



ANNA UNIVERSITY
CHENNAI - 600 025

UNIVERSITY DEPARTMENTS

REGULATIONS 2012

CURRICULA AND SYLLABI FOR
I TO VIII SEMESTERS

B.TECH. TEXTILE TECHNOLOGY
(FULL TIME)

ANNA UNIVERSITY:: CHENNAI 600 025

UNIVERSITY DEPARTMENT

R – 2012

B.TECH. TEXTILE TECHNOLOGY

I – VIII SEMESTERS CURRICULA AND SYLLABI

SEMESTER I

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
HS8151	Technical English – I	3	1	0	4
MA8151	Mathematics – I	3	1	0	4
PH8151	Engineering Physics	3	0	0	3
CY8151	Engineering Chemistry	3	0	0	3
GE8151	Computing Techniques	3	0	0	3
GE8152	Engineering Graphics	2	0	3	4
PRACTICAL					
PH8161	Physics Laboratory	0	0	2	1
CY8161	Chemistry Laboratory	0	0	2	1
GE8161	Computer Practices Laboratory	0	0	3	2
GE8162	Engineering Practices Laboratory	0	0	3	2
	TOTAL	17	2	13	27

SEMESTER II

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
HS8251	Technical English II	3	1	0	4
MA8251	Mathematics II	3	1	0	4
PH8254	Physics for Technologists	3	0	0	3

CY8253	Chemistry for Technologists	3	0	0	3
GE8251	Engineering Mechanics	3	1	0	4
EE8252	Principles of Electrical and Electronics Engineering	3	0	0	3
PRACTICAL					
PH8261	Applied Physics Lab	0	0	2	1
CY8261	Applied Chemistry Lab	0	0	2	1
EE8261	Electrical and Electronics Lab	0	0	3	2
TOTAL		18	3	7	25

SEMESTER III

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
MA8356	Probability and Statistics	3	1	0	4
GE8351	Environmental Science and Engineering	3	0	0	3
TT8301	Fundamentals of Polymer Chemistry	3	0	0	3
TT8302	Technology of Pre Spinning Process	3	0	0	3
TT8303	Technology of Pre Weaving Process	3	0	0	3
TT8351	Characteristics of Textile Fibres I	3	0	0	3
PRACTICAL					
TT8311	Fiber Science Lab	0	0	3	2
TT8312	Spinning Process Lab I	0	0	3	2
TOTAL		18	3	6	23

SEMESTER IV

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
MA8353	Numerical Methods	3	1	0	4
AE8351	Solid Mechanics	3	0	0	3

TT8401	Technology of Woven Fabric Manufacture	4	0	0	4
TT8402	Technology of Yarn Spinning	3	0	0	3
TT8451	Characteristics of Textile Fibres II	3	0	0	3
TT8452	Fabric Structure	3	0	0	3
PRACTICAL					
TT8411	Spinning Process Lab II	0	0	3	2
TT8461	Cloth Analysis Lab	0	0	3	2
	TOTAL	19	1	6	24

SEMESTER V

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
TT8501	Chemical Processing of Textile Materials I	3	0	0	3
TT8502	Knitting Technology	3	1	0	4
TT8503	Process control in spinning	3	0	0	3
TT8504	Quality Evaluation of Fibres and Yarns	3	0	0	3
TT8505	Technology of Manufactured Fibre Production	3	0	0	3
PRACTICAL					
HS8561	Employability Skills	0	0	2	1
TT8511	Fabric Manufacture Lab	0	0	3	2
TT8512	Fibre and Yarn Quality Evaluation Lab	0	0	3	2
	TOTAL	15	1	8	21

SEMESTER VI

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
TT8601	Chemical Processing of Textile Materials II	3	0	0	3

TT8602	Garment Manufacturing Technology	4	0	0	4
TT8603	Mechanics of Textile Machinery	3	0	0	3
TT8651	Fabric Quality Evaluation	3	0	0	3
TT8652	Financial Management for Textile and Apparel Industries	3	0	0	3
TT8653	Technology of Bonded Fabrics	3	0	0	3
PRACTICAL					
TT8611	Textile Chemical Processing Lab	0	0	3	2
TT8661	Fabric Quality Evaluation Lab	0	0	3	2
TOTAL		19	0	6	23

SEMESTER VII

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
TT8701	Structural Mechanics of Fabrics	2	0	0	2
TT8702	Structural Mechanics of Yarns	2	0	0	2
TT8703	Technical Textiles	3	0	0	3
TT8751	Clothing Comfort	3	0	0	3
TT8752	Operations Research for Textile Industry	3	0	0	3
TT8753	Total Quality Management for Textile Industry	3	0	0	3
E1	Elective I	3	0	0	3
PRACTICAL					
TT8711	Industrial Training*	0	0	0	2
TOTAL		19	0	0	21

*Two weeks each at the end of IV and VI semester

SEMESTER VIII

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
E2	Elective II	3	0	0	3
E3	Elective III	3	0	0	3
PRACTICAL					
TT8811	Project work	0	0	12	6
	TOTAL	6	0	12	12

LIST OF ELECTIVES FOR TEXTILE TECHNOLOGY

CODE NO.	COURSE TITLE	L	T	P	C
TT8001	Characterization of Polymers	3	0	0	3
TT8002	Coated Textiles	3	0	0	3
TT8003	High Performance Fibres	3	0	0	3
TT8004	Long Staple Spinning Technology	3	0	0	3
TT8005	Medical Textiles	3	0	0	3
TT8006	Textile Costing	3	0	0	3
TT8007	Textile Reinforced Composites	3	0	0	3
TT8071	Colour Science	3	0	0	3
TT8072	Enterprise Resource Planning	3	0	0	3
TT8073	Human Resources Management	3	0	0	3
TT8074	Production and Operations Management	3	0	0	3
TT8075	Supply Chain Management for Textile Industry	3	0	0	3
TT8076	Textile and Apparel EXIM Management	3	0	0	3
GE8751	Engineering Ethics and Human Values	3	0	0	3
AT8071	Smart Garments	3	0	0	3
AT8451	Apparel Production Machinery	3	0	0	3

AT8551	Apparel Accessories and Embellishments	3	0	0	3
AT8552	Production and Application of Sewing Threads	3	0	0	3
AT8651	Industrial Engineering in Apparel Industry	3	0	0	3
AT8652	Protective Garments	3	0	0	3
AT8751	Apparel Marketing and Merchandising	3	0	0	3

TOTAL NO. OF CREDITS : 176

OBJECTIVES:

- To enable all students of engineering and technology develop their basic communication skills in English.
- To give special emphasis to the development of speaking skills amongst the students of engineering and technology students.
- To ensure that students use the electronic media such as internet and supplement the learning materials used in the classroom.
- To inculcate the habit of reading for pleasure.

UNIT I

Listening - Introducing learners to GIE - Types of listening - Listening to audio (verbal & sounds); Speaking - Speaking about one's place, important festivals etc. – Introducing oneself, one's family / friend; Reading - Skimming a reading passage – Scanning for specific information - Note-making; Writing - Free writing on any given topic (My favourite place / Hobbies / School life, etc.) - Sentence completion - Autobiographical writing (writing about one's leisure time activities, hometown, etc.); Grammar - Prepositions - Reference words - Wh-questions - Tenses (Simple); Vocabulary - Word formation - Word expansion (root words / etymology); E-materials - Interactive exercises for Grammar & Vocabulary - Reading comprehension exercises - Listening to audio files and answering questions.

UNIT II

Listening - Listening and responding to video lectures / talks; Speaking - Describing a simple process (filling a form, etc.) - Asking & answering questions - Telephone skills – Telephone etiquette; Reading – Critical reading - Finding key information in a given text - Sifting facts from opinions; Writing - Biographical writing (place, people) - Lab descriptions (general/specific description of laboratory experiments) - Definitions - Recommendations; Grammar - Use of imperatives - Subject-verb agreement; Vocabulary - Compound words - Word Association; E-materials - Interactive exercises for Grammar and Vocabulary - Listening exercises with sample telephone conversations / lectures – Picture-based activities.

UNIT III

Listening - Listening to specific task - focused audio tracks; Speaking - Role-play – Simulation - Group interaction - Speaking in formal situations (teachers, officials, foreigners); Reading - Reading and interpreting visual material; Writing - Jumbled sentences - Coherence and cohesion in writing - Channel conversion (flowchart into process) - Types of paragraph (cause

& effect / compare & contrast / narrative / analytical) - Informal writing (letter/e-mail/blogs) - Paraphrasing; Grammar - Tenses (Past) - Use of sequence words - Adjectives; Vocabulary - Different forms and uses of words, Cause and effect words; E-materials - Interactive exercises for Grammar and Vocabulary - Excerpts from films related to the theme and follow up exercises - Pictures of flow charts and tables for interpretations.

UNIT IV

Listening - Watching videos / documentaries and responding to questions based on them; Speaking - Responding to questions - Different forms of interviews - Speaking at different types of interviews; Reading - Making inference from the reading passage - Predicting the content of a reading passage; Writing - Interpreting visual materials (line graphs, pie charts etc.) - Essay writing – Different types of essays; Grammar - Adverbs – Tenses – future time reference; Vocabulary - Single word substitutes - Use of abbreviations & acronyms; E-materials - Interactive exercises for Grammar and Vocabulary - Sample interviews - film scenes - dialogue writing.

UNIT V

Listening - Listening to different accents, Listening to Speeches/Presentations, Listening to broadcast & telecast from Radio & TV; Speaking - Giving impromptu talks, Making presentations on given topics; Reading - Email communication - Reading the attachment files having a poem/joke/proverb - Sending their responses through email Writing - Creative writing, Poster making; Grammar - Direct and indirect speech; Vocabulary - Lexical items (fixed / semi fixed expressions); E-materials - Interactive exercises for Grammar & Vocabulary - Sending emails with attachment – Audio / video excerpts of different accents, - Interpreting posters.

TOTAL : 60 PERIODS

TEXT BOOKS

1. Mindscapes: English for Technologists and Engineers, Orient Black Swan, 2012 .
2. S.P. Dhanavel, English and Communication Skills for Students of Science and Engineering, Orient Black Swan, Chennai, 2011.

REFERENCES

1. Pickett, Nell Ann, Ann A.Laster and Katherine E.Staples. Technical English: Writing, Reading and Speaking. New York: Longman, 2001.
2. Bailey, Stephen. Academic Writing: A practical guide for students. New York: Rutledge, 2011.
3. Morgan, David and Nicholas Regan. Take-Off: Technical English for Engineering. Reading: Garnet Publishing Limited, 2008.

4. Thorn, Michael and Alan Badrick, An Introduction to Technical English, Harlow: Prentice Hall Europe, 1993.
5. Rizvi, M.Ashraf., Effective Technical Communication. New Delhi: Tata McGraw-Hill Publishing Company, 2007.

EXTENSIVE READERS

1. Murthy, Sudha. Wise & Otherwise. New Delhi: Penguin Books India, 2006.
2. Gates, Bill and Collins Hemingway. Business @ the Speed of Thought: Succeeding in the Digital Economy. New York: Warner Business Books, 2000.

Website Resource

1. www.uefap.com
2. www.eslcafe.com
3. www.listen-to-english.com
4. www.owl.english.purdue.edu
5. www.chompchomp.com

MA8151

MATHEMATICS – I L T P C

3 1 0 4

OBJECTIVES:

1. To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
2. To make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling.
3. To familiarize the student with functions of several variables. This is needed in many branches of engineering.
4. To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
5. To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

UNIT I MATRICES

9+3

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of eigenvalues and eigenvectors – Cayley-Hamilton Theorem – Diagonalization of matrices –

Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

UNIT II INFINITE SERIES

9+3

Sequences – Convergence of series – General properties – Series of positive terms – Tests of convergence (Comparison test, Integral test, Comparison of ratios and D’Alembert’s ratio test) – Alternating series – Series of positive and negative terms – Absolute and conditional convergence – Power Series – Convergence of exponential, logarithmic and Binomial Series.

UNIT III FUNCTIONS OF SEVERAL VARIABLES

9+3

Limits and Continuity – Partial derivatives – Homogeneous functions and Euler’s theorem – Total derivative – Differentiation of implicit functions – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor’s series for functions of two variables – Errors and approximations – Maxima and minima of functions of two variables – Lagrange’s method of undetermined multipliers.

UNIT IV IMPROPER INTEGRALS

9+3

Improper integrals of the first and second kind and their convergence – Evaluation of integrals involving a parameter by Leibnitz rule – Beta and Gamma functions – Properties – Evaluation of integrals using Beta and Gamma functions – Error functions

UNIT V MULTIPLE INTEGRALS

9+3

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of Solids – Change of variables in double and triple integrals – Area of a curved surface.

TOTAL: 60 PERIODS

TEXT BOOKS

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 40th Edition, 2007.
2. Ramana B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.

REFERENCES

1. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, New Delhi, 3rd Edition, 2007.

2. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
3. Greenberg M.D., "Advanced Engineering Mathematics", Pearson Education, New Delhi, 2nd Edition, 5th Reprint, 2009.
4. Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, New Delhi, 2007.

PH8151

ENGINEERING PHYSICS
(Common to all branches of B.E / B.Tech programmes)

LTPC

3 0 0 3

OBJECTIVE:

To introduce the basic physics concepts relevant to different branches of Engineering and Technology.

UNIT I PROPERTIES OF MATTER

9

Elasticity - Poisson's ratio and relationship between moduli (qualitative) - Stress-strain diagram - factors affecting elasticity - bending of beams - cantilever - bending moment - theory and experiment of Young's modulus determination - Uniform and non-uniform bending - I shaped girders - twisting couple - hollow cylinder - shaft - torsion pendulum - determination of rigidity modulus- moment of inertia of a body (regular and irregular).

UNIT II ACOUSTICS AND ULTRASONICS

9

Classification of sound - loudness and intensity - Weber-Fechner Law - standard intensity and intensity level - decibel - reverberation - reverberation time - rate of growth and decay of sound intensity - derivation of Sabine's formula - absorption coefficient and its determination - factors affecting acoustics of buildings : focussing, interference, echo, Echelon effect, resonance - noise and their remedies. Ultrasonics - production - magnetostriction and piezoelectric methods - detection of ultrasound - acoustic grating - industrial applications - NDT - Ultrasonic method: scan modes and practice.

UNIT III THERMAL PHYSICS

9

Thermal expansion - thermal stress - expansion joints - bimetallic strips - thermal conductivity - conduction in solids - Forbe's and Lees' disc methods - Rectilinear flow of heat through a rod - flow of heat through a compound materials - radial flow of heat through a spherical shell - thermal insulation of buildings – Laws of blackbody radiation: Kirchoffs law, Stephens law, Wiens law, Raleigh-Jean law and Planks law (derivation). Laws of thermodynamics - Otto

and diesel engines and their efficiency - entropy - entropy of Carnot's cycle - reverse Carnot's cycle - refrigerator.

UNIT IV APPLIED OPTICS

9

Interference - Michelson interferometer: construction, working, determination of wave length and thickness - anti-reflection coating - air wedge and its application - Lasers - Einstein's coefficients - CO₂, Nd:YAG and semiconductor lasers - homo junction and hetro junction - construction and working - applications - Optical fibres - classification (index & mode based) - principle and propagation of light in optical fibres - acceptance angle and numerical aperture - fibre optic communication system - active and passive sensors.

UNIT V SOLID STATE PHYSICS

9

Nature of bonding - growth of single crystals (qualitative) - crystal systems - crystal planes and directions - expressions for interplanar distance - coordination number and packing factor for simple structures: SC, BCC, FCC and HCP - structure and significance of NaCl, ZnS, diamond and graphite - crystal imperfections: point defects, dislocations and stacking faults - unit cell, Bravais space lattices - miller indices.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Gaur R.K., and Gupta, S.L., Engineering Physics, Dhanpat Raj Publications, 2003.
2. Palanisamy, P.K., Engineering Physics, Scitech Publications (P) Ltd, 2006.
3. Arumugam, M., Engineering Physics, Anuradha Publications, 2000.

REFERENCE BOOKS

1. Sankar, B.N., Pillai.S.O., Engineering Physics, New Age International (P) Ltd., 2007.
2. Rajendran.V Engineering Physics, Tata McGraw-Hill, 2009.

CY8151

ENGINEERING CHEMISTRY

LTPC

(Common to All Branches of Engineering and Technology)

3 0 0 3

UNIT I CHEMICAL THERMODYNAMICS

9

Second law: Entropy - entropy change for an ideal gas, reversible and irreversible processes; entropy of phase transitions; Clausius inequality. Free energy and work function: Helmholtz and Gibbs free energy functions; Criteria of spontaneity; Gibbs-Helmholtz equation; Clausius-Clapeyron equation; Maxwell relations – Van't Hoff isotherm and isochore. Chemical potential; Gibbs-Duhem equation – variation of chemical potential with temperature and pressure.

UNIT II POLYMER CHEMISTRY

9

Introduction: Classification of polymers – Natural and Synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerisation. Types and mechanism of polymerisation: Addition (Free Radical, cationic, anionic and living); condensation and copolymerisation. Properties of polymers: T_g, Tacticity, Molecular weight – weight average, number average and polydispersity index. Techniques of polymerisation: Bulk, emulsion, solution and suspension.

UNIT III KINETICS AND CATALYSIS

9

Introduction – reaction velocity, factors affecting reaction velocity, rate constant, order of reaction, molecularity, pseudo molecular reactions, zero, first, second and third order reactions, reactions of fractional orders, determination of order of reactions. Catalysis: Auto catalysis - Enzyme Catalysis: Michaelis-Menton equation; factors affecting enzyme catalysis. Heterogeneous Catalysis: Types of adsorption isotherms: Langmuir–Hinselwood and Rideal–Eley Mechanism.

UNIT IV PHOTOCHEMISTRY AND SPECTROSCOPY

9

Photochemistry: Laws of photochemistry - Grotthuss–Draper law, Stark–Einstein law and Lambert-Beer Law. Photoprocesses - Internal Conversion, Inter-system crossing, Fluorescence, Phosphorescence, Chemiluminescence and Photo-sensitisation. Spectroscopy: Electromagnetic spectrum - Absorption of radiation – Electronic, Vibrational and rotational transitions. Width and intensities of spectral lines. Spectrophotometric estimation of iron. UV-visible and IR spectroscopy – principles, instrumentation (Block diagram) and applications.

UNIT V NANOCHEMISTRY

9

Basics - distinction between molecules, nanoparticles and bulk materials; size-dependent properties. Nanoparticles: Nanocluster, nanorod, nanotube and nanowire. Synthesis: Precipitation, thermolysis, hydrothermal, solvothermal, electrodeposition, chemical vapour deposition, laser ablation; Properties and Applications. Risk discussion and Future perspectives.

TOTAL : 45 PERIODS

TEXT BOOKS

1. P. Kannan and A. Ravikrishnan, "Engineering Chemistry", Sri Krishna Hitech Publishing Company Pvt. Ltd. Chennai, 2009.
2. S. Vairam, P. Kalyani and Suba Ramesh, "Engineering Chemistry", Wiley India, 2011

REFERENCES

1. P.W. Atkins and de Paula Julio, "Physical Chemistry", Oxford University Press, 8th Ed., (Indian Student Edition) (2009).
2. K. K. Rohatgi-Mukherjee, "Fundamental of Photochemistry" New Age International (P) Ltd., New Delhi, 1986.
3. G.A. Ozin and A.C. Arsenault, "Nanochemistry: A Chemical Approach to Nanomaterials", RSC Publishing, 2005.
4. V.R.Gowariker, N.V.Viswanathan and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.), Chennai, 2006

GE8151

COMPUTING TECHNIQUES

L T P C

3 0 0 3

UNIT I INTRODUCTION

8

Generation and Classification of Computers- Basic Organization of a Computer –Number System – Binary – Decimal – Conversion – Problems. Need for logical analysis and thinking – Algorithm – Pseudo code – Flow Chart.

UNIT II C PROGRAMMING BASICS

10

Problem formulation – Problem Solving - Introduction to 'C' programming –fundamentals – structure of a 'C' program – compilation and linking processes – Constants, Variables – Data Types – Expressions using operators in 'C' – Managing Input and Output operations – Decision Making and Branching – Looping statements – solving simple scientific and statistical problems.

UNIT III ARRAYS AND STRINGS

9

Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays. String-String operations – String Arrays. Simple programs- sorting- searching – matrix operations.

UNIT IV FUNCTIONS AND POINTERS

9

Function – definition of function – Declaration of function – Pass by value – Pass by reference – Recursion – Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays- Example Problems.

UNIT V STRUCTURES AND UNIONS

9

Introduction – need for structure data type – structure definition – Structure declaration –

Structure within a structure - Union - Programs using structures and Unions – Storage classes, Pre-processor directives.

TOTAL : 45 PERIODS

TEXT BOOKS

1. Pradip Dey, Manas Ghosh, “Fundamentals of Computing and Programming in C”, First Edition, Oxford University Press, 2009
2. Ashok N. Kamthane, “Computer programming”, Pearson Education, 2007.
3. Yashavant P. Kanetkar. “ Let Us C”, BPB Publications, 2011.

REFERENCES

1. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006
2. Byron S Gottfried, “ Programming with C”, Schaum’s Outlines, Second Edition, Tata McGraw-Hill, 2006.
3. R.G. Dromey, “How to Solve it by Computer”, Pearson Education, Fourth Reprint, 2007

GE8152

ENGINEERING GRAPHICS

L T P C

2 0 3 4

OBJECTIVES

- To develop in students, graphic skills for communication of concepts, ideas and design of engineering products
- To expose them to existing national standards related to technical drawings.

CONCEPTS AND CONVENTIONS (Not for Examination)

1

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I PLANE CURVES AND FREE HAND SKETCHING

5+9

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves, Scales: Construction of Diagonal and Vernier scales.

Visualization concepts and Free Hand sketching: Visualization principles –Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES 5+9

Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and trapezoidal method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS 5 + 9

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method and auxiliary plane method.

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 5+9

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 6 + 9

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids- Prisms, pyramids and cylinders by visual ray method and vanishing point method.

COMPUTER AIDED DRAFTING (Demonstration Only) 3

Introduction to drafting packages and demonstration of their use.

TOTAL : 75 PERIODS

TEXT BOOK

1. N.D.Bhatt and V.M.Panchal, “Engineering Drawing”, Charotar Publishing House, 50th Edition, 2010

REFERENCES

1. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 2007.
2. Luzzader, Warren.J. and Duff,John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
3. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson, 2nd Edition, 2009.
4. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.
5. Natrajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2009.
6. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.

Publication of Bureau of Indian Standards:

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only.
4. The students will be permitted to use appropriate scale to fit solution within A3 size.
5. The examination will be conducted in appropriate sessions on the same day

PH8161

PHYSICS LABORATORY
(Common to all branches of B.E. / B.Tech. Programmes)

LTPC

0 0 2 1

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of disc
2. Non-uniform bending - Determination of young's modulus
3. Lee's disc - Determination of thermal conductivity of a bad conductor

4. Potentiometer – Determination of thermo e.m.f. of thermocouple
5. Air wedge – Determination of thickness of a thin sheet of paper
6. i. Optical fibre - Determination of Numerical Aperture and acceptance angle
ii. Compact disc – Determination of width of the groove using laser
7. Acoustic grating - Determination of velocity of ultrasonic waves in liquids
8. Post office box – Determination of Band gap of a semiconductor
9. Spectrometer – Determination of wavelength using grating
10. Viscosity of liquids – Determination of co-efficient of viscosity of a liquid by Poiseuille's flow

TOTAL: 30 PERIODS

CY8161

CHEMISTRY LABORATORY
(Common to all branches of Engineering and Technology)

LTPC
0 0 2 1

1. Estimation of HCl using Na₂CO₃ as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by Iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1,10- phenanthroline / thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
11. Determination of molecular weight of poly vinyl alcohol using Ostwald viscometer.
12. Pseudo first order kinetics – ester hydrolysis.
13. Corrosion experiment – weight loss method.
14. Determination of CMC.
15. Phase change in a solid.

TOTAL: 30 PERIODS

REFERENCES

1. A text of quantitative inorganic analysis, A. L.Vogel, ELBS London, 1995.
2. Experiments in physical chemistry, D.P. Shoemaker and C.W. Gardad, McGraw Hill, London, 2001.
3. American Public Health Association.

GE8161

COMPUTER PRACTICES LABORATORY

L T P C

0 0 3 2

LIST OF EXPERIMENTS:

1. Search, generate, manipulate data using MS office/ Open Office
2. Presentation and Visualization – graphs, charts, 2D, 3D
3. Problem formulation, Problem Solving and Flowcharts
4. C Programming using Simple statements and expressions
5. Scientific problem solving using decision making and looping.
6. Simple programming for one dimensional and two dimensional arrays.
7. Solving problems using String functions
8. Programs with user defined functions
9. Program using Recursive Function and conversion from given program to flow chart.
10. Program using structures and unions.

TOTAL : 45 PERIODS

GE8162

ENGINEERING PRACTICES LABORATORY

OBJECTIVE

To provide exposure to the students with hands-on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICE

12

Plumbing

Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings. Preparation of plumbing line sketches.

Laying pipe connection to the suction side of a pump – inlet.

Laying pipe connection to the delivery side of a pump – out let.

Practice in mixed pipe connections: Metal, plastic and flexible pipes used in household appliances.

Wood Work

Sawing, planing and making common joints: T-Joint, Mortise and Tennon joint, Dovetail joint.

Study

Study of joints in door panels, wooden furniture

Study of common industrial trusses using models.

2. ELECTRICAL ENGINEERING PRACTICE

9

Basic household wiring using switches, fuse, indicator – lamp etc.,

Preparation of wiring diagrams

Stair case light wiring

Tube – light wiring

Study of iron-box, fan with regulator, emergency lamp

GROUP – B (MECHANICAL AND ELECTRONICS)

15

3. MECHANICAL ENGINEERING PRACTICE

Welding

Arc welding of butt joints, lap joints, tee joints

Gas welding Practice.

Basic Machining

Simple turning, drilling and tapping operations.

Machine assembly Practice.

Study and assembling the following:

Centrifugal pump, mixies and air conditioners.

Demonstration on

(a) Smithy operations like the production of hexagonal bolt.

(b) Foundry operation like mould preparation for grooved pulley.

4. ELECTRONIC ENGINEERING PRACTICE

9

Soldering simple electronic circuits and checking continuity.

Assembling electronic components on a small PCB and testing.

Study of Telephone, FM radio, low-voltage power supplies.

TOTAL: 45 PERIODS

HS8251

TECHNICAL ENGLISH - II

L T P C

(For all branches of B.E / B.Tech programmes)

3 1 0 4

OBJECTIVES:

- To make the students acquire listening and speaking skills meant for both formal and informal contexts
- To help them develop their reading skills by exposing them to different types of reading strategies
- To equip them with writing skills needed for academic as well as workplace situations
- To make them acquire language skills at their own pace by using e-materials and language lab component

UNIT I

9 + 3

Listening - Listening to informal conversations and participating; Speaking - Opening a conversation (greetings, comments on something, weather) - Turn taking - Closing a conversation (excuses, general wish, positive comment, thanks); Reading - Developing analytical skills, Deductive and inductive reasoning - Extensive reading; Writing - Effective use of SMS for sending short notes and messages - Using 'emoticons' as symbols in email messages; Grammar - Regular & irregular verbs - Active and passive voice; Vocabulary - Homonyms (e.g. 'can') - Homophones (e.g. 'some', 'sum'); E-materials - Interactive exercise on Grammar and vocabulary – blogging; Language Lab - Listening to different types of conversation and answering questions.

UNIT II

9 + 3

Listening - Listening to situation based dialogues; Speaking - Conversation practice in real life situations, asking for directions (using polite expressions), giving directions (using imperative sentences), Purchasing goods from a shop, Discussing various aspects of a film (they have already seen) or a book (they have already read); Reading - Reading a short story or an article from newspaper, Critical reading, Comprehension skills; Writing - Writing a review / summary of a story / article, Personal letter (Inviting your friend to a function, congratulating someone for his success, thanking one's friend / relatives); Grammar - modal verbs, Purpose expressions; Vocabulary - Phrasal verbs and their meanings, Using phrasal verbs in sentences; E-materials - Interactive exercise on Grammar and vocabulary, Extensive reading activity (reading stories / novels from links), Posting reviews in blogs - Language Lab - Dialogues (Fill up exercises), Recording students' dialogues.

UNIT III

9 + 3

Listening - Listening to the conversation - Understanding the structure of conversations; Speaking - Conversation skills with a sense of stress, intonation, pronunciation and meaning - Seeking information – expressing feelings (affection, anger, regret etc.); Reading - Speed reading – reading passages with the time limit - Skimming; Writing - Minutes of meeting – format and practice in the preparation of minutes - Writing summary after reading the articles from the journals - Format for the journal articles – elements of technical articles (abstract, introduction, methodology, results, discussion, conclusion, appendices, references) - Writing strategies; Grammar - Conditional clauses - Cause and effect expressions; Vocabulary - Words used as nouns and verbs without any change in the spelling (e.g. 'rock', 'train', 'ring'); E-materials - Interactive exercise on Grammar & vocabulary - Speed Reading practice exercises; Language Lab - Intonation practice using EFLU materials – Attending a meeting and writing minutes.

UNIT IV

9 + 3

Listening - Listening to a telephone conversation, Viewing a model interview (face-to-face, telephonic and video conferencing) and observing the practices; Speaking - Role play practice in telephone skills - listening and responding, -asking questions, -note taking – passing on messages, Role play and mock interview for grasping the interview skills; Reading - Reading the job advertisements and the profile of the company concerned – scanning; Writing - Applying for a job – cover letter - résumé preparation – vision, mission and goals of the candidate; Grammar - Numerical expressions - Connectives (discourse markers); Vocabulary - Idioms and their meanings – using idioms in sentences; E-materials - Interactive exercises on Grammar & Vocabulary - Different forms of résumés- Filling up a résumé / cover letter; Language Lab - Telephonic interview – recording the responses - e-résumé writing.

UNIT V

9 + 3

Listening - Viewing a model group discussion and reviewing the performance of each participant - Identifying the characteristics of a good listener; Speaking - Group discussion skills – initiating the discussion – exchanging suggestions and proposals – expressing dissent/ agreement – assertiveness in expressing opinions – mind mapping technique; Reading - Note making skills – making notes from books, or any form of written materials - Intensive reading Writing - Types of reports – Feasibility / Project report – report format – recommendations / suggestions – interpretation of data (using charts for effective presentation); Grammar - Use of clauses; Vocabulary – Collocation; E-materials - Interactive grammar and vocabulary exercises - Sample GD - Pictures for discussion, Interactive grammar and vocabulary exercises - Pictures for discussion; Language Lab - Different models of group discussion

TOTAL: 60 PERIODS

TEXT BOOKS

1. Mindscapes: English for Technologists and Engineers, Orient Black Swan, 2012 .
2. S.P. Dhanavel, English and Communication Skills for Students of Science and Engineering, Orient Black Swan, Chennai, 2011.

REFERENCES

1. Laws, Anne. Presentations. Hyderabad: Orient BlackSwan, 2000.
2. Lewis, Hedwig. Body Language: A Guide for Professionals. New Delhi: Sage Publications, 1998.
3. Naterop, Jean B. and Rod Revell. Telephoning in English. Cambridge: Cambridge University Press, 1987.
4. Rutherford, Andrea J. Basic Communication Skills for Technology. New Delhi: Pearson Education, 2001.
5. Ur, Penny. Teaching Listening Comprehension. Cambridge: Cambridge University Press, 1984.

EXTENSIVE READERS

1. Abdul Kalam, A P J. Ignited Minds: Unleashing the Power within India. New Delhi: Penguin Books India, 2002.
2. Parameswaran, Uma. C.V.Raman: A Biography. New Delhi: Penguin Books India, 2011.

WEB RESOURCES

1. www.esl-lab.com
2. www.englishgrammar.org

3. www.englishclub.com
4. www.mindtools.com
5. www.esl.about.com

MA8251 **MATHEMATICS II** **LTPC**
(Common to all branches of B.E. / B.Tech. Programmes in II Semester) 3 1 0 4

OBJECTIVES

- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To acquaint the student with the concepts of vector calculus needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I DIFFERENTIAL EQUATIONS 9+3

Method of variation of parameters – Method of undetermined coefficients – Homogenous equation of Euler’s and Legendre’s type – System of simultaneous linear differential equations with constant coefficients.

UNIT II VECTOR CALCULUS 9+3

Gradient and directional derivative – Divergence and Curl – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral and volume integral - Green’s, Gauss divergence and Stoke’s theorems – Verification and application in evaluating line, surface and volume integrals.

UNIT III ANALYTIC FUNCTION 9+3

Analytic functions – Necessary and sufficient conditions for analyticity - Properties – Harmonic conjugates – Construction of analytic function - Conformal mapping – Mapping by functions $w = z + c, az, 1/z, z^2$ - Bilinear transformation.

UNIT IV COMPLEX INTEGRATION 9+3

Line integral - Cauchy’s integral theorem – Cauchy’s integral formula – Taylor’s and Laurent’s

series – Singularities – Residues – Residue theorem – Application of residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

UNIT V LAPLACE TRANSFORMS

9+3

Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems – Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem — Transform of periodic functions – Application to solution of linear ordinary differential equations with constant coefficients.

TOTAL : 60 PERIODS

TEXT BOOKS

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 40th Edition, 2007.
2. Ramana, B.V. “Higher Engineering Mathematics”, Tata McGraw Hill, New Delhi, 2010.

REFERENCES

1. Glyn James, “Advanced Modern Engineering Mathematics”, Pearson Education, New Delhi, 2007.
2. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, Delhi, 3rd Edition, 2007.
3. Bali N., Goyal M. and Watkins C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
4. Peter V.O’Neil, Advanced Engineering Mathematics, Cengage Learning India Pvt., Ltd, New Delhi, 2007.

PH8254

PHYSICS FOR TECHNOLOGISTS

L T P C

3 0 0 3

UNIT I ATOMIC STRUCTURE AND ELECTRO MAGNETIC RADIATION

13

Study of Atomic Structure – Proton Neutron, and Electron; Radiation - photons and their wavelength energy relationship; The Dual nature of Particles and Radiation; The interaction of matter and radiation; The Crystal Lattice structure of matter; Tools to investigate structure - Electron generation – methods - their energy levels; X-ray generation – Composition – energy levels; Infra red radiation-molecular vibrations – mode and amplitude; Electromagnetic lenses – Magnification and focal length calculations.

UNIT II THERMODYNAMICS**9**

Properties of Gasses -Boyel's Law, Charles Law. The combined Gas Law; The Laws of Thermodynamics; Properties of Water; Water in the Atmosphere – Humidity and Relative Humidity, Water Ballance between the atmosphere and hydrophilic materials

UNIT III MECHANICAL PROPERTIES**6**

Tensile Load and Deformation - stress and strain definitions - pressure. work and modulus of elasticity –; Bending Load and Deformation– bending rigidity - force couple study; Shear and Torsion – sheer and torsional rigidity; studies-measurements of the above methods of loading.

UNIT IV OPTICAL AND FRICTIONAL STUDIES**9**

Interaction of light and matter - Reflection-specular and diffuse, scattering, absorption; measurement of light intensity; refraction – effect of medium – refractive index of different materials – measurements, lenses and their properties; Friction – theories of friction – static friction – limiting friction – kinetic friction – roughness index – measurement techniques.

UNIT V ELECTRICAL PROPERTIES**9**

Theory of electrical conductance and resistance – measurement of – units of – study of different materials; static charges – formation – measurement techniques – study of different materials; Dielectrics – formation – measurements – control measures.

TOTAL : 45 PERIODS**TEXT BOOKS**

1. Engineering Physics, R.K. Gaur & S.L.Gupta Dhanpat Rai Publications,2003.
2. Arumugam. M, "Engineering Physics" 2nd Edition, Anuradha Publishers, Kumbakonam, 2003.

REFERENCES

1. Physics for scientists and engineers, R.A. Serway and J.W. Jewett Publications : Thomas Brooks / Cole, 2009.
2. Physics for Engineers and Scientists, H.Ohanian and J. Markert W.W. Norton & company, 2007.
3. Physics for Scientists & Engineers D.C. Giancoli Prentice Hall, 2007.

UNIT I WATER 9

Water quality parameters- determination of hardness (EDTA method), TDS, BOD, COD and iron and their significance. Softening – Zeolite and demineralization processes. Boiler troubles and remedies – removal of oils and silica, internal conditioning. Desalination by electro-dialysis and reverse osmosis. Water quality parameters and standards for textile wet processing.

UNIT II CHEMISTRY OF INTERFACES 9

Interface region-curved interfaces-thermodynamics of surfaces - Surface film on liquids-Adsorption of gases on Solids-adsorption isotherms. Applications of adsorption studies-detergency, wetting, foaming , defoaming, spreading, water repellency.

UNIT III OILS, FATS, SOAPS & LUBRICANTS 9

Chemical constitution, Chemical analysis of oils and fats – acid, saponification and iodine values, Definitions, determinations and significance. Definition, mechanism of lubrication, preparation of petrolubes, desirable characteristics – viscosity, viscosity index, carbon residue, oxidation stability, flash and fire points, cloud and pour points, aniline 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

UNIT IV CHEMICALS AND AUXILIARIES 9

Surfactant Chemistry, bleaching powder, sodium hypochlorite, hydrogen peroxide, chlorine dioxide, preparation, estimation of available chlorine in hypochlorite bleach liquor. determination of strength of hydrogen peroxide.

UNIT V COLORANTS 9

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

TOTAL : 45 PERIODS**REFERENCES**

1. Dhara S. S., "A Text Book of Engineering Chemistry", S. Chand & Co. Ltd., New Delhi, 2002
2. Jain. P.C. and Monica Jain, "Engineering Chemistry", Dhanpet Rai & Sons, New Delhi, 2001

3. Puri B. R., Sharma L. R. and Madhan S. Pathania, "Principles of Physical Chemistry", Shoban Lal Nagin Chand & Co., Jalandar, 2000
4. Shore J., "Colourants and Auxiliaries: Volume I Colorants", Wood head Publishing Ltd., 2002, ISBN 0 901956 77 5
5. Shore J., "Colourants and Auxiliaries: Volume II Auxiliaries", Wood head Publishing Ltd., 2002, ISBN 0 901956 78 3
6. Trotman E. R., "Dyeing and Chemical Technology of Textile Fibres", B.I Publishing Pvt. Ltd., New Delhi, 1994
7. Shenai V. A., "Chemistry of Dyes and Principles of Dyeing", Sevak Publications, Mumbai, 1995

GE8251

ENGINEERING MECHANICS

L T P C

3 1 0 4

OBJECTIVE

To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering

UNIT I BASICS AND STATICS OF PARTICLES

9 + 3

Introduction – Units and Dimensions – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces — Vectorial representation of forces – Vector operations of forces -additions, subtraction, dot product, cross product – Coplanar Forces – rectangular components – Equilibrium of a particle – Forces in space – Equilibrium of a particle in space – Equivalent systems of forces – Principle of transmissibility .

UNIT II EQUILIBRIUM OF RIGID BODIES

9 + 3

Free body diagram – Types of supports –Action and reaction forces –stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions

UNIT III PROPERTIES OF SURFACES AND SOLIDS

9 + 3

Centroids and centre of mass– Centroids of lines and areas - Rectangular, circular, triangular areas by integration – T section, I section, - Angle section, Hollow section by using standard formula –Theorems of Pappus - Area moments of inertia of plane areas – Rectangular, circular,

triangular areas by integration – T section, I section, Angle section, Hollow section by using standard formula – Parallel axis theorem and perpendicular axis theorem –Principal moments of inertia of plane areas – Principal axes of inertia-Mass moment of inertia –mass moment of inertia for prismatic, cylindrical and spherical solids from first principle – Relation to area moments of inertia.

UNIT IV DYNAMICS OF PARTICLES

9 + 3

Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion -Newton’s laws of motion – Work Energy Equation– Impulse and Momentum – Impact of elastic bodies.

UNIT V FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS

9 + 3

Friction force – Laws of sliding friction – equilibrium analysis of simple systems with sliding friction –wedge friction-. Rolling resistance -Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion of simple rigid bodies such as cylinder, disc/wheel and sphere.

TOTAL : 45 PERIODS

TEXT BOOKS

1. Beer, F.P and Johnson Jr. E.R. “Vector Mechanics for Engineers (In SI Units): Statics and Dynamics”, 8th Edition, Tata McGraw-Hill Publishing company, New Delhi (2004)
2. Vela Murali, “Engineering Mechanics”, Oxford University Press (2010)

REFERENCES

1. Hibbeler, R.C and Ashok Gupta, “Engineering Mechanics: Statics and Dynamics”, 11th Edition, Pearson Education (2010).
2. Irving H. Shames and Krishna Mohana Rao. G., “Engineering Mechanics – Statics and Dynamics”, 4th Edition, Pearson Education (2006)
3. J.L.Meriam and L.G.Kraige, “ Engineering Mechanics- Statics - Volume 1, Dynamics- Volume 2,Third Edition, John Wiley & Sons,(1993)
4. Rajasekaran, S and Sankarasubramanian, G., “Engineering Mechanics Statics and Dynamics”, 3rd Edition, Vikas Publishing House Pvt. Ltd., (2005).

UNIT I ELECTRICAL CIRCUITS 9

Basic principles involved in power generation, transmission and use – Ohms Law Kirchoff's Law – steady state solution of DC circuits – Theorem: Thevinin's, Norton's and Superposition Theorems.

UNIT II AC CIRCUITS 9

Introduction to AC circuits – waveforms and RMS value – power and power factor, single phase and three-phase balanced circuits, housing wiring, industrial wiring, materials of wiring.

UNIT III ELECTRICAL MACHINES 9

Principles of operation and characteristics of DC machines. Transformers (single and three-phase) – synchronous machines – three-phase and single-phase induction motors – (op. Principles).

UNIT IV ELECTRONIC DEVICES & CIRCUITS 9

Types of Materials – Silicon & Germanium- N type and P type materials – PN Junction –Forward and Reverse Bias – Semiconductor Diodes – Rectification – Bipolar Junction Transistor – Characteristics – transistor as an Amplifier – Introduction to operational Amplifier –Inverting Amplifier –Non Inverting Amplifier –DAC – ADC .

UNIT V MEASUREMENTS & INSTRUMENTATION 9

Introduction to transducers: pressure, temperature, position, electrical measurements - Classification of instruments – moving coil and moving iron ,Ammeter and Voltmeter – multimeters – dynamometer type Wattmeter – three-phase power measurements – energy meter – megger – instrument transformer (CT and PT)

TOTAL : 45 PERIODS

REFERENCES

1. Del Toro, "Electrical Engineering Fundamentals", Pearson Education, New Delhi, 2007
2. John Bird, "Electrical Circuit Theory and Technology", Elsevier, First Indian Edition, 2006
3. Allan S Moris, "Measurement and Instrumentation Principles", Elseveir, First Indian Edition, 2006

4. Rajendra Prasad, "Fundamentals of Electrical Engineering", Prentice Hall of India, 2006
5. Thereja .B.L., "Fundamentals of Electrical Engineering and Electronics", S. Chand & Co. Ltd., 2008
6. Sanjeev Sharma, "Basics of Electrical Engineering", S.K International Publishers, New Delhi, 2007
7. V.K Mehta and Rohit Mehta, "Principle of Electrical Engineering", S. Chand & Company, 2008

PH8261

APPLIED PHYSICS LAB

L T P C

0 0 2 1

LIST OF EXPERIMENTS

1. X-ray powder method
2. Study of crystal lattices
3. Torsion test
4. Density measurements of fibres
5. Electrical resistance measurement
6. Optical absorption –Spectrometer
7. FTIR study
8. pH measurement
9. Thermal conductivity
10. Di-electric constant
11. Viscosity of liquid
12. Strain gauge meter – Young's modulus
13. Instrumentation amplifier
14. Electrical conductivity
15. Creep characterization
16. Melt flow index of polymers

TOTAL : 30 PERIODS

LIST OF EXPERIMENTS

1. Preparation of solutions with various normality and molarity.
2. Determination of Redwood / Saybolt numbers, kinematic viscosity and viscosity index of lubricating oils
3. Determination of flash point, fire point, cloud and pour point of oils
4. Determination of acid value, saponification number and iodine value of oils
5. Determination of total, temporary, permanent, calcium and magnesium hardness of water samples
6. Determination of chloride, sulphate ,and COD of water samples
7. Determination of purity of washing soda and strength of a commercial acid
8. Estimation of available chlorine in hypochlorite solution
9. Estimation of strength of hydrogen peroxide
10. Synthesis of a dye, preparation of soap and a defoamer

TOTAL : 30 PERIODS**LIST OF EXPERIMENTS**

1. Study of DC & AC Starters
2. Wheatstone Bridge and Schering Bridge
3. Speed Control of DC Shunt Motor
4. Load Test on DC Shunt Motor
5. OCC & Load Characteristics of DC Shunt Generator
6. Load Test on Single-Phase Transformer
7. Load Test on Three-Phase Induction Motor
8. Load Test on Single-Phase Induction Motor
9. Study of Transducers
10. ADC and DAC Converters

TOTAL : 45 PERIODS

OBJECTIVES

- To make the students acquire a sound knowledge in statistical techniques that model engineering problems.
- The Students will have a fundamental knowledge of the concepts of probability.

UNIT I RANDOM VARIABLES 9+3

Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable.

UNIT II TWO-DIMENSIONAL RANDOM VARIABLES 9+3

Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III TESTS OF SIGNIFICANCE 9+3

Sampling distributions - Tests for single mean, proportion, Difference of means (large and small samples) – Tests for single variance and equality of variances – χ^2 -test for goodness of fit – Independence of attributes – Non-parametric tests: Test for Randomness and Rank-sum test (Wilcoxon test).

UNIT IV DESIGN OF EXPERIMENTS 9+3

Completely randomized design – Randomized block design – Latin square design - 22 - factorial design - Taguchi's robust parameter design.

UNIT V STATISTICAL QUALITY CONTROL 9+3

Control charts for measurements (\bar{x} and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

TOTAL : 60 PERIODS

TEXT BOOKS

1. Milton, J. S. and Arnold, J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, New Delhi, 4th Edition, 3rd Reprint, 2008.

2. Johnson, R.A. and Gupta, C.B., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2011.

REFERENCES

1. Devore, J.L., "Probability and Statistics for Engineering and the Sciences", Thomson Brooks/Cole, International Student Edition, New Delhi, 7th Edition, 2008.
2. Walpole, R.E., Myers, R.H., Myers, S.L. and Ye, K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 8th Edition, 2007.
3. Ross, S.M., "Introduction to Probability and Statistics for Engineers and Scientists", Elsevier, New Delhi, 3rd Edition, 2004.
4. Spiegel, M.R., Schiller, J. and Srinivasan, R.A., "Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill, New Delhi, 2004.

GE8351

ENVIRONMENTAL SCIENCE AND ENGINEERING

L T P C

3 0 0 3

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY

14

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Field study of common plants, insects, birds

Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION

8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes –

role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL : 45 PERIODS

TEXT BOOKS

1. Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, (2006).

REFERENCE BOOKS

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press (2005)

TT8301

FUNDAMENTALS OF POLYMER CHEMISTRY

L T P C

3 0 0 3

UNIT I

9

Introduction to natural and synthetic polymers; Terms and fundamental concepts; Step-growth polymerization, Carother's equation, Functionality, Crosslinking; PET manufacturing; Chain growth polymerization, Free radical polymerization, Kinetics of free-radical initiation, termination, chain transfer, Mayo's equation, cage effect, autoacceleration, inhibition and retardation;

UNIT II

9

Polypropylene manufacturing; Acrylic manufacturing; Atom transfer radical polymerization, ionic polymerization, ring opening polymerization; Nylon-6 manufacturing; Co-polymerization and its importance. Copolymer equation, reactivity ratio, tailor making of copolymer properties; Techniques of chain polymerization; Bulk, solution, emulsion, microemulsion and suspension polymerization; chemical modification of fibres; Polymer solution, Flory's theory; Interaction parameter.

UNIT III

9

Molecular weight and its distribution by: End group analysis, osmometry, light scattering, ultra centrifugation, gel permeation chromatography, intrinsic viscosity; Spectroscopic methods of

polymer characterization such as, FTIR. UV, NMR and others.

UNIT IV

9

Compounding of polymers - fillers, plasticizers, antioxidants, UV stabilizers, colouring agents and flame retardants. Polymer processing - compression, moulding, injection, extrusion, calendaring and film casting; Preparation and properties of polyesters, polyamides, epoxy and silicone polymers; Conductive polymers, super absorbent polymers.

UNIT V

9

Recycling, remoulding, depolymerisation, incineration, biodegradable polymers.

TOTAL : 45 PERIODS

REFERENCES

1. Joel R., "Fried Polymer Science and Technology", Journal of Chemical Association, ACS Publications, 2004
2. Fred W Billmeyer, "Textbook Of Polymer Science", John Wiley & Sons, 1984-03
3. Hearle, J.W.S, "Polymers and their Properties", E. Horwood, New York, 1982
4. Lenz RW , "Organic Chemistry of Synthetic High Polymers", Interscience Publishers, New York, 1967
5. Anil Kumar; Rakesh K Gupta, "Fundamentals of Polymers", McGraw-Hill, New York, 1998
6. Stephen Z. D. Cheng and Bernhard Wunderlich, "Polymer Science", Polymer Physics Ed., 1986
7. Mishra G. S., "Introductory Polymer Chemistry", John Wiley & Sons, Dhanpat Rai & Co. Pvt. Ltd., 2003
8. Gowariker V. R., Viswanathan N. V., and Jayadev Sreedhar, "Polymer Science", New Age International (P) Limited publishers, Bangalore, 2001
9. William D. Callister, Jr, "Materials Science and Engineering – An Introduction", Sixth Edition, John Wiley & Sons, Inc., 2004

TT8302

TECHNOLOGY OF PRE SPINNING PROCESS

L T P C

3 0 0 3

UNIT I INTRODUCTION

9

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

REFERENCES

1. John A. Iredale "Yarn Preparation: A Hand Book", Textile Institute, Manchester, 1992, ISBN: 1853390429
2. Lord P. R. and Mohamed M.H., "Weaving: Conversion of Yarn to Fabric", Merrow, 1992, ISBN: 090409538X
3. Ormerod A. and Sondhelm W. S., "Weaving: Technology and Operations", Textile Institute, 1995, ISBN: 187081276X

TT8351

CHARACTERISTICS OF TEXTILE FIBRES I

L T P C

3 0 0 3

UNIT I

STRUCTURE OF FIBRES

6

Study of structures of natural and man-made fibers – physical, chemical and morphological structures . Molecular conformations – planar zig-zag, helical, lamellar, and spherulite conformations.

UNIT II

STRUCTURE INVESTIGATION TECHNIQUES

12

Transmission and Scanning electron microscopes-principle construction and working; X-ray diffraction techniques – X-ray analysis-estimation of crystallinity; Infrared radiation and dichroism.techniques – chemical element and group identification by transmittance and optical density methods. Molecular orientation estimation, Typical molecular structures of commercially important fibers.

UNIT III

MOISTURE ABSORPTION CHARACTERISTICS OF FIBRES

9

Moisture absorption behaviour of natural and man-made fibres; influence of fibre structure, humidity and temperature on the moisture absorption; conditioning of fibres –mechanism of conditioning and factors influencing conditioning.Moisture diffusion in fibres. Heat of sorption – integral and differential, their relation; factors influencing heat of sorption - measurement of heat of sorption.

UNIT IV

TENSILE CHARACTERISTICS OF FIBRES

9

Tensile characteristics –Study of strength, elongation, work of rupture, initial modulus, work factor and yield point – determination of yield point. Stress-strain relations of natural and man-made fibres - influence of humidity and temperature on tensile characteristics .Time effects-Study of creep phenomena.

Elastic recovery and its relation to stress and strain of fibres; mechanical conditioning of fibres and its influence on elastic recovery. Load cycling and extension cycling-their effect on elastic recovery.

TOTAL : 45 PERIODS

REFERENCES

1. Morton W. E. and Hearle J. W. S., "Physical Properties of Textile Fibres", The Textile Institute, Washington D.C., 2008, ISBN 978-1-84569-220-95
2. Meredith R. and Hearle J. W. S., "Physical Methods of Investigation of Textiles", Wiley Publication, New York, 1989
3. Meredith R., "Mechanical Properties of Textile Fibres", North Holland, Amsterdam, 1986
4. Hearle J. W. S. Lomas B. and Cooke W. D., "Atlas of Fibre Fracture and Damage to Textiles", The Textile Institute, 2nd Edition, 1998, ISBN: 1855733196
5. Raheel M. (ed.), "Modern Textile Characterization Methods", Marcel Dekker, 1995, ISBN:0824794737
6. Mukhopadhyay S. K., "The Structure and Properties of Typical Melt Spun Fibres", Textile Progress, Vol. 18, No. 4, Textile Institute, 1989, ISBN: 1870812115
7. Mukhopadhyay S. K., "Advances in Fibre Science", The Textile Institute, 1992, ISBN: 1870812379
8. Hearle J.W.S., "Polymers and Their Properties, Vol.1. Fundamentals of Structures and Mechanics", Ellis Horwood, England, 1982
9. Greaves P.H. and Aville B.P., "Microscopy of Textile Fibres", Bios Scientific, U.K., 1995
10. Saville, "Physical Testing of Textiles", M. K. Book Distributors, 1998

TT8311

FIBRE SCIENCE LAB

L T P C

0 0 3 2

LIST OF EXPERIMENTS

1. Identification of fibres by feel, microscopic view, burning behavior and solubility
 - a. Natural cellulose fibres
 - b. Natural protein fibres
 - c. Regenerated cellulose fibres
 - d. Polyamide fibres

- e. Polyester fibres
- f. Polyolefin fibres
- 2. Determination of density of various fibres by density gradient column
- 3. Determination of denier of synthetic fibres by gravimetric method
- 4. Determination of Moisture Regain and Moisture content of fibres
- 5. Determination of the percentage of spin finish of synthetic fibres
- 6. Determination of wax content of the cotton fibres
- 7. Determination of the blend proportion
- a. Natural/ regenerated cellulose
- b. Cellulose/ protein fibres
- c. Cellulose/polyester fibres
- d. Natural cellulose/ regenerated cellulose/polyester
- 8. Thermo gravimetric analysis of fibres
- 9. FTIR analysis of polymers and fibres

TOTAL : 45 PERIODS

TT8312

SPINNING PROCESS LAB I

L T P C

0 0 3 2

LIST OF EXPERIMENTS

- 1. Construction details of blow room machines and the material passage
- 2. Cleaning efficiency and production calculations in blow room
- 3. Construction details of carding machine and the material passage
- 4. Draft and production calculations in carding machine
- 5. Wire point specifications and settings in card
- 6. Construction details of drawing machine, material passage, draft and production calculations
- 7. Production calculations in comber preparatory machines
- 8. Construction details of comber and material passage
- 9. Combing cycle, draft and production calculations
- 10. Construction details of roving machine, material passage
- 11. Draft, Twist and production calculations in roving machine
- 12. Study of builder mechanism of roving machine

13. Determination of degree of openness of fibre at blow room
14. Determination of neps present in the card and comber web

TOTAL : 45 PERIODS

MA8353

NUMERICAL METHODS

L T P C
3 1 0 4

OBJECTIVES

- To provide the mathematical foundations of numerical techniques for solving linear system, eigenvalue problems, interpolation, numerical differentiation and integration and the errors associated with them;
- To demonstrate the utility of numerical techniques of ordinary and partial differential equations in solving engineering problems where analytical solutions are not readily available.

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton-Raphson method- Solution of linear system of equations - Gauss Elimination method – Pivoting - Gauss-Jordan methods – Iterative methods of Gauss-Jacobi and Gauss-Seidel - Matrix Inversion by Gauss-Jordan method - Eigenvalues of a matrix by Power method and by Jacobi's method.

UNIT II INTERPOLATION AND APPROXIMATION 9+3

Interpolation with unequal intervals - Lagrange interpolation – Newton's divided difference interpolation – Cubic Splines - Interpolation with equal intervals - Newton's forward and backward difference formulae – Least square method - Linear curve fitting.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9+3

Approximation of derivatives using interpolation polynomials - Numerical integration using Trapezoidal, Simpson's 1/3 and Simpson's 3/8 rules – Romberg's method - Two point and three point Gaussian quadrature formulae – Evaluation of double integrals by Trapezoidal and Simpson's rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9+3

Single step-methods - Taylor's series method - Euler's method - Modified Euler's method -

Fourth order Runge-Kutta method for solving first and second order equations - Multi-step methods - Milne's and Adams-Bashforth predictor-corrector methods for solving first order equations.

**UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL
DIFFERENTIAL EQUATIONS**

9+3

Finite difference methods for solving two-point linear boundary value problems. Finite difference techniques for the solution of two dimensional Laplace's and Poisson's equations on rectangular domain – One dimensional heat-flow equation by explicit and implicit (Crank-Nicholson) methods - One dimensional wave equation by explicit method.

TOTAL : 60 PERIODS

TEXT BOOKS

1. Grewal, B.S. and Grewal, J.S., "Numerical methods in Engineering and Science", Khanna Publishers, New Delhi, 9th Edition, 2007.
2. Sankara Rao, K. "Numerical methods for Scientists and Engineers", Prentice Hall of India Private Ltd., New Delhi, 3rd Edition, 2007.

REFERENCES

1. Brian Bradie, "A Friendly Introduction to Numerical Analysis", Pearson Education Asia, New Delhi, 1st Edition, 2007.
2. Gerald, C.F. and Wheatley, P.O., "Applied Numerical Analysis", Pearson Education Asia, New Delhi, 6th Edition, 2006.
3. Laurene V. Fausett, "Applied Numerical Analysis using MATLAB", Pearson Education, New Delhi, 1st print, 2nd Edition, 2009.

AE8351

SOLID MECHANICS

L T P C

3 0 0 3

AIM

To given them knowledge on structural, Mechanical properties of Beams, columns.

OBJECTIVES

- The students will be able to design the support column, beams, pipelines, storage tanks and reaction columns and tanks after undergoing this course. This is precursor for the study on process equipment design and drawing.

UNIT I STRESS, STRAIN AND DEFORMATION OF SOLIDS 9

Rigid bodies and deformable solids – forces on solids and supports – equilibrium and stability – strength and stiffness – tension, compression and shear stresses – Hooke’s law and simple problems – compound bars – thermal stresses – elastic constants and Poisson’s ratio.

UNIT II TRANSVERSE LOADING ON BEAMS 9

Beams – support conditions – types of Beams – transverse loading on beams – shear force and bending moment in beams – analysis of cantilevers, simply supported beams and overhanging beams – relationships between loading, S.F. and B.M. in beams and their applications – S.F. & B.M. diagrams.

UNIT III DEFLECTIONS OF BEAMS 9

Double integration method – Macaulay’s method – Area – moment theorems for computation of slopes and deflections in beams.

UNIT IV STRESSES IN BEAMS 9

Theory of simple bending – assumptions and derivation of bending equation ($M/I = F/Y = E/R$) – analysis of stresses in beams – loads carrying capacity of beams – proportioning beam sections – leaf springs – flitched beams – shear stress distribution in beams – determination of shear stress in flanged beams.

UNIT V TORSION AND COLUMNS 9

Torsion of circular shafts – derivation of torsion equation ($T/J = fs/R = C\theta/L$) – stress and deformation in circular and hollow shafts – stresses and deformation in circular and hollow shafts – stepped shafts – shafts fixed at both ends – stresses in helical springs – deflection of springs – spring constant. Axially loaded short columns – columns of unsymmetrical sections – Euler’s theory of long columns – critical loads for prismatic columns with different end conditions – effect of eccentricity.

TOTAL : 45 PERIODS

TEXT BOOKS

1. Junarkar, S.B., Mechanics of Structure Vol. 1, 21st Edition, Character Publishing House, Anand, Indian, (1995)
2. William A.Nash, Theory and Problems of Strength of Materials, Schaum’s Outline Series. McGraw Hill International Editions, Third Edition, 1994.
3. Bansal, R.K., Strength of Materials, Laxmi Publications(P) Ltd., Fourth Edition 2010

REFERENCE

1. Elangovan, A., Thinma Visai Iyal (Mechanics of Solids in Tamil), Anna University, Madras, 1995.

TT8401

TECHNOLOGY OF WOVEN FABRIC MANUFACTURE

L T P C

4 0 0 4

UNIT I INTRODUCTION TO WEAVING

6

Yarns quality requirements for high speed automatic shuttle looms and shuttle less loom; warp and weft preparation for high speed looms; Principle of weaving with hand and power looms, passage of material, motions in loom – primary, secondary and auxiliary motions, plain power loom driving, timing of motions.

UNIT II SHEDDING MOTIONS

12

Shed geometry and shedding requirement. Types of shed. Shedding mechanisms - positive and negative. Principles of tappet, dobby and jacquard shedding mechanisms, reversing mechanisms- limitations of various shedding mechanisms; Conventional and modern dobby and jacquard mechanism.

UNIT III WEFT INSERTION AND BEAT UP

18

Shuttle picking and checking mechanisms, shuttle flight and timing; Weft feeder – types, Principles of weft insertions in shuttle less looms; mechanism of weft insertion by projectile, rapier loom and jet – air and water. Multi-Phase weaving systems; Kinematics of sley, sley eccentricity; beat up mechanism in modern looms;

UNIT IV SECONDARY AND AUXILIARY MOTIONS LOOMS

12

Take up and let - off motions used in plain power looms; cloth formation, weaving condition - factors and control; warp protector and warp and weft stop motion; plain power loom accessories. Automatic weft replenishment in shuttle looms – pirn changing and shuttle changing looms; mechanisms involved in automatic pirn changing – feelers, cutters, design of shuttle, three try motions; multi shuttle looms- box changing principle, Automatic pirn changing in multi shuttle loom. Weft arrival control and automation in shuttle less looms; selvages in shuttle less looms; quick style change;

UNIT V PROCESS CONTROL & SPECIAL WEAVING PROCESS

12

Techno economics of shuttle less loom weft insertion systems; loom monitoring and control Loom stoppages and efficiency; fabric defects and value loss; fabric shrinkage in the loom -

causes and control; fabric engineering. Filament weaving – Silk & Texturised yarns. Principles and mechanisms in weaving Pile fabrics, tapes and triaxial fabrics

TOTAL : 60 PERIODS

REFERENCES

1. Talukdar M.K., Sriramulu P.K. and Ajgaonkar D.B., "Weaving: Machines, Mechanisms, Management", Mahajan Publishers, Ahmedabad, 1998, ISBN: 81-85401-16-0
2. "Weaving: The knowledge in Technology", Papers Presented at the Textile Institute Weaving Conference 1998, Textile Institute, ISBN: 18770372182
3. Booth J.E., "Textile Mathematics Volume 3", The Textile Institute, Manchester, 1977, ISBN: 090073924X
4. Marks R. and Robinson T.C., "Principles of Weaving", The Textile Institute, Manchester, 1989, ISBN: 0 900739 258
5. Lord P.R. and Mohamed M.H., "Weaving: Conversion of Yarn to Fabric", Mellow, 1992, ISBN: 090409538X
6. Ormerod A. and Sondhelm W.S., "Weaving: Technology and operations", Textile Institute, 1995, ISBN: 187081276X
7. Sabit Adanur, "Handbook of Weaving", Technomic Publishing Co. Inc., 2001
8. Vangheluwe L., "Air- Jet Weft Insertion", Textile progress, Vol. 29, No. 4, Textile Institute Publication, 1999, ISBN; 1870372255

TT8402

TECHNOLOGY OF YARN SPINNING

L T P C

3 0 0 3

UNIT I RING SPINNING

13

Principle of yarn formation in ring spinning machines; working of ring spinning machine; cop building; design features of important elements used in ring spinning machine; draft, twist and production calculations in ring spinning machine; end breakage rate – causes and remedies

UNIT II CONDENSED YARN SPINNING

5

Condensed yarn spinning – principle, different methods, properties; comparison with ring spun yarn

UNIT III YARN PLYING

9

Merits of plying of yarns; methods followed for plying – TFO, ring twisting; selection of twist

level for plying; calculation of resultant count of plied yarns; types of fancy yarns, method of production

UNIT IV ROTOR SPINNING 9

Principle of open end spinning; principle of yarn production by rotor spinning system; design features of important elements used in rotor spinning; properties of rotor yarn

UNIT V OTHER SPINNING SYSTEMS 9

Friction and air-jet spinning methods – principle of yarn production, raw material used, structure, properties and applications; principle of yarn production by self-twist, core, wrap, integrated compound spinning systems.

TOTAL : 45 PERIODS

REFERENCES

1. Oxtoby E., "Spun Yarn Technology ", Butterworth Publications, London, 1987
2. Klein W., "The Technology of Short-staple Spinning", The Textile Institute, Manchester, 1998
3. Klein W., "A Practical Guide to Ring Spinning ", The Textile Institute, Manchester, 1999
4. Klein W., "New Spinning Systems ", The Textile Institute, Manchester, 1993
5. Lord P.R., "Yarn Production: Science, Technology and Economics", The Textile Institute, Manchester, 1999
6. Shaw J., "Short-staple Ring Spinning, Textile Progress", The Textile Institute, Manchester, 1982
7. Iredale J., "Yarn Preparation: A Handbook ", Intermediate Technology, 1992

**TT8451 CHARACTERESTICS OF TEXTILE FIBRES II L T P C
3 0 0 3**

UNIT I TORSIONAL CHARACTERISTICS 9

Torsional rigidity of fibres –comparison of natural and man-made fibres– measurement techniques - torsional rigidity and its relation to other fibre properties - torque – twist relations for various fibres - Torsion and time relation breaking twist angle – estimation- comparison of various fibres.

UNIT II FLEXURAL CHARACTERISTICS 9

Flexural rigidity of fibres – measurement techniques - Flexural rigidity and its relation to other fibre properties - comparison of various fibres.

UNIT III OPTICAL CHARACTERISTICS 9

Reflexion and Lustre-objective and subjective methods of measurement - refractive index and its measurement - birefringence, factors influencing birefringence - Absorption and dichroism

UNIT IV FRICTIONAL CHARACTERISTICS 9

Friction – static, limiting and kinetic friction , its measurement, comparison of fibres, directional friction in wool - frictional and surface characteristics of natural and synthetic fibres - friction and lubrication.

UNIT V ELECTRICAL AND THERMAL CHARACTERISTICS 9

Electrical resistance of fibres – measurement, factors influencing electrical resistance; di-electric behaviour – factors influencing di-electric properties; static electricity – measurement, problems and elimination techniques; thermal conductivity, thermal expansion and contraction, melting.

TOTAL : 45 PERIODS

REFERENCES

1. Morton W. E. and Hearle J. W. S., “Physical Properties of Textile Fibres”, The Textile Institute, Washington D.C., 2008, ISBN 978-1-84569-220-95
2. Meredith R. and Hearle J. W. S., “Physical Methods of Investigation of Textiles”, Wiley Publication, New York, 1989
3. Meredith R., “Mechanical Properties of Textile Fibres”, North Holland, Amsterdam, 1986
4. Hearle J. W. S. Lomas B. and Cooke W. D., “Atlas of Fibre Fracture and Damage to Textiles”, The Textile Institute, 2nd Edition, 1998, ISBN: 1855733196
5. Raheel M. (ed.), “Modern Textile Characterization Methods”, Marcel Dekker, 1995, ISBN:0824794737
6. Mukhopadhyay S. K., “The Structure and Properties of Typical Melt Spun Fibres”, Textile Progress, Vol. 18, No. 4, Textile Institute, 1989, ISBN: 1870812115
7. Mukhopadhyay S. K., “Advances in Fibre Science” The Textile Institute, 1992, ISBN: 1870812379
8. Hearle J.W.S., “Polymers and Their Properties, Vol.1. Fundamentals of Structures and Mechanics”, Ellis Horwood, England, 1982
9. Greaves P.H. and Aville B.P., “Microscopy of Textile Fibres”, Bios Scientific, U.K., 1995

10. Saville, "Physical Testing of Textiles", M. K. Book Distributors, 1998

TT8452

FABRIC STRUCTURE

L T P C

3 0 0 3

UNIT I

9

Elementary weaves – plain and its derivatives, twill and its derivatives, satin, sateen and their derivatives – loom requirements

UNIT II

9

Ordinary and Brighten Honey Comb; Huck-a-Back and its modifications; Mock Leno; crepe weaves; colour theory – light and pigment theory; modification of colour; application of colours; colour and weave effects – loom requirements

UNIT II I

13

Bedford cords - plain and twill faced, wadded; welts and piques, wadded piques; backed fabrics - warp and weft, reversible and non-reversible fabrics; extra warp and extra weft figuring - single and double colour – loom requirements

UNIT IV

9

Pile fabrics; warp pile - wire pile, terry pile, loose backed; weft pile – plain back and twill back velveteen, lashed pile, corduroy, weft plush – loom requirements

UNIT V

5

Double cloth, types of stitches; Damasks; Gauze and Leno principles – loom requirements, 3D fabrics.

TOTAL : 45 PERIODS

REFERENCES

1. Grosicki Z. J., "Watson's Textile Design and Colour", Vol.1, Woodhead Publications, Cambridge England, 2004
2. Grosicki Z. J., "Watson's Advanced Textile Design and Colour", Vol.II, Butterworths, London, 1989
3. Wilson J., "Handbook of Textile Design", Textile Institute, Manchester, 2001, ISBN:1 85573 5733

4. Horne C.E., "Geometric Symmetry in Patterns and Tilings", Textile Institute, Manchester, 2000, ISBN:1 85573 4923
5. Seyam A. M., "Structural Design of Woven Fabrics, Theory and Practice", Textile Institute, Manchester, 2002, ISBN: 1 87037 2395
6. Georner D, "Woven Structure and Design, part 1: Single Cloth Construction", WIRA, U.K., 1986
7. Georner D, "Woven Structure and Design, Part 2: Compound Structures", WIRA, U.K.,1989

TT8411

SPINNING PROCESS LAB II

L T P C

0 0 3 2

LIST OF EXPERIMENTS

1. Construction details of ring spinning machine and material passage
2. Draft, Twist and production calculations in ring spinning machine
3. Study of builder mechanism of ring spinning machine
4. Selection of ring travellers
5. Construction details of rotor spinning machine and material passage
6. Draft, Twist and production calculations in rotor spinning machine
7. Production of carded web using miniature card
8. Production of sliver using miniature drawing machine
9. Production of yarn using ring spinning machine
10. Production of yarn using rotor spinning machine
11. Analysis of MIS reports from spinning mills

TOTAL : 45 PERIODS

TT8461

CLOTH ANALYSIS LAB

L T P C

0 0 3 2

Analysis of construction details of the following fabric structure

1. Plain and its derivatives
2. Twill and its derivatives
3. Satin (Regular and irregular)

4. Sateen(Regular and irregular)
5. Honeycomb (ordinary and Brighton)
6. Huck-a-back
7. Extra warp and extra weft figuring
8. Pile fabrics (warp and weft)
9. Backed fabrics
10. Gauze and Leno
11. Double cloth
12. Crepe
13. Tapestry
14. Mock-leno
15. Bedford cord.
16. Single jersey
17. Double jersey structures
18. Analysis of blend composition in the yarn of the fabric
19. Analysis of finish on the fabric

TOTAL : 45 PERIODS

TT8501	CHEMICAL PROCESSING OF TEXTILE MATERIALS I	L T P C
		3 0 0 3

UNIT I	9
Chemical structure of fibres; action of chemicals on fibres; natural and added impurities in textiles; singeing and desizing of natural and synthetic fibres and its blends; heat setting.	

UNIT II	9
Scouring, bleaching and mercerization of cotton, bioscouring of cotton; carbonization, scouring and bleaching of wool; degumming of silk	

UNIT III	9
Loose stock machine; hank and package processing machines; yarn singeing machine; woven and knitted fabric singeing machines; stretching devices; shearing and raising machines; kiers; mangles; jigger; winch; jet and soft flow machines; yarn mercerizer, chain and chainless mercerizers; continuous scouring and bleaching machines; washing ranges, hydro extractors; detwisters; dryers; stenters.	

UNIT IV **9**
Calendering, crease proofing, shrink proofing and softening; wool finishing.

UNIT V **9**
Water and oil repellent finishes; fire retardant finish; antibacterial finish; Application of nanotechnology in finishing; assessment of finishes

TOTAL : 45 PERIODS

REFERENCES

1. Trotman E. R., "Dyeing and Chemical Technology of Textile Fibres", B.I Publishing Pvt. Ltd., New Delhi, 1994
2. Menachem Lewin and Eli M. Pearce, "Handbook of Fibre Chemistry: Second Edition, Revised and Expanded, Marcel Dekker, Inc., 1998
3. Menachem Lewin and Stephen B. Sello., "Handbook of Fibre Science and Technology: Volume I: Chemical Processing of Fibres and Fabrics-Fundamentals and Preparation Part A", Marcel Dekker, Inc., 1983
4. Karmakar S. R., "Chemical Technology in the Pre-treatment Process of Textiles", Elsevier sciences B.V.,1999
5. Shenai V. A., "Technology of Bleaching and Mercerizing", Sevak Publications, 2003
6. Bhagwat R. S., "Handbook of Textile Processing", Colour Publication, Mumbai.,1999
7. Cavaco-Paulo A. and Gubitz G. M., "Textile Processing with enzymes", Woodhead Publication Ltd., 2003
8. Shenai V. A., "Technology of Textile Finishing", B.I. Publication, Mumbai, 1989.
9. Heywood D., "Textile Finishing", Wood head Publishing Ltd., 2003, ISBN 0901956 81 3

TT8502

KNITTING TECHNOLOGY

L T P C

3 1 0 4

UNIT I INTRODUCTION **12**

Reasons for the growth of the knitting industry. Comparison of fabric properties - wovens, knits and bonded fabrics; classification of knitting processes – weft knit & warp knit; yarn quality requirements for knitting. Preparation of staple yarns for weft and warp knitting.

UNIT II FUNDAMENTALS OF KNITTING **12**

General definitions and principles of knitting; Types of knitting needles – Bearded, Latch & Compound Needle. Elements of knitted loop structure.

UNIT III WEFT KNITTING

12

Basic weft knitted structures and their production - plain, rib, interlock and purl; Fundamentals of formation of knit, tuck and float stitches; factors affecting the formation of loop; effect of loop length and shape on fabric properties; Analysis of various types of weft knitted structure. Weft knitted fabric geometry.

UNIT IV WEFT KNITTING MACHINES

12

Construction, Characteristics and working of circular knitting machines used for the production of basic structures; production of derivatives of weft knitted structures; needle control in circular knitting machines; quality control in knitted fabric production; production calculation. 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.

UNIT V WARP KNITTING

12

Basic principles; elements of warp knitted loop – open loop, closed loop; warp knitting elements- chain link, chain links for simple patterns, guide bar movement mechanism,.

Tricot and Rachel warp knitting machines. Principles of double needle bar patterning, Terry pile fabric production. Let off system; run in value based on the lapping diagram; take up system; theoretical concepts of warp knitted loop configuration.; Uses of warp knitted fabrics in technical applications.

TOTAL : 60 PERIODS

REFERENCES

1. Ajgaonkar D.B., "Knitting Technology", Universal Publishing Corporation, Mumbai, 1998, ISBN: 81-85027-34-X
2. Chandrasekhar Iyer, Bernd Mammel and Wolfgang Schach., "Circular Knitting", Meisenbach GmbH, Bamberg, 1995, ISBN: 3-87525-066-4
3. Spencer D.J., "Knitting Technology", III Ed., Textile Institute, Manchester, 2001, ISBN: 1 85573 333 1
4. Samuel Raz., "Flat Knitting: The new generation", Meisenbach GmbH, Bamberg, 1997, ISBN: 3-87525-054-0
5. Samuel Raz., "Warp Knitting production", Melliland Textilberichte, GmbH, Rohrbacher, 1987, ISBN: 3-87529-022-4
6. Gajjap B.J., "Handbook of warp Knitting Technology", Textile Institute, Manchester, 2004, ISBN: 1 85573 7701

7. Thomas D.G.B., "An Introduction to Warp Knitting", Merrow Publishing Company, UK., 1971, ISBN-13: 9780900541070
8. Sam Raz, "Warp Knitting Production", Melliand Textilberichte GmbH, Heidelberg, Germany, 1987, ISBN:3-87529-022-4
9. Die Maschenbindungen der Kettenwirkerai, "An Introduction to the Stitch Formations in Warp Knitting", Published Employee's Association, Karl Mayere.V., Germany, 1966
10. Paling D.F., "Warp Knitting Technology", Columbine Press, U.K, 1966
11. Charles Reichman, "Wool and Synthetic Knitwear Handbook", National Knitted Outerwear Association, U.S.A, 1967
12. Charles Reichman, "Knitted Stretch Technology", National Knitted Outerwear Association, U.S.A, 1965

TT8503

PROCESS CONTROL IN SPINNING

L T P C

3 0 0 3

UNIT I LEVELLING

9

Different levelling methods adopted in the spinning machines to achieve better uniformity of the products; influence of the uniformity of the intermediate products on the yarn quality; effect of machines and processing parameters on product uniformity; importance of fibre-mix homogeneity on yarn quality; types and levels of mixing in the preparatory processes; assessment of fibre-blend variations.

UNIT II NEP AND HOOK REMOVAL

9

Causes of nep and hook formation in the fibre-opening processes; improving the removal of neps in the carding and combing machines; maximizing the fibre hook straightening during the preparatory operations; measurement of neps and hooks.

UNIT III WASTE CONTROL

9

Control of waste in blowroom, card and combers; influence of machine and processing parameters on waste removal; controlling the lint content in waste; cleaning efficiency and cleaning intensity.

UNIT IV PRODUCTION CONTROL

9

Factors affecting the production limits of the spinning machinery; achieving maximum production in the given machinery; new concepts in achieving higher production in the spinning machinery; role of machinery maintenance and humidity control on production efficiency; computation of the productivity indices.

UNIT V YARN QUALITY ANALYSIS & MAN-MADE FIBRE PROCESSING 9

Analysis and control of within length and between length variations and spectrogram; yarn faults classifications; causes and remedies for yarn defects. Optimum processing conditions required for man-made-fibres like polyester, viscose in the spinning machinery.

TOTAL : 45 PERIODS

REFERENCES

1. Garde A.R. and Subramaniam T.A., "Process Control in Spinning", ATIRA Publicaitons, Ahmedabad, 1989
2. Lord P.R., "Yarn Production; Science, Technology and Economics", The Textile Institute, Manchester, 1999
3. Furter R., "Evenness Testing in Yarn Production Part 1 and Part II ", The Textile Institute, Manchester, 1982
4. Van der Sluijs M and Hunter L., "Neps in Cotton Lint, Textile Prograss ",The Textile Institute, Manchester, 1999
5. Klein W., "Man-made Fibres and their Processing" ,The Textile Institute, Manchester, 1994
6. Slater K.Yarn Evenness, "Textile Progress", The Textile Institute, Manchester, 1986
7. Townend P.P., "Nep Formation in Carding ", Wira, U.K., 1982

**TT8504 QUALITY EVALUATION OF FIBRES AND YARNS L T P C
3 0 0 3**

UNIT I INTRODUCTION 5

Definition of quality- importance of quality assessment- selection of samples for quality assessment – random and biased samples – squaring technique and zoning technique for fibre selection; yarn sampling - use of random numbers - sampling for various types of yarn tests.

UNIT II FIBRE LENGTH AND STRENGTH ANALYSIS 9

Fibre testing, the fibre quality index and spinnability; Fibre length and length uniformity-measuring techniques. Strength Tensile Testing modes – CRT, CRE, CRL and ARL; Fibre strength, importance, relation to yarn strength; Measurement techniques.

UNIT III FIBRE FINENESS, MATURITY AND TRASH ANALYSIS 9

Fibre fineness – definition-comparison of various fibres – its importance in yarn manufacture; measurement techniques. Cotton fibre maturity, estimation by microscopic method - maturity ratio and index, estimation by other methods – optical, air flow differential dyeing; its importance in spinning. Fibre trash – influence on quality; measurement – principle and estimation microdust estimation for rotor spinning. High volume instrument for total fiber quality measurement.

UNIT IV YARN COUNT, TWIST AND STRENGTH 9

Yarn numbering systems-Indirect and direct systems-count conversions; Count measuring systems. Twist in single and ply yarns –twist direction – twist factor – twist and yarn strength; twist measurement and breaking twist angle measurement. Single yarn strength; Lea count-strength product (CSP) and Corrected Count Strength Product (CCSP).

UNIT V YARN MASS EVENNESS AND SURFACE QUALITY 9

Yarn mass evenness parameters – measurement – electronic mass evenness determination – Yarn fault classification – Yarn Appearance; Yarn abrasion resistance – importance and measuring technique. Yarn hairiness – importance and assessment techniques. Yarn friction – static and dynamic friction – methods of measurement

TOTAL : 45 PERIODS

REFERENCES

1. Booth J.E., “Principle of Textile Testing”, Butterworth Publications, London, 1989
2. Saville B.P., “Physical Testing of Textiles”, Textile Institute, Manchester, 1998
3. Kothari V. K., “Testing and Quality Management”, Progress in Textile Technology Vol.1, IAFL Publications, New Delhi, 1999
4. Ruth Clock and Grace Kunz., “Apparel Manufacture – Sewn Product Analysis”, Upper Sadle River Publications, New York, 2000
5. Pradip V. Mehta., “Managing Quality in the Apparel Industry”, NIFT Publication, India, 1998
6. Sara J. Kadolph., “Quality Assurance for Textiles and Apparels”, Fair child Publications, New York, 1998
7. Slater K., “Physical Testing and Quality Control”, The Textile Institute, Vol.23, No.1/2/3 Manchester, 1993

UNIT I POLYMER RHEOLOGY**9**

Transport Phenomena in Fibre Manufacturing- Heat and mass; Polymer rheology-Newtonian and non-Newtonian fluids; Necessary conditions of fibre forming polymer; Melt instabilities.

UNIT II MELT SPINNING**9**

Melt Spinning- Polymer Selection and Preparation, equipments, properties and applications of polyester, polyamide and polypropylene fibers.

UNIT III SOLUTION SPINNING**9**

Solution spinning- Polymer Selection and Preparation, equipments, properties and applications of acrylic, polyurethane and regenerated cellulose fibres.

UNIT IV POST SPINNING OPERATIONS**9**

Neck drawing, drawing systems, influence of drawing on structure and properties of fibres; Types of heat setting, influencing parameters on heat setting, influence of heat setting on fibre behavior; Spin finish application; texturising.

UNIT V ADVANCES IN FIBER SPINNING**9**

Liquid crystal spinning; Gel spinning; Profile fibres, hollow & porous fibres; Speciality fibres- polyglycolic acid, polylactic acid, chitosan fibres preparation properties and applications.

TOTAL : 45 PERIODS**REFERENCES**

1. Kothari V. K., "Textile Fibres: Development and Innovations", Vol. 2, Progress in Textiles, IAFL Publications, New Delhi, 2000
2. Gupta V. B. and Kothari V. K. (Editors), "Manufactured Fibre Technology", Kluwer Academic Publishers, 1997, ISBN 0412-54030-4
3. Vaidya A. A., "Production of Synthetic Fibres", Prentice Hall of India Pvt. Ltd., New Delhi, 1988
4. Cook J. G., "Handbook of Textile Fibres: Vol. 2: Man Made Fibres", The Textile Inst., 5th Ed. 1984, ISBN: 1855734850
5. Srinivasa Murthy H. V., "Introduction to Textile Fibres", Textile Association, India, 1987

6. Vaidya A. A., "Production of Synthetic Fibres", Prentice Hall of India Pvt. Ltd., New Delhi, 1988
7. Nakasjima (English edition, edited by Kajiwara K. and McIntyre J. E.), "Advanced Fibre Spinning Technology", Wood head Publication Ltd., England, 1994, ISBN: 1855731827

HS8561

**EMPLOYABILITY SKILLS
(LAB / PRACTICAL COURSE)**

L T P C

0 0 2 1

(Common to all branches of Fifth or Sixth Semester B.E / B.Tech programmes)

OBJECTIVES

- To enhance the employability skills of students with a special focus on Presentation skills, Group discussion skills and Interview skills
 - To help them improve their soft skills, including report writing, necessary for the workplace situations
1. Making presentations – introducing oneself – introducing a topic – answering questions – individual presentation practice
 2. Creating effective PPTs – presenting the visuals effectively
 3. Using body language with awareness – gestures, facial expressions, etc.
 4. Preparing job applications - writing covering letter and résumé
 5. Applying for jobs online - email etiquette
 6. Participating in group discussions – understanding group dynamics - brainstorming the topic
 7. Training in soft skills - persuasive skills – sociability skills - questioning and clarifying skills – mock GD
 8. Writing reports – collecting, analyzing and interpreting data – drafting the report
 9. Attending job interviews – answering questions confidently
 10. Interview etiquette – dress code – body language – mock interview

TOTAL: 30 PERIODS

Requirements for a class of 30 students

1. A PC or a lap top with one or two speakers
2. A Collar mike and a speaker
3. An LCD projector and a screen
4. CD's and DVD's on relevant topics
5. Individual chairs for conducting group discussions

REFERENCE BOOKS

1. Dhanavel, S.P. 2010. English and Soft Skills. Hyderabad: Orient BlackSwan Ltd.
2. Corneilssen, Joep. How to Prepare for Group Discussion and Interview. New Delhi: Tata-McGraw-Hill, 2009.
3. D'Abreo, Desmond A. Group Discussion and Team Building. Mumbai: Better Yourself Books, 2004.
4. Ramesh, Gopalswamy, and Mahadevan Ramesh. The ACE of Soft Skills. New Delhi: Pearson, 2010.
5. Gulati, Sarvesh. Corporate Soft Skills. New Delhi: Rupa and Co. 2006.
6. Van Emden, Joan, and Lucinda Becker. Presentation Skills for Students. New York: Palgrave Macmillan, 2004.

EXTENSIVE READERS

1. Covey, Stephen R. The 7 Habits of Highly Effective People. New York: Free Press, 1989.
2. Bagchi, Subroto. The Professional. New Delhi: Penguin Books India, 2009.

WEB RESOURCES

1. www.humanresources.about.com
2. www.careerride.com

TT8511

FABRIC MANUFACTURE LABORATORY

L T P C

0 0 3 2

LIST OF EXPERIMENTS

1. Analysis of Yarn faults
2. Control of production, package density, yarn faults in cone / cheese winding machine
3. Determination of depth of shed and heald shaft movements in tappet shedding mechanism
4. Preparation of pattern card for dobby shedding mechanism and way in which adjust the depth of shed
5. Study of jacquard shedding mechanism
6. Power required to insert the weft through shuttle in over and under picking mechanism
7. Study of picking mechanism in shuttleless loom

8. Control of sley eccentricity and Beat-up force in weaving
9. Study of let-off mechanisms
10. Determination of pick space through 5 and 7 wheel take-up mechanisms
11. Study of weft replenishment mechanism in shuttle looms
12. Method of achieving the required colour patterns in 4 X 1 drop box motion
13. Study of warp protector mechanism
14. Study of plain, rib and interlock circular knitting machines
15. Study of flat knitting machines

TOTAL : 45 PERIODS

TT8512 FIBRE AND YARN QUALITY EVALUATION LABORATORY

L T P C

0 0 3 2

LIST OF EXPERIMENTS

Determination of

1. Fibre fineness
2. Fibre length
3. Fibre maturity
4. Fibre trash content
5. Bundle fibre strength
6. Fiber migration parameters
7. Roving, sliver and yarn linear density
8. Single yarn strength
9. Yarn lea strength
10. Yarn single and ply yarn twist
11. Yarn impact strength
12. Yarn to yarn abrasion
13. Unevenness of yarn
14. Assessment of yarn appearance

TOTAL : 45 PERIODS

UNIT I COLOUR SCIENCE 9

Theories of colour measurement, Beer–Lambert’s law and Kubelka-Munk theory and their application in colour assessment and colour matching; whiteness and yellowness indices.

UNIT II THEORY OF DYEING 9

Dyeing equilibrium; dye-fibre interaction; adsorption isotherm; dye affinity; heat of dyeing; half dyeing time.

UNIT III DYEING 13

Basic characteristics of dyes and pigments; classification of dyes and principle of application of dyes; Chemistry and technology of application of direct, reactive, disperse, acid and basic dyes; processing of denims; determination of fastness properties.

UNIT IV PRINTING 9

Methods and styles of printing; printing machines; constituents of printing paste; printing with direct, reactive, acid and disperse dyes; printing with pigments

UNIT V KNITS AND GARMENTS 5

Dimensional stabilization of tubular and open width knits; garment dyeing and printing; garment washing

TOTAL : 45 PERIODS**REFERENCES**

1. Trotman E. R., “Dyeing and Chemical Technology of Textile Fibres”, B.I Publishing Pvt. Ltd., New Delhi, 1994
2. Shenai V. A., “Chemistry of Dyes and Principles of Dyeing”, Sevak Publications, Mumbai, 1995
3. Shore J., “Colourants and Auxiliaries: Volume I Colorants”, Wood head Publishing Ltd., 2002, ISBN 0 901956 77 5
4. Shore J., “Colourants and Auxiliaries: Volume II Auxiliaries”, Wood head Publishing Ltd., 2002, ISBN 0 901956 78 3
5. Cegerra J. Puente P. And Valladepars J., “The Dyeing of Textile Materials”, Textile Institute, Manchester, 1993

6. Shenai V. A., "Technology of Printing", Sevak Publications, Mumbai, 1996
7. Miles W. C., "Textile Printing", Wood head Publication, 2003, ISBN 0 901956 76 1
8. Johnson A., "The Theory of Colouration of Textiles", SDC, Second edition, 1989, ISBN 0 901956 481
9. Shah H. S. and Gandhi R. S., "Instrumental Colour Measurement and Computer Aided Colour Matching for Textiles", Mahajan Book Publication, 1990

TT8602

GARMENT MANUFACTURING TECHNOLOGY

**L T P C
4 0 0 4**

UNIT I

12

Anthropometry, mass-production, mass-customization; pattern making, grading, marker planning, spreading & cutting

UNIT II

18

Different types of seams and stitches; single needle lock stitch machine - mechanism and accessories; needle – functions, special needles, needle size, numbering, needlepoint; sewing thread-construction, material, thread size, packages.

UNIT III

6

Labels, linings, interlinings, wadding, lace, braid, elastic, hook and loop fastening, shoulder pads, eyelets and laces, zip fasteners, buttons

UNIT IV

18

Raw material, in process and final inspection; needle cutting; sewability of fabrics; strength properties of apparel; dimensional changes in apparel due to laundering, dry-cleaning, steaming and pressing; care labeling of apparel

UNIT V

6

Garment dyeing, printing and finishing; pressing categories and equipment, packing

TOTAL : 60 PERIODS

REFERENCES

1. Carr H., and Latham B., "The Technology of Clothing Manufacture", Blackwell Science Ltd., Oxford, 1994, ISDN: 0632037482

2. Winifred Aldrich., "Metric Pattern Cutting", Blackwell Science Ltd., Oxford, 1994
3. Peggall H., "The Complete Dress Maker", Marshall Caverdish, London, 1985
4. Gerry Cooklin., "Introduction to Clothing Manufacture", Blackwell Scientific Publications, London, 1991, ISDN: 0-632-02661-8
5. Jai Prakash and Gaur R.K., "Sewing Thread", NITRA, 1994
6. Ruth Glock, Grace I. Kunz, "Apparel Manufacturing", Dorling Kindersley Publishing Inc., New Jersey, 1995, ISDN: 0-02-344142-9
7. Pradip V.Mehta, "An Introduction to Quality Control for the Apparel Industry", J.S.N. Internationals, 1992

TT8603	MECHANICS OF TEXTILE MACHINERY	L T P C
		3 0 0 3

UNIT I			5
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Equations of forces, motion and energy; energy stored in rotating masses.

UNIT II			9
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Clutches and brakes – types, application in textile machines; gears, gear trains; power transmission – different modes, advantages and limitations, applications

UNIT III			9
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Differential and variable speed drives – principles, application in textile machines; design of cone drums – piano feed regulation, roving machine builder mechanism; ;

UNIT IV			9
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Friction – calculations; bearings, design of drive transmitting shafts, balancing of rotating masses

UNIT V			13
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Design of winder drums; kinematics of shedding; design of tappets; beat up force, sley eccentricity; power for picking

TOTAL : 45 PERIODS

REFERENCES

1. Booth J. E., "Textile Mathematics", Vol. 2&3, The Textile Institute, Manchester, 1975, ISBN-10: 0900739193
2. Slater K., "Textile Mechanics", Vol. 1&2, The Textile Institute, Manchester, 1977, ISBN: 0900739274
3. Rengasamy R. S., "Mechanics of Spinning Machines", NCUTE, Ministry of Textiles, Govt. of India, 2000

TT8651

FABRIC QUALITY EVALUATION

L T P C

3 0 0 3

UNIT I CONSTRUCTION CHARACTERISTICS

9

Basic fabric particulars – Measurement of ends and picks per inch, count of warp and weft, determination of the type of weave, measurement of length, width, thickness and Area density (GSM); warp and weft crimp measurements for spun and filament yarn fabrics, the cover factor calculations; Fabric sampling techniques.

UNIT II STRENGTH CHARACTERISTICS

9

Tensile strength measurement – ravelled strip test and grab test – mechanical and electronic measuring systems. Tear strength – importance – measuring systems. Bursting strength and its measurement. Ballistic impact strength. Universal tensile tester - principle and operation

UNIT III COMFORT AND SURFACE CHARACTERISTICS

9

Fabric stiffness – principle of measurement of flexural rigidity; Drapeability – measurement of drape coefficient; Crease recovery measurement techniques. Wrinkle recovery assessment using standard grades; Principle and functioning of air permeability testers, water repellency, contact angle and fabric shrinkage testing; Fabric abrasion resistance – measuring technique; Fabric pilling resistance – methods of determination.

UNIT IV SPECIAL CHARACTERISTICS

5

Fabric bending hysteresis testing; Shear hysteresis measurements; Fabric compression and decompression behaviour; Fabric surface roughness and friction measurements; Fabric tensile hysteresis measurements; Fabric flame resistance testing methods; Moisture and thermal characteristics.

UNIT V FABRIC INSPECTION AND GARMENT QUALITY**13**

Fabric inspection – Manual, semi-automatic and Automatic Inspection systems, classification of fabric defects, independent product quality certification, acceptable quality level, MIL standards and final inspection. Quality assessment of garments - cutting, sewing, pressing, finishing and packaging defects.

TOTAL : 45 PERIODS**REFERENCES**

1. Booth J.E., "Principle of Textile Testing", Butterworth Publications, London, 1989
2. Saville B.P., "Physical Testing of Textiles", Textile Institute, Manchester, 1998
3. Kothari V. K., "Testing and Quality Management", Progress in Textile Technology Vol.1, IAFL Publications, New Delhi, 1999
4. Ruth clock and Grace Kunz., "Apparel Manufacture – Sewn Product Analysis", Upper Sadle River Publications, New York, 2000
5. Pradip V. Mehta., "Managing Quality in the Apparel Industry", NIFT Publication, India, 1998
6. Sara J. Kadolph., "Quality Assurance for Textiles and Apparels", Fair Child Publications, New York, 1998
7. Slater K., "Physical Testing and Quality Control", The Textile Institute, Vol.23, No.1/2/3 Manchester, 1993

**TT8652 FINANCIAL MANAGEMENT FOR TEXTILE AND APPAREL INDUSTRIES LTPC
3 0 0 3****UNIT I****18**

Costing - concepts; classification of costs; preparation of cost sheet; costing of yarn, fabric and garment; cost profit volume analysis, breakeven analysis

UNIT II**9**

Depreciation – method of computing depreciation; techniques of investment analysis - payback period method, accounting rate of return, Discounted Cash Flow methods - IRR, NPV, PI

UNIT III**5**

Capital structure; Sources and cost of capital; working capital management

UNIT IV**13**

Tools for financial analysis and control- profit and loss account, balance sheet; financial ratio analysis - illustrations from textile unit

TOTAL : 45 PERIODS**REFERENCES**

1. Pandey I. M., "Financial Management", Vikas Publishing House Pvt. Ltd., New Delhi, 8th Edition, 1999
2. Bhavé P.V. and Srinivasan V., "Costing Accounting to Textile Mills", ATIRA, Ahmadabad, 1976
3. Thukaram Rao M.E., "Cost and Management Accounting" New Age International, Bangalore, 2004
4. Thukaram Rao M.E., "Cost Accounting and Financial Management" New Age International, Bangalore, 2004
5. Prasanna Chandra, "Financial Management, Theory and Practice, Tata McGraw-Hill Publishing Company Ltd, 5th Edition, New Delhi, 2001
6. James C. Vanhorne, "Financial Management and Policy", Pearson Education Asia (Low Priced Edition) 12th Edition, 2002
7. Narang, G. B. S. and Kumar V., "Production and Costing", Khanna Publishers, New Delhi, 1988
8. Aswat Damodaran, "Corporate Finance Theory and Practice", John Wiley & Sons, 2000
9. Hrishikes Bhattacharya, "Working Capital Management, Strategies and Techniques", Prentice – Hall of India Pvt. Ltd., New Delhi, 2001
10. Khan and Jain, "Basic Financial Management and Practice", Tata McGraw Hill, New Delhi, 5th Edition, 2001

TT8653**TECHNOLOGY OF BONDED FABRICS****L T P C****3 0 0 3****UNIT I FUNDAMENTALS OF BONDED FABRICS****5**

Definitions and classification of bonded fabrics; fibres, fibre preparations and their characteristics for the production of bonded fabrics, uses; methods of bonded fabric production

UNIT II WEB FORMATION WITH STAPLE FIBRES**9**

Production of staple-fibre web by dry and wet methods; influence of web laying methods on fabric properties; quality control of web

UNIT III MECHANICAL, CHEMICAL AND THERMAL BONDING 13

Bonded fabric production by mechanical bonding - needling, stitching, water jet consolidation; Thermal Bonding technologies; Chemical bonding – Binder polymers and bonding technologies

UNIT IV POLYMER – LAID WEB AND FABRIC FORMATION 9

Manufacture of Spun bonded fabrics, fibre orientation in spun bonded fabrics and characterization of filament arrangement; Manufacture of Melt blown fabrics – fibre formation and its attenuation; Effect of processing parameters on fabric characteristics

UNIT V FINISHING AND APPLICATION OF BONDED FABRICS 9

Dry and Wet finishing; Characterisation, structure - property relationship in bonded fabrics; End uses of bonded fabrics

TOTAL : 45 PERIODS

REFERENCES

1. Lunenschloss J., Albrecht W. and David Sharp., “Nonwoven Bonded Fabrics”, Ellis Horwood Ltd., New York, 1985, ISBN: 0-85312-636-4
2. Mrstina V. and Feigl F., “Needle Punching Textile Technology”, Elsevier, New York, 1990
3. Dharmadhikary R. K., Gilmore T. F., Davis H. A. and Batra S. K., “Thermal Bonding of Nonwoven Fabrics”, Textile Progress, Vol.26, No.2, Textile Institute Manchester, 1995, ISBN: 1870812786
4. Jirsak O. and Wadsworth L. C., “Nonwoven Textiles”, Textile Institute, Manchester, 1999, ISBN: 0 89089 9788
5. Russell S., “Hand Book of Nonwovens”, Textile Institute, Manchester, 2004, ISBN: 1 85573 603 9
6. Chapman R., “Applications of Nonwovens in Technical Textiles”, Textile Institute, Manchester, 2010, ISBN: 1 84569 4376

**TT8611 TEXTILE CHEMICAL PROCESSING LAB L T P C
0 0 3 2**

LIST OF EXPERIMENTS

1. Desizing and scouring of cotton fabric.
2. Peroxide Bleaching of Cotton Yarn/Fabric.
3. Degumming of silk.

4. Identification of dyes
5. Dyeing of Cotton using Reactive dyes.
6. Dyeing of Cotton using Vat dye.
7. Dyeing of polyester using disperse dyes.
8. Dyeing of polyester and cotton blend
9. Determination of wash, light, perspiration and rubbing fastness of dyed fabrics.
10. Printing of cotton fabric by direct technique.
11. Determination of Whiteness and Yellowness index
12. Determination of K/S of dyed fabrics using Spectrophotometer
13. Water proof and Flame retardant finishing of cotton.
14. Resin and softener finishes.
15. Antimicrobial Finish Evaluation

TOTAL : 45 PERIODS

TT8661

FABRIC QUALITY EVALUATION LAB

L T P C

0 0 3 2

LIST OF EXPERIMENTS

Determination of

1. Fabric tensile strength
2. Fabric bursting strength
3. Fabric tear strength
4. Fabric flexural rigidity and bending modulus
5. Drapability of fabrics
6. Fabric crease recovery
7. Fabric wrinkle recovery
8. Fabric abrasion resistance
9. Fabric pilling resistance
10. Fabric air permeability
11. Fabric compression and decompression characteristics
12. Fabric surface roughness and friction coefficient
13. Seam strength and seam slippage

TOTAL : 45 PERIODS

UNIT I GEOMETRY OF CLOTH STRUCTURE**10**

Geometry of Plain and Non-Plain weaves; Peirce and Olofsson models; crimp ratio and thread spacing; Jamming of threads; Crimp interchange; Balance of crimp.

UNIT II FABRIC DEFORMATION**10**

Fabric deformation under tensile stress; prediction of modulus; tensile properties in bias direction; other fabric deformation – compression, shear, bending and buckling; fabric handle; Spirality and skewness formation and its control.

UNIT III KNITTED FABRIC STRUCTURES**5**

Geometry of weft and warp knitted structures, influence of friction on knit geometry; load-extension of warp knit fabrics; biaxial stress behavior of plain-knit fabrics

UNIT IV NONWOVEN STRUCTURES**5**

Structure of felts; mechanical behavior of needle felts; structure of stitch bonded fabrics

TOTAL : 30 PERIODS**REFERENCES**

1. Hearle J. W. S., "Structural Mechanics of Fibers, Yarns and Fabrics", Wiley-Interscience, New York, 1969, ISBN: 0471366692
2. Hearle J. W. S., John J., Thwaites. and Jafargholi Amirbayat., "Mechanics of Flexible Fibre Assemblies", Sijthoff and Noordhoff, 1980, ISBN : 902860720X
3. Jinlian Hu., "Structure and Mechanics of Woven Fabrics", Woodhead Publishing Ltd., 2004, ISBN: 1855739046
4. Hassan M. Berery., "Effect of Mechanical and Physical Properties on Fabrics Hand", Wood head publishing Ltd., 2005, ISBN : 13: 978 – 1- 85573 -9185

UNIT I GEOMETRY OF TWISTED YARNS**6**

Idealized helical yarn structure; yarn count and twist factors, twist contraction; Limits of twist.

UNIT II	PACKING OF FIBERS IN YARNS	6
Idealized packing; measurement of packing density and radial packing density of yarn; Packing in actual yarns; Specific volume of yarns; measurement of yarn diameter.		
UNIT III	FIBRE MIGRATION	6
Ideal migration, tracer fiber technique, characterization of migration behavior, migration in spun yarns, mechanisms of migration, effect of various parameters on migration behavior.		
UNIT IV	MECHANICS OF CONTINUOUS FILAMENT YARNS	6
Analysis of tensile behavior; prediction of breakage; analysis of yarn modulus by energy method; observed extension and breakage of continuous filament yarns;		
UNIT V	MECHANICS OF STAPLE FIBRE YARNS	6
Theoretical analysis of tensile behaviour; deduction based on fiber obliquity and slippage; influence of fiber length, fineness and friction on tensile behaviour; strength prediction model for blended yarns.		
		TOTAL : 30 PERIODS

REFERENCES

1. Hearle J. W. S., "Structural Mechanics of Fibers, Yarns and Fabrics", Wiley-Interscience, New York, 1969, ISBN: 0471366692
2. Hearle J. W. S., John J., Thwaites. and Jafargholi Amirbayat., "Mechanics of Flexible Fibre Assemblies", Sijthoff and Noordhoff, 1980, ISBN : 902860720X
3. Goswami B. C., "Textile Yarns: Technology, Structure and Applications", Wiley-Interscience, New York, 1977, ISBN: 0471319007

TT8703	TECHNICAL TEXTILES	L T P C
		3 0 0 3

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

UNIT II**9**

Design and characteristics required in textiles for medical and hygiene applications – antimicrobial, disposable and reusable products; Textiles in sports wear

UNIT III**13**

Design and characteristics of home textiles; Garment design and choice of materials in protection from hazards due to mechanical, extreme climate, nuclear, biological, chemical and flame

UNIT IV**14**

Use of geo textiles in filtration, drainage, separation and reinforcement application in construction; Type of fibre and fabric to be used in such applications; evaluation of geo textiles; use of textile materials in permanent and temporary civil construction - tents, awnings, sound and thermal insulation

TOTAL : 45 PERIODS**REFERENCES**

1. Anand S.C., "Medical Textiles", Textile Institute, Manchester, 2001, ISBN:185573494X
2. Mukhopadhyay S.K. and Partridge J.F., "Automotive Textiles", Textile Progress, Vol.29, No1/2, 1999, ISBN:1870372212
3. Horrocks A.R. and Anand S.C., "Handbook of Technical Textiles", The Textile Institute, Manchester, 2000, ISBN: 1855733854
4. Adanur S., "Wellington Sears Handbook of Industrial Textiles", Technomic Publishing Co. Inc., 1995, ISBN : 1-56676-340-1
5. Scott.R.A., "Textiles for Protection", Wood head Publishing Limited, Cambridge, UK, 2005, ISBN 1-85573-921-6
6. Saville.B.P, "Physical Testing of Textiles", Woodhead Publishing Limited, Cambridge, UK, 1999, ISBN 1-85573-367-6
7. Long.A.C, "Design and Manufacture of Textile Composites", Wood head Publishing Ltd, Cambridge, UK, 2005, ISBN 1-85573-744-2
8. Fung.W, "Coated and Laminated Textiles", Wood head Publishing Ltd., Cambridge, UK, 2002, ISBN 1-85573-576-8
9. Anand.S.C, Kennedy.J.F, Miraftab.M and Rajendran.S., "Medical Textiles and Biomaterials for Health Care", Wood head Publishing Ltd, Cambridge, UK, 2006, ISBN 1-85573-683-7
10. Fung.W and Hardcastle, "Textiles in Automotive Engineering", Wood head Publishing Ltd., Cambridge, UK, 2001, ISBN 1-85573-493-1

11. John.N.W.M, "Geo Textile", Blackie and Sons Ltd., London, UK., 1987, ISBN 0-412-01351-7

TT8751

CLOTHING COMFORT

L T P C
3 0 0 3

UNIT I

9

Comfort – types and definition; human clothing system, comfort perception and preferences

UNIT II

9

Thermo physiological comfort – thermoregulatory Mechanisms of the Human Body, role of clothing on thermal regulations

UNIT III

9

Heat and moisture transfer – moisture exchange, wearer's temperature regulations, effect of physical properties of fibres, behavior of different types of fabrics

UNIT IV

9

Psychological comfort; neuro physiological comfort - basis of Sensory Perceptions, measurement techniques - Mechanical Stimuli and thermal stimuli.

UNIT V

9

Fabric tactile and mechanical properties - fabric prickliness, itchiness, stiffness, softness, smoothness, roughness, and scratchiness. Predictability of clothing comfort performance

TOTAL : 45 PERIODS

REFERENCES

1. Hassan M. Behery, "Effect of Mechanical and Physical Properties on Fabric Hand", Wood head Publishing Ltd.,
2. Y. Li, "The Science of Clothing Comfort", Textile Progress 31:1
3. R.M.Laing, G.G. Sleivert, "Clothing, Textile and Human Performance, Textile Progress, 32:2

UNIT I **9**

Scope of operation research, applications, limitations; linear programming problems – construction, solutions by graphical method, simplex method, Big M method; sensitivity analysis; application of LP technique for mixing optimization in spinning mill

UNIT II **9**

Transportation problem – construction, initial basic feasible solution – North West Corner rule, lowest cost entry method, Vogel's Approximation Method; optimality test - MODI method, stepping stone method; replacement analysis

UNIT III **9**

Assignment problem – construction, solution by Hungarian method, application in textile industry; sequencing problems; integer programming – construction, solving by cutting plane method

UNIT IV **9**

Game theory- two person zero sum games, solving by matrix method, graphical method; Decisions theory - decisions under assumed certainty, decision under risk, decision under uncertainty, illustrations from textile industry; inventory control - EOQ models-deterministic models –probabilistic models

UNIT V **9**

Project planning and control models: CPM, PERT – network representation, determining critical path, project duration; crashing of project duration; resource leveling

TOTAL : 45 PERIODS

REFERENCES

1. Hillier and Lieberman, "Introduction to Operations Research", McGraw-Hill International Edition, Seventh Edition, 2001
2. Hamdy A Taha, "An Introduction to Operations Research, Prentice Hall, 8th Edition.
3. W.J. Fabrycky, P.M. Ghare & P.E. Torgersen, "Applied Operation Research and Management Science", Prentice Hall, New Jersey, 1984
4. Panneerselvam R., "Operations Research", Prentice Hall of India, 2002

5. Tulsian P.C., "Quantitative Techniques Theory and Problems", Dorling Kindersley (India) Pvt. Ltd., 2006
6. Ronald L. Rardin, "Optimization in Operations Research", Pearson Education, 1998
7. Srivastava U.K., Shenoy G.V., Sharma S. C., "Quantitative Techniques for Managerial Decision", Second Edition, New Age International (P) Ltd., 2007
8. Gupta P. K., Hira D.S., "Problems in Operations Research", S. Chand & Company, 2002
9. Mustafi C.K., "Operations Research: Methods and Practice", 3rd Edition, New Age International (P) Ltd., 2007
10. Sharma J. K., "Operations Research: Theory and Applications", Macmillan, 1997

TT8753 TOTAL QUALITY MANAGEMENT FOR TEXTILE INDUSTRY L T P C
3 0 0 3

UNIT I INTRODUCTION 9

Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of product and service quality - Basic concepts of TQM – TQM Framework - Contributions of Quality Gurus – Barriers to TQM – Cost of Quality.

UNIT II TQM PRINCIPLES 9

Quality statements - Customer focus –Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Continuous process improvement – PDCA cycle, 5S, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS & TECHNIQUES I 9

The seven traditional tools of quality – New management tools – Six-sigma: Concepts, methodology, applications to spinning, weaving, chemical processing and garment industries – Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages, Types

UNIT IV TQM TOOLS & TECHNIQUES II 9

Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Performance measures – BPR; application of TQM tools in textile industry.

UNIT V QUALITY SYSTEMS 9

Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, Quality auditing- QS 9000 – ISO 14000 – Concepts, Requirements and Benefits - Quality Council

– Leadership, Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward.

TOTAL : 45 PERIODS

REFERENCE BOOKS

1. Dale H.Besterfield, et al., “Total Quality Management”, Pearson Education Asia, Third Edition, Indian Reprint , 2006.
2. James R. Evans and William M. Lindsay, “The Management and Control of Quality”, (6th Edition), South-Western (Thomson Learning), 2005.
3. Oakland, J.S. “TQM – Text with Cases”, Butterworth – Heinemann Ltd., Oxford, Third Edition , 2003.
4. Suganthi,L and Anand Samuel, “Total Quality Management”, Prentice Hall (India) Pvt. Ltd., 2006 .
5. Janakiraman,B and Gopal, R.K, “Total Quality Management – Text and Cases”,Prentice Hall (India) Pvt. Ltd., 2006.

TT8001

CHARACTERISATION OF POLYMERS

L T P C

3 0 0 3

UNIT I MOLECULAR WEIGHT

9

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

UNIT II MOLECULAR STRUCTURE CHARACTERISATION

9

Infrared, NMR, UV –visible, raman spectroscopy, mass spectroscopy

UNIT III THERMAL PROPERTIES

9

Thermal properties by differential scanning calorimetry, differential thermal analysis, thermo gravimetry, thermo-mechanical analyzer, dynamic mechanical and di-electric analysis

UNIT IV CHROMATOGRAPHIC TECHNIQUES

9

Chromatographic techniques – adsorption chromatography – TLC, GC, LC – HPLC, GPC – hyphenated techniques

UNIT V OTHERS**9**

Optical and electron microscopy; SEM, TEM, X-ray scattering from polymers, birefringence, crystallinity by density measurements,

TOTAL : 45 PERIODS**REFERENCES**

1. Gupta V.B. and Kothari V.K., "Man Made Fibre Production," Chapman and Hall, 1985
2. Bill Mayer, "Textbooks of Polymer Science," 3rd ed., Wiley, 1984
3. Sperling, "Introduction to Physical Polymer Science," Wiley, 1986
4. Campell D. and White J.R., "Polymer characterization, Physical Techniques", McGraw – Hill, New York, 1969
5. Stamm M., "Polymer Surfaces and Interfaces", Springer 1st Ed., 2008

TT8002**COATED TEXTILES****L T P C****3 0 0 3****UNIT I****9**

Rubber—Natural and Synthetic- Polyvinyl Chloride- Polyurethanes-Acrylic Polymers-Adhesive Treatment-Radiation-Cured Coatings Materials and Trends- Textile Fibers- Spinning- Woven Fabrics- Knitted Fabrics, Nonwoven Fabrics

UNIT II**9**

Rheological Behavior of Fluids- Rheology of Plastics-Hydrodynamic Analysis of Coating, Clothing Comfort- Impermeable Coating-Breathable Fabrics

UNIT III**9**

Coating Features -Methods of Coating- Knife Coating- Roll Coating-Dip Coating-Transfer Coating- Rotary Screen Printing- Calendering-Hot-melt Coating, General Characteristics- Tensile Strength- Elongation- Adhesion- Tear Resistance-Weathering Behavior-Microbiological Degradation-Yellowing

UNIT IV**9**

Synthetic Leather, Architectural Textiles, Fluid Containers, Tarpaulins, Automotive Air Bag Fabrics, Carpet Backing-Textile Foam Laminates for Automotive Interiors, Flocking, Fabrics for Chemical Protection-Thermochromic Fabrics, Temperature Adaptable Fabrics, Camouflage Nets Metal and Conducting Polymer-Coated Fabrics.

UNIT V**9**

Test methods for coated fabric evaluation; environmental norms for the chemicals used in coating industry.

TOTAL : 45 PERIODS**REFERENCES**

1. Sen A.K., "Coated Textiles: Principles and Application", Technomic Publication, U.S.A., 2001
2. W. C. Smith, "Journal of Coated Fabrics", Vol. 15, Jan., 1986, pp. 180–197
3. Mary Jo Waters, "Laboratory Methods for Evaluating Protective Clothing System Against Chemical Agents", Report no. CRDC-SP 84010, CRDC, Aberdeen Proving Ground, MD, U.S.A, 1984

TT8003**HIGH PERFORMANCE FIBERS****L T P C****3 0 0 3****UNIT I LINEAR POLYMER FIBRES****9**

Aramid fibres - Polymer preparation, Spinning, Structure and properties and applications. Polyethylene fibres – Manufacture, Fibre characteristics, Properties, Yarn and fabric processing and applications.

UNIT II CARBON FIBRE**9**

Manufacture of PAN-based, Pitch-based carbon fibres; physical properties and applications.

UNIT III GLASS AND CERAMIC FIBRES**9**

Glass fibres - Fibre manufacture; fibre properties; glass-fibre composites and other applications. Manufacture of ceramic fibres; Silicon carbide-based fibres, other non-oxide fibres, Alumina-based fibres, other polycrystalline oxide fibres, Single-crystal oxide fibres

UNIT IV CHEMICAL AND THERMAL RESISTANCE FIBRES**9**

Chlorinated fibres, fluorinated fibres, Polyetheretherketones, Polyphenylenesulphide, Polyetherimide, properties and applications. Thermoplastic and thermoset polymers, aromatic polyamides and polyaramids, semicarbon fibres, Polybenzimidazole.

UNIT V SPECIALITY FIBRES**9**

Speciality fibres - Hollow and profile fibres; blended and bi-component fibres; super absorbent fibres; film fibres

TOTAL : 45 PERIODS**REFERENCES**

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

TT8004**LONG STAPLE SPINNING TECHNOLOGY****L T P C****3 0 0 3****UNIT I FIBRE CLEANING AND BLENDING****5**

Impurities in the long-staple fibre like wool and their removal; methods adopted to process raw flax and jute; blending methods followed for long staple fibres

UNIT II FIBRE INDIVIDUALISATION**9**

Fibre individualization in the carding machine; working principle and details of different type of carding machine-worsted carding, semi –worsted carding, woolen carding, flax carding and jute carding; card clothing and its maintenance; carding performance

UNIT III COMBING**9**

Objective of combing; basic principles of combing; details of wool combing preparation and combing operation; worsted top finishing

UNIT IV DRAWING**9**

Principle of long-staple drafting; effect of doubling; drafting irregularities; working details of worsted, semi worsted, jute and flax drawing; operating principle of roving machine

UNIT V YARN SPINNING**13**

Mule spinning –drafting, twisting, backing-off, winding on; description of centrifugal spinning; flyer spinning; ring spinning – twisting, rings and ravelers; condenser yarn spinning; cap spinning; open end spinning –general features of rotor and friction spinning as applicable to long-staple fibres; double-rove spinning; self twist spinning system

TOTAL : 45 PERIODS**REFERENCES**

1. Oxtoby E., “Spun Yarn Technology”, Butterworths, London, 1987
2. Happey F., “Contemporary Textile Engineering”, Academic Press, London, 1983
3. Lord P.R., “Yarn Production: Science, Technology and Economics”, The Textile Institute, Manchester, 1999
4. Ross D.A., Carnaby G.A and Lappage J., “Woollen Yarn Manufacture”, Textile Progress, The Textile Institute, Manchester, 1986
5. Richards R.T.D. and Sykes A.B., “Woollen Yarn Manufacture”, The Textile Institute, Manchester, 1994
6. Henshaw D.E., “Worsted Spinning”, Textile Progress, The Textile Institute, Manchester, 1981

TT8005**MEDICAL TEXTILES****L T P C****3 0 0 3****UNIT I****9**

Polymers and Textile-based techniques used for medical applications, Cell-Polymer interaction.

UNIT II**9**

Non-implantable materials: Wound-dressing, related hydrogel and composite products, Bandages, Gauges, Implantable biomedical devices: Vascular grafts, Sutures, Heart valves.

UNIT III**9**

Extra-corporeal materials: Scaffolds for Tissue engineering, Rapid prototyping , Cartilages, Liver, Blood Vessel, Kidney, Urinary bladder, Tendons, Ligaments, Cornea,

UNIT IV**9**

Healthcare and hygiene products: Surgical Gowns, masks, wipes, Antibacterial Textiles, Super absorbent polymers.

UNIT V**9**

Safety, Legal and ethical issues involved in the medical textile materials

TOTAL : 45 PERIODS**REFERENCES**

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
4. Anand S., “ Medical Textiles”, Textile Institute, 1996, ISBN: 185573317X
5. Horrocks A.R. and Anand S.C., “Technical Textiles”, Textile Institute, 1999, ISBN: 185573317X
6. Adanur S., “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., Lancaster Pennsylvania, 1995, ISBN 1-56676-340-1
7. Michael Szycher and Steven James Lee, “Modern Wound Dressing: A Systematic Approach to Wound Healing”, Journal of Biomaterials Applications, 1992

TT8006**TEXTILE COSTING****L T P C****3 0 0 3****UNIT I****9**

Cost accounting, elements of cost, classification of cost elements – examples from textile industry, methods of costing

UNIT II**5**

Cost profit volume analysis, breakeven analysis; standard costing, analysis of variance

UNIT III**17**

Costing of yarn – material, labour, power and overhead expenses, cost of fabric; costing of garment

UNIT IV **9**
Foreign exchange mechanisms, exchange rates; foreign exchange exposure management – risks, strategies to reduce risk

UNIT V **5**
Budget, types of budgets, budgeting and control in apparel industry

TOTAL : 45 PERIODS

REFERENCES

1. “Cost accounting for textile mills”, ATIRA, Ahmadabad, 1974
2. Kantwala, D.N., “Costing and Cost Control – A Marginal Approach for Textile Industry”, Texcons, Bombay, 1974
3. James C., Van Home., “Financial Management and Policy”, Prentice Hall of India Pvt. Ltd, New Delhi, 1980
4. Bhave P.V. and Srinivasan V., “Costing Accounting to Textile Mills”, ATIRA, Ahmadabad, 1976
5. Thukaram Rao M.E., “Cost and Management Accounting” New Age International, Bangalore, 2004
6. Thukaram Rao M.E., “Cost Accounting and Financial Management” New Age International, Bangalore, 2004.

TT8007 **TEXTILE REINFORCED COMPOSITES** **L T P C**
3 0 0 3

UNIT I INTRODUCTION **9**
Fiber reinforced polymers materials, properties; Resins - Thermoset and Thermo plastics / additives release agents; Composite material classification and its properties: Reinforcement – matrix interface watability.

UNIT II PREPREGS AND PREFORMS **9**
Introduction -→ manufacturing techniques - property requirements - Textile preforms - weaving, knitting and braiding. Geometrical Aspects: Fiber orientation, Volume fraction, weight fraction and voids.

UNIT III	TECHNIQUES FOR MANUFACTURE OF COMPOSITES	13
Introduction → manufacturing processes – open mould process, closed mould process and continuous process. Metal matrix composites, Ceramic matrix composites - types-importance and processing.		
UNIT IV	MECHANICAL PROPERTIES OF TEXTILE COMPOSITES	9
Testing of Reinforced Plastics – Tensile, flexural, Impact, Interlaminar shear and compression properties.		
UNIT V	APPLICATION OF POLYMER COMPOSITES	5
Composites application in aerospace, construction industry, and sports products. electrical, Polymer composite for biomedical and vibration damping.		

TOTAL : 45 PERIODS

REFERENCES

1. Leonard Hollaway, "Handbook of Polymer Composites for Engineering", Wood head Publishing limited, 2007
2. Long A C, "Design and Manufacture of Textile Composites", Wood head Publishing limited, 2005
3. White J R, and De S K, "Short Fiber-Polymer Composites", Wood head Publishing limited, 1996
4. George Lubin, "Handbook of Fiberglass and Advanced Plastics Composites", Van Nostrand Reinhold Company, New York, 1969

TT8071	COLOUR SCIENCE	L T P C
		3 0 0 3

UNIT I	LIGHT-MATTER INTERACTION	9
The electromagnetic spectrum – the optical region, interaction of light with matter a) Transparent case – Beer's Law and Lambert's Law b) Opaque case – reflection absorption and scattering, the concept of "Radiative Transfer Theory" and its simplification into the Kubelka – Munk model.		
UNIT II	HUMAN COLOUR VISION	9
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.

UNIT III COLOUR ORDER SYSTEMS 9

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.

UNIT IV NUMERICAL COLOUR MATCHING 9

Reflectance and K/S value, relationship between dye concentrations and a) reflectance values and b) 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

UNIT V METAMERISM AND COLOUR DIFFERENCE ASSESSMENT 9

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.

TOTAL : 45 PERIODS

REFERENCES

1. Wright W.D., "The Measurement of Colour", Adam Hilger Ltd., 1969
2. Sule A.D., "Computer Colour Analysis", New Age International Publishers, 2002
3. Shah H.S. and Gandhi R. S., "Instrumental Colour Measurement and Computer Aided Colour Matching for Textiles", Mahajan Book Publication, 1990
4. Park J., "Instrumental Colour Formulation: A Practical Guide", Wood head Publishing, 1993, ISBN 0 901956 54 6
5. Kuehni R.G., "Computer Colorant Formulation", Lexington Books, 1975, ISBN 0-669-03335-9
6. Choudhury A. K. R., "Modern Concepts of Colour and Appearance", Oxford and IBH Publishing Ltd., 2000
7. McLaren K., "The Colour Science of Dyes & Pigments", Adam Hilger Ltd., 1983, ISBN 0-85274-426-9
8. D. Travis, "Effective Colour Displays", Academic Press, 1991, ISBN 0-12-697690-2

UNIT I**9**

Enterprise Resource Planning - principle, framework, application and suitability in garment production

UNIT II**9**

Client/Server architecture; technology choices; SCM, CRM – concepts, Business Process Re engineering, Data ware Housing, Data mining

UNIT III**9**

ERP system packages - SAP, Oracle People soft, BAAN; integration of different ERP applications; integrated Ecommerce, ERP and internet applications.

UNIT IV**9**

ERP implementation strategies – organizational and social issues, data safety & security, ERP implementation in a garment production facility

UNIT V**9**

ERP procurement issues – market trends – outsourcing ERP – economics – hidden cost issues, ROI

TOTAL : 45 PERIODS**REFERENCES**

1. Brady, "Enterprise Resource Planning", Thomson Learning, U. K., 2001
2. Alexis Leon, "ERP Demystified", Tata McGraw–Hill Publishing Company limited, New Delhi, 2002
3. Sadagopan. S., "ERP-A Managerial Perspective", Tata McGraw-Hill, New Delhi, 2001
4. Jose Antonio Hernandez, "The SAP R/3 Handbook", Tata McGraw-Hill, New Delhi, 2001
5. Vinod Kumar Crag and Bharat Vakharia, "Enterprise Resource Planning Strategy", Jaico Publishing house, Mumbai, 1999
6. Garg and Venkitakrishnan, "ERPWARE, ERP Implementation Framework", Prentice Hall of India, New Delhi, 1999
7. Vinod Kumar Grag and Venkitakrishnan N.K., "Enterprise Resource Planning", Prentice Hall of India, New Delhi, 2001

UNIT I **9**

Human resource development systems - The Indian society in transition, understanding the concepts of HRD past, present and future , strategies adopted, structure, objectives and working of the HRD system in India and abroad , role of HR managers in textile and apparel industries.

UNIT II **9**

Human resource planning – objectives of planning on the macro level, demand forecasting of HR planning, MIS in HR planning ,future skill mapping, human resource outsourcing, recruitment and processes involved in textile and apparel industries, induction ; training objectives, methods, carrier planning, performance and potential appraisal.

UNIT III **9**

Job - analysis, description, evaluation, enrichment; Performance measurement- objectives, methods, multi-skill development, motivation. Organised labour, understanding groups, development, cohesion, alienation, group work behaviour & managing international work force.

UNIT IV **9**

Compensation, wage policy, industrial pay-structure, types, components, laws and methods of payment; methods of wage fixation in a textile mill and apparel units; laws governing employee benefits and welfare, incentives, overtime, bonus, cost to the company.

UNIT V **9**

Different Acts governing labour welfare and employment; employee discipline- disciplinary actions, procedures, suspension, dismissal and retrenchment, roll of trade unions, collective bargaining, industrial democracy and workers participation in management, related case studies.

TOTAL : 45 PERIODS

REFERENCES

1. Decenzo and Robbins, "Human Resource Management", Wiley, 8th Edition, 2007
2. Dessler, "Human Resource Management", Pearson Education Limited, 2007

2. Taha H.A., "Operations Research: An Introduction", Prentice Hall of India, New Delhi, 1997
3. Adam Jr. E.E. and Elber R.J., "Production and Operations Management", Prentice Hall of India, New Delhi, 1997
4. Chary S.N., "Production and Operations Management", Tata McGraw-Hill, New Delhi, 1988
5. Narasimhan S.L., Mcleavy, D.W. and Billington P.J., "Production Planning and Inventory Control", Prentice Hall of India, New Delhi, 1997
6. Grant Ireson., "Factory Planning & Plant Layout", Prentice Hall, New Jersey, 1952

TT8075

SUPPLY CHAIN MANAGEMENT FOR TEXTILE INDUSTRY

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

UNIT I

9

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

UNIT II

9

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 and finalisation.

UNIT III

9

Distribution network and design for global textile and apparel products, models of distribution – facility location and allocation of capacity, uncertainty on design and network optimisation; the 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.

UNIT IV

9

Coordination in supply chain- the bullwhip effect, forecasting, obstacles to coordination in supply chain; supply chain management for apparel retail stores, high fashion fad; supply chain in e-business and b2b practices

UNIT V**9**

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

TOTAL : 45 PERIODS**REFERENCES**

1. Janat Shah, "Supply Chain Management – Text and Cases", Pearson Education, 2009
2. Sunil Chopra and Peter Meindl, "Supply Chain Management-Strategy Planning and Operation", PHI Learning / Pearson Education, 2007
3. David Simchi-Levi, Philip Kaminsky, Edith Simchi-Levi, "Designing and Managing the Supply Chain: Concepts, Strategies, and Cases", Tata McGraw-Hill, 2005
4. Altekar Rahul V, "Supply Chain Management-Concept and Cases", PHI, 2005

TT8076**TEXTILE AND APPAREL EXIM MANAGEMENT****L T P C****3 0 0 3****UNIT I****5**

International markets for yarns, woven fabrics; international market for cotton, silk, jute, wool and other fibres; export and import of textiles by India – current status, promotional activities

UNIT II**5**

International markets for carpets and home textiles – product types, market potential and statistics, India - current status and promotional activities, role of export promotional councils

UNIT III**9**

International markets for woven piece goods, knitted garments, leather garments; statistics of international apparel market and trade; export incentives, role of AEPC, CII, FIEO, Textile Committee

UNIT IV**13**

Marketing – strategies, global brand building; logistics & SCM; role of export finances & EXIM banking, ECGC, Indian council of arbitration, FERA; impact of foreign trade on Indian economy

UNIT V**13**

Exim policy - customs act, acts relating to export/import of textile and apparel; Indian customs formalities - export documentation for excisable goods, import documentation, clearance of import goods; concepts - 100% export oriented units, export processing zones, special economic zones; duty drawback procedure; import/export incentives; licenses; case study

TOTAL : 45 PERIODS**REFERENCES**

1. Charles W.I. Hill and Arun Kumar Jain, "International Business", 6th edition, Tata Mc Graw Hill, 2009
2. John D. Daniels and Lee H. Radebaugh, "International Business", Pearson Education Asia, New Delhi, 2000
3. K. Aswathappa, "International Business", Tata Mc Graw Hill, 2008
4. Michael R. Czinkota, Ilkka A. Ronkainen and Michael H. Moffet, "International Business", Thomson, Bangalore, 2005
5. Aravind V. Phatak, Rabi S. Bhagat and Roger J. Kashlak, "International Management", Tata Mc Graw Hill, 2006
6. Oded Shenkar and Yaong Luo, "International Business", John Wiley Inc., Noida, 2004
7. Datey V.S., "Taxmann's Indirect Taxes", Taxmann Publications, 2008
8. Kapoor D.C., "Export Management", Vikas Publishing House Pvt. Ltd., 2009
9. Govindan N.S., "Indirect Taxes Made Easy", C.Sitaram & Co. Pvt.,

GE8751**ENGINEERING ETHICS AND HUMAN VALUES****L T P C****3 0 0 3****UNIT I HUMAN VALUES****10**

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality.

UNIT II ENGINEERING ETHICS**9**

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories

UNIT I**13**

An overview on smart textiles, electrically active polymers materials- application of non ionic polymer gel and elastomers for artificial muscles. Heat storage and thermo regulated textiles and clothing, Thermally sensitive materials, Cross – linked polymers of fiber substrates as multifunctional and multi use intelligent material . Mechanical properties of fiber bragg gratings, optical responses of FBG (Fiber Bragg grating) sensors under deformation. Smart textile composites integrated with optic sensors.

UNIT II**9**

Adaptive and responsive textile structures, bioprocessing for smart textiles and clothing, Tailor made intelligent polymers for biomedical application

UNIT III**11**

Smart fabrics – passive, active, very smart – classification of smart materials, concept of wearable computing, basic structure of fabric used for integrating different electronic sensors

UNIT IV**12**

Smart Interactive garments for combat training, for hospital and patient care, smart garments in sports and fitness activities, smart garments for children, smart home textiles.

TOTAL : 45 PERIODS**REFERENCES**

1. Edited by Sanjay Gupta, “Smart Textiles their Production and Marketing Strategies”, NIFT, New Delhi, 2000
2. William C. Smith, “Smart Textile Coating and Laminates”, Wood Head Publishing Series in Textiles, UK, 2010, ISBN 978-1-84569-379-4
3. X M Tao, “Smart Fibers, Fabrics and Clothing Fundamentals and Application”, Wood Head Publishing Ltd., October 2001, ISBN 1 855735466
4. J. Mccann, D. Bryson, “Smart Clothes and Wearable Technology”, Wood Head Publishing Series in Textiles, UK, 2010, ISBN-10: 1845693574

UNIT I FABRIC INSPECTION AND SPREADING MACHINES 9

Fabric inspection devices – manual and automatic – modes of fabric feeding, fabric tension controller and modern developments; Spreading machines – manual, semi automatic and fully automatic machines, fabric control devices in spreading machines

UNIT II CUTTING MACHINES 9

Mechanism of straight knife cutting machines, rotary cutting machines, band knife cutting machines, die cutting, laser cutting, plasma cutting, water jet cutting and ultra sonic cutting; Notches, drills and thread markers; Computer interfaced cutting machines.

UNIT III SEWING MACHINES 9

Sewing machines – primary and secondary components; Working principle, stitch formation and timing diagram - lock stitch and chain stitch; single needle and double needle lock stitch mechanism: needle bar, hook – rotary and feed mechanism; Needles – geometry, types and selection

UNIT IV SPECIAL SEWING MACHINES 9

Over lock, Flatlock, Feed off arm, button fixing and button holing; Embroidery machines – mechanism and stitch formation; Sewing machines feed mechanisms; sewing machine attachments

UNIT V FINISHING MACHINES 9

Molding machineries; Shrinking machineries – London shrinking, hot-water shrinking, steam sharking and compaction shrinkage; Pressing machineries – buck pressing, iron pressing, block or die pressing, form pressing, steamers and advanced pressing machineries; Pleating – principles and mechanics machineries

TOTAL : 45 PERIODS**REFERENCES**

1. Harold Carr & Barbara Iatham, "The Technology of Clothing Manufacture", Blackwell Sciences, 1996
2. Jacob Solinger., "Apparel Manufacturing Handbook", VanNostrand Reinhold Company, 1980
3. Ruth E. Glock and Grace I. Kunz, "Apparel Manufacturing Sewn Product Analysis", Pearson Prentice Hall, 2005

UNIT I**9**

Garment components and trimmings – labels and motifs, linings, interlining wadding, lace, braid and elastic, seam binding and tape, shoulder pads, eyelets and laces, zip fasteners, buttons – tack buttons, snap fastener and rivets; buckles, frag closures, belts, ribbons, fringe, emblems and sequins, decorative and functional trimmings; performance properties of components and trims.

UNIT II**9**

Hook and loop fastening (Velcro), Zippers – anatomy of zipper, types, function of zipper, position of slider, standards on zipper, selection of zipper, application of zipper, shortening of zipper; evaluation of quality of accessories

UNIT III**9**

Embroideries - basic embroidery stitches – chain stitch, button hole stitch, herringbone stitch, feather stitch, lazy daisy, double knot stitch, interlacing stitch, stem stitch, French knot stitch, types of embroidery machines, limitations of hand embroidery; kaustic embroidery; kasida, kathiwar; Sind; chickankari; zardosai; tribal embroideries.

UNIT IV**9**

Fashion accessories – footwear, handbags, gloves, hats, scarves, hosiery, jewelry, watches; testing of zippers, elastic waist band testing, fusible interlinings; safety issues for different accessories in children garment.

UNIT V**9**

Printing – introduction; different methods – block printing, roller, screen, discharge, resist and pigment; styles of printing - batik, tie and dye, patch work, appliqué work, bead work

TOTAL : 45 PERIODS**REFERENCES**

1. Shailaja D. Naik, "Traditional Embroideries of India", API Publishing Corporation, New Delhi, 1996
2. Shella Paine, "Embroidered Textiles", Thames and Hudson Ltd., U. S. A., 1990

UNIT I**9**

Sewing thread – requirements and characteristics - sewability of the thread, seam efficiency index, tensile properties, abrasion resistance, friction, heat resistance, shrinkage, snarling tendency. fastness, mass evenness.

UNIT II**18**

Types of sewing thread – spun threads, core spun threads, filament threads; sewing thread production method; characteristics and application of high performance sewing threads - aramid threads, ceramic threads, polypropylene threads, polyethylene threads, polytetrafluoroethylene threads, fiberglass threads, other sewing threads – tencel, acrylic, linen, elastic, soluble; embroidery threads.

UNIT III**9**

Ticket number in sewing threads; testing of sewing threads – physical and chemical properties; sewing performance – control of missing stitches and seam puckering, factors affecting seam strength.

UNIT IV**9**

Selection of sewing thread for different end uses

TOTAL : 45 PERIODS**REFERENCES**

1. Rao J.V and Rajendra Kr. Gaur “Sewing Threads: Technology, Stitches, Seams, Problems, Needles”, NITRA, 2006
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
5. Jacop Solinger, “Apparel Manufacturing Hand Book”, Litton Educational Publishing, 1980

UNIT I**5**

Industrial Engineering - evolution, functions, role of industrial engineer

UNIT II**13**

Methods study – introduction, techniques of recording; method analysis techniques; principles of motion economy; method study in garment manufacture; ergonomics- importance, workplace design, fatigue

UNIT III**13**

Work measurement – introduction; time study – equipment and procedure; standard data; predetermined time standards; work sampling techniques; incentive wage system; work measurement applied to garment industry

UNIT IV**5**

Site selection for textile industry; plant layout - types of layouts suitable for textile industry, methods to construct layout; line balancing

UNIT V**9**

Statistical Process Control – data collection; concept of AQL, control charts in quality control; process capability

TOTAL : 45 PERIODS**REFERENCES**

1. Khanna O. P. and Sarup A., "Industrial Engineering and Management", Dhanpat Rai Publications, New Delhi, 2005
2. Norberd Lloyd Enrick, "Industrial Engineering Manual for Textile Industry", Wiley Eastern (P) Ltd., New Delhi, 1988
3. George Kanwaty, "Introduction to Work Study ", ILO, Geneva, 1989
4. Enrick N. L., "Time study manual for Textile industry", Wiley Eastern (P) Ltd., 1989
5. Chuter A. J., "Introduction to Clothing Production Management", Black well Science, U. S. A., 1995
6. Richard I. Levin. and David S. Rubin., "Statistics for Management", 7th Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 1997

7. David M. Levine, Timothy C. Krehbiel and Mark L. Berenson., "Business Statistics: A First Course", Pearson Education Asia, New Delhi, 2nd Edition, 2000
8. Panneerselvam R., "Production and Operation Management", Prentice Hall of India, 2002
9. Edward S. Buffa and Rakesh Sarin., "Modern Production and Operations Management", John Wiley & Sons, U. S. A., 1987
10. Lee J. Krajewski and Larry P. Ritzman., "Operations Management: Strategy and Analysis", Addison Wesley, 2000
11. Chase, Aquilano and Jacobs., "Production and Operations Management", Tata McGraw-Hill, New Delhi, 8th Edition, 1999

AT8652

PROTECTIVE GARMENTS

L T P C

3 0 0 3

UNIT I FIBRES, YARNS AND FABRICS FOR PROTECTIVE GARMENTS 9

Characteristic requirements of fiber, yarn and fabric for flame proof, heat resistant, ballistic resistance, electrical conduction, bacterial protection, radiation protection and radiation contamination protection

UNIT II CHEMICAL FINISHES FOR PROTECTIVE FABRICS 9

Mechanism, Chemistry, Materials and methods - Flame retardant, Liquid repellent, Antistatic, Antibacterial, UV protection and mite protection finishes

UNIT III PROTECTIVE FABRICS IN DIFFERENT APPLICATIONS 9

Protective fabrics used in the medical field and in hygiene; military combat clothing; protective fabrics against biological and chemical warfare; textiles for high visibility

UNIT IV PROTECTIVE GARMENT CONSTRUCTION 9

Garment construction - method of construction of garments according to various protective end uses; use of accessories for protective garment

UNIT V EVALUATION OF PROTECTIVE GARMENTS 9

Standards and test method for protective fabric performance - Flame retardant finishes, Liquid repellent finishes, Antistatic, Liquid repellent, antibacterial, UV protection, mite protection; Materials and methods. Manikins – Thermal manikins, segmented thermal manikins, evaporative resistance measurement- moisture permeability index, skin model, Concept of

dynamic manikins; Permeation resistance test – index of penetration and index of repellency; Liquid tight integrity and gas tight integrity; Ergonomics of protective clothing

TOTAL : 45 PERIODS

REFERENCES

1. Adanur S., “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., 1995, ISBN : 1 – 56676 – 340 – 1
2. Pushpa Bajaj and Sengupta A.K., “Protective Clothing”, The Textile Institute, 1992, ISBN :1-870812 – 44-1
3. Chellamani K.P. and Chattopadhyay D., “Yarns and Technical Textiles”, SITRA, 1999
4. Scott R.A., “Textiles for Protection”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-921-6, 2005
5. Saville.B.P., “Physical Testing of Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-367-6, 1999
6. Fan Q., “Chemical Testing of Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-917-8, 2005
7. Long A.C., “Design and Manufacture of Textile Composites”, Wood head Publishing Limited, Cambridge, UK, ISBN : 1-85573-744-2, 2005
8. Fung W., “Coated and Laminated Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-576-8, 2002
9. Horrocks A.R. and Anand S.C., “Handbook of Technical Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-385-4, 2004
10. Anand S.C., Kennedy J.F., Miraftab M. and Rajendran S., “Medical Textiles and Biomaterials for Health Care”, Wood head Publishing Limited, Cambridge, UK, ISBN: 1-85573-683-7, 2006

AT8751

APPAREL MARKETING AND MERCHANDISING

L T P C

3 0 0 3

UNIT I INTRODUCTION TO APPAREL BUSINESS

9

International apparel business pattern, basic business concepts in Indian apparel export house, business operations in China and other south Asian countries. Business patterns for Indian apparel retail and home textiles. Understanding from concept board to finished product and its sequence.

