies. 9. Explain the working principles of sizing machines and select the size ingredients for the given warp. 10. Describe the principle and working of drawing –in, knotting and pinning machines.

Introduction

Various types of woven fabrics and sequence of operation in warp and weft preparation - plain, stripes, checked, dyed, printed and denim; different types of supply and end packages; classification of winding machine – characteristics of parallel winding, cross winding and precision winding.

Warp Winding

Principle and working of modern cone, cheese and precision winding machines; angle of wind, angle of cone and traverse ratio; principles of yarn clearers, stop motions, knotters and splicer; patterning and gain; waxing; clearing efficiency; quality package for dyeing; package faults and remedies; production calculations in cone and cheese winding machines.

Weft Winding

Working of spindle and spindle less weft winders - bobbin loaders, bunching, stop motions; different types of weft winding machine; features of automatic pirn winders; pirn defects and remedies; production calculations in pirn winding machine.

Warping

Objectives; classification of warping machines; working principle of beam warping machine- types, creels, stop motion, length measuring motion; features of modern warping machines; sectional warping machines- creel-lease reed-stop motion; warping beam defects - causes and remedies; production calculations in warping machine.

Sizing & Drawing – In Process

Objectives; selection of size ingredients; size preparation equipments; working of two cylinder and multi-cylinder sizing machines; size add - on% and stretch control; marking and measuring motion, control system; beam pressing devices- mechanical, pneumatic, hydraulic; single end sizing machines; sizing of blended and filament yarns; developments in sizing - high pressure squeeze sizing, foam sizing and wet-on-wet sizing; sizing faults- causes and remedies; production calculations.

Drawing-in operation: working principles of manual, semi-automatic and automatic drawing-in machines; knotting and pinning machines.

Text book(s):

1	Lord P.R and Mohamed M.H, “Weaving conversion of yarn to fabric”, Wood head Publishers Ltd UK,reprint, 1992, ISBW: 090409538X.
2	Ajgaonkar D.B., Talukdar M.K. and Wedekar, “Sizing: Material Methods and Machineries”, Mahajan Publications, Ahmedabad, 1999.

Reference(s) :

1	Booth J.E., “Textile Mathematics”, Vol. II & III, Textile Institute, Manchester, U.K.
2	Sengupta, “Weaving Calculation”, D.P. Taraporewala Sons & Co. Ltd., reprint, 1996.
3	Ormerod A, “Modern Preparation and Weaving”, Wood head Publishers Ltd UK, reprint, 2004.
4	Talukdar M.K., “An Introduction to Winding and Warping” Testing Trade Press, Mumbai, 1998.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 404 - Knitting Technology								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	50	50	100

Objective(s)	To explain mechanism of warp and weft knitting and production of various knitted structures.
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain construction and function of various knitting elements and machines, and choose yarns for knitting 2. Demonstrate the mechanism of knitting of plain, rib, interlock, and purl structures 3. Draw the structures of plain, rib, interlock, purl and relate characteristics and end uses of fabrics with their structures. 4. Explain mechanism of needle selection and formation of knit, tuck and float stitches, and draw the structure of derivatives. 5. Calculate optimum knitting conditions and production and explain dimensional state of knitted fabrics. 6. Explain the mechanism of knitting of various structures using flat knitting machine and socks knitting. 7. Explain construction and function of various warp knitting elements and machines 8. Explain the mechanism of knitting using Tricot and Rachel knitting machines. 9. Draw the warp knitted structures and explain their characteristics. 10. Describe the influence of various factors on quality of knitted fabric.

Weft Knitting

Characteristics of woven and knitted fabrics; classification of weft knitting machines; comparison of warp and weft knitting; yarn quality requirements for knitting; weft knitting elements; single jersey, rib, interlock and purl knitting machines – construction and knitting operation.

Weft Knitted Structures

Single jersey, rib, purl and interlock structures – characteristics and their derivatives – lecoste, accordian type, Swiss and derby ribs, half and full cardigan, eight lock, single pique, ponte-di-roma, ottoman rib, bourrelet, texi pique, pin tuck, Milano rib, French and Swiss pique; fundamentals of formation of knit, tuck and float stitches; needle selection in weft knitting - multi cam tracks, pattern wheel and pattern drum; weft knitted fabric geometry, dimensional stability, dimensional states and dimensional parameters, spirality; calculation of optimum knitting conditions and production.

Flat Knitting

Basic principles and elements of flat knitting machines; different types of flat knitting machines- manual, mechanical and computer controlled; production of various weft knitted structures using flat knitting machines; mechanism of socks knitting.

Warp Knitting

Classification of warp knitting machines; preparation of yarns for warp knitting; knitting elements and working of Raschel and Tricot knitting machines, production of elementary warp knitted structures; warp knit structures - chain stitch, tricot, lock knit structures, satin, queen's cord, sharkskin, blind lap and inlay; warp knitted fabric geometry; production calculations.

Quality Control

Effect of loop length and its shape on fabric properties and factors affecting the formation of loop; defects in knitted fabrics- causes and remedies; tests for knitted fabric quality.

Text book(s):

1	Ajgaonkar. D.B., "Knitting Technology", Universal Publication Corporation, Mumbai, 1998.
2	Spencer. D.J., "Knitting Technology", Textile Institute, Manchester, 1989.

Reference(s) :

1	Chandrasekhar Iyer, Bernd Mammal and Wolfgang Schach., "Circular Knitting", Meisenbach GmbH, Bamberg, 1995.
2	Samuel Raz., "Flat Knitting; The new generation", MeisenbachGmbH, Bamberg, 1992.
3	Samuel Raz., "Warp Knitting Production", Melliand TextilberichteGmbH, Rohrbacher, 1987.
4	N. Anbumani., "Knitting fundamentals, machines, structures and developments, New Age Internatinal (P) Ltd., Publisher, 2007.
5	P. K. Banerjee, "Knitting Technology", NPTEL web course

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 405 Textile Chemical Processing I								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	50	50	100

Objective(s)	To impart technical knowledge on preparatory process and dyeing process of natural (cotton, wool and silk), man-made fibres/fabrics and its blends. To impart knowledge on the construction and working principles of wet processing and dyeing machineries.
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain the wet process sequences for cotton, wool, silk, polyester and blended fabrics and summarize the singeing, desizing and scouring processes for cotton material. 2. Evaluate the efficiency of desizing and scouring processes and explain the wool carbonizing and silk degumming process. 3. Describe the bleaching of cotton, cotton/viscose and P/C blends and select suitable chemicals and other auxiliaries for the above processes. 4. Explain and evaluate the mercerization and liquid ammonia treatments for cotton material 5. Choose the appropriate dye, chemicals and agents required for dyeing based on quality requirements, cost and input material and dye the given material with direct, reactive, vat and solubilised vat dyes. 6. Describe the colour fastness of dyed material to washing, rubbing, and light. 7. Summarize the principle of dyeing of polyester and polypropylene 8. Explain mass colouration technique, dyeing of nylon and acrylic 9. Describe the working principles of preparatory machines (Jigger, winch) 10. Demonstrate the working principles involved in dyeing machineries (Soft flow, beam, jet, cheese, cone, fibre and garment dyeing)

Desizing and Scouring

Wet process sequences for cotton, wool, silk, jute, polyester and blended fabrics (P/C, P/V).

Shearing and cropping; Singeing- yarn singeing, gas singeing of woven and tubular knits.

Desizing: classification of desizing methods, enzymatic desizing-mechanism and process conditions, desizing efficiency.

Scouring: mechanism and machines, process conditions and scouring efficiency. Wool carbonizing and degumming of silk.

Bleaching and Mercerizing

Bleaching: Hypochlorite and hydrogen peroxide bleaching - effect of process parameters; per-acidic, sodium chlorite, ozone, enzymatic bleaching; batch, semi-continuous and continuous processes; continuous scouring and bleaching machines; bleaching of viscose/linen, cotton/viscose, and polyester/cotton blends; evaluation of bleaching process.

Mercerisation: objectives, methods, process conditions and their effects;yarn mercerizer; fabric mercerizing machine – chain, chainless and circular; liquid ammonia treatment; evaluation of mercerizing process.

Dyes and Colorants

Classification of Colorants according to type of application; dyeing behavior of textile fibres; principle, methods of application and fastness properties of direct, reactive dyes, vat, solublised vat, sulphur-black, acid and basic dyes; fluorescent dyes; banned dyes;wash, rub, light fastness measurements.

Dyeing of Manmade Fibers

Dyeing of polyester -HTHP beamand jet dyeing, thermosol dyeing; dyeing of texturised filament; dyeing of polypropylene, nylon and acrylic;mass coloration - dope, piece and continuous dyeing process.

Dyeing Machines

Mechanical and economic aspects of fibre, yarn, and fabric processing machines; scouring, bleaching and dyeing machines -loose stock, bale, hank, package, jigger, winch, soft flow, soft-over flow, air flow machines; padding mangles; garment dyeing machines- paddle, rotary drum, tumbler, toroid.

Text book(s):

1	Trotman, E.R., “Dyeing and Chemical Technology of Textile Fibres”, Charles Griffin and Co. Ltd., London. 2001.
2	Bhagwat R.S “Handbook of Textile Processing Machinery”, Colour Publication, Mumbai, 1999

Reference(s) :

1	Kesav V.Datye and A.A.Vaidya, “Chemical processing of synthetic fibers and Blends”, John wiley & Sons,2004
2	Bhagwat R.S “Handbook of Textile Processing”, Colour Publication, Mumbai, 1999.
3	T.L.Vigo, “Textile Processing and Properties”, Elsevier, New York, 1994.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 4P1 Spun Yarn Technology Laboratory II								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	0	0	3	45	2	50	50	100

Objective(s)	• To enable the students to learn material passage in the machine, important parts of machines, draft, twist and production calculations. • To train the students to handle machine and operate them practically.
Course Outcomes	**At the end of the course, the students will be able to** 1. Demonstrate the working of ring spinning frame. 2. Calculate the speed and production of ring spinning frame. 3. Calculate the twist and set the machine variables in ring spinning frame. 4. Explain the working of builder mechanism in ring spinning frame. 5. Select optimum process variables and produce two ply yarn using two-for-one twister. 6. Calculate the twist and production of two-for-one twister. 7. Produce fancy yarns on two-for-one twister. 8. Set the variables and produce quality yarns using rotor spinning machine. 9. Calculate the twist and production of rotor spinning machine. 10. Produce multiply yarns
	LIST OF EXPERIMENTS 1. Passage of material through ring frame and settings in ring frame. Calculation of speed and draft in ring frame, production of yarn and measurement of yarn count. 2. Calculation of twist and twist constant 3. Builder mechanism in ring frame 4. Passage of material through Two-For-One twister (TFO) and production of ply yarn and measurement of ply yarn count. 5. Calculation of twist in Two-For-One twister 6. Production and quality characterization of two-fold yarns 7. Production of fancy yarns in Fancy Doubler 8. Passage of material through rotor spinning machine and production of yarn and testing ofrotor yarn count. 9. Calculation of production and twist in rotor spinning 10. Production of Multi ply yarn.

K.S. Rangasamy College of Technology - Autonomous R 2014

40 TT 4P2 Fabric Manufacture Laboratory I

B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	0	0	3	45	2	50	50	100

Objective(s)

To develop the skills in

- Operation of weaving preparatory machines
- Selection of optimum process variable in the preparatory process

Course Outcomes

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

1. Choose the optimum process variables and carry out winding using cone winding machine and calculate the production.
2. Set the machine variables and carry out winding using cheese winding machine and calculate the production.
3. Explain and evaluate the setting of stop motion mechanism in winding machines.
4. Explain and evaluate the setting of slub catcher and tensioners in winding machines.
5. Demonstrate the material passage and calculate the production and speed in pirn winding machines.
6. Set the process variables such as bunch length, pirn content and tension in pirn winding machine.
7. Demonstrate the passage of material and calculate the speed of reeling machine.
8. Thread the material and calculate winding and traverse speed in double flanged bobbin machine.
9. Calculate the warping speed in sectional warping machine.
10. Demonstrate the passage of material and practice the drawing of warp yarn through the heald wire and reed for plain and twill weave structures.

LIST OF EXPERIMENTS

1. Passage of material through the cone winding machine. Calculation of drum speed, traverse speed, production in cone winding machine.
2. Passage of material through doubler winding machine. Calculation of drum speed, traverses speed, production in doubler winding machine.
3. Working of stop motion in cone winding machine.
4. Setting of tensioners and slub catchers on cone and doubler winding machine.
5. Passage of material through the Schweiter automatic pirn winding machine. Calculation of production in pirn winding machine.
6. Adjustment of bunch length, pirn content and tension settingsin pirn winding machine.
7. Passage of material through reeling machine. Calculation of production in reeling machine.
8. Passage of material through double flanged bobbin machine. Speed and production calculation in hank winding machine.
9. Passage of material through the sectional warping machine. Calculation of production and plan of warp patterns for striped fabrics
10. Drawing-in, denting-in and knotting of the weavers beam.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 4P3 Textile Chemical Processing Laboratory I								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	0	0	3	45	2	50	50	100

Objective(s)	To study the various methods of pretreatment of yarns and fabrics. To study the various dyeing methods.
Course Outcomes	**At the end of the course, the students will be able to** 1. Know the degumming process of silk materials 2. Know the desizing and scouring process of grey cotton goods 3. Recognize the Bleaching process of cellulosic materials at different methods 4. Know dyeing of cotton / viscose materials with direct dye 5. Demonstrate the reactive dyes application methods on cotton yarn 6. Apply the disperse dyes application on polyester fabric in HTHP methods and two stage method on polyester/cotton materials 7. Know the dyeing method of silk and wool materials with acid dyes 8. Know the dyeing method of cotton using vat dyes and preparation of shade card using reactive dyes 9. Demonstrate the dyeing process of Remazol and Sulphur black dyes with cotton fabric 10. Calculate the amount of dyes and fabric required for shade matching of samples with reactive dyes using Jigger / Winch dyeing machine
	LIST OF EXPERIMENTS 1. Degumming of silk 2. Desizing of grey cotton fabric using enzymes 3. Scouring of cotton materials 4. Bleaching of cotton using hypochlorite 5. Bleaching of cotton using hydrogen peroxide 6. Dyeing of cotton / viscose using direct dyes 7. Dyeing of cotton using reactive dyes (Dichloro/Monochlorotriazinyl/Bi-functional) 8. Dyeing of cotton using vat dyes 9. Dyeing of cotton with sulphur black 10. Dyeing of silk and wool with acid dyes 11. Dyeing of polyester using disperse dyes (HTHP) 12. Dyeing of polyester / cotton blends by two stage method 13. Preparation of shade card using reactive dyes (Shade-0.2%, 0.5%, 1%, 1.5%) 14. Dyeing of cotton fabric with remazol using pad-dry-pad silicate batch method 15. Dyeing of cotton fabric with reactive dyes using jigger / winch dyeing machine 16. Shade matching for thegiven sample using reactive dyes(two / three colour combinations)

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 MA 013 Statistics for Textile Industry								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	1	0	60	4	50	50	100

Objective	• To acquire skills in handling situations involving random variable • To familiarize the students with various methods in hypothesis testing • To learn how to use control charts to monitor discrete data • To construct an appropriate model using time series approach
Course Outcomes	**At the end of the course, the students will be able to** 1. Acquire the knowledge of probability and random variable 2. Apply discrete and continuous probability distributions in engineering problems 3. Measure the relationship between two variables 4. Construct and interpret quality control charts 5. Test the statistical hypotheses using normal, t and F distributions 6. Test the statistical hypotheses for goodness of fit using chi-square test 7. Analyze the variance of factors using CRD and RBD 8. Analyze the multi-factorial design of experiment using Latin square. 9. Know the components of time series and methods to measure the trend 10. Construct the time series for moving averages

Probability and Distributions

Probability (basic concepts) – Probability distributions – Properties of random variable – Moment generating function – Standard distributions – Binomial, Poisson, Weibull and Normal distributions – Problems

Testing of Hypothesis

Application of Normal distribution for testing mean and proportion – Applications of t, F and χ^2 distribution for testing mean and variance – Goodness of fit – Independence of attributes – Non-parametric test: Test of Concordance

Correlation and Control Charts

Correlation and Regression (discrete) – Control charts – $\overline{X}$ chart – R chart – np chart – p chart – C chart – AQL chart – Basics of process capability study and six sigma

Design of Experiments

One way classification – Two way classification – Completely randomized design – Randomized block design – Latin square design

Time Series

Components of time series – Measurement of trend – Methods of least square – Linear trend – Quadratic trend – Exponential trend – Method of semi-averages – Method of moving averages

Text book:

1	Nagla J.R., “Statistics for Textile Engineers”, Wood head Publishing India Limited, New Delhi, 2014
2	Leaf G.A.V., “Practical Statistics for the Textile Industry: Part I and Part II”, The Textile Institute, UK, 1984

Reference(s):

1	Montgomery D.C., “Introduction to Statistical Quality Control”, John Wiley & Sons Inc., Singapore, 2001
2	Hayavadana J., “Statistics for textiles and apparel management”, Wood head Publishing India Limited, New Delhi, 2012

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 501 Fabric Manufacture II								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	50	50	100

Objective(s)	To impart basic knowledge in different aspects and methods of fabric manufacture, get thorough knowledge in the concepts involved in these processes.
Course Outcome	**At the end of the course, the students will be able to** 1. Explain the basics of weaving motions. 2. Summarize the different mechanism in primary motions & secondary motions. 3. Comprehend the types & selection of weaving accessories. 4. Acquire knowledge on types, working and different mechanisms involved in drop box mechanisms. 5. Explain the working and settings involved in the different types of dobbies. 6. Practice pegging for dobby. 7. Explain the working and setting points in Terry mechanism. 8. Undersatnd the classification, function, working, harness mounting and tie ups involved in jacquard mechanism.. 9. Practice design preparation for simple jacquard design. 10. Discuss the weft insertion principles, weft preparation, techno – economics & yarn quality requirements of different shuttleless looms.

Primary Motions of Loom

Basic weaving motions-primary, secondary and auxiliary motions; shedding - positive and negative; top reversing motion – four bar and six bar linkages; picking - over picking and under picking; beat-up – sley eccentricity, loom timing diagram; swell checking and hydraulic swell checking; check straps.

Secondary, Auxiliary Motions and Accessories

Let-off – positive and negative, tension control device; take-up– different types of take-up mechanism; side weft fork and centre weft fork mechanisms; warp protector mechanism - loose reed and fast reed; warp stop motion – mechanical and electrical; weft stop motion – different types and feelers; shuttle changing mechanism; cop changing mechanism; weaving accessories – types and selection of heald wires, heald frames, reeds, drop wires, temples; picking accessories – shuttles.

Drop Box and Dobby Looms

Drop box mechanism - - 1x4; different types of dobby- climax, cross-border, cam and electronic dobby; pick finding device; method of pegging for right hand and left hand dobby- designing and pegging; terry mechanism – principle and types – loose reed terry and fast reed terry mechanism.

Jacquards

Classification of jacquards - working of different jacquards **-** single lift single cylinder jacquard, double lift single cylinder jacquard, double lift double cylinder jacquard, cross-border jacquard and electronic jacquard; casting out; tie ups; harness mounting; motif and design preparation for a simple jacquard design; card punching; brief note on card lacing and types of card lacing.

Shuttleless Loom

Yarn quality requirements for shuttleless loom; weft preparation for shuttleless loom; weft insertion principle of shuttleless looms in projectile, rapier, air-jet, water jet and multiphase looms; weft accumulators; types of selvedges; techno-economics of shuttleless loom; weaving of blended yarns and filament yarns.

Text book (s) :

1	Sriramlu P.K., Ajgaonkar D.B. and Talukdar M.K., Weaving Machines: Mechanisms, Management, Mahajan Publishers, Ahmedabad, 1998.
2	Marks P and Robinson A.T.C., Principles of Weaving, The Textile Institute, Manchester, 1989.

Reference(s) :

1	Lord P.R. and Mohamed M.H., Weaving: Conversion of Yarn to Fabric, Merrow Publications, 1992.
2	Chakravorthy B., Mechanism of Weaving Machines, Smt.Chakravorthy serampore W.B.1982.
3	Ormerod, Modern Preparation and Weaving, Butterworths & Co. Ltd., 1983.
4	Woven Fabric production-I (The Plain Power Loom), Woven fabric Production-II (Dobby, Dropbox, Jacquard and Terry Looms), NCUTE Publication.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 502 Non Woven Technology								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	50	50	100

Objective	To impart the knowledge on manufacturing technology of nonwoven fabric and its application.
Course Outcomes	**At the end of the course, the students will be able to** 1. Define the concept of nonwovens and its applications. List the fibres used in the production of nonwovens and study the fibre characteristics. 2. Identify the suitable binders, stabilisers, pigments used in non woven production. Explain the current trends and market potential for nonwovens and collect the information on future prospects of nonwovens in India 3. Illustrate the different methods of web preparation like dry, air, wet laid methods and relate the factors influencing the web characteristics 4. Illustrate the different methods of web preparation like spun bond , melt blown methods and relate the factors influencing the web characteristics and Interpret the relationship between the structure and property of the webs produced by various methods 5. Illustrate the mechanical bonding techniques land interpret the influence of process parameters in bonding. 6. Illustrate the thermal and chemical bonding techniques and interpret the influence of process parameters in bonding. 7. Define the objective of finishing treatment on nonwovens. Describe the mechanical finishing and chemical finishing methods. 8. Describe about nonwoven composites and the end use of nonwovens in home textiles and technical textiles. 9. Define the objective of testing of nonwovens fabrics. Describe the method of testing nonwovens for home textiles, geo textiles and technical textiles. 10. Describe the method of testing microbiological resistance by soil burial test, resistance to static electricity.

Introduction

Definitions and classification of nonwoven fabrics; fibres used for making nonwovens and their characteristics; polymer powders,pigments,stabilizers,binder fluids, binder fibres-adhesive fibres(soluble and hotmelt) and their characteristics; worldwide production and consumption of nonwoven fabrics.

Web Forming

Web preparation**-** methods of making the web using carding machines- parallel laying and cross laying, factors influencing the web quality; various air laid principles and factors influencing web quality; wet laid principles – methods of binder addition and methods of drying nonwoven batt, factors influencing web quality; synthetic web formation principles -spunbonded and meltblown method; Non woven layering-MSM and SMS, applications; structure-property relationship in nonwoven fabrics.

Bonding

Mechanical bonding techniques**-** working principle of needle punching machine, surface structuring, needle characteristics, needle parts and influence of needling conditions on nonwoven batt; stitch bonding-working principle(with and without thread); hydroentangling(spunlaced)- working principle and process influence on nonwoven batt; thermal bonding- principles of calendaring, ultrasound, contact drying, radiation drying; chemical bonding- principles of adhesion, cohesion bonding and methods of adhesive bonding(doctor blade, engraved cylinder, spraying and foam application).

Finishing and End Uses

Finishing - dry finishing- shrinkage, wrenching and creping, calendaring, perforating, slitting and splitting; wet finishing – printing, softening, flame proof coating, laminating and flocking; introduction to nonwoven composites; end uses of nonwoven fabrics in technical textiles and home textiles.

Testing

CBR cone puncture test, liquid strike through time, bacterial filtration test(wet & dry), free formaldehyde, demand absorbency, opacity, super absorbency test-centrifuge retention capacity, geotextiles-resistance to weathering, microbiological resistance by soil burial test, home textiles - flammability, bending rigidity, resistance to static electricity of floor fabrics.

Text book(s):

1	Albrecht Wilhelm, “Non woven fabrics: Raw material, Manufacture, Applications”. Wiley VCH, 2008.
2	Albin Turbak, “Nonwovens: Theory, Process, Performance & Testing”, 1993.

Reference(s) :

1	Purdy.A.T. “Developments in Non-woven fabrics”, Textile progress, vol.12, No.47, Textile Institute 1983.
2	J. Lunenschloss, W. Albrecht and David Sharp, “Nonwoven Bonded Fabrics”, Ellis Norwood Ltd., New York, 1985, ISBN -085312-636-4.
3	Dharmadhikaru.R.K., Gilmore T.F, Davis H.A and Batra S.K, ”Thermal bonding of non woven fabrics”, Textile progress, vol.26, No.2, Textile Institute, 1995.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 503 Textile Chemical Processing II								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	50	50	100

Objective(s)	To impart knowledge on the various processes involved in Chemical Processing and the fundamental aspects of eco-friendly processing in Textile Finishing, understand the processes of Printing, Finishing
Course Outcome	**At the end of the course, the students will be able to** 1. Explain the ingredients, methods of printing and styles of printing. 2. Describe the working of rotary, roller, flat-bed, transfer and ink-jet printing machines and discuss the defects and limitations 3. Explain the printing of cotton and polyester fabric 4. Describe the procedure involved in printing of silk, wool and garment. Discuss its faults-cause & remedies 5. Explain the procedure involved in finishing of cotton materials using various machines- (raising, brushing, calendaring, anti shrink finish, relaxation shrinkage, felt compacting & felting) 6. Describe the procedure involved in finishing of denims. 7. Explain the procedure involved in crease resistance, water proof and water repellent finishes 8. Describe the finishing process of flame proof and value added finishing 9. Summarize the various treatments of textile effluents 10. Explain the waste disposal & solid waste reduction techniques and concepts of ISO 14000

Methods and Styles of Printing

Essential ingredients and properties of printing paste; methods of printing- roller, screen (manual and flatbed) and rotary printing method; styles of printing-direct, discharge and resist; making of screens for flat bed and rotary screen machines; defects and limitations of screen printing; transfer printing; foam printing; ink jet printing.

Printing of Fabrics

Printing of cotton fabric using direct, reactive dyes and pigment; printing of polyester with disperse dyes; printing of silk and wool with acid and basic dyes; digital printing; garment printing; printing faults- causes and remedies.

Finishing

Introduction to finishing- objectives- mechanical and chemical finishing; durable and temporary finishes on cotton fabrics; back filling; raising and brushing; calendaring; anti shrink finish; relaxation shrinkage, felt compacting; softening, felting, non-felting; Denim finishing- stone, enzyme wash; bio-polishing.

Functional Finishes

Crease resist finish; cross linking agents – DMDHEU, poly carboxylic acids (BTCA & citric acid) for cotton; water proof and repellent finishes for cotton and synthetics; flame resistance finishes for cellulosic's and blends; antimicrobial finishes; insect-resist finishes; stain free finish; softeners; finishing of knits; value added finishing of garments; herbal finishes and aroma finish.

Effluent Treatment

Textile effluent–textile waste water problems, textile waste water characteristics, chemicals used in textile industry; treatment of textile effluents – primary, secondary and tertiary techniques for effluent treatment; solid waste reduction and disposal; concepts of ISO 14000.

Text book(s):

1	Shenai, V.A., "Technology of Textile Finishing", Sevak Publications, Bombay, 1995.
2	Shenai, V.A., "Technology of Printing", Sevak Publications, Bombay, 1996.
3	Peter J. Hauser, "Advances in Treating Textile Effluent", InTech, October 2011

Reference(s) :

1	LWC Miles, (Editor) "Textile Printing", Dyers Company of Publications trust, U.K, 1981.
2	Marsh, J.T., "An Introduction to Textile Finishing", Chapman and Hall Ltd., London, 1979.
3	Padmavankar, 'Textile Effluent NCUTE', IIT, Publication, 2002.
4	W.D.Schindler, "Chemical Finishing of Textiles", Wood Head Publishing Ltd, 2004.
5	Wareen Perkins, ''Textile Coloration and Finishing'', Carolina academic press, 1996.
6	Prof. Dr. rer. nat. Hans-Karl Rouette, "Encyclopedia of Textile Finishing", Springer Verlag, 2002.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 504 Textile Quality Evaluation								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	50	50	100
Objective(s)	To study the aim of quality evaluation, know in detail the various aspects of fiber properties, yarn properties, Fabric properties and Garment properties.							
Course Outcome	**At the end of the course, the students will be able to** 1. Analyze various factors influencing quality. 2. Explain the fibre, yarn and fabric sampling methods. 3. Describe the working of fibre testing equipment. 4. Describe the working of advanced testing equipment. 5. Describe yarn fundamental properties and handle yarn testing equipment. 6. Describe the working of advanced yarn testing equipment. 7. Describe the fabric basic properties and handle fabric testing equipments 8. Evaluate fabric comfort properties and handle the equipments 9. Implement the concept of garment checking procedure and assess the seam and accessories properties 10. Handle FAST & KAWABATA testing equipments							

Introduction

Definition of quality; types of quality – quality of design, quality of conformance, quality of performance, quality control and quality assurance; factors influencing quality; reasons for quality evaluation; random and biased sampling, fibre sampling from bulk, combed slivers and rovings; yarn sampling; fabric sampling; standard testing atmosphere; standard testing methods.

Fibre Quality Evaluation

Determination of fibre length and its uniformity- fibrograph; determination of fibre fineness and its importance; determination of fibre strength and elongation - stelometer; high speed fibre measurement- High Volume Instrument, Advanced Fibre Information System; evaluation of man-made fibre properties - single fibre fineness - vibroscopic method, single fibre strength – universal tensile tester ; determination of trash; fibre maturity- caustic soda swelling method, differential dyeing method and air flow method; determination of moisture content and regain in fibres.

Yarn Quality Evaluation

Linear density – Direct & Indirect systemsand Determination; evaluation of twist in single and ply yarn - take-up twist tester and tension type twist tester; determination of evenness- capacitance method, spectrogram , variance-length curve; yarn hairiness principles of tensile testing, tensile testing of yarn at high speeds, factors influencing tensile characteristics; classification of yarn faults; yarn appearance assessment – ASTM yarn grades, electronic inspection board.

Fabric Quality Evaluation

Determination of tensile and tear strength; bursting strength; dimensional stability- WIRA steaming cylinder, cubex method and IWS method; air permeability; water repellency-spray test, drop penetration test, wetting time test and shower test; abrasion resistance; pilling; crease recovery; stiffness; drape; fabric weight, colour fastness (light, washing, perspiration and rubbing).

Fabric Assessment Requirement for Apparel

Fabric checking procedure - 4 point system,10 point system; seam slippage and strength testing; comfort-subjective and objective evaluation of fabric handle-FAST, KES; Button pull strength test, button impact test, zipper strength test.

Text book(s):

1. V. K. Kothari (Ed), “Testing and Quality Management”, Vol.1, IAFL Publications, New Delhi, India, 1999.
2. B. P. Saville,” Physical Testing of Textiles”, Woodhead Publishing Ltd., England, 1999.

Reference(s) :

J.E. Booth, “Textile Testing”, Butterworth Heinemann Ltd., U.K, 1996.

A. Basu, “Textile Testing; Fibre, Yarn and Fabric”, SITRA, Coimbatore, 2001.

V.Sundaram, “Hand book of Textile Testing”, CTRL Publications, Bombay, 2004.

”Textile testing – fiber and yarn testing”, NCUTE Publications.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 505 Fashion Design and Pattern Making								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	50	50	100
Objective(s)	To impart knowledge on elements of design, fashion cycle and role of designers, impart knowledge on basic pattern making and grading							
Course Outcomes	**At the end of the course, the students will be able to** 1. Describe the philosophy of design and classification of fashion. 2. Express the elements and principles of design in garment designing. 3. Analyze various stages of fashion cycle, structure of the fashion market and motives for consumer buying. 4. Describe the role and types of designers and the effect of fashion adoption. 5. Sketch various head theories and difference between normal figure and fashion figure. 6. Analyze various measurements and size charts involved in garment construction. 7. Demonstrate the skills acquired on basic pattern bodice front, back, sleeve, skirt front and back, trouser. 8. Demonstrate the skills acquired on basic pattern making for men, women and children. 9. Demonstrate the skills acquired on grading patterns for shirt, trousers, skirt and midi top 10. Perform on computerized grading, marker planning and marker making.							

Principles and Elements of Design

Definition of fashion, Classification of fashion-style, classic, fad, fashion trend and fashion forecasting; philosophy of design – structural and decorative design; elements of design – silhouette, line, color, pattern and texture; principle of design – proportion, balance, unity, rhythm and emphasis.

Fashion Movement and Types of Designers

Fashion cycle - stages of fashion cycle; motives for consumer buying; factors influencing fashion movement; recurring fashion; structure of fashion market- haute couture, designer wear and street fashion; role of designer; types of designers; sources of inspiration for designers; theories of fashion adoption-trickle up, trickle down and trickle across theories.

Anatomy and body measurements

Anatomy - Importance of anatomy in garment making; proportion - eight head theory and ten head theory; joints and their effects on garment; Illusion created by clothing; normal figure and fashion figure - its differences; body measurements - measurements needed for the construction of children's, men's and ladies garments; method and sequence of taking measurements; recording of measurements; meaning of the men's, women's size charts and control dimensions.

Basic Pattern Making

Basic pattern making – Importance of paper pattern; pattern making tools; Methods of pattern making –Draft pattern technique, flat paper pattern making technique and draping; Drafting of basic pattern – bodice front, back, sleeve, skirt front and back, shirt and trouser; Drafting of men's shirt components like front, back, yoke and sleeves; pattern grain line and its importance; pattern making for leg garments – front and back for trouser, skirt front and back.

Pattern Grading and Marker Planning

Pattern grading – definition and general rules; grading patterns for shirt, trousers, skirt and midi top; basics of computerized grading technology; Advantages of computerized pattern making; Marker planning and marker making.

Text book(s):

1	Helen Joseph Armstrong, "Pattern Making for Fashion Design", Harper Collins N.Y., 1995, IInd edition.
2	Sumathi G.J. "Elements of Fashion and Apparel Design" New Age International Publishers, New Delhi 2002.
3.	Ashdown.s.p."Sizing in clothing" Wood head publishing limited, 2007.
4.	Fan J,Yuw and Hunter .L " Clothing Appearance and fit science and technology ", Wood head Publishing limited.

Reference(s) :

1	Gini Stephens Frings, "Fashion-from concept to consumer" 7th Edition, Prentice Hall 2005.
2.	Ruth.E. Glock / Grace I.Kunz, Apparel manufacturing and sewn product analysis fourth edition Prentice hall 2005
3.	Sharon Lee Tate, "Inside Fashion Design", 5th Edition, Pearson Prentice Hall, Delhi 2004.
4.	Geery cooklin" Pattern grading for women's clothes the technology of sizing" OM Books Services New Delhi 1999 Edition 2000
5.	Geery cooklin" Pattern grading for childerns clothes Black well publishing oxford edition1996
6.	"Carr and lathams "Technology of clothing manufacture , Fourth edition ,Black well publishing

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 5P1 Fabric Manufacture Laboratory II								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	0	0	3	45	2	50	50	100

Objective(s)	To study the mechanism / settings in non-auto loom and effect of altering the various parameters, To develop skills in the operation and maintenance of all the above machines, improve skills in the operation and maintenance of the various attachments like dobby, jacquards, etc on non-automatic loom.
Course Outcome	**At the end of the course, the students will be able to** 1. Practice dismantling, assembling and setting of Shedding. 2. Practice dismantling, assembling and setting of Picking mechanism. 3. Perform dismantling, assembling and setting of Beat Up mechanism. 4. Practice dismantling, assembling and setting of Let - Off Motion. 5. Practice dismantling, assembling and setting of Take – up. 6. Perform dismantling, assembling and setting of Warp Stop Mechanism in loom. 7. Perform dismantling, assembling and setting of weft Stop Mechanism in loom. 8. Understand dismantling, assembling and setting of Warp protector mechanism. 9. Practice designing of pegging plan on wooden lags. 10. Understand production calculation for circular single jersey, circular rib and interlock.

LIST OF EXPERIMENTS

To study the mechanism, setting, operation of the following

1. Dismantling, assembling and setting of Tappet Shedding mechanism in plain power loom.
2. Dismantling and assembling of Cone over picking mechanism and study adjustment of picking force.
3. Dismantling and assembling of Beat –up mechanism and setting of sley eccentricity
4. Dismantling and assembling of Negative Let-off mechanism and adjustment of warp tension
5. Dismantling and assembling of seven wheel Take-up mechanism and calculation of dividend
6. Dismantling and assembling of Weft Stop Mechanism and setting of various parts
7. Dismantling and assembling of Warp Stop Motion (mechanical or electrical)
8. Dismantling and assembling of Warp protector mechanism (Fast Reed Mechanism) setting of various parts.
9. Designing of pegging plan on wooden lags and preparation of punched card for 4x4 drop box mechanism for a given design.
10. Material passage and production calculation for circular single jersey weft knitting machine
11. Material passage and production calculation for circular rib knitting machine
12. Material passage and production calculation for interlock knitting machine

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 5P2 Textile Chemical Processing Laboratory II								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	0	0	3	45	2	50	50	100
Objective	To acquire practical knowledge on printing and finishing of various fabrics, learn the usage of chemical and auxiliaries in printing and finishing of fabrics							
Course Outcomes	**At the end of the course, the students will be able to** 1. Perform direct style of printing on cotton fabric using vinyl sulphone reactive dyes 2. Practice printing on cotton fabric using pigment 3. Practice discharge style of printing on cotton fabric –white & colour base 4. Apply Resist style of printing on cotton fabric – white & colour base 5. Practice Tie & Dye style of printing on cotton fabric 6. Determine the color fastness to washing, rubbing of coloured material 7. Determine of color fastness to light of coloured material 8. Determine of colour fastness to perspiration 9. Determine of cotton fabric shrinkage- woven, knit 10. Apply soft finishing of cotton fabric using cationic softeners, Apply crease resistant finish on cotton fabric using citric acid & DMU							

LIST OF EXPERIMENTS

1. Direct style of printing on cotton fabric using vinyl sulphone reactive dyes
2. Printing on cotton fabric using pigment
3. Discharge style of printing on cotton fabric –white & colour base
4. Resist style of printing on cotton fabric – white & colour base
5. Tie & Dye style of printing on cotton fabric
6. Determination of colour fastness to washing on coloured material for 5 and 10 washing cycles
7. Determination of colour fastness to rubbing on coloured material
8. Determination of colour fastness to light on coloured material
9. Determination of colour fastness to perspiration
10. Determination of cotton fabric shrinkage – woven, knit fabrics
11. Soft finishing of cotton fabric using cationic softeners
12. Crease resistant finish on cotton fabric using citric acid &DMDHEU

K.S. Rangasamy College of Technology - Autonomous R 2014

40 TT 5P3 Textile Quality Evaluation Laboratory

B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	0	0	3	45	2	50	50	100

Objective(s)	To study the evaluation procedure for determining various fibre, yarn and fabric properties
Course Outcomes	**At the end of the course, the students will be able to** 1. Analyse the fibre length using Baersorter. 2. Determine the bundle fibre strength and elongation using Stelometer 3. Determine fibre fineness using Sheffield micronaire 4. Evaluate the linear density of sliver, roving and yarn using wrap block and automatic wrap reel 5. Determine single yarn and ply yarn twist using manual and electronic twist tester 6. Evaluate the single yarn strength using single thread strength tester 7. Determine of lea strength using mechanical lea tester 8. Analyse fabric abrasion using Martindale abrasion tester 9. Evaluate fabric tearing strength using Elemendorf tear tester 10. Determine fabric seam slippage using seam slippage tester

LIST OF EXPERIMENTS

1. Determination of fibre length using Baersorter
2. Determination of bundle fibre strength and elongation using Stelometer
3. Determination of fibre fineness using Sheffield micronaire
4. Determination of fibre trash content using Shirley trash analyzer
5. Determination of linear density of sliver, roving and yarn using wrap block and automatic wrap reel
6. Determination of single yarn and ply yarn twist using manual and electronic twist tester
7. Determination of single yarn strength and elongation using single thread strength tester
8. Determination of lea strength using mechanical lea tester
9. Determination of yarn ballistic strength using ballistic tester
10. Determination of fabric stiffness using stiffness tester
11. Determination of crease recovery angle using crease recovery tester
12. Determination of fabric pilling using ICI pill box tester
13. Determination of fabric abrasion using Martindale abrasion tester
14. Determination of fabric tearing strength using Elemendorf tear tester
15. Determination of fabric seam slippage using seam slippage tester

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2014
Department	Textile Technology	Programme Code & Name			TT. B.Tech. Textile Technology			
Semester V								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
40TP0P3	**CAREER COMPETENCY DEVELOPMENT III**	0	0	2	0	100	00	100
Objective(s)	To enhance employability skills and to develop career competency							

Unit – 1	Written and Oral Communication – Part 1	Hrs
Reading Comprehension Level 3 - Self Introduction - News Paper Review - Self Marketing - Debate- Structured and Unstructured GDs Psychometric Assessment – Types & Strategies to answer the questions **Practices:** Sentence Completion - Sentence Correction - Jumbled Sentences - Synonyms & Antonyms - Using the Same Word as Different Parts of Speech - Interpretation of Pictorial Representations - Editing - GD - Debate. **Materials:** Instructor Manual, Word power Made Easy Book, News Papers		6
Unit – 2	Verbal & Logical Reasoning – Part 1	8
Syllogism - Assertion and Reasons - Statements and Assumptions - Identifying Valid Inferences - identifying Strong Arguments and Weak Arguments - Statements and Conclusions - Cause and Effect - Deriving Conclusions from Passages - Seating Arrangements **Practices:** Analogies - Blood Relations - Statement & Conclusions **Materials:** Instructor Manual, Verbal Reasoning by R.S.Aggarwal		
Unit – 3	Quantitative Aptitude – Part 3	6
Probability - Calendar- Clocks - Logarithms - Permutations and Combinations **Materials:** Instructor Manual, Aptitude Book		
Unit – 4	Quantitative Aptitude – Part 4	6
Algebra - Linear Equations - Quadratic Equations - Polynomials **Practices:** Problem on Numbers - Ages - Train - Time and Work - Sudoku - Puzzles **Materials:** Instructor Manual, Aptitude Book		
Unit – 5	Technical & Programming Skills – Part 1	4
Core Subject – 1,2 3 **Practices :** Questions from Gate Material **Materials:** Text Book, Gate Material		
	Total	30

Evaluation Criteria

S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	15 Questions each from Unit 1, 2, 3, 4 & 5 (External Evaluation)	60
2	Evaluation 2 - Oral Communication	GD and Debate (External Evaluation by English, MBA Dept & External Trainers)	20
3	Evaluation 3 – Technical Paper Presentation	Internal Evaluation by the Dept.	20
		Total	**100**

Reference Books

1. Aggarwal, R.S. “A Modern Approach to Verbal and Non-verbal Reasoning”, Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, “Quantitative Aptitude”, TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Power Made Easy by Norman Lewis W.R. GOYAL Publications

Note :

- Instructor can cover the syllabus by Class room activities and Assignments (5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough work pages
- Each Assignment has 20 Questions from Unit 1,2,3,4 and 5 and 5 Questions from Unit 1
- Evaluation has to be conducted as like Lab Examination.

K.S.Rangasamy College of Technology - Autonomous R 2014								
40 HS 003 Total Quality Management								
Common to all branchs								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	2	0	0	45	2	50	50	100
Objective(s)	To understand the Total Quality Management concept and principles and the various tools available to achieve Total Quality Management, statistical approach for quality control, ISO and QS certification process and its need for the industries.							
Course outcomes	**At the end of the course, the student will be able to** 1. Recognize the basic concepts of total quality management 2. List the role of senior management. 3. Identify the customer satisfaction, retention and employee involvement. 4. Locate the continuous process improvement techniques. 5. List the seven tools of quality and new seven management tools 6. Demonstrate concept of six sigma. 7. Implement the concept of quality function deployment 8. Assess the total productive maintenance, failure mode and effective analyses 9. Demonstrate the need for ISO 9000 and other quality system. 10. Categorize the quality auditing.							

Introduction

Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs - Analysis Techniques for Quality Costs, Basic concepts of Total Quality Management, Historical Review, Principles of TQM, Quality Council, Quality Statements, Deming Philosophy, Barriers to TQM Implementation.

TQM Principles

Customer satisfaction, Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement, Juran Trilogy, PDSA Cycle, 5S, Kaizen, Supplier Partnership, Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures-Basic Concepts, Strategy.

Statistical Process Control (SPC)

The tools of quality, Statistical Fundamentals, Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma.

TQM Tools

Benchmarking, Reasons to Benchmark, Benchmarking Process, Quality Circle, Quality Function Deployment (QFD). House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM), Concept, Improvement Needs, FMEA–Stages, Types.

Quality Systems

Need for ISO 9000 Quality Systems, ISO 9001:2008 ISO 14000 Quality Systems, Elements Concepts, Implementation, Documentation, Quality Auditing, Requirements and Benefits, Non Conformance report, Case Studies on Educational System.

Text book (s) :	
1	Dale H.Besterfiled, et al., “Total Quality Management”, Pearson Education Asia, 1999. (Indian reprint 2002).
Reference(s) :	
1	James R.Evans & William M.Lidsay, “The Management and Control of Quality”, (5th Edition), South-Western (Thomson Learning), 2002.
2	Feigenbaum.A.V. “Total Quality Management”, McGraw Hill, 1991.
3	Jayakumar.V, Total Quality Management”, Lakshmi Publications, 2006.
4	Suburaj, Ramasamy “Total Quality Management”, Tata McGraw Hill, 2005.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 601 Fabric Structure								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	50	50	100

Objective(s)	To impart knowledge on the characteristics and applications of different fabric structures, impart knowledge on colour theory relevant to production of fabrics with various colour combinations and designs
Course Outcomes	**At the end of the course, the students will be able to** 1. Describe about the elements of fabric structure and elementary weaves. 2. Explain the loom requirements for producing primary weaves and methods of weave representation on point paper. 3. Explain the loom requirements for special weave and colour theory. 4. Analyze the concept of colour and weave effects. 5. Explain the loom requirements and uses of extra thread figuring. 6. Analyze the backed fabrics and gain knowledge on concept of bed ford cords. 7. Explain the loom requirements and designing concept of pile fabrics and multilayer fabrics. 8. Analyze the construction of double cloths. 9. Explain the loom requirements and uses of advanced weave structures. 10. Explain the production of leno weave production.

Elements of Simple Structure

Elements of fabric structure and the devices used for analyzing the fabrics; elementary weaves – plain weave and its derivatives, twill weave and its derivatives, twill and twist interaction, twill angle; satin, sateen weaves and their derivatives; methods of representation on point paper; different types of drafts; loom requirements for producing primary weaves.

Special Weaves and Colour Theory

Design, characteristics, loom requirements and uses of special weaves – ordinary honey comb, brighton honey comb, huck –a – back and its modifications, mock leno, crepe weaves; colour theory – light and pigment theory, modification of colours, application of colours, colour and weave effects.

Compound Structure

Design, characteristics, loom requirements and uses of extra warp, extra weft figuring and backed fabrics; extra warp and extra weft figuring with single and two colours; backed fabrics, reversible and non reversible; bed ford cords, plain faced, twill faced and wadded bed ford cords; welts, piques and wadded piques.

Pile Fabrics and Multi Layer Fabrics

Design, characteristics, loom requirements and uses of pile fabrics and multilayer fabrics – pile fabrics, warp pile, fast wire pile, terry pile, weft pile, plain back, twill back velveteen and lashed pile; corduroy, weft flush; double cloths- classification, types of stitches, wadded double cloth, warp and weft wadded double cloth, centre stitched warp and weft way double cloth; multi layer fabrics.

Advanced Structures

Design, characteristics, loom requirements and uses of advanced structures – damask, brocades, tapestry, gauze and leno weaves, types of sheds, doup wire, easer bar motion and jumper motion; Russian cords – net leno, Madras muslin structure 3D Fabrics.

Text book(s):

1	Grosicki Z.J, “Textile Design and Colour” – Textile Institute, Universal book publisher, Mumbai 2004.
2	Grosicki Z.J, “Advanced Textile Design” - Textile Institute, Universal book publisher ltd, Mumbai 2007.

Reference(s) :

1	Goerner D, “Woven Structure and Design”, Part-I - WIRA, 1986.
2	Goerner D, “Woven Structure and Design”, Part-II – BTT6, 1989.
3	Marks and A.T.C. Robinson, “Woven cloth construction”, Textile Institute, Manchester, 1969.
4	N.Gokarneshan, “Fabric Structure and Design”, New Age International Publishers, 1st Edition, New Delhi, 2004.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 602 Garment Manufacturing Technology								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	50	50	100

Objective(s)	To impart exposure to merchandising and sourcing, impart knowledge on cutting machines and apparel production systems, impart knowledge on stitches, seams and garment accessories
Course outcomes	**At the end of the course, the students will be able to** 1. Express the nature of apparel business 2. Describe the structure of apparel industry 3. Discuss about the fabric inspection system and spread methods 4. Demonstrate the cutting methods and computer controlled cutting machines 5. Describe the different apparel Production systems 6. Summarize the apparel production management 7. Classify the stitches, seams and sewing threads 8. Classify the different sewing machines 9. Identify the functions of accessories in apparel industry 10. Recognize the elements of pressing

Organization of the Apparel Business

Objectives; nature of apparel-timing of product change, quality, price; structure of apparel industry –types of contractors, retailing, business concepts, apparel trade association; corporate social responsibility.

Spreading and Cutting

Fabric inspection system; types of defects-patent and latent defects; spreading and spreading equipment; cutting and cutting equipment – portable cutters, stationary cutters, computer controlled cutting machines; types of cutting blades; notches and drills.

Production Systems and Management

Apparel production systems - make through system, section process system, modular system, straight line system, progressive bundle system and unit production system; production management-human resource management, compensation, training and development, inventory management, waste management, equipment management and plant modernization.

Stitches ,Seams and Basic Sewing Machine

Classification of stitches and seams; stitch and seam properties; sewing threads – functions of sewing thread, characteristics of threads, thread size and ticket number; classification of sewing machines; basic parts and working of SNLS sewing machine, over lock and flat lock sewing machines.

Garment Accessories and Pressing

Interlinings – functions of interlinings; linings – functions of linings; fasteners-purpose of fasteners; functions of zippers, buttons, button holes, snaps, hooks and eyes; function of elastics; types of embroidery; labels - styles and application methods; elements of pressing – types of pressing equipment.

Text book(s):

1	Carr.H. Latham. B., “The Technology of Clothing Manufacture”, Blackwell Scientific Publications, 1998.
2	Ruth E.Glock, Grace I.Kunz, “Apparel Manufacturing Sewn Product Analysis”, Blackwell Scientific Publications. 2004.

Reference(s) :

1	Gerry Cooklin, “Introduction to Clothing Manufacture”, Blackwell Science Ltd., 1995.

K.S. Rangasamy College of Technology - Autonomous R 2014

40 TT 603 Apparel Marketing and Merchandising

B. Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	50	50	100

Objective(s)	To impart the knowledge of marketing, merchandising, sourcing, time management and documentation aspects of apparel business.
Course Outcomes	**At the end of the course, the students will be able to** 1. Comprehend the basic concepts of apparel marketing business and types of marketing research in apparel industry. 2. Find and classify the retail and wholesale marketing strategies and various types of advertising and labeling. 3. Discuss the role & responsibilities of a merchandiser and requirements of a merchandiser. 4. Describe the different types of buyers in garment industry and concepts of visual merchandising techniques 5. Practice the pricing theory involved in apparel sector. 6. Explain the concepts of sourcing of different materials, Manufacturing Resources Planning , JIT and lean manufacturing 7. Discuss the production scheduling techniques like route card format, time and action calendar and process follow up for yarn, knitting and processing. 8. Discuss the application of computer in marketing and merchandising. 9. Know the various documents used for export, terms of payment and export incentives like duty drawback, DEPB 10. Explain the functions & objectives of WTO, GATT and MFA and understand the concepts of exchange control regulations, export finance and export risk

Apparel Marketing

Apparel Marketing - definition, responsibilities of a marketing division, marketing objectives and strategie Marketing research – types of marketing research; Retails and wholesale marketing strategies; Domestic international markets; Advertising - types of advertising, different media in apparel marketing; Brand loyalty identity; Labeling and licensing.

Apparel Merchandising

Merchandising - definition, types of merchandising, functions of merchandising division-importance of lead time and implications of lead time, role and responsibilities of a merchandiser, quality of a merchandiser; Types of buyers ; Visual merchandising – definition, objectives, purpose of visual merchandising, seasonal visual merchandising.

Pricing and Sourcing

Pricing theory – factors affecting price structure in apparels, mark up and mark down.

Sourcing: Definition, need for sourcing, method of sourcing; Sourcing of accessories – linings, buttons, zippe labels, etc.; Manufacturing resources planning (MRP); JIT – philosophy; Lean manufacturing-concepts and application in garment industry.

Time Management In Merchandising

Production scheduling – route card format, time and action calendar: Process follow up – yarn, knitting, processing, sewing & labels; Practical check points; Computer applications in marketing and merchandising.

Documentation

Various types of export documents – Pre-shipment & post-shipment documentation; Terms of payment; Export incentives – Duty drawback (DBK), DEPB; I /E license; Exchange control regulation; Export management risk-ECGC; Export finance; WTO / GATT / MFA – functions, objectives, success & failures.

Text book(s):

1	Elaine Stone, Jean A. Samples, “Fashion Merchandising”, McGraw-Hill Book Company (1995), ISBN: 0–08–061742–2.
2	S.Shivaramu. “Export Marketing” – A Practical Guide to Exporters”, Wheeler Publishing (1996), ISBN: 81-7544-166-6.
3	Gopalakrishnan N. “Simplified Lean Manufacture : Elements, Rules, Tools and Implementation”, Prentice Hall India (2013).

Reference(s) :

1	Moore Evelyn. C, “Path for Merchandising – A Step-by-Step Approach”, Thames and Hudson Ltd., 2001.
2	Vijay Barotia, “Marketing Management”, Mangal Deep Publication, 2001.
3	Jarnow J., Dickerson K.G., ‘Inside the Fashion Business ”, Perntice Hall, 1977.
4	Tuhin K. Nandi, “Import–Export Finance”, IIM, Calcutta (1989).

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 604 Technical Textiles I								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	50	50	100

Objective(s)	To impart the knowledge on various technological aspects of technical textiles.
Course Outcomes	**At the end of the course, the students will be able to** 1. Comprehend the textile reinforced composite materials and identify the stitched fabrics 2. Demonstrate the filtration textiles and analyse the constructions and properties of filtration textiles 3. Use the textiles as geo synthetics 4. Recognize the application of geotextile structure and find out the frictional resistance of it 5. Practice the application of medical textiles 6. Explain and apply the healthcare and hygiene products in practical uses 7. Recognize the defence textiles 8. Describe the technology of camouflage concealment 9. Select the fibres and yarns used for transportation textiles 10. Analyze the sportswear for its fiber, fabric and finish particulars

Textile-Reinforced Composite Materials

Composite materials, Textile reinforcement, Woven fabric-reinforced composites, Braided reinforcement, Knitted reinforcement. Stitched fabrics.

Textiles in Filtration: Introduction, Dust collection, Fabric construction, Finishing treatments, Yarn types and fabric constructions and properties, Production equipment, Finishing treatments, Fabric test procedures.

Textiles In Civil Engineering

Textiles in Civil Engineering - Geotextiles, Geosynthetics, Essential properties of geotextiles, Engineering properties of geotextiles; Applications for natural geotextiles, Geotextile structure forms, Frictional resistance of geotextiles.

Textiles In Medical

Medical Textiles -Introduction, Fibres used, Non-implantable materials; Extracorporeal devices; Implantable materials; Healthcare and hygiene products.

Textiles In Defence

Introduction- Historical background, Criteria for modern military textile materials; Textiles for environmental protection; Thermal insulation materials; Water-vapour permeable and waterproof materials; Military combat clothing systems; Camouflage concealment and deception; Flame retardant and heat protective textiles; Ballistic protective materials; Biological and chemical warfare protection.

Textiles In Transportation

Introduction- Textiles in road vehicles; Rail applications; Textiles in aircraft and Marine applications; Future prospects for transportation textiles; Belts, Tyre cords; Hoses- Introduction, Construction particulars, Fibres and yarns used.

Textiles in sportswear: Fiber, Fabric and Finish.

Text book(s):

1	A.R.Horrocks & S.C. Anand (Edrs.), Handbook of Technical Textiles, The Textile Institute, Manchester, U.K., Woodhead Publishing Ltd., Cambridge, England, 2000.
2	E.Willusz, “Military Textiles”, Woodhead Publishing Ltd, 2008.
3	S. Adanur “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., Lancaster, Pennylvania, ISBN: 1-56676-340-1, 1995.
4	T.Matsuo, “Fiber materials for Advanced Technical Textiles”, CRC publication, 2008.

Reference(s) :

1	N.W.M. John, “Geotextiles”, Blackie, London, ISBN: 0-216-91995-9, 1987.
2	S.K. Mukhopadhyay and J.F. Partridge, “Automotive Textiles”, Text. Prog, Vol. 29, No.1/2, 1998, ISBN: 1870372212.
3	S. Anand, “Medical Textiles”, Text. Inst., 1996, ISBN: 185573317X.
4	R.W.Sarsby, “Geosyhthetics in Civil engineering”, Wood head Publishing Ltd, 2006.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 6P1 Fabric Structure Laboratory								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	0	0	3	45	2	50	50	100

Objective(s)	To impart exposure on the analysis different fabric structures with its construction details, impart exposure about colour theory relevant to production of fabrics with various colour combinations and designs
Course Outcomes	**At the end of the course, the students will be able to** 1. Gain knowledge about the elements of fabric structure and elementary weaves. 2. Explain the loom requirements for producing primary weaves and methods of weave representation on point paper. 3. Explain the loom requirements for special weave and colour theory. 4. Analyze the concept of colour and weave effects. 5. Explain the loom requirements and uses of extra thread figuring. 6. Analyze the backed fabrics and gain knowledge on concept of bed ford cords. 7. Explain the loom requirements and designing concept of pile fabrics and multilayer fabrics. 8. Analyze the construction of double cloths. 9. Explain the loom requirements and uses of advanced weave structures. 10. Explain the production of leno weave production.

LIST OF EXPERIMENTS

Analysis of fabric structure of the following weaves:

1. Different types of plain weaves fabrics (Casement, poplin, cambric, long cloth & mull cloth).
2. Matt weaves
3. Twill, herring bone and pointed twill weaves
4. Satin and Sateen weaves
5. Honey comb and huck-a-back weaves
6. Extra thread figuring – extra warp and weft figuring.
7. Double cloth
8. Gauze and Leno
9. Mock Leno
10. Bedford cord
11. Single jersey, rib, interlock and purl structures and derivatives of jersey structures.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 6P2 Garment Construction Laboratory I								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	0	0	3	45	2	50	50	100
Objective(s)	To give hands on training in constructing stitches, seams and basic garment, give hands on training in drafting patterns for basic styles.							
Course Outcomes	**At the end of the course, the students will be able to** 1. Construct types of seams 2. Construct types of stitches 3. Construct types of embroidery stitches 4. Construct types of pleats &gathers 5. Construct types of darts, tucks, yokes, sleeves and collars 6. Demonstrate the drafting of men& women patterns 7. Demonstrate the drafting of children patterns 8. Construct body garments and leg garments 9. Construct kitchen room furnishing and living room furnishing 10. Calculate the amount of fabric required and cost for the garment.							

LIST OF EXPERIMENTS

1. Construction of different types of stitches and seams
2. Construction of different types of embroidery stitches
3. Construction of different types of pleats and gathers
4. Construction of different types of darts, tucks and yokes
5. Construction of different types of sleeves and collars
6. Drafting pattern for children's summer frock
7. Drafting pattern for ladies skirt and blouses
8. Drafting pattern for men's T-shirts
9. Drafting pattern for men's pyjama
10. Construction of men's pyjama
11. Construction of men's T-shirts
12. Construction of anyone living room furnishing and any one kitchen utility

K.S. Rangasamy College of Technology - Autonomous R 2014

40 TT 6P3 Computer Aided Designing Laboratory

B. Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	0	0	3	45	2	50	50	100

Objective(s)	To impart training on usage of software in Textile designing.
Course Outcomes	**At the end of the course, the students will be able to** 1. Practice to draw the design draft and peg plan for different weaves and it derivatives using winsoft software 2. Demonstrate simulation of checked and striped fabric 3. Calculate the cost of different types of fabrics 4. Demonstrate simulation of jacquard and dobby designs 5. Practice to draft the patterns for different garments 6. Demonstrate grading for different components of a garment 7. Execute marker planning for the patterns 8. Arrange the components on the lay 9. Calculate the efficiency of laying by placing the components effectively 10. Demonstrate simulation ofthe garment

LIST OF EXPERIMENTS

1. Design, draft and peg plan for plain weave and its derivatives, twill weave and its derivatives, and sateen and satin weaves.
   Simulation of stripped and checked pattern on the above weaves.
   Costing of warp & weft yarn required for the above fabrics.
2. Design, draft and peg plan for Honey comb, Huck a back, and Bed ford cordweaves.
   Simulation of stripped and checked patterns on the above weaves.
   Costing of warp & weft yarn required for the above fabrics.
3. Design, draft and peg plan for any one dobby weaves and jacquard weaves.
   Simulation of stripped and checked patterns.
   Costing of warp & weft yarn required for the above fabrics.
4. Computer aided pattern making, grading and marker planning for the following garments.
   1. T-Shirt
   2. Half sleeve shirt
   3. Full sleeve shirt
   4. Skirt blouse
   5. S.B. Waist coat
   6. Plain skirt
   7. Pleated trousers
   8. Ladies pant

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2014
Department	**Textile Technology**	Programme Code & Name			**TT. B.Tech. Textile Technology**			
Semester VI								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
40TP0P4	**CAREER COMPETENCY DEVELOPMENT IV**	0	0	2	0	100	00	100
Objective(s)	To enhance employability skills and to develop career competency							

Unit – 1	Written and Oral Communication – Part 2	Hrs
Self Introduction – GD - Personal Interview Skills **Practices** on Reading Comprehension Level 2 – Paragraph Writing - News paper and Book Review Writing - Skimming and Scanning – Interpretation of Pictorial Representations - Sentence Completion - Sentence Correction - Jumbled Sentences - Synonyms & Antonyms - Using the Same Word as Different Parts of Speech - Editing **Materials:** Instructor Manual, Word power Made Easy Book, News Papers		4
Unit – 2	Verbal & Logical Reasoning – Part 2	8
Analogies – Blood Relations – Seating Arrangements – Syllogism - Statements and Conclusions, Cause and Effect – Deriving Conclusions from Passages – Series Completion (Numbers, Alphabets & Figures) – Analytical Reasoning – Classification – Critical Reasoning **Practices**: Analogies – Blood Relations - Statement & Conclusions **Materials:** Instructor Manual, Verbal Reasoning by R.S.Aggarwal		
Unit – 3	Quantitative Aptitude - Part – 5	6
Geometry - Straight Line – Triangles – Quadrilaterals – Circles – Co-ordinate Geometry – Cube – Cone – Sphere. **Materials:** Instructor Manual, Aptitude book		
Unit – 4	Data Interpretation and Analysis	6
Data Interpretation based on Text – Data Interpretation based on Graphs and Tables. Graphs can be Column Graphs, Bar Graphs, Line Charts, Pie Chart, Graphs representing Area, Venn Diagram & Flow Charts. **Materials:** Instructor Manual, Aptitude Book		
Unit – 5	Technical & Programming Skills – Part 2	6
Core Subject – 4,5,6 **Practices :** Questions from Gate Material **Materials:** Text Book, Gate Material		
	Total	30

Evaluation Criteria

S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	15 Questions each from Unit 1, 2, 3, 4 & 5 (External Evaluation)	60
2	Evaluation 2 - Oral Communication	GD and HR Interview (External Evaluation by English, MBA Dept.)	20
3	Evaluation 3 – Technical Interview	Internal Evaluation by the Dept. – 3 Core Subjects	20
		Total	100

Reference Books

1. Aggarwal, R.S. “A Modern Approach to Verbal and Non-verbal Reasoning”, Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, “Quantitative Aptitude”, TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications

Note:

- Instructor can cover the syllabus by Class room activities and Assignments (5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough Work pages
- Each Assignment has 20 questions from Unit 1,2,3,4,5 and 5 questions from Unit 1 (Oral Communication) & Unit 5(Programs)
- Evaluation has to be conducted as like Lab Examination.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 701 Production Planning and Control								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	50	50	100

Objective(s)	To impart basic knowledge on • To impart knowledge about the system of production in garment industries and the various control mechanisms involved in production.
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain the apparel production parameters and express on Product development from prototype to production model. 2. Analyze the time table concept, product data management, understanding and interpretation of specification sheet. 3. Execute the skills on marker planning and get practice on marker making. 4. Explain the spreading techniques and lay lot planning. 5. Analyze about the garment operation breakdown with machine and attachment details and get practice on production grid for T shirt. 6. Explain production flowchart for men's full sleeve shirt, trousers, five-pocket jeans, shorts and T-shirt. 7. Estimate the Capacity for cutting, sewing and finishing and analyze the machine requirements for new factory. 8. Explain line balancing and estimate on utilising the man power and machines for the given target. 9. Describe the quality assurance during product development, methods to avoid problems during pattern making, garment construction and other areas and discuss the inspection procedures. 10. Demonstrate on work-study in garment industry and methods to control time and cost.

Introduction

Apparel production parameters - planning and lead-time; Product development steps from prototype to production model; Importance of pre-production activities; Introduction to timetable concepts; Product data management; Understanding and interpretation of specification sheet.

Marker and Lay Planning

Marker planning - plain, stripe, plaid, check, directional and non directional; Marker making; Spreading techniques - one way, two way, biased and cross grain; Laying-types, splicing, limitation of lay: Numerical exercises on lay lot planning.

Operation Sequence Development

Garment operation breakdown with machine and attachment details; Development of production grid for T- Shirts; Development of production flowchart - men's full sleeve shirt, trousers, five-pocket jeans, shorts and T-shirt.

Balance of Production

Capacity calculation - cutting, sewing and finishing; Determination of machine requirements for new factory; Line balancing - determination and allocation of manpower and machine for balanced production in existing plant for a given target.

Quality Control

Quality assurance during product development-methods to avoid problems during pattern making, garment construction and other areas; Inspection procedures; Work-study in garment industry – methods to control time and cost.

Text book(s):

1.	Garg R.K. and Sharma V., "Production Planning and Control Management", Dhanpat Rai Publishing, 1998
2.	Jacob Solinger, "Apparel Production Handbook", Bobbin Media corporation, USA 1988.

Reference(s) :

1	Chuter, A. J., "Introduction to Clothing Production Management", Blackwell Scientific publications, 1995.
2	Carr Harold, Latham Barbara, "The Technology of Clothing Manufacture", Om Book Service, New Delhi 1994.
3	Cooklin Gerry, "Introduction to Clothing Manufacture", Blackwell Science Ltd., 1995

K.S. Rangasamy College of Technology - Autonomous R 2014

40 TT 702 Financial Management and Costing in Textile and Apparel

B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	50	50	100

Objective(s)	Understand the basic concepts of financial accounting and capital budgeting. Practice the fundamental concepts of costing and costing systems followed in apparel induatry.
Course Outcomes	**At the end of the course, the students will be able to** 1. Know the concepts of Financial Management and capital budgeting. 2. Understand the basic concepts of discounting and non-discounting cash flow techniques of capital budgeting 3. Understand importance of principles and concepts of working capital, operating cycle, determinants of working capital. 4. Understand basic concepts of Inventory management. 5. Understand the basic concepts in costing and elements of costing 6. Explain the preparation of cost sheet for garments 7. Practice the Job order costing and contract costing for various materials. 8. Explain the joint and by product costing 9. Understand the factors influence the cost of garments. 10. Practice the CMT cost for garments and simple problems

Introduction and Captial Budgeting

Objectives, scope and functions of financial management - Profit maximization wealth maximization - Functions of financial manager

Capital Budgeting: Nature and principles -Techniques of investment analysis – payback period method, accounting rate of return(ARR), Discounted cash flow methods – IRR and NPV.

Working Capital and Inventory Management

Definition – Types of working capital – Gross and Net working capital – Operating cycle – Factors influencing working capital - Inventory control techniques - Economic order quantity, ABC analysis.

Cost Accounting

Cost accounting, compare cost accounting and financial accounting, elements of cost, examples from apparel industry, methods of costing, cost sheet preparation - simple problems.

Costing Systems

Job order costing; contract costing; process costing: joint and by product costing in apparel manufacturing.

CMT Cost

Costing of garments; factors that determine the price of garments – material cost, cost of yarn, cost of fabric production, cost of fabric processing and design, lot size, cost of components, cutting cost, making and trim cost, simple problems.

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Text book(s):

1	Asish K. Bhattacharyya., Principals and practice of cost Accounting, PHI. Third Edition.
2	S.P. Iyengar., Cost Accounting – Principles and practice. Sulten chand & Sons, New Delhi.
3	Pandey I. M., “Financial Management”, Vikas Publishing House Pvt. Ltd., New Delhi, 8th Edition, 1999

Reference(s) :

1	Prasanna Chandra, “Financial Management, Theory and Practice, Tata McGraw-Hill Publishing Company Ltd, 5th Edition, New Delhi, 2001.
2	Khan and Jain, “Basic financial Management & Practice”, Tata McGraw Hill, New Delhi, 5th edition, 2001.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 703 Industrial Engineering In Textile and Clothing Industry								
B.Tech Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	50	50	100
Objective(s)	To study about method study, time study, product flow chart and garment manufacturing systems. To understand the concept of industrial engineering techniques and its application in textile industry							
Course Outcomes	**At the end of the course, the students will be able to** 1. Understand the basic concepts of industrial engineering and productivity 2. Explain the process of improving productivity and its influence on standard of living 3. Understand the concepts of method study and procedure for conducting method study 4. Illustrate the process of method study using different charts and diagrams 5. Understand the concepts of motion economy and micro motion analysis 6. Calculate standard time for various operations and understand the concept of PTS 7. Understand the concept of layout and construct the layout of textile and apparel industry 8. Solve line balancing problems and apply IE techniques in garment industry 9. Describe the requirement of work environment and its importance 10. Understand the types of material handling equipments used in textile and apparel industry							

Concepts of Industrial Engineering and Productivity

Industrial Engineering - definition and scope, Role of industrial engineers, Tools and techniques and benefits of industrial engineering techniques; Productivity – definition, different Productivity indices, factors influencing productivity, pr oductivity linked with Standard of living; Work content - basic and added work content, Reduction of work content and ineffective time; Low productivity in textile and apparel industries - reasons and suggestions for improving productivity.

Work Study and Method Study

Work study – definition and purpose, Basic Procedure of work study; Method study – definition and purpose, Method analysis chart, symbols and diagrams; Charts indicating process sequence – outline process chart, Flow process chart (man type , material type and equipment type); Charts using time scale - multiple activity charts; Diagrams indicating movement – flow diagram, string diagram, cycle graph, chronocycle graph and travel chart.

Motion Study and Work Measurement

Motion study – Principles of Motion economy, classification of movements, Two handed process chart; Micro motion study – concept and Therblig chart, SIMO chart; Work measurement– definition and purpose, Techniques of time study – stop watch method; Predetermined Motion Time Standards (PMTS)-definition, concepts, merits and demerits: Rating – Definition and types; Allowances – definition and types; Standard time – definition and method for calculating SAM.

Plant Layout, Product Layout and Line Balancing

Lay out – definition and types of garment lay out with examples, methods for determining space requirement and steps for developing a new layout; Line balancing – definition, objectives and procedure, examples for line balancing techniques; Application of IE techniques – capacity study calculation, measurement of operator performance, WIP; Operation Bulletin – objectives and examples.

Work Environment and Material Handling

Work environment – factors influencing working environment, lighting, Ventilation, Temperature control, humidity control and Noise control; Occupational health and Safety; Ergonomics; Services – stores, health and convenience related service; Material handling – objectives, classification of material handling equipments, characteristics of material handling equipments related to textile and apparel industry.

Text book(s)

1	ILO, Geneva, “Introduction of Work Study”, Universal Publishing Corporation, Mumbai, 2006.
2	Ramesh Babu V, “Industrial Engineering in Apparel Production”, Woodhead Publications India Pvt Ltd, New Delhi, 2012.

Reference(s) :

1	Kiell B.Zandin, “Maynard’s “Industrial Engineering Hand Book”, Mc Graw Hill, Inc., New York, 2001.
2	James M Apple, “Plant Layout and Materials Handling”, John Wiley & Sons, 1997.
3	Rajesh Bheda, “Managing Productivity of Apparel Industry” CBS Publishers and distributors, New Delhi 2002.
4	“Industrial engineering manual for textile industry”, Wiley Eastern (p) Ltd., New Delhi, 1988.
	Jacob Solinger, “Apparel Manufacturing Hand Book - Analysis, Principles and Practice”, Boblin Media Corp, Columbia, 1991.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 704 Technical Textiles II								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	50	50	100

Objective(s)	To impart the knowledge on various technological aspects of technical textiles.
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain the technical details of high performance fibres 2. Describe the application of coating materials in technical textiles 3. Practice the application of nano fibres 4. Use the Phase change materials 5. Summarize the concepts of shape memory polymers 6. Apply the shape memory textiles 7. Describe the application of textiles in agriculture and electronics 8. Evaluate the technical textiles 9. Develop textile based circuits 10. Summarize the properties of conductive polymer fibres

High performance fibres

Aramids-Structure and properties, Applications. Carbon fibres- Physical properties,PAN-based carbon fibres, Pitch-based carbon fibres, Carbon nanotubes.

Coating materials: Polymeric materials for coating and their properties like rubber (natural and synthetic), polyvinyl chloride, polyurethane, acrylic polymers. Applications of coated materials.

Nano fibers

Various Methods of manufacturing of nano-fibres, properties and application of nano fibres Introduction, Basics of wetting, Wicking and absorption.

Phase changing materials-Concept of Phase Change Materials, Mode of action of Phase Change materials, Application of Phase Change Materials.

Shape memory polymers

Concepts associated with shape memory materials, principle of temperature dependant shape memory polymers, Application and prospects for shape memory polymers. Shape memory fibres, role of smart materials in textiles, shape memory material in smart fabrics and garments.

Miscellaneous industrial applications of textiles

Textiles in Agriculture, Electronics. Textiles for Banners and Flags. Textile Reinforced Products ,Transport Bags and Sheets, Fabrics to Control Oil Spills, Canvas Covers and Tarpaulins, Ropes and Nets, Home and Office Furnishings, Testing and evaluation techniques of all these products

Chromic and conductive materials

Photochromic, Thermochromic, Electrochromic materials. Formation of electrical circuits in textile structures-Development of textile based circuits, Materials used, Characterization, Applications. Solar textiles: Solar cells, Textiles as substrates, Suitable textile constructions, Conductive layers for PVs. Electrical, morphological and electromechanical properties of conductive polymer fibres,

Text book(s):

1	A.R.Horrocks & S.C. Anand (Edrs.), Handbook of Technical Textiles, The Textile Institute, Manchester, U.K., Woodhead Publishing Ltd., Cambridge, England, 2000.
2	H.R.Mattila, Intelligent Textiles and Clothing, Woodhead Publishing Ltd, 2006.

Reference(s) :

1	S. Adanur “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., Lancaster, Pennylvania, ISBN: 1-56676-340-1, 1995.
2	T.Matsuo, “Fiber materials for Advanced Technical Textiles”, CRC publication, 2008.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 7P1 Apparel Planning Laboratory								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	0	0	3	45	2	50	50	100
Objective(s)	To impart basic knowledge on • To impart the knowledge of garments styles, costing, merchandising chart, garments defects, forecasting, balancing of machines aspects of apparel industry.							
Course Outcomes	**At the end of the course, the students will be able to** 1. Analysis the given garment – styles, measurements, cloth construction particulars. 2. Cost the given garment. 3. Prepare merchandising follow-up chart for given garment. 4. Identify garment defects – causes and remedies. 5. Plan for forecasting of colour, style, fabrics, trims and accessories. 6. Construct fashionable garments as perforecasting established. 7. Reconstruct the given men's garments. 8. Reconstruct the given women's garments. 9. Reconstruct the given kid's garments. 10. Balance the machines for given style.							

LIST OF EXPERIMENTS

1. Detailed analysis of given garment – styles, measurements, cloth construction particulars.
2. Costing for the given garment.
3. Preparation of merchandising follow-up chart using excel sheet for given garment.
4. Identification of garment defects – causes and remedies.
5. Production planning for forecasting of colour, style, fabrics, trims and accessories.
6. Construction of fashionable garments as per forecasting established.
7. Reconstruction of given men's garments.
8. Reconstruction of given women's garments.
9. Reconstruction of given kid's garments.
10. Balancing of machines for given style.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 7P2 Garment Construction Laboratory II								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	0	0	3	45	2	50	50	100
Objective(s)	To give hands on training in constructing stitches, seams and basic garment, give hands on training in drafting patterns for basic styles.							
Course Outcomes	**At the end of the course, the students will be able to** 1. Demonstrate the drafting of men's patterns. 2. Demonstrate the drafting of women's patterns. 3. Demonstrate the drafting of children's patterns. 4. Construct men garments. 5. Construct women garments. 6. Construct children garments. 7. Construct body garments and leg garments. 8. Calculate the amount of fabric required for the garment. 9. Calculate the cost of the garment 10. Draft, construct and finish the garments							

LIST OF EXPERIMENTS

1. Drafting pattern for Men's half – sleeve shirt
2. Drafting pattern for Men's blazer
3. Drafting pattern for ladies kurti
4. Construction of Men's half – sleeve shirt
5. Construction of ladies kurti
6. Construction of ladies pyjama
7. Construction of ladies skirt
8. Construction of ladies blouses
9. Construction of children's summer frock
10. Construction of Men's full – sleeve shirt

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 7P3 Industrial In-plant Training								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	0	0	3	45	2	50	50	100
Objective(s)	To give practical industrial exposure to the students on the day-to-day working of textile industries.							
Course Outcomes	1. To provide practical exposure in Textile Engineering related organizations.							

Each student has to compulsorily undergo an Industrial In-plant Training in any one of the textile industry for a minimum period of 2 weeks. This has to be carried out after completion of VI Semester examination and before commencement of VII semester.

Each student has to follow the below mentioned guidelines:

1. Drawing the layout plan of building and machineries of the selected.
2. Organization chart.
3. Noting down the number of machineries of each type and its technical Details-Motor HP, Motor rpm, Production capacity of the machine.
4. To make the production process flow chart.
5. To note down the existing production for all products.
6. To note down the maintenance schedule.
7. To learn about inventory and despatch sections.
8. Allocation of man power for different products.
9. After completion of training programme a report has to be prepared.
10. The report has to be signed by the Principal.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 7P4 Project Work- Phase I								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	0	0	3	45	2	100	00	100
Objective(s)	To make the student understand the practical problem solving process in the industry							
Course Outcomes	1. Identify engineering problems relevant to the domain and collect literature survey for its support 2. Analyze and identify an appropriate technique to solve the problem 3. Do experimentation / Fabrication, collect and interpret the data obtained 4. Document, prepare the project report and do the presentation. 5. Demonstrate their responsibility as an individual and a leader in group project work.							

LIST OF EXPERIMENTS

Each student has to select a project from any industrial related problems or innovations in technology or critical studies related to textiles. The student can undertake the project work individually or in a batch consisting a maximum of four students. The works to be undertaken during this phase is given below:

1. Identifying the area of proposed project work
2. Identifying the problem areas in textile industry for the proposed work
3. Collecting relevant literature for the above work
4. Framing the proposed methodology for the work to be done

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2014
Department	**Textile Technology**	**Programme Code & Name**			**TT. B.Tech. Textile Technology**			
Semester VII								
Course Code	**Course Name**	**Hours/Week**			**Credit**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CA**	**ES**	**Total**
	Career Competency Development V	**0**	**0**	**2**	**0**	**100**	**00**	**100**
Objective(s)	To enhance employability skills and to develop career competency							

Unit – 1	**Written and Oral Communication**	**Hrs**
Self Introduction – GD – HR Interview Skills – Corporate Profile Review **Practices** on Company Based Questions and Competitive Exams **Materials:** Instructor Manual		6
Unit – 2	**Verbal & Logical Reasoning**	6
Practices on Company Based Questions and Competitive Exams **Materials:** Instructor Manual		
Unit – 3	**Quantitative Aptitude**	6
Practices on Company Based Questions and Competitive Exams **Materials:** Instructor Manual		
Unit – 4	**Data Interpretation and Analysis**	6
Practices on Company Based Questions and Competitive Exams **Materials:** Instructor Manual		
Unit – 5	**Programming & Technical Skills – Part 3**	6
C Language - Control Structures – Data Types – Arrays – Operators -Functions- Structures – Pointers-Files **Practices :** Programs and Find Output and Errors **Materials:** Instructor Manual , Exploring C by Yashwant Kanetkar		
	Total	**30**

Evaluation Criteria

S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	15 Questions each from Unit 1, 2,3, 4 & 5 (External Evaluation)	60
2	Evaluation 2 - Oral Communication	GD and HR Interview (External Evaluation by English, MBA Dept.)	20
3	Evaluation 3 – Technical Interview	Internal Evaluation by the Dept. – 3 Core Subjects	20
		Total	**100**

Reference Books

1. Aggarwal, R.S. “A Modern Approach to Verbal and Non-verbal Reasoning”, Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, “Quantitative Aptitude”, TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL PUBlications

Note:

- Instructor can cover the syllabus by Class room activities and Assignments(5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough work pages
- Each Assignment has 20 questions for Unit 1,2,3,4 & 5 and Unit 5 and 5 questions from Unit 5(Algorithms) & Unit 1(Oral Communication)
- Evaluation has to be conducted as like Lab Examination.

K.S. Rangasamy College of Technology - Autonomous R 2014

40 TT 801Supply Chain Management for Textile and Apparel Industry

B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VIII	3	0	0	45	3	50	50	100

Objective(s)	• To study the supply chain management in apparel industry. • To know the e-business and global practices in supply chain systems
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain the principles of supply chain management and its drivers and metrics in apparel industry. 2. Discuss the role of supply chain in maintaining financial stability in textile and apparel industry. 3. Analyze the supply and demand cycle and economies of scale in apparel industry. 4. Describe the geographical identification of suppliers, supplier selection and sourcing decision. 5. Explain the role and characteristics of transportation in textile and apparel network. 6. Analyze the transport design network and risk management in transportation. 7. Discuss the importance of coordination and obstacles to co-ordination in supply chain. 8. Summarize the role of supply chain in e-business. 9. Explain the importance of supply chain in foreign trade. 10. Analyze the role of supply chain in customer relationship management.

Introduction

Basic principles of supply chain management and logistics, supply chain models, supply chain for volatile market; Supply chain drivers and metrics in apparel industries; Role of supply chain in the textile and apparel industries financial stability.

Planning Supply & Demand

Planning supply and demand in apparel production house, managing economies of scale, supply cycle and inventory levels; Managing uncertainty in supply chain, safety pricing and inventory; Make Vs buy decision, make Vs hire decision; Geographical identification of suppliers - supplier evaluation, supplier selection, contract negotiations, finalization.

Transportation Designing & Planning

Distribution network and design for global textile and apparel products, models of distribution – facility location and allocation of capacity, uncertainty on design and network optimization; Transportation - role of transportation in supply chain, modes of transportation, characteristics of transportation, transport design options for global textile and apparel network, trade-off in transport design, risk management in transportation, transport decision in practice for textile and apparel industries.

Coordination In Supply Chain & E- Business

Coordination in supply chain: The bullwhip effect, forecasting, obstacles to coordination in supply chain; Supply chain management for apparel retail stores, high fashion; Supply chain in e-business & b2b practices.

Global Practices In Supply Chain

Import - Export management: Documentation, insurance, packing and foreign exchange; Methods of payments – domestic, international, commercial terms; Dispute handling modes and channels; Supply chain and information system; Customer relationship management.

Text book(s):

1	Janat Shah, “Supply Chain Management – Text and Cases”, Pearson Education, New Delhi, 2009. ISBN: 978-8131715178.
2	Sunil Chopra and Peter Meindl, “Supply Chain Management-Strategy Planning and Operation”, PHI Learning / Pearson Education, 2010. ISBN: 978-81-317-3071-3.

Reference(s) :

1	David Simchi-Levi, Philip Kaminsky, Edith Simchi-Levi, Ravi Shankar, “Designing and Managing the Supply Chain: Concepts, Strategies, and Cases”, Tata McGraw-Hill Education Pvt Ltd. New Delhi, 2010. ISBN-13: 978-0-07-066698-6.
2	Rahul V Altekar, “Supply Chain Management-Concept and Cases”, Prentice-Hall of India Pvt Ltd, New Delhil, 2005. ISBN: 81-203-2859-0
3	Amir Sinha, Herbert Kotzab, “Supply chain management”, Tata McGraw-Hill Education Pvt Ltd. New Delhi, 2012. ISBN-13 : 978-0-07-133343-6.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT 8P1 Project Work- Phase II								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VIII	0	0	16	45	8	50	50	100
Objective(s)	To make the student understand the practical problem solving process in the industry							
Course Outcomes	1. Identify engineering problems relevant to the domain and collect literature survey for its support 2. Analyze and identify an appropriate technique to solve the problem 3. Do experimentation / Fabrication, collect and interpret the data obtained 4. Document, prepare the project report and do the presentation 5. Demonstrate their responsibility as an individual and a leader in group project work.							

LIST OF EXPERIMENTS

The student can undertake the project work individually or in a batch consisting a maximum of four students. The project work can be the continuation of the project work in phase-1.

i. The work has to be carried out in the industry

ii. All the observations have to be noted down

iii. Testing and analysis has to be done and conclusions made

iv. The phase I work has to be consolidated with phase II work

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E11 Fundamentals of Nano Science and Technology								
B. Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	50	50	100

Objective(s)	To impart knowledge on the basics of nano science and its applications.
Course Outcome	**At the end of the course, the students will be able to** 1. Deliver the scientific revolutions in nano engineering and technology 2. Describe nanostructures and dimensions of nanoscale materials 3. Describe the surface chemistry and physics of nanoparticles 4. Explain the properties of nanoparticles and structures 5. Perform physical and chemical synthesis of nanomaterials 6. Synthesis and process the nano composite materials. 7. Report on the microscopic characterization of nano materials 8. Report on the spectroscopy characterization of nano materials 9. Analyze the fabrication of nanostructures 10. Explain the mechanism of Nanostructured surface protective coating

Introduction

Scientific revolutions-nanoengineering and technology; atomic and molecular size and structure. Introduction to nanoscale materials-top down and bottom up approach; nanostructures and dimensions – shape and morphology; scope for nano technology.

Nanoscale Properties

Surface to volume and surface to mass ratio; size dependent properties-quantum size effect; inter dynamic aspects of inter molecular forces; surface chemistry and physics of nanoparticles; mechanical, optical, electronic, magnetic, thermal and chemical properties of nanoparticles and structures.

Synthesis of Nanomaterials

Chemical approaches-wet chemical synthesis, sonochemical method, microemulsion technique and sol-gel processing; physical approaches-mechanical milling, spray phyrolysis, gas phase synthesis, gas condensation processing, physical and chemical vapor deposition and condensation; synthesis of bulk nanostructured materials – sol-gel processing, mechanical alloying and mechanical milling, nano composite materials synthesis and processing. Nano-polymers.

Nanomaterials Characterization

X-ray powder diffraction- dispersive X-ray analysis (EDX), thermo gravimetric analysis (TGA), differential thermal analysis (DTA); scanning and transmission electron microscopy technique (SEM and TEM); atomic force microscopy (AFM); nanoindentation; X-ray fluoresce spectroscopy (XRF), energy inductively coupled plasma mass spectrometry (ICP-MS), X-ray photoelectron spectroscopy (XPS), UV-Visible spectroscopy, Fourier Transform Infrared spectroscopy (FTIR), Diffuse reflection spectroscopy (DRS), Microwave and Raman spectroscopy.

Fabrication Of Nanostructures And Applications

Fabrication of nanostructures: self-assembly, self-assembled monolayers (SAMs), microencapsulation, nanodispersed dyeing, dipcoating, roller printing, electro spinning; nanostructured surface protective coating-anti-adhesive coating, water and oil repellent coating, flame retardant coating, wrinkle free and self cleaning surfaces, UV and IR ray shielding fabrics, chemical and biological protective coating.

Text book(s) :

1	Charles P. Poole, Frank J. Owens, “Introduction to Nanotechnoogy”, Wiley Interscience, 2003.
2	A.K. Sen, John Damewood, “Coated Textiles: Principles and Applications” CRC Press, 2001

Reference(s) :

1	J. Dutta, H.Hoffmann, “Nanomaterials”, Topnano-21, 2003.
2	Anthony L. Andrad, “Science and Technology of polymer nanofibers” Wiley John Wiley & Sons, 2008
3	C Ricbard Brundle Charles A. Evans, Jr. Sbaun Wihon and Lee E. Fitzpatrick “Encyclopedia of Materials Characterization” Manning publications, 1992
4	T. Pradeep, “Nano the Essential Nanoscience and Nanotechnology”, Tata McGraw hill, 2007.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E12 High Performance Fibres								
B. Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	50	50	100

Objective(s)	To study about energy management system in textile industry.
Course Outcomes	**At the end of the course, the student will be able to** 1. Compare conventional and advanced fibre spinning techniques 2. Explain the process and parameters influencing the quality of fibre in dry-jet wet, gel and electro spinning method 3. Describe the manufacturing, properties and applications of glass and basalt fibre 4. Summarize the manufacturing, properties and applications of carbon and HPPE fibre 5. Explain the manufacturing , properties and applications of aramid, basofil and ceramic fibre 6. Describe the manufacturing, properties and applications of sulphur, PBO, PBI and PI fibre 7. Summarize the manufacturing, properties and applications of alginate. Chitin and chitosan fibre 8. Describe the manufacturing, properties and applications of regenerated silk, wool PLA and SAF fibre 9. Summarize the manufacturing, properties and applications of hollow, profile and blended fibers 10. Outline the film, functionalized and specific fibre

Advanced Spinning Technology
Advances in conventional fiber forming process; gel spinning; Dry-jet-wet spinning; liquid crystal spinning; electro-spinning.

High Performance Fibres For Industrial Applications
Manufacturing, properties and applications of glass fibers, basalt fibers; carbon fibers, high performance polyethylene fibers.

Chemical and Thermal Resistant Fibres
Manufacture of aramid fibers; properties and application of aramid fibers; Basofil and Ceramic fibers, Sulphur fibers, properties and applications of PBO, PBI and PI fibers

High Performace Fibres for Medical Applications
Manufacturing, properties and applications of alginate fibers; chitin and chitosan fibers; regenerated silk and wool protein fibers; synthetic biodegradable fibers like PLA and SAF.

Speciality Fibres
Hollow and profile fibers; blended and bi-component fibers; film fibers and functionalized fibers for specific applications.

Text book(s):

1	Kothari V.K., “Textile Fibers: Development and Innovations”, Vol. 2, Progress in Textiles, IAFL Publications, 2000.
2	Peebles L.H., “Carbon Fibers”, CRC Press, London, 1995.

Reference(s) :

1	Hearle J.W.S., “High Performance Fibers”, Wood head Publishing Ltd., Cambridge, England, 2001.
2	Hongu T. and Phillips G.O., “New Fibers”, Wood head Publishing Ltd., England, 1997.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E13 Textured Yarn Technology								
B. Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	50	50	100

Objective(s)	To impart knowledge on heat setting and mechanism of texturing.
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain the need for bulking synthetic yarns and texturability of fibers 2. Demonstrate the quality of raw material required for texturing and explain basic principles and methods of texturing. 3. Describe the factors involved and mechanism of heat setting and discuss the fiber morphology and yarn properties during heat setting. 4. Describe the fundamentals of thermo- mechanical texturing, helanca process and simultaneous and sequential draw texturing. 5. Explain about the twisting device ,heating ,cooling and take-up systems of false twist texturing and discuss about characteristics of feed yarns and process parameter like time and temperature 6. Analyze the evaluation of false twist textured and its end uses. 7. Describe the air jet texturing yarn production, express airflow pattern in different types of nozzles, loop formation mechanism and analyze the evaluation of air-jet textured yarn. 8. Compare air-Jet textured yarn with spun and false twist textured yarns. 9. Describe the working procedure of stuffer box, edge crimping, and knit-de-knit, gear crimping, bi-component filament texturing and differential shrinkage texturing. 10. Discuss the limitations and application of different textured yarns types

Introduction

Need for bulking of synthetic yarns; texturability of fibres, state and quality of raw material required; classifications, basic principles and methods of texturing.

Heat Setting

Heat setting – need, types of setting, mechanism, factors involved; effect on fibre morphology and yarn properties; evaluation of heat setting processes; fundamentals of thermo-mechanical texturing, Helanca process.

False Twist Texturing

Draw texturing - simultaneous and sequential draw texturing; twisting devices; heating and cooling systems; take-up systems; characteristics of feed yarns; process parameters-time, temperature, twist, tension; evaluation of false-twist textured yarns; end-uses.

Air Jet Texturing

Types of yarns produced; airflow pattern in different types of nozzles; loop formation mechanism, factors involved; evaluation of air-jet textured yarn; comparison of air-jet textured yarn with spun and false twist textured yarns; end-uses.

Other Methods of Yarn Texturing

Stuffer box, edge crimping, knit-de-knit and gear crimping methods; bi-component filament texturing; differential shrinkage texturing; chemo - mechanical texturing; limitations and applications.

Text book(s):

1	Hes L. Ursiny P., “Yarn Texturing Technology”, Eurotex, U.K., 1994.
2	Behery H.M. and Demir A., “Synthetic Filament Yarn Texturing Technology”, Prentice Hall, 1996, ISBN 0134400259.

Reference(s) :

1	Guirajani M.L. (Edr.), “Annual Symposium of Texturing”, I.I.T Delhi, 1977.
2	Wilson D.K. and Kollu T., “Production of Textured Yarns by the False Twist Technique”, Textile Progress, Vol. 21, No.3, Textile Institute, Manchester, U.K., 1991.
3	Gupta V.B. (Edr.), “Winter School on Man-made Fibers – Production, Processing, Structure, Properties and Applications”, Vol. 1, 1988.
4	J.W.S. Hearle, L.Hollick, D.K.Wilson, “Yarn Texturing Technology”, Woodhead, 2001, ISBN 0849313104, 9780849313103.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E14 Process and Quality Control In Spinning								
B. Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	50	50	100

Objective(s)	To make the student to be conversant with following studies of process and quality cont in spinning. Scope of process control and statistical application. Control of raw mater quality, waste generation, yarn quality and productivity
Course Outcomes	At the end of the course, the students will be able to 1. Understand the concept of process control 2. Know the process control in mixing & spinning preparatory 3. Analyse the characteristic of fibre quality & spinnability 4. Explain the concept of nep generation & nep removal 5. Know the estimation of yarn realization & cleaning efficiency 6. Understand the concept of waste control 7. Explain the assessment of yarn unevenness and imperfections 8. Know the yarn faults and their remedies 9. Analyse the cause for maximising the production 10. Understand the productivity and snap study in ring spinning

Process Control Concept and Statistical Application

Scope of process control in spinning - Identification of process variables and product characteristics to control process in the blowroom, card, drawframe, comber, speedframe and yarn spinning - Concepts of developing norms and standards for spinning process. Application of statistical techniques in process and quality control.

Control of Raw Material Quality

Quality control of mixing quality through fibre quality characteristics - Concept of fibre quality index and its application – Prediction of spinnability and yarn quality - Blending irregularity. Causes of nep generation –.nep removal in carding and combing machines. Online monitoring and control of neps on modern cards

Control of Yarn Realization And Waste

Estimation of yarn realization – Determination of trash content and cleaning efficiency in blow room and carding – Determination of comber noil and combing efficiency - Control of waste in blow room, carding and comber - Control of hard waste.

Yarn Quality Control

Assessment of within and between bobbin count variations, Assessment and control of count variations in preparatory machines and ringframe –Assessment of yarn unevenness and imperfections - causes for unevenness and imperfections - unevenness caused by random fibre arrangement – Drafting waves – Periodic variation. Yarn faults – classification – assessment of faults – causes and methods to reduce faults. Causes for variability in strength, elongation and hairiness and measures for their control.

Production Control

Factors affecting the productivity in ring spinning. Productivity indices. Methods for maximizing production in spinning machinery – New concepts. Effect of Machinery maintenance and Humidity on production. Causes for end breaks in spinning, Measures to control end breaks, Snap study.

Text book(s):

1.	Garde. A. R. & Subramaniam T. A., Process Control in Spinning, ATIRA, Ahmedabad 1989.
2.	Ratnam T.V. & Chellamani. K. P., Quality Control in Spinning, SITRA Coimbatore 1999.

Reference(s) :

1.	Chattopadhyay R., “Advances in Technology of Yarn Production”, NCUTE Publication, New Delhi, 2002.
2.	Furter.R., “Strength and Elongation Testing of Single and Ply Yarns”, The Textile Institute, Manchester, U.K., 1985.
3.	Furter.R., “ Eveness Testing in Yarn Production”, (Part II), The Textile Institute, Manchester, U.K., 1982.
4.	Klein W., “The Technology of Short - Staple Spinning”, The Textile Institute, Manchester, U.K. 1987.
5.	Slater K., “Yarn Evenness”, Textile Progress, The Textile Institute, Manchester, U.K., 1986

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E15 Operations Research								
B.Tech Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	1	0	60	3	50	50	100

Objective(s)	• To study the principles and techniques of operations research. • To apply these techniques in decision making for work accomplishment.
Course Outcomes	**At the end of the course, the students will be able to** 1. Describe the solution of LP problem by graphical method, Simplex method, Duel simplex method. 2. Explain the Transportation problems; Vogle's approximation method. 3. Describe the MODI method, assignment problems; balanced and unbalanced assignment problems. 4. Explain the Processing n jobs on 2 machines-processing n jobs on 3 machines. 5. Demonstrate the processing n jobs on m machines. Individual replacement, group replacement- problems. 6. Explain the Game theory; Rule of saddle Point determination ,rule of dominance 7. Explain the mixed strategy, graphical approach, problems related to the above theoretical aspects. 8. Describe the Simulation model, Monte, Carlo Technique and its problems 9. Explain the balanced and unbalanced assignment problems 10. Describe the Travelling salesman problems.

Linear Programming Problems

Formulation of LP problem - Solution of LP problem by graphical method - Simplex method - Big-M method - Two phase simplex method - Dual simplex method

Transportation and Assignment Problems

Transportation problems: North-west corner rule - Least cost method - Vogel's approximation method - MODI method - Assignment problems: balanced and unbalanced assignment problems - Travelling salesman problems

Network Analysis

Network Construction – Critical Path Method – Project Evaluation and Review Technique - problems

Sequencing and Replacement Models

Processing n jobs on 2 machines - processing n jobs on 3 machines - processing n jobs on m machines. Replacement models - individual replacement - group replacement - problems

Game Theory and Simulation Model

Game theory: Saddle point –Dominance property –- graphical method. Simulation model – Monte – Carlo Technique – problems.

Text book:

1	Kanti Swarup, P.K. Gupta, Man Mohan, "Operations Research", Sultan Chand & Sons, New Delhi, 15th Edition (2010)

Reference(s):

1	V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan., "Resource Management Techniques" AR Publications, Chennai, third Edition (2005)
2	Taha, H.A. "Operations Research: An Introduction", Ninth Edition, Pearson Education Edition, Asia, New Delhi, 2010
3	J.Heizer, B.Render, "Production and Operations Management", Prentice Hall (1993)

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E16 Theory of Textile Structures								
B.Tech Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	50	50	100

Objective(s)	To impart the fundamental knowledge about yarn geometry, fibre migration, mechanics of staple-fibre and filament yarns, and fabric geometry related issues concerning textile structures.
Course Outcome	**At the end of the course, the students will be able to** 1. Explain the geometry of twisted yarn and understand the relationship between yarn count and twist 2. Explain the concept of packing of yarn 3. Explain the mechanism of migration behavior of spun yarn 4. Explain the concept of yarn twisting 5. Discuss the tensile behavior of yarn 6. Explain the concept of yarn slippage and its influencing factors 7. Explain the geometry of fabric in various models. 8. Describe the geometry and deformation of fabric during tensile, shear and drape. 9. Discuss the geometry of knitted structures 10. Explain load extension behaviour of knitted fabric

Yarn Geometry

Basic geometry of twisted yarn; Idealized helical yarn structure; Yarn count & twifactorsst factor; Twist contraction; Limits of twist; Packing of fibres in yarn - idealized packing, packing in yarns, specific volume of yarns; Relation between twist, diameter and twist angle.

Fibre Migration

Ideal migration; Characterization of migration behavior; Migration in spun rayon yarns; Mechanism of migration; Form of yarn twisting: Cylindrical and ribbon twisting.

Mechanics of Filament / Staple Fibre Yarns

Filament Yarn: Analysis of tensile behavior; Analysis for large extension; Prediction of breakage; Analysis of yarn mechanics by energy method; Observed extension and breakage of continuous filament yarns.
Staple fibre yarn: Theoretical analysis of yarn geometry; Stress-strain distribution in yarn; Fibre obliquity and slippage; Influence of fibre length, fineness and friction on fibre slippage and yarn strength.

Geometry of Fabric Structure

Geometry of Pierce, Olofson and Hamalton's models; cover factor; crimp interchange; Modification to Pierce model- race track, saw tooth and bilinear models; Application of cloth geometry; Geometrical solution during extension of cloths; Load - extension modulus; Concept of maximum weavability in woven fabrics; Deformation on shear and drape of fabrics.

Geometry of Knitted Fabrics

Geometry of plain knitted structures; Geometry of complex knitted structures; Mechanics of knitted fabrics-warp wise load extension, biaxial stress behavior, weft wise extension.

Text book(s):

1	J.W.S.Hearle, P.Grosberg, and S.Backer, Structural Mechanics of Fibres, Yarns and fabrics, Willre Interscience, New york, 1969.
2	B.C. Goswami, J. Martindale and Scandio, Textile Yarns: Technology, Structure and Application, Wiley-Interscience, New York, 1977.

Reference(s) :

1	Peirce F T and Womersley J R, "Cloth Geometry", reprint, The Textile Institute, Manchester 1978.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E21Shuttleless Weaving								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100

Objective(s)	• To study the weft insertion principles of shuttleless looms • To know the mechanism and features of shuttleless looms
Course Outcomes	**At the end of the course, the students will be able to** 1. Generalize the functions of machine elements in unconventional weaving machines 2. Explain the working and formation of knotting machines and unconventional selvedges 3. Discuss the concept and mechanism of projectile weaving machine 4. Generalize the salient features, modifications required, fabric defects and remedies in projectile loom 5. Summarize the working of each elements in rapier weaving machine 6. Generalize the salient features, modifications required, fabric defects and remedies in rapier loom 7. Explain the weft insertion cycle and mechanism in of air jet weaving machines 8. Summarize the weft insertion cycle and mechanism in water jet weaving machines 9. Explain the mechanism of multiphase weaving . 10. Summarize about the principle, mechanism and features of 3 D weaving.

Introduction

Limitation of shuttle looms-parameters affecting productivity-Classification of shuttleless looms- Comparison of shuttle and shuttleless looms - warp and weft yarn requirement for shuttleless weaving. Knotting machines - Weft accumulators – types- Formation of unconventional selvedges – tuck-in, leno, chain, fused and adhesive. Techno economics of shuttleless weaving.

Projectile Looms

Gripper projectile machines: Working elements and weft insertion cycle in projectile loom- Torsion bar picking mechanism-Weft selection device-Salient features of projectile machine, Loom timing diagram. Modifications required in the machine for filament yarns. Fabric defects and remedies. Weft insertion rate and production calculation.

Rapier Looms

Rapier Machines: - Classification of rapier weaving machines: Flexible, Rigid rapiers- Principles of tip and loop transfer-Weft insertion cycle-Rapier drives-Salient features. Modifications required in the machine for filament yarns. Fabric defects and remedies. Weft insertion rate and production calculation..

Jet Looms

Air jet weaving Machine - Principle of air jet weaving, types of nozzles, profile reed. Air requirements. Loom timing diagram. Modifications required in the machine for filament yarns. Fabric defects and remedies. Weft insertion rate and production calculation. Principle of water jet weaving – Weft insertion system – Nozzles - Water requirements – Loom timing diagram. Modifications required in the machine for filament yarns. Fabric defects and remedies. Weft insertion rate and production calculation.

Multiphase Looms

Multiphase weaving machine – Warp and weft direction shed wave principle. Principle and operation of circular weaving machines – sectional weaving machine – combined weaving and knitting machine. 3 D Weaving – Principle of Dual directional shedding: Linear-Linear, Linear-angular method. Modifications required in the machine for filament yarns. Fabric
defects and remedies in multiphase looms. Special jacquards.

Text book(s):

1	Talukdar M K, Sriramulu P K and Ajgaonkar D B, “Weaving: Machines, Mechanisms and Management”, Mahajan publishers, Ahmedabad, 1981.
2	Sabit Adanur, “Hand book of weaving”, CRC Press Co. ISBN No. 1-58716-013-7, 2001.

Reference(s) :

1	Talavasek O & Svaty V, “Shuttleless weaving machines”, Elsevier science publications, Newyork, 1981.
2	Ormerod A, “Modern preparation and weaving”, Butterworths, London, 1983.
3	“Techno economics of modern weaving machines”, Textile Association (India),Bombay, 1982.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E22Application of Biotechnology In Textile								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100

Objective(s)	• To develop skills of the students in the area of applied Biotechnology with reference to textile technology. • To incorporate the applications of both the domain for the higher applications in medicine, environment and industrial applications.
Course Outcomes	**At the end of the course, the students will be able to** 1. Recognize the scope of natural fibres in biotechnology 2. Understand the different types natural fibres and polymers 3. Demonstrate the production of Enzymes 4. Appraise the nature and characteristic of Enzymes 5. Exhibit the applications of Enzymes in preparatory process 6. Describe the properties of chemical treated and trio logical treated fibres. 7. Exemplify the Enzymes activity 8. Understand the health and safety issues in using enzymes 9. Explain the types of solid & hazardous wastes 10. Describe the waste processing technologies.

Bio Technology In Fibres
Improvements in natural fibres – Transgenic cotton, BT cotton, colored cotton, modified wool fibre, Spider silk, bacterial cellulose, corn fibers, bacterial polyester fibre, protein polymers.

Enzymes
Production and characterization of cellulase, Amylase, pectinase, catalase, laccase, Lipase, peroxidase, sericinase, pectinestearases

Enzyme In Processing
Mechanism and application of amylase in desizing, pectinase in scouring, Catalase and laccase in bleaching, Cellulase in finishing, Sericinase in degumming, Pectinestearases in softening flaks. Properties and comparison of chemical treated and biological treated fabrics.

Practical aspects of handling enzymes
Introduction - Enzymes activity, stabilization of enzymatic activity, handling of enzymes, health and safety issues.

Waste Water Management
Need for solid and hazardous waste in textile industry, types and sorces ofsolidand hazardous wastes,storages, collection and transportof wastes, waste processing technologies, waste disposal.

Text book(s):

1	Cavaco – Paulo A. andGubitzG., “Textile Processing with enzymes”,Wodhead Publishing Ltd, Cambrdge, UK, 2003.
2	Anand S.C., Kennedy J.F. Miraftab M. and Rajendran S.,”MedicalTextiles and Biomaterials forhealth care”,Wood head Publishing Ltd. 2006.

Reference(s) :

1	Brydson J.A., “Flowproperties ofpolymer melts”, life books,London ,1978.
2	P.J.Brown and K.Stenens, Nanofibers and Nanotechnology in Textile, Woodhead publishing Limited,.England, 2007.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E23 Warp Knitting Technology								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100

Objective(s)	The students on the completion of this course will master the machineries and warp knitted structures
Course Outcomes	**At the end of the course, the students will be able to** 1. Summarize the fabrics produced using guide bars in tricot knitting machines. 2. Analyze the application of electronics in tricot knitting machines. 3. Discuss the functions of multi guide bar and jacquard raschel knitting machines. 4. Discuss the production of various technical textile fabrics using raschel machines. 5. Explain the functions of flat knitting machines. 6. Describe the production of knitted fabrics in flat knitting machines. 7. Explain the warp knitted fabric geometry and loop models. 8. Calculate the production and trace the loop formation mechanism in warp knitting. 9. Classify the methods of yarn preparation for warp knitting machines. 10. Discuss the functions of creel attachment and direct warp equipments.

Warp knitting – Tricot knitting Technology

Fabrics produced with two fully threaded guide bars – Fabrics produced with two partly threaded guide bars – fabrics produced with three or more guide bars – multi – guide bar Tricot – The use of electronics and computers in Tricot – tricot knitting with weft insertion – terry fabric production – sinker pile fabrics – cut press and miss press techniques – double needle bar Tricot. High-performance tricot machines

Warp Knitting – Raschel knitting Technology

Introduction – standard Raschel machines – multi guide bar Raschel machines – jacquard knitting – multi – guide bar and jacquard Raschel machines – electronic patterning equipment – double needle bar Raschel machines – Raschel machines for the production of corsetry nets, shoe spacer fabrics, plush lingerie.
Production of technical textiles fabrics using Raschel knitting machines.

Flat Knitting Machines

Double system flat machines : Cam plate description – yarn carrier sequences – the products of double system machinery – multiple feed machines – stripes – long and short needles eight system flat knitting machines. colour effects on eight system machines – knitted fabrics with fancy stitch effects – special devices on flat knitting machines: Widening on V bed knitting machines – The application of loop transfer.

Science of Warp Knitting

Yarn count and its relation to machine gauge – warp knitted fabric geometry – Loop models – the machine state loop model – yarn to fabric ratio – the machine of loop formation in warp knitting. Production calculations

Yarn Preparation

Methods of yarn preparation – Indirect /mill warping – Direct Warping – Direct warping equipment for filament yarns – Warping machines – yarn creel – attachments. Types of warping equipment

Text book(s):	
1	Thomas D.G.B., “An Introduction to Warp Knitting”, Merrow Publishing Company, UK, 1971.
2	Raz S, “Warp Knitting Technology”, Verlag Melliand Textilberchte, GMBH, Heidelberg,1987.
3	F Au K, “Advances in knitting technology”, Hong Kong Polytechnic University, Hong Kong ,Wood head Publishing Series in Textiles No. 89 ,India, 2001
Reference(s) :	
1	Ajgaonkar. D.B., “Knitting Technology”, Universal Publication Corporation, Mumbai, 1998.
2	David Spencer, “Knitting Technology”, Pergoman Press, U.K, 1989.
3	Gottlieb N, “The Production and Properties of Warp Knitted Fabrics”, Textile Progress, Vol.7, No.2, 1975

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E24 - Computer Applications in Textile and Apparel								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100

Objective(s)	Use of computers in various application areas such as yarn and fabric structure, modelling snd simulation, Image processing and artificial neural networks. .
Course Outcomes	**At the end of the course, the students will be able to** 1. Understand the use of computer for yarn analysis 2. Recognize the role of computer fabric structure analysis 3. Understanding the concept of model development, computer graphics amd model demonstration 4. Know the advanced modelling tecgniques and simulation. 5. Understand the theory of 3D human body modelling and techniques, 3D body scanning 6. Recognize the concepts of generic body models, virtual try on techniques, CAD in pattern making. 7. Understand the basic concepts of Image processing, principle of human eye, CCD camera and image formation & measures. 8. Know the concept of image transform, image extraction methods and application of image processing in textiles. 9. Understand the basic concepts in knowlwdge based neural networks, Application of ANN.. 10. Fuzzu logic in fabric care, pattern recognition, clothing performance and garment manufacturing.

Digital Technology for Analysis of Yarn and Fabric Structure Appearance

Introduction - Measurement of yarn evenness - Analysis of yarn hairiness - Measurement of yarn twist - Recognition of yarn snarl - Analysis of yarn blend - Grading of yarn appearance.

Fabric structure: The digital system for weave pattern recognition - Theoretical background for weave pattern analysis - Methodology for active grid model (AGM) construction and weave pattern extraction.

Modeling and Simulation Techniques for Garments

Model development - Computer graphics techniques for garment structure and appearance - Rendering of garment appearance and model demonstration for garments - Considerations for real-time applications - Advanced modeling - techniques - Future developments in simulating garment materials.

Three-Dimensional (3D) Technologies for Apparel and Textile Design

Introduction - Applications of three-dimensional (3D) human body modeling - 3D body scanning - Technologies of human body modeling in three dimensions (3D) - Development of the body surface - Generic vs individualized body models - Virtual try-on technologies. Application of CAD in patternt making

Image Processing

Elements of Digital Image Processing - Principle of Human eye, CCD camera - Image formation and measures. Pre-processing techniques, image transforms - enhancement - restoration – encoding. Image analysis and feature extraction methods – Application of image processing to textile process/product feature extraction.

Artificial Neural Networks

Basic concept - Knowledge based Neural Networks - Application of ANN - Fuzzy logic in fabric care, pattern recognition, prediction of clothing performance, garment manufacturing.

Text book(s):

1	Hu J, Computer technology for textile and apparel, woodhead publishing
2	Berkstresser G A. Grady P and Buchanan.D R, “Automation in the Textile Industry from Fibres to Apparel”, the Textile Institute, Manchester, 1995.

Reference(s) :

1	Computers in the world of textile, Book of papers presented at Hongkong conference – Textile Institute, 1984
2	Summer School on Computer applications in Textiles, ISTE, VJTI, Bombay, 1981
3	Li Min Fu Neural Networks in Computer Intelligence, Mc graw - Hill Inc., Singapore, 1994.
4	Gonzalez .R.C & Wintz.P, Digital Image Processing, Addition - Wesley Publishing Co., 1987
5	Gordon A Berkstresser , “Automation and Robotics in the Textile and Apparel Industries”, Noyers Publication Park Ridge, 1996

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E25 Apparel Machinery and Equipments								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100

Objective(s)	To impart basic knowledge on • Impart the various aspects of spreading and cutting machines and functions of the sewing machines. • Selection of work aid attachments and expertized in computer controlled sewing machine.
Course Outcomes	**At the end of the course, the students will be able to** 1. State the types and functions of spreading and cutting machines. 2. Categorize the common cutting and spreading defects. 3. Explain the various parts of sewing machines. 4. Describe the stitch length control and time sequence of stitch formation. 5. State the classification of sewing machine according to bed types. 6. Explain the types of belt drives and the functions of over lock and flat lock.. 7. Describe the various work aid attachements of sewing machines. 8. Express the sewing machine safety, care and maintenance. . 9. Categorize the various special machines. 10. Comprehend the various garment folding, computer controlled sewing machines.

Spreading and Cutting machines

Types and functions of fabric spreading machines; types and functions of cutting machines – straight knife, round knife, band knife, die cutting, computerized cutting, laser cutting and other modern techniques; types of blades for different cutting machines; common defects in cutting and their remedies.

Parts and Functions of Sewing machines

Parts and functions of sewing machines: needles, bobbin, bobbin cases, shuttle, shuttle hook, loops, loop spreader, threading fingers, throat fingers, throat plate, take up lever; tension discs, tension guides, feed dog, pressure foot; stitch length control; belt tension; timing sequence of stitch formation.

Sewing machine mechanism

Sewing machineries: classification according to bed types; classification based on stitch types (hook and looper); driving mechanism of SNLS and double needle lockstitch machine; types of belt drives; threading diagram for overlock and flat lock machines - various parts and their functions; common problems and their remedies.

Work Aids and Special attachments

Work aids attachments: roller guides, edge guides, hemmers, folders, compensating pressure foots, elastic attachment, placket making attachments, zipper attachments, pocket making attachments, sequins attachments; sewing machines safety regulations; care and maintenance of sewing machines.

Special Purpose machines

Special machines: collar and cuff turning machines, bar tacking machine, button hole machine. button stitch machine, blind stitch machine; feed of the arm machine; fusing and pressing machines; garment folding machines; computer controlled sewing machines; metal detector machine; care and maintenance.

Text book(s):

1	Harold Carr & Barbara Latham, “The Technology of Clothing Manufacture”, Om Books International, New Delhi, 1994.
2	Gerry Cooklin, “Introduction to Clothing Manufacture” Blackwell Science Ltd., 1995.

Reference(s) :

1	Ruth E.Glock, Grace I.Kunz, “Apparel Manufacturing Sewn Product Analysis”, Blackwell Scientific Publications. (2004).
2	Claire Shaeffer, “Sewing for Apparel Industry”, 1st edition, Pearson’s Prentice Hall, New Jersey, USA, 2000.
3	Mary Mathews, Practical Clothing Construction Part-I. Designing, Drafting and tailoring Bhattarams Reprographics (P) Ltd., Chennai, 1991.
4	Mary Mathews, Practical Clothing Construction Part-II. Designing, Drafting and tailoring Bhattarams Reprographics (P) Ltd., Chennai, 1991.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E 26 Export Documentation and Policies								
B.Tech Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100

Objective(s)	• To impart the knowledge of various aspects of export trade, export finance and forex market • To impart the knowledge of EXIM policies, export documents and export procedures
Course Outcomes	**At the end of the course, the students will be able to** 1. Differentiate domestic and international trade, merits and demerits & functions of Regional Trade Blocs 2. Summarize the international business environment, regulatory framework and export barriers. 3. Analyze the different types of export credit facilities available for exporters. 4. Describe the export risk coverage facilities 5. Summarise the concept of balance of payment and its functions. 6. Identify the factors affecting counter trade and forex functions. 7. Analyse the export promotion activities undertaken by the government. 8. Summarise the foreign trade regulation act for regulating export trade 9. Discuss the steps involved in export activity from raw material to shipping. 10. Identify the documents to be produced in bank for payment clearance and documents to be produced in central excise department for claiming incentives.

Introduction to International Business

Domestic trade Vs international trade - comparison; regional trade blocks – ASEAN, EU, SAARC, NAFTA; International business environment – social, cultural, political and regulatory; Tariff and Non Tariff barriers – features.

International Trade Financing

Export credit - L/C, export packing credit, post shipment credit, Buyers credit, Line of credit, short term, medium term, long term finance; EXIM bank – objectives and functions; ECGC – objectives and functions; Forfaiting – functions and benefits; Payment and Pricing Terms in export trade.

Balance of Payment

BOP – Introduction, components, functions, disequilibrium, financing BOP deficit; Forex market – functions, dealings, exchange rate systems; Devaluation – introduction, limitations; Counter trade – meaning, factors responsible for growth of counter trade.

Exim Policies

Foreign Trade Policy- objectives, EXIM policy related to textile; Export promotional measures – ASIDE, MAI, MDA, TEE, BPQ, TPS, DBK, EPCG, EOU, EHTP, STP, BTP, SEZ; Regulation and promotion of foreign trade – Introduction, Foreign Trade(Development and Regulation) Act 1992, FEMA.

Export Documents

Documents for export – principal and secondary, documents for claiming export assistance; international codes for products and services; export procedure – from packing to shipment.

Text book(s)

1	T.A.S Balagopal, " Export Management ", New age Publishers,2008
2	Francis Cherunilam, "International Buisness Text and Cases", Prentice Hall India, 2009

Reference(s) :

1	Richard M.Hill, Ralph S.Alexander, James S.Cross, "Industrial Marketing", Aitbs Publishers & Distributors, 1998
2	Jeannette Jamow, Kitty G.Dickerson, "Inside the Fashion Business", Prentice Hall, 1997

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E31 Process Control in Weaving and Chemical Processing								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100

Objective(s)	To impart basic knowledge on • Impart the various aspects of Process and control practised in weaving and chemical processing area. • Selection and control ofProcess parameters involved and Optimised Process Parameters of each process.
Course Outcomes	**At the end of the course, the students will be able to** 1. State the process control in warp winding. 2. Categorize the process control in weft winding and productivity. 3. Explain the process control in warping. 4. Describe the process control of sizing and sizing loss. 5. State the process control in weaving. 6. Explain the control of loom shed, loss of efficiency by snap reading and hard waste control. 7. Describe the process control in grey inspection, desizing, scouring, souring, bleaching and mercerization. 8. Express the various quality parameters of desizing, scouring, souring, bleaching and mercerization . 9. Categorize the various process parameters of chemicals in dyeing and printing. 10. Comprehend the various process control parameters for finishing treatment.

Process control in winding

Scope and approach of process control in warp winding - control of quality of knot, producing good packages, control of efficiency of fault removal, process parameters, performance in winding; Process control in pirn winding- Scope and approach, Minimising end breaks, stoppages due to mechanical failures, improving the build of the pirn; productivity.

Process control in warping and sizing

Scope and approach of process control in warping and sizing- minimising end breaks in warping, performance, quality and productivity in warping; Choice of size recipe and size pick- up, preparation of size recipe, control of size pick-up, control of yarn stretch and moisture in sized yarns, quality of sized beams, improved fibre lay, after waxing, control of productivity and size losses.

Process control in weaving

Scope and approach of process control in weaving- control of loom speed and loom efficiency, control of loss of efficiency by snap reading, loom performance, quality of yarn and loom allocation; Control of some specific fabric defects, some other common fabric defects, grey fabric inspection; Hard waste control- setting norms, control of hard waste; Control of loom productivity, efficiency and fabric quality; Online and off-line process control, quality control and monitoring in weaving; Cost control in weaving.

Process control in Wet processing (Preparatory Process)

Process control in Preparatory Process- Grey Inspection of Fabrics, Process control measures in desizing, scouring, souring, bleaching and mercerization; Important functions of a control laboratory in a modern process house.

Process control in Dyeing , Printing and Finishing

Process control measures in dyeing, printing and finishing - Process control in dyeing of cotton, synthetic, and blended materials of yarn and fabric stages; Process control in Continuous and batch dyeing machines; Process control in printing - direct, discharge, resist, heat transfer printing, roller, screen and inkjet printing; Process control in finishing – Basic finishing machines, stentering, calendaring, surface raising, pre shrinking, softening, resin finishing, water proofing, flame proofing, anti-pilling, antistatic, soil release, antimicrobial, UV protection, low –liquor finishing, plasma treatments, wool treatment and enzyme finishes.

Text book(s):

1	Abihijit Majumdar, Apurba das,Algar samy.R and Kothari.V.K, "Process control in Textile manufacring",Woodhead publishing Ltd,New Delhi, 2013.
2	Process control in weaving, ATIRA Publications, ATIRA.1974.

Reference(s) :

1	Chemical Processing Tablet, "Process and Quality Control in Chemical Processing" – Textile Association of India publication, 1984.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E32 Colour Science, Measurement and its Applications								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100
Objective(s)	To study the light and pigment theory and to know the colour measurement techniques							
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain the various laws related to light matter and its interaction. 2. Write the theory of reflection, scattering and Kubelka-Munk. 3. Describe the theory involved in colour vision. 4. Identify the defects in colour vision and clarify the confusion in colour perception. 5. Write the various colour order systems. 6. Explain the colour scale and chromaticity diagram. 7. Describe the relationship between dye concentrations and reflectance value and K/S value. 8. Explain the working, limitations of computer colour matching. 9. Write the types of metamerism and its assessment. 10. Describe the methods and problems in assessment of colour difference.							

Light-Matter Interaction

The electromagnetic spectrum – the optical region, interaction of light with matter transparent case – beer's law and lambert's law, opaque case – reflection absorption and scattering; the concept of radiative transfer theory and its simplification into the Kubelka – Munk model.

Human Colour Vision

Colour sensation – physiological and psychological mechanism of color vision, color vision theories, defects in color vision, color vision tests, additive and subtractive color mixing, confusion in color perception, **colour psychology, psychological properties of colours.**

Colour Order Systems

Description of color, various color order systems, CIE numerical system for colour definition and its components – illuminants, the versions of the standard observer, the colour scales, chromaticity diagram

Numerical Colour Matching

Reflectance and K/S value, relationship between dye concentrations and reflectance values and K/S values, reflectance and K/S curves of dyed samples, the CIE model for computer color matching and the calculation of colour recipes, non CIE models for colour matching, limitations of computer color matching.

Metamerism and Colour Difference Assessment

Metamerism – types and its assessment, metamerism in textile materials; colour differences – visual assessment, standard conditions, methods and problems, assessment of colour difference, the non linearity of subjective perception of colour, the need for specific colour difference systems, setting up of objective pass/fail standards.

Text book(s):

1	Sule A.D., "Computer Colour Analysis", New Age International Publishers, 2002.
2	Choudhury A. K. R., "Modern Concepts of Colour and Appearance", Oxford and IBH Publishing Ltd., 2000.

Reference(s) :

1	Shah H.S. and Gandhi R. S., "Instrumental Colour Measurement and Computer Aided Colour Matching for Textiles", Mahajan Book Publication, 1990.
2	Park J., "Instrumental Colour Formulation: A Practical Guide", Wood head Publishing, 1993, ISBN 0 901956 54 6.
3	Kuehni R.G., "Computer Colorant Formulation", Lexington Books, 1975, ISBN 0-669-03335-9.
4	McLaren K., "The Colour Science of Dyes & Pigments", Adam Hilger Ltd., 1983, ISBN 0-85274-426-9.
5	D. Travis, "Effective Colour Displays", Academic Press, 1991, ISBN 0-12-697690-2.
6	Wright W.D., "The Measurement of Colour", Adam Hilger Ltd., 1969.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E33 Production and Application of Sewing Threads								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100

Objective(s)	To impart basic knowledge on • To study about production, production parameters, types and applications of sewing threads.
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain about sewing threads and its requirements. 2. Discuss the quality parameters of good sewing thread. 3. Classify the types of sewing thread and describe the production method of sewing thread. 4. Express the tensile properties of sewing threads. 5. Recognize the high performance fibres and classify the types of high performance fibres used in sewing threads. 6. Categories the applications of different high performance sewing threads. 7. Explain the quality parameters of sewing threads and execute the different quality control techniques in sewing. 8. Identify the factors affecting the seam strength and explain the concept of ticket numbering in sewing threads. 9. Analyze the types of tests for sewing threads and describe the procedure of testing the physical and chemical properties of sewing threads. 10. Compare the tested sewing threads with standard quality and select suitable sewing threads according to end-use.

Introduction

Sewing thread –Origin of threads and past history; revolution in sewing thread industry, present scenario, consumption trends; Quality parameters of good sewing thread-Quality of raw material used, quality of threads, quality parameter of sewing threads.

Types and Properties of Sewing Threads

Types of sewing thread – spun threads, core spun threads, filament threads; sewing thread production method; tensile properties, abrasion resistance, friction, heat resistance, shrinkage, snarling tendency, fastness, mass evenness.

Characteristics and Application of High Performance Sewing Threads

Aramid threads, ceramic threads, polypropylene threads, polyethylene threads, polytetrafluroethylene threads, fiberglass threads; other sewing threads – tencel, acrylic, linen, elastic, soluble embroidery threads.

Quality Control in Sewing

Sewing performance – sewing problem, damages and seam puckering, factors affecting seam strength, ticket number in sewing threads.

Testing and Selection of Sewing Threads.

Testing of sewing threads – physical and chemical properties; selection of sewing thread for different end uses.

Text book (s) :

1	Jacop Solinger, “Apparel Manufacturing Hand Book”, Litton Educational Publishing, 1980

Reference(s) :

1	Rao J.V and Rajendra Kr. Gaur “Sewing Threads: Technology
2	Carl A Lawrence, “Fundamentals of Spun Yarn Technology”, CRC Press, Florida, USA, 2003
3	Carr H, “The Technology of Clothing Manufacture”, Blackwell Publisher, UK, 2004
4	Ruth E. Glock, “Apparel Manufacturing Sewn Product Analysis”, Prentice Hall, New Jersey, 2005, ISBN-10: 0131119826

K.S.Rangasamy College of Technology - Autonomous R2014								
40 TT E34 Protective Garments								
B.Tech. Textile Technology								
Elective III								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100
Objective(s)	Impart knowledge on fibres, fabrics and its requirements for making protective textiles. Understand the manufacturing techniques, characteristics and various end uses of protective textile products.							
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain the standards, functions of protective textiles 2. Discuss the factors affecting design, and materials for protective textiles 3. Describe the production techniques of mechanical, pressure and fire hazards 4. Understand the chemical, biological, electrical and UV protective textiles 5. Explain the manufacturing technique of smart textiles 6. Explain the surface and modern treatments for smart textiles 7. Evaluate the testing methods for heat and moisture properties of materials 8. Explain the measurement of insulation and evaporative resistance, manikin and fabric tests 9. Evaluate the protective textiles against microorganism and ballistic 10. Explain the protective textiles against knives, and other weapons							

Overview of protective clothing

Overview and various standards for protective clothing, Market prospects, Classification, Materials and technologies, Future of personal protection, Requirements, International standards, Certification,

Future trends. Factors affecting the design and use of protective clothing: Introduction, Factors influencing the design development process, Clothing systems and functionality, Reconciling fashion and function, Future trends, Recommended steps in the selection of textiles for protective clothing, Relevant standards, specifications or guidelines, Protection performance of materials, Biological protection performance,

Flame and thermal protection performance, Mechanical protection performance, Selection of materials based on other major factors,

Protection against biological hazards

Introduction, Types of hazards, Environmental and biological hazards, Microorganism protection, textiles for respiratory protection, insect and bacterial protection, biological warfare protection.

Protection against chemical and heat hazards

Introduction, Definition of comfort, Test methods for heat and moisture transfer, Measurement of thermal comfort with practice-related tests, Interactions between heat and mass transfer, Moisture storage and influences on protection, Thermal manikins, Measuring the insulation of protective clothing systems,

Measuring the evaporative resistance of protective clothing systems, Ensemble data, Moving manikins, Manikin tests vs fabric tests, Using manikins under transient conditions Electrical and radiation hazards. Civilian protection and protection of industrial workers from chemicals, Textiles for UV protection. Thermal (heat and fire) protection

Intelligent textiles and surface treatments for textiles:

Smart textiles, Applications of smart textiles for protective purposes, Sensor function, Data processing, Actuators, Energy, Communication, Electric actuation, Types of surface treatments, Early treatments for protective textiles, Progression to modern treatments, Choice of treatments in relation to fibre and fabric types, Treatment process fundamentals, Treatment application systems, Brief overview of finishes for protection.

Protective textiles for defense and various industry

Textiles for protection against cold, electrostatic protection, Ballistic protection, Military protection, Fire fighters protective clothing, Protection against knives and other weapons, Flight suits for military aviators, Protection for workers in the oil and gas industry, Motorcyclists

Text book(s):

1	R A Scott, RASCOTEX, UK., “Textiles for Protection, 1st Edition” Wood head Publishing Ltd., October 2005.
2	Sabit Adanur., “Wellington Series Handbook of Industrial Textiles”, CRC Press, October 6, 1995.
3	F. Wang and C. Gao., “Protective Clothing Managing Thermal Stress” Woodhead Publishing Series in Textiles 2014.

Reference(s) :

1	ASTM Standards on Protective Clothing Textbook Solutions
2	Cherilyn N. Nelson, Norman W. Henry., Performance of Protective Clothing: Issues and Priorities for the 21st Century. ASTM International, 2000.

3	Krister Forsberg, Ann Van den Borre, Norman Henry, III, James P. Zeigler.,Quick Selection Guide to Chemical Protective Clothing, 6th Edition, Wiley, June 2014.

K.S. Rangasamy College of Technology - Autonomous R 2014

40 TT E35 Textile Composites

B.Tech. Textile Technology

Elective III

Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100

Objectives	• To study the usage of textile materials in composites. To know the applications of composites.
Course Outcomes	**At the end of the course, the students will be able to** 1. Describe fibre reinforced polymers and their properties 2. Discriminate thermoset and thermoplastic resins 3. Report on properties and manufacturing of matrix reinforcements 4. Explain the manufacturing techniques of prepregs and preforms 5. Explain about manufacturing processes of Fibre reinforced composites 6. Report on the concept of metal matrix composites 7. Report on the concept of ceramic matrix composites 8. Analyze the tensile, flexural and impact testing of reinforced plastics 9. Analyze the interlaminar, shear, compression testing of reinforced plastics 10. Explain the composite applications in various fields

Introduction

Fiber reinforced polymers materials, properties; Resins - thermoset and thermo plastics / additives release agents; Composite material classification and its properties; Reinforcement – matrix interface wetability.

Prepregs and Preforms

Introduction - manufacturing techniques, property requirements, textile preforms - weaving, knitting and braiding; Geometrical aspects - fiber orientation, volume fraction, weight fraction and voids.

Techniques for Manufacture of Composites

Introduction, manufacturing processes - open mould process, closed mould process and continuous process; Metal matrix composites, Ceramic matrix composites - types, importance and processing.

Mechanical Properties of Textile Composites

Testing of reinforced plastics - tensile, flexural, impact, interlaminar shear, compression and frictional properties.

Application of Polymer Composites

Composites application in aerospace, automobile, construction industry, and sports products; polymer composite for biomedical and vibration damping.

Text book :

1	Hull.D, “An introduction to composite materials”, Cambridge University Press, Cambridge 1988.
2	Gupta.L, “Advanced Composite Materials”, Himalayam Books, New Delhi, 1998.

Reference(s) :

1	Mathews F.L and Rawlings R.D. “Composite Materials Engineering Science" Chapman & Hall, London 1994.
2	Pipes, R.B., “Composite Materials Series”, Vol, 1 to 3, Elsevier, New York 1990.
3	Ken Ashbee, “Fundamental Principles of Fibre Reinforced Composite”, PRC press, 1993.
4	Bogdanocivh.A and Pastore.C., “Mechanics of Textile and Laminated Composites”, Chapman & Hall Due, 1997.
5	Hearle J.W.S. “High Performance Fibres, Composites and Engineering Textile Structures”, Journal of the Textile Institute special issues, The Textile Institute, 1990.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E 36 International Social Compliance								
B.Tech Textile Technology								
Elective III								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100

Objective(s)	• To gain knowledge about various industry practices of social compliance norms followed in industry. • To impart the concept of labor welfare measures and international ethical standards
Course Outcomes	**At the end of the course, the students will be able to** 1. Define the concept of minimum wages and its benefits. Discuss the ill effects of forced, bonded labours and discrimination of labours at the workplace. 2. Underline the importance of freedom of association and health and safety measures, amenities and accommodation facility at the workplace. 3. Discuss about trade union and analyze the advantages of collective bargaining. 4. List the labor welfare measures like PF, ESI, crèche, maternity and transport facility to be provided for the labours. 5. Interpret the main features brought out in the second national labour commission. 6. Discuss the importance of workers participation in wage negotiation and decision making process along with the management. 7. Know the features and benefits of ISO 9001, ISO 14001, SA 8000 and OHSAS 18001. 8. Implement the standards brought out in ISO 9001, ISO 14001, SA 8000 and OHSAS 18001. 9. Recognize the labor standards practiced in different countries. 10. Implement the standards that are essential for having trade with specific country.

Working Environment

Minimum wages – concept and benefits; Working hours - requirement and facilities for men and women; Forced and bonded labor – features and ill effects; Discrimination – workplace in terms of race, religion, caste and sex; Freedom of association; Accommodation and amenities.

Welfare Measures

Trade union – history and norms for forming trade union, functions, central trade union, advantages and disadvantages; Collective bargaining machinery; Labor welfare measures, ESI - features, EPF - features; Family welfare activities-first aid, rest rooms, crèches, maternity facilities and transport facility.

Labour Policy

Second National Labor Commission - major recommendations; Employee participation; Labor and management cooperation in decision making.

Social Accountability

ISO 9001 – features and benefits; SA8000 - features and benefits; ISO 14001:2015 - Concepts and benefits; OHSAS 18001:2007 - Concepts and benefits.

Compliance With Ethical Codes

International Labor Organization – conventions and functions; United Nations Global Compact; Ethical Trading Initiative base code(ETI); Worldwide Responsible Apparel Production(WRAP); Fair Labour Association(FLA); Initiative Clause Society(ICS); AVE sector model; Business Social Compliance Initiative(BSCI).

Text book(s)

1	N.G.Nair, Lata Nair, “Personnel Management and Industrial Relations”, S.Chand and Co., New Delhi, 2001.
2	C.B.Mamoria and Sathish Mamoria, “Dynamics of Industrial Relations”, Himalaya Publishing House, New Delhi, 1998.
3	Dr.K.C.Arora, “ISO 9000 to OHSAS 18001”.

Reference(s) :

1	C.S.Venkata Ratnam, “Industrial Relations”, Oxford University Press, New Delhi, 2006.
2	S.C.Srivastava, “Industrial Relations and Labour Laws”, 4th edition, Vikas Publications, 2000.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E 41 Mechanics of Textile Machinery								
B.Tech. Textile Technology								
Elective IV								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	1	0	60	3	50	50	100
Objective(s)	• To impart knowledge on the concepts of Gears, Motions, Friction, Energy and Moments. The students will be familiar with Design and Construction of cams, Design of transmission of shafts and machine components balancing.							
Course Outcomes	At the end of the course, the students will be able to 1. Define the importance of gear and belt drives and to express the relationship between tensions in belt drives and also the condition for maximum power transmission. 2. Design the profiles of plain and twill tappets and ring frame builder motion cams 3. Understand concepts of displacement, velocity and acceleration and determine the same in textiles. 4. Calculate force, work done and power in textile machinery. 5. Understand the laws of friction and determine frictional force involved in textile. 6. Apply the principle of moment and calculate forces and couples in textiles. 7. Understand the stress- strain, bending shear and torsion characteristics of materials. 8. Design transmission shafts and drafting rollers. 9. Understand concept of balancing of rotating objects. 10. Balance rotor and card cylinder							

Drives and Design of Cam and Tappets

Belts and Ropes- Drive Speed Ratio – Centrifugal tension - Condition for maximum power transmission and speed – PIV drives. Gears Nomenclature - Velocity ratio-Speed calculations - Epicyclic gear trains.

Cam and Tappets: Design of Ring frame builder motion cam; Plain and Twill cams for tappet looms.

Equation of Motion and Friction

Simple harmonic motion; Fundamental equation of motion- force, mass, momentum, work done, power; Shuttle and ring frame traveller velocity and power consumption.

Friction: Static, dynamic and coil friction; Frictional force and power; Application in textiles - negative let off, tension devices.

Energy and Moments

Kinetic and potential energy calculation in the textile application; Principles of moments- scutcher calendar roller, ring frame top arm loading; Centre of gravity; Sley displacement, velocity, acceleration, and sley eccentricity in relation with crank radius and connecting arm length.

Design of Transmission of Shafts and Drafting Rollers

Material Properties; Safety consideration in design; Stress-strain relationships of materials; Tensile, compressive, shear, bending and torsion; Design of transmission shaft; Static load, torsional rigidity and lateral rigidity; Design of drafting rollers; Torsional rigidity and lateral rigidity.

Balancing of Machine Components

Balancing of machinery-concepts and definitions; Theoretical considerations in balancing; Balancing of rotors; Balancing of card cylinder; Practical aspects of balancing; Measurement of balance.

Text book(s):

1	Slater K. “Textile Mechanics, Vol. I & II” Textile Institute, Manchester, UK, 1997.
2	V. Jayakumar, “Kinetimatics of Machinery”, Lakshmi publications 2006.
3	R.S. Rengasamy “Mechanics of Machines”, NCUTE Publications, Ministry of Textiles, New Delhi, 2002.

Reference(s) :

1	W.A. Henton, “Mechanics for Textile students”, Textile Institute, Manchester, UK, 1960.
2	Booth J E “Textile Mathematics, Vol. I, II & III” Textile Institute, Manchester, UK, 1977.

K.S.Rangasamy College of Technology - Autonomous R 2014								
40 TT E 42 Silk Technology								
B.Tech. Textile Technology								
Elective IV								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	50	50	100
Objectives	• To gain knowledge in silk preparation and its machineries. • To correlate the theoretical importance of silk, silk rearing and silk reeling.							
Course Outcomes	**At the end of the course, the students will be able to** 1. Know the sericulture and silk industry and cultivation and grading of silk. 2. Express the classification and varieties of mulberry and non-mulberry silks. 3. Explain the principle of silk worm rearing and various methods of silk worm rearing. 4. Describe the Silk worm seed production and rearing equipments. 5. Express the quality and characteristics of cocoons and sorting of cocoons. 6. Know the stifling and conditioning process of cocoons. 7. Explain the silk reeling and machineries used for silk reeling. 8. Describe the silk throwing, winding, doubling and twisting. 9. Express the quality control in reeling and treatment of water used for reeling. 10. Know the national and international testing methods and grading of raw silk.							

Introduction

Geographical distribution, cultivation & grading of silk fibre; Introduction to sericulture and silk industry; Classification & varieties of mulberry & non mulberry silk; Species – multivoltine, bivoltine and univoltine species; Scope for non-mulberry silk in India.

Silk Rearing

General principles of silk worms rearing; Environmental conditions for silk worm rearing; various methods; Precautions during rearing; Rearing equipment and their maintenance; Silk worm seed production and activities in a grainage house.

Cocoon

Cocoon quality; Stifling and conditioning of cocoons, boiling and brushing of cocoons; Different types of cocoons; Importance of cocoon quality; Pretreatment of cocoons; Factors influencing quality of cocoon; Cocoon characteristics; Storage of cocoons; Cocoon sorting.

Silk Reeling and Throwin

Cocoon cooking – objectives, various methods cooking; Silk reeling - systems of silk reeling, factors influencing silk reeling, silk reeling machinery; Re-reeling, skein finishing & packing; Recent developments in reeling of silk; Wild silk reeling; Throwing – objectives, winding, doubling, re-winding and twisting; Manufacture of yarns for use in ordinary, chiffon, crepe, georgette fabrics; Recent developments in silk throwing machinery.

Quality Control and Testing of Silk

Quality Control in Reeling: Characteristics of water, Raw silk testing & grading – National & International methods of testing & grading of raw silk, shell ratio, assessment of reelability. Application and end uses of silk. Different types blended fabric, modal, union fabric and spun silk. Market potential and demand of silk fibre, furnishing cloth, silk needs, Branded product in silk,varities of banaras silk .

Text book (s) :

1	Sonwalker T.A., “Handbook of silk technology”, Wiley Eastern, Chennai, 1992.
2	Shekar P. and Ardingham, “Sericulture and silk production – A hand book”, Intermediate Technology, U.K., 1995.

Reference(s) :

1	“Manuals on Sericulture”, Food and agriculture organisation of the United Nations, Rome, 1976.
2	Nanavathy M., “Silk production, processing and marketing”, Wiley Eastern, 1991.

K.S. Rangasamy College of Technology - Autonomous R 2014

40 TT E 43 Pollution Control in Textile Industry

B.Tech. Textile Technology

Elective IV

Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	50	50	100

Objectives	• To gain knowledge in silk preparation and its machineries. • To familiarize the learners with the impacts of pollution control and legislation. • To enlighten the learners about waste and recycling, reuse of waste. • To endow with an overview of environmental management and human health.
Course Outcomes	1. Know the pollution and its impact on ecology, environment and society. 2. Express the waste categorization for the textile industry, problems associated with waste-Importance of pollution control in textile industry 3. Explain the air pollution in yarn and fabric manufacturing process. 4. Describe the method of noise control in textile mills. water Pollution in slashing and sizing. 5. Express the toxicity of dyes, intermediates, auxiliaries, finishing Chemical causes and effects health hazards associated with hazardous dyes and chemical. 6. Know the emerging pollution prevention technologies pollution in printing, finishing, garment manufacturing process, pollution control and preventive measures. 7. Describe environment management systems (EMS). 8. Choose eco-friendly dyes and chemicals in wet processing of fabric. 9. Express the textile effluent and their characterization, measurement of effluent strength. 10. Know the environment legislation in India and other countries with Respect to dyes and other chemicals- Banned dyes and chemicals.

Introduction to Pollution and Its Sources

Pollution and its impact on ecology, environment and society - Sources of pollution -Air, water, noise pollution in textile industry-Overview of pollutants and waste streams-hazardous waste-Waste categorization for the textile industry-Problems associated with waste-Importance of pollution control in textile industry.

Pollution In Spinning and Weaving

Air pollution in yarn and fabric manufacturing process-standards –causes-effects- health hazards associated with air pollution-pollution prevention measures-Noise pollution invarious textile departments- standards - causes and effects-preventive measures-health hazards associated with noise pollution-Method of noise control in textile mills. Water pollution in slashing and sizing- water pollutants –causes and effects – remedial measures.

Pollution In Textile Chemical Processing

Pollutant associated with dyeing- Toxicity of dyes, intermediates, auxiliaries, finishing chemicals –causes and effects – health hazards associated with hazardous dyes and chemicals-Pollution prevention measures in dyeing–Emerging pollution prevention technologies pollution in printing, finishing, garment manufacturing process – Pollution control and preventive measures.

Environmental Management

Organisation involved in pollution control-national & international-Waste Audit-Pollution prevention programme-Pollution control board, pollution norms -ISO 14000-Ecolabels-Organic Clothing-Eco-friendly garment processing-Environmental management, Study of polluted rivers and audit system-Pollution prevention case studies.Hard waste management and dispose of cut pieces ,zippers, E-waste management system.

Effluent Treatment

Textile effluent and their characterization, measurement of effluent strength- BOD-COD AOX-TDS- methods of effluent treatment: primary, secondary and tertiary treatments disposal and recycling of effluents-Environment legislation in India and other countries with respect to dyes and other chemicals- Banned dyes and chemicals.Recycling of textile products,Zero discharge in effluent treatment process.

1	Best Management Practices for Pollution Prevention in the Textile Industry –Manual by US Environmental Prevention Agency, 1996.
2	S.C.Bhatia “Handbook of Industrial Pollution and Control (Vol. 1 & 2), CBS edition, 2002.

Reference(s) :

1	R.Senthil Kumar, “Cotton Dust-Impact on human health and environment in the textile industry”, Textile Magazine, January 2008.
2	R.Senthil Kumar, “Noise pollution-A nuisance to Textile industry” , Asian Textile Journal, May 2008.
3	Energy conservation in Textile Industry”, SITRA, Coimbatore, 1997.
4	Palaniappan C et ai, "Renewable Energy Applications to Industries", Narose Publishing House, 1998.
5	Harold R, Park Ridge. N.J, “Pollution Control in the Textile Industry”, Jones Noyes Data Corp., 1973.
6	S.C.Bhatia “Handbook of Industrial Pollution and Control (Vol. 1 & 2), CBS edition, 2002.
7	Harold R, Park Ridge. N.J, “Pollution Control in the Textile Industry”, Jones Noyes Data Corp., 1973.
8	K.Slater, “Environmental Impact of Textiles” , Wood head publication,2003.
9	Pollution Prevention in Textile Industry manual by U.S EPA/SEMARNAP Pollution prevention work group, 1996.

K.S. Rangasamy College of Technology - Autonomous R 2014

40 TT E 44 Home Textiles

B.Tech. Textile Technology

Elective IV

Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	50	50	100

Objective(s)	• To impart basic knowledge on • To study about home furnishings material. To know the usage of textile materials in interior design.
Course Outcomes	**At the end of the course, the students will be able to** 1. Describe different types of fabrics used in home textiles. 2. Explain special finishes and surface ornamentation on home textile products. 3. Compare different furnishings used for interiors like living room, dining room, kitchen, bed room and bathroom. 4. Analyze factors influencing in the selection of home furnishings for different interiors. 5. Discuss on the types, features and end use of different floor coverings. 6. Analyze factors influencing in the selection of different floor covering and its maintenance. 7. Describe the types of doors and windows and choice of fabrics used in curtains and draperies. 8. Demonstrate the construction of curtains for different types of windows and doors. 9. Describe home decoration articles and bed linens. 10. Evaluate the properties of home textile.

Introduction

Introduction to home textiles; definition and classification of home textiles, woven, non-woven and knitted fabrics; different types of fibres used for home textile; eco-friendly home textiles; Special finishes and surface ornamentation on home textile products; Indian home textiles industry and its future prospects.

Furnishings

Types of furnishings used for different interiors- living room, dining room, kitchen, bed room, bathroom and kids room. Factors influencing the selection of home furnishings for different interiors; Requirements of furnishing for different interiors, role of fabrics in interior furnishing.

Wall and Floor Coverings

Types of flooring; Types of floor covering-carpet, rugs and carpet cushion; Fibres used ;Manufacturing process and its types of , salient of features of carpet and rugs ; Factors influencing the selection of different floor covering and its maintenance.

Doors and Windows Treatments

Different types of doors and windows used; Curtains and draperies- types and choice of fabrics, calculating the material required for curtains, construction of curtains for different types of windows and doors; Method of finishing draperies.

Linens

Home decorations- sofa covers, cushion, cushion cover, upholsteries, bolster, bolster covers and throws; Bed linens- classification and types of mattresses and mattresses covers; Properties required for hotel and hospital linens; Latest development in home textile products ; Testing of home textile-abrasion, antimicrobial, flammability and color fastness.

Text book(s):

1	Alexander. N. G., “Designing Interior Environment”, Mas Court Brace Covanorich, New York, 2001
2	Wingate IB & Mohlen J.F. “Soft Furnishings”. Prentice Hall Inc, New York, 2000.
3	Jay Diamond and Ellen Diamond, “Fashion Apparel, Accessories, and Home Furnishings”, Prentice Hall, First Edition, 2007

Reference(s) :

1	Donserkery K. G., “Interior Decoration in India”, D. B. Taraporevala Sons and Co. Pvt Ltd., 1993
2	Robert Harding, “Curtains, Blinds and Valances”, Egatemoss, Ohio, 1998
3	Brian D Coleman, “Luxurious Home Interiors”, Gibbs Smith Publication, Hong Kong, 2004

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E 45 ERP and MIS in Apparel Industry								
B.Tech. Textile Technology								
Elective IV								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	50	50	100
Objectives	•							
Course Outcomes	**At the end of the course, the students will be able to** 1. Discuss the importance, benefits of ERP. 2. Outline the types of enterprises and its functions. 3. Explain the method and costs involved in implementation of ERP. 4. Describe the role of contractors, vendors, buyersemployees& consultants and in corpora ting them in ERP. 5. Explain the business modules of ERP package. 6. Identity the significance& advantages of each business module. 7. Apply software for production planning costing & merchandising in ERP. 8. Explain the principles of production resource planning. 9. Apply MIS for data sharing in garment industry. 10. Apply computers in designing, pattern making and communicating with vendors.							

Unit 1

Introduction: ERP: An Overview, enterprise – an overview, types of Enterprises, need for ERP, benefits of ERP, ERP and related technologies, Business Process Reengineering (BPR), Benefits of BPR

Unit II

Implementation of ERP: ERP implementation lifecycle, implementation methodology, hidden costs, organizing the implementation, vendors, consultants and users, contracts with vendors, consultants and employees, project management and monitoring.

Unit III

Business modules in an ERP package - finance, manufacturing, human resources, plant maintenance, materials management, quality management, sales and distribution. Significance and advantages of each of the modules.

Unit IV

ERP in apparel industry:Production resource planning – principles and management of demand chain analysis– quick response strategy - material management for 'Quick Response' –software for production planning , costing & Merchandesing costing and merchandising software.

Unit V

Computer Applications:Management Information System in garment industry – EDI in garment technology; Use of Computers in Designing, Pattern making, computerized production systems, communicating with vendors and buyers; Telephone, fax, video conferencing, intranet, internet, etc;

Text book(s):

1	Alexis Leon, "ERP Demystified", Tata McGraw Hill, New Delhi, 2000
2	Glock Ruth E. and Kunz Grace I., "Apparel Manufacturing - Sewn Product Analysis", Blackwell Scientific Publications, 1996

Reference(s) :

1	Joseph A. Brady, Ellen F. Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson
2	Garg Vinod Kumar and Venkitakrishnan N. K., "Enterprise Resource Planning – Concepts and Practice", PHI, New Delhi, 2003
3	Enterprise Resource Planning, Theory & Practice – Rahul Altekar , V.,Printice Hall of India, New Delhi, 2005
4	Enterprise Resource Planning– Leon , V., Diamond Publications, New Delhi.
5	Enterprise Resource Planning – Mary Sumner, Diamond Publications, New Delhi, 2001

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E 46 Textile and Apparel Entrepreneurship								
B.Tech. Textile Technology								
Elective IV								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	50	50	100
Objectives	**To impart basic knowledge on** • Aware of the importance of entrepreneurship opportunities available in the society for the entrepreneur. • Acquaint them with the challenges faced by the entrepreneur.							
Coure Outcomes	**At the end of the course, the students will be able to** 1. State the entrepreneurship concept,definition and characteristics . 2. Categorize the types of entrepreneurship and Entrepreneurial growth. 3. Explain the Small scale industries. 4. Describe the market survey and techno economic feasibility assessment. 5. State the sources of finance and financial assistance. 6. Explain the costing and break even analysis. 7. Describe the Sickness in small industries, causes and consequences, corrective measures. 8. Express the various government policies for small scale enterprises and business incubators. 9. Categorize the various electronic commerce and small enterprises. 10. Comprehend the various leadership in the new economy and hiring the right employees.							

Entrepreneurship

Introduction of Entrepreurship – Concept, definition, characteristics and functions.Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur, Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth.

Small Scale Industries

Small Scale Industries - Definition, Classification – Characteristics, Ownership Structures – Project Formulation – Steps involved in setting up a samll industry – identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports – Project Appraisal – Sources of Information – Classification of Needs and Agencies.

Finance Support and Financial Institutions

Need – Sources of Finance, Term Loans, Capital Structure, Financial Institution, Management of working Capital, Costing, Break Even Analysis, Taxation – Income Tax, Excise Duty – Sales Tax.

Support to Entrepreneurs

Sickness in small Business – Concept, Magnitude, Causes and Consequences, Corrective Measures – Business Incubators – Government Policy for Small Scale Enterprises – Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Sub Contracting.

Export Documentation and Procedure for Small Enterprises

Electronic commerce and small enterprises, Franchising, Leadership in the new Economy, Hiring the Right Employees, Building the Right Organizational culture and structure, the challenge of Motivating Workers.

Text book(s):

1	Khanka. S.S., “Entrepreneurial Development” S.Chand & Co. Ltd., Ram Nagar, New Delhi, 2013.
2	Donald F Kuratko, “Entreprenuership – Theory, Process and Practice”, 9th Edition, Cengage Learning, 2014.

Reference(s) :

1	Hisrich R D, Peters M P, “Entrepreneurship” 8th Edition, Tata McGraw-Hill, 2013
2	Mathew J Manimala, “Enterprenuership theory at cross roads: paradigms and praxis” 2nd Edition Dream tech, 2005.
3	Rajeev Roy, “Entrepreneurship” 2nd Edition, Oxford University Press, 2011.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E51 Functional Finishes								
B.Tech. Textile Technology								
Elective V								
Elective	Hours / Week				Credit	Maximum Marks		
	L	T	P	Total hrs	C	CA	ES	Total
V	3	0	0	45	3	50	50	100
Objectives	• To study the concepts of finishing, process of various garment finishing techniques and special finishes for garments							
Course Outcomes	At the end of the course, the student will be able to 1. Explain the mechanisms and applications of crease resistant finish & softening process 2. Explain the Bio polishing mechanism and properties of finished fabrics. 3. Discuss the flame retardant & soil release finish and Identify their methods of assessment 4. Explain the water repellent finishes & Water proof finishes for cotton and synthetics materials. 5. Apply the antibacterial, antifungal, UV finishes and pest resistant finishes on different fabrics. 6. Demonstrate the application & evaluation of Fragrance and mosquito repellent finish. 7. Know the combined enzyme and stone wash finishes 8. Demonstrate the mechanism of anti odour finish and their application & evaluation 9. Explain the surface modification by sol-gel, plasma and radiation techniques. 10. Demonstrate plasma modification of wool & natural cellulosic fibers and nano finishes.							

Crease Recovery And Biopolishing Finish

Crease resist and wrinkle free finish - Cross linking agents - nitrogenous and non-nitrogenous - mechanisms and applications; Pre-cure, Post-cure, Reversible cross linking, Effects of cross-linking on properties of the fabrics; Softening treatment- anionic, cationic, non-ionic, reactive softeners, silicone softeners and PE emulsions – application methods and limitations; Biopolishing:-mechanism of enzyme reactions- cellulases – components and their mechanisms –properties of biopolished fabrics.

Flame Proof, Water Proof, Soil Release And Antistatic Finish

Flame retardant finish- mechanisms –physical structure on pyrolysis – flammability of textile fibres – flame retarding systems. Assessment methods of FR finish and their limitations; Water repellent and water proof finishes- wetting -contact angle - critical surface tension and surface energy – temporary and durable methods for cotton, synthetics – assessment methods; Soil release finish – soils and soiling, detergency of particulate, fatty soils – soil transfer – redeposition - antiredeposition - agents and methods; Assessment of soil resistance, release and resistance to wet soiling; Antistatic finish – conductivity – static propensity – non-durable and durable antistatic; NBC Protection finishes.

Antimicrobial, Stonewash And UV Protect Finish

Protection of textile materials from biological attacks-basic microbiology- classification- chemistry - mode of action- factors affecting- application of antibacterial, antifungal and pest resistant finishes – its evaluation methods- coating and surface modification techniques; UV Finish- Concept of UV-A and UV-B- factors affecting UV protection- various UV- protective finishes and their evaluation methods; Fragrance and Mosquito repellent finish- agents and chemicals- mechanism - application and evaluation. Stone Wash, Enzyme Wash, Combined enzyme and stone wash, acid wash- function of chemicals, agents, concepts, mechanism, method of application and evaluation.

Anti-Odour, Mosquito Repellent And Smart Finish

Anti-odour and Mosquito repellent finish- agents and chemicals, mechanism of finish, application and evaluation; Conductive finish; Fibre surface modifying finishes using plasma and radiation technologies; Fibre surface modification by sol-gel finishes with inorganic oxide films; Microencapsulating technique for finishing of Textiles; Smart textiles by chemical finishing .

Novel Finishes

Plasma Finish- Concept, types of plasma and their generation, Plasma treatment of textile for water and oil repellency, plasma modification of wool, plasma modification of natural cellulosic fibers, characterization of plasma treated textiles; Nanofinishes - Super hydrophobicity, lotus effect, self cleaning, UV protection, Antimicrobial finishes. Moisture management finish.

Text book

1.	Schindler W.D. and Hauser P.J.: Chemical Finishing of Textile", The Textile Institute, Woodhead Publishing ltd., Cambridge, 2004. ISBN : 1855739054
2.	Perkins W.S, "Textile Colouration and Finishing", Carolina Academic Press, U.K, 1996, ISBN: 089089855.
3.	R Shishoo, Shishoo Consulting AB, Sweden, Plasma technologies for textiles, ISBN-13: 978 1 84569 073 1, February 2007

Reference(s) :

1.	John Thompson Marsh, "An Introduction to Textile Finishing", Research Press, 2011, 144740078X, 9781447400783, 556 pages.
2.	Archibald John Hall, "A handbook of textile finishing", National Trade Press, 22 Jan 2007.
3.	Miles Augustinus Dahlen, "Textile finishing treatments", 26 Oct 2009.
4.	PETR Nasadil and Petr Benešovský, "Plasma in Textile Treatment" Chem. Listy *102*, s1486−s1489 (2008)
5.	Sawhney A.P.S "Modern Application of nanotechnology in Textiles", Textile Research Journal, vol. 78 (8) 2008, pp.731 731-739

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40 TT E 52 Medical Textiles

B.Tech. Textile Technology

Elective V

Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	50	50	100

Objective(s)	Impart knowledge on fibres, fabrics and its requirements for making medical textiles. Understand the manufacturing techniques, characteristics and various end uses of medical textile products.
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain the properties of biomaterials for medical textiles 2. Discuss the properties of specialty medical fibres 3. Describe the production techniques and properties of healthcare products 4. Understand the materials and treatment needed for hygiene product development 5. Explain the manufacturing technique of bandages 6. Evaluate the characteristics of bandages 7. Discuss the requirements of wound dressing 8. Explain the kinds of wound care dressing 9. Describe the materials and properties required for sutures, vascular grafts 10. Explain the properties of ligaments, tendons and scaffolds.

Bio Materials

Bio materials – metals, ceramics, composites and textile materials; specialty medical fibres

Health Care Textiles

Healthcare and hygiene products types; advanced textile materials in healthcare; infection control and barrier materials; study of non-woven hygienic products; plasma treated barrier materials

Bandages

Specification, properties and manufacture of range of bandages and pressure garments - elastic and non elastic compression bandages, support and retention bandages, bandaging textiles, evaluation of bandage and bandages for various end uses

Wound Care

Wound – types, healing process; requirement of wound dressing; an overview of wound care materials - study of various kinds of wound care dressing and advanced wound dressings.

Implantable Products

Implantable products; sutures – requirements, classifications, specifications, materials used –their properties and application; vascular grafts, artificial ligaments, artificial tendons and scaffolds; intelligent textiles for medical applications.

Text book(s):

1	Allison Mathews and Martin Hardingham ., “Medical and Hygiene Textile Production - A hand book”, Intermediate Technology Publications, 1994.
2	Anand S.C., Kennedy J.F. Miraftab M. and Rajendran S., “Medical Textiles and Biomaterials for Health care”, Wood head Publishing Ltd. 2006.
3	Joon B. Park. and Joseph D. Bronzino., “Biomaterials – Principles and Applications”,CRC Press Boca Raton London, NewYork, Washington , D.C. 2002

Reference(s) :

1	Anand S., “ Medical Textiles”, Textile Institute, 1996, ISBN: 185573317X
2	Horrocks A.R. and Anand S.C, “Technical Textiles”, Textile Institute, 1999, ISBN: 185573317X.
3	Adanur S., “Wellington Sears Handbook of Industrial Textiles”’ Technomic Publishing Co., Inc., Lancaster Pennylvania 1995, ISBN 1-56676-340-1.

K.S. Rangasamy College of Technology - Autonomous R 2014								
40 TT E53 Lean Six Sigma								
B.Tech. Textile Technology								
Elective V								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	50	50	100

Objective(s)	• To teach the concepts of Lean Manufacturing and six sigma. • To provide knowledge on the implementation procedure for Lean six sigma.
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain the concepts, features and elements of lean manufacturing. 2. Describe the principles and concepts of six sigma. 3. Summarize the evolution, principles and scope of lean six sigma. 4. Discuss the features and benefits of lean six sigma and importance of DMAIC tools. 5. Explain the techniques, approaches and production process for lean manufacturing. 6. Analyse the tools involved in lean manufacturing. 7. Summarize the concepts of Kanban, Kaizen, VSM and JIT in inventory control. 8. Explain the standardisation and abnormality control techniques in lean manufacturing. 9. Describe the concepts of 5S and TPM in lean manufacturing. 10. Discuss the implementation and difficulties of lean six sigma in textile industries.

Introduction to Lean Manufacturing and Six Sigma

Introduction to Lean-Definition, Purpose, features of Lean; Need for Lean, Elements of Lean Manufacturing, Lean principles, the lean matrices, Definition of six sigma, origin of six sigma, six sigma concept, Critical success factors for six sigma.

Lean six sigma approach

Evolution of lean six sigma, the synergy of lean and six sigma, Definition of lean six sigma, the principles of lean six sigma, scope for lean six sigma, Features of lean six sigma, The laws of lean six sigma, benefits of lean six sigma, introduction to DMAIC tools.

Lean Production Preparation

Lean production processes, approaches and techniques.—Importance of focusing upon flow, wastes, types of wastes, impact of wastes, waste elimination methodologies, Tools include - Workplace organization –Stability, Cellular systems, Quick change and set-up reduction methods,

Lean concepts in inventory control

Practical Kaizen Training, Key factors in Practical Kaizen Training, Lean Culture, Standardization, Standards and abnormality Control, Definition, Principles of JIT, Continous Flow, Kanban, Value Stream Mapping, Current State VSM and Future state VSM, Poke – Yake.

Lean for Textile & Apparel Industry

Visual Management, 5S, total productive maintenance, Small group activity, process flow diagram, establishing TAKT, ECRS. Implementation of lean six sigma in textile and apparel industries, Difficulties in implementation.

Text book(s):

1	Dennis P Hobbs, “Lean Manufacturing Implementation”, Cengage learning India Pvt Ltd, New Delhi, 2004
2	John Black, “Lean Production Implementing a World Class System”, Industrial Press Inc, New York, 2008
3	Michael L George: Lean Six Sigma, McGraw Hill Publication.

Reference(s) :

1	Askin G and Goldberg B, “Design and Analysis of Lean Production System”, John Wiley & Sons Inc, 2003.
2	Bill Carrieva, “Lean Manufacturing That Works”, Prentice Hall of India Pvt Ltd, New Delhi, 2007.
3	Gopalaksrishnan N , Simplified Lean Manufacture : Elements, Rules, Tools and Implementation, Prentice Hall of India Learning Pvt. Ltd., 2010

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40 TT E54 Production Operation Management

B. Tech. Textile Technology

Elective V

Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	50	50	100

Objective(s)	To impart the knowledge on various aspects of production and operation management.
Course Outcomes	**At the end of the course, the students will be able to** 1. Explain the various production systems 2. Forecast the production and operation management 3. Practice the capacity planning 4. Use different layouts 5. Aggregate production planning 6. Schedule the operation management 7. Manage the material management 8. Plan the material requirement 9. Use automated technology in maintenance 10. Evaluate the performance of computers in maintenance

Production systems

Factors of production; environmental and social concerns of operations; design of production system; forecasting in production and operation management – various qualitative and quantitative techniques

Capacity Planning

Capacity planning – single stage system, multistage system; facility planning – objectives; different types of layouts, developing process layout, product layout; job design techniques

Operation Management

Aggregate production planning – procedure, importance; scheduling in operation management – mass production system, batch and job shop

Material Management

Material management – material planning, purchase, stores, material handling and disposal; inventory models – basic inventory model, gradual replacement model, basic model with backlogging, bulk discount model, independent demand system for multiple products, models with uncertain demand, multiple period model; MRP-objectives, elements of MRP, MRP computation, implementation

Maintenance Management

Concepts - Total Productive Maintenance, Autonomous Maintenance, Just In Time, Automated Technology, Hard Technology, Soft Technology, Hybrid Technology, CIM, CAD, GT, CAM, CAPP, robotic FMS; application of MIS in production and operations management

Text book(s):

1	Buffa E.S. and Sarin R.K., “Modern Production / Operations Management”, John Wiley & Sons. Inc., 1994.
2	Taha H.A., “Operations Research: An Introduction”, Prentice Hall of India, New Delhi, 1997.

Reference(s) :

1	Adam Jr. E.E. and Elber R.J., “Production and Operations Management”, Prentice Hall of India, New Delhi, 1997.
2	Chary S.N., “Production and Operations Management”, Tata McGraw-Hill, New Delhi, 1988.
3	Narasimhan S.L., Mcleavy, D.W. and Billington P.J., “Production Planning and Inventory Control”, Prentice Hall of India, New Delhi, 1997.
4	Grant Ireson., “Factory Planning & Plant Layout”, Prentice Hall, New Jersey, 1952.

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40 TT E 55 Energy Management In Textile Industry								
B.Tech. Textile Technology								
Elective V								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	50	50	100
Objective(s)	• To gain knowledge in energy consumption and energy audit. • To help the learners to analyze the importance of energy conservation.							
Course Outcomes	**At the end of the course, the students will be able to** 1. Know the different sources of energy 2. Express the unexploited energy sources and problems in their exploitation. 3. Explain the Present energy consumption trends, Growth and Demand pattern 4. Describe the energy use in various production processes. 5. Express the types of audit instrumentation and methodology of conducting audit. 6. Know the analog - Digital - Computerized instruments measurement techniques. 7. Explain the Specific Energy Consumption (UKG), Specific Water Consumption, Specific Fuel Consumption. 8. Environmentally Sound Technologies. 9. Express the Organizational rationalization, improving the efficiency of usage of electricity Fuel and Steam. 10. Know the benefits of energy efficient technologies equipments and fibre to fabric.							

Introduction

Sources of Energy, Limitations of Natural resources. Types of energy sources used in textile industry. Unexploited energy sources and problems in their exploitation. Green building concept, Air tunnelling technique, Wind mill renewable energy, Carbon foot prints.

Energy consumption patterns:

Present energy consumption trends, Growth and Demand pattern. Energy use in production processes – Fibre production, Spinning, Textured yarn production, Weaving, Knitting, Dyeing and Finishing, Clothing Manufacture and apparel industry. Energy use in Auxiliary Machinery – Boiler, Humidification plants, compressors. Energy & Material Balance Diagram. Low liquor machine, foam technology.

Energy Audit & Energy Instrumentation

Objectives. Types of Audit. Instrumentation and Methodology of conducting Audit. Analysis of Energy Audit Data .Analog - Digital - Computerized instruments measurement techniques. Maintenance of instruments. Servo control motor.

Performance Indicators:

Specific Energy Consumption (UKG), Specific Water Consumption, Specific Fuel Consumption, Specific Steam Consumption. Cross – Country Comparisons of energy usage – Developed & Developing Nations. Benchmarking. Impact on environment. Policy options for promotion of Energy Efficient and Environmentally Sound Technologies.

Energy Conservation Management Technologies

Organizational rationalization, Improving the efficiency of usage of Electricity Fuel and Steam. Utilization of heat exchanger. Case Study**:** Benefits of energy efficient technologies / equipments-Fibre to fabric. Economics with payback period. Selection of bulb which conserve low energy,Led,Due to heat impact on environment.

Text book (s) :

1	Proceedings of output of a seminar on Energy Conservation in Textile Industry, Energy Conservation Centre (ECC), Japan, 1992.
2	SIMA Annual Report, SIMA, 1996 – 97.

Reference(s) :

1	Vallier,P," Energy uses in the Textile Finishing Industry", Eurotex, 1990
2	Environmental Friendly Technologies in Small and Medium Scale Sector", PSG College of Technology, November 24, 2000.
3	Energy conservation in Textile Industry", SITRA, Coimbatore, 1997.
4	Palaniappan C et ai, "Renewable Energy Applications to Industries", Narose Publishing House, 1998.

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40 TT E 56 Safety In Textile Industry

B. Tech. Textile Technology

Elective V

Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	50	50	100

Objectives

- To study about the safe handling of materials involved in work atmosphere.
- To get exposure on noise levels and certain ergonomic considerations to be accomplished in textile industry.

Course Outcomes

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

1. Explain the accident hazards and need for guarding of machinery.
2. Know the safety precautions in opening, carding, combing, drawing, speed frame ring frame, rotor spinning and doubling processes.
3. Explain the hazards and safety measures in winding, warping and sizing processes.
4. Know the hazards and safety measures in loom shed, knitting and non-wovens.
5. Describe the hazards and safety measures in scouring, bleaching, dyeing and printing processes.
6. Express the hazards and safety measures in finishing processes and effluents management.
7. Explain the health hazards in textile industry and their control measures.
8. Express the special precautions for specific hazardous work environments.
9. Know the relevant provision of factories act and rules of textile industries.
10. Explain the effluent treatment and waste disposal in textile industry.

Hazards In Yarn Manufacturing

Accident hazard, guarding of machinery and safety precautions in opening, carding, combing, drawing, flyer frame and ring frame, rotor spinning and doubling.

Hazards In Fabric Manufacturing

Hazards and safety measures in i) Winding and warping, ii)sizing processes- cooking vessels, transports of size, hazards due to steam iii) Loom shed – shuttle looms and shuttle less looms iii) knitting machines iv) non-wovens.

Hazards In Chemical Processing

Hazards and safety measures in scouring, bleaching, dyeing, printing, finishing processes and effluents management.

Health And Welfare

Health hazards in textile industry due to dust, fly and noise, their control measures, relevant occupational diseases, personal protective equipment, health and welfare measures specific to textile industry,

Safety Status

Relevant provision of factories act and rules and other statues applicable to textile industry – effluent treatment and waste disposal in textile industry.

Text book:

1	"Safety in Textile Industry", Thane Belapur Industries Association, Mumbai.

Reference(s):

1	100 Textile Fires – analysis, findings and recommendations LPA.
2	Groover and Henry DS, "Hand Book of Textile Testing and Quality Control".
3	Shenai V.A., "A technology of textile processing", Vol.I, Textile Fibres.
4	Little A.H.,"Water supplies and the treatment and disposal of effluent".