

ANNA UNIVERSITY :: CHENNAI 600 025

UNIVERSITY DEPARTMENTS

R – 2013

B. TECH. (PART TIME) TEXTILE TECHNOLOGY

I - VII SEMESTERS CURRICULA AND SYLLABI

SEMESTER I

CODE NO.	COURSE TITLE	L	T	P	C
PTMA8151	Applied Mathematics	3	0	0	3
PTPH8151	Engineering Physics	3	0	0	3
PTCY8152	Engineering Chemistry	3	0	0	3
PTGE8151	Computing Techniques	3	0	0	3
PTGE8152	Engineering Graphics	3	0	0	3
TOTAL		15	0	0	15

SEMESTER II

CODE NO.	COURSE TITLE	L	T	P	C
PTMA8253	Transforms and Partial Differential Equations	3	0	0	3
PTTT8201	Physics for Technologists	3	0	0	3
PTCY8251	Chemistry for Technologists	3	0	0	3
PTGE8153	Engineering Mechanics	3	0	0	3
PTEE8253	Principles of Electrical and Electronics Engineering	3	0	0	3
TOTAL		15	0	0	15

SEMESTER III

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
PTMA8252	Probability and Statistics	3	0	0	3
PTGE8251	Environmental Science and Engineering	3	0	0	3
PTTT8301	Characteristics of Textile Fibres I	3	0	0	3
PTTT8302	Technology of Pre Spinning Process	3	0	0	3
PTTT8303	Technology of Pre Weaving Process	3	0	0	3
TOTAL		15	0	0	15

SEMESTER IV

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
PTTT8401	Characteristics of Textile Fibres II	3	0	0	3
PTTT8402	Fabric Structure	3	0	0	3
PTTT8403	Knitting Technology	3	0	0	3
PTTT8404	Technology of Woven Fabric Manufacture	3	0	0	3
PTTT8405	Technology of Yarn Spinning	3	0	0	3
PRACTICAL					
PTTT8411	Textile Manufacture Laboratory	0	0	3	2
	TOTAL	15	0	3	17

SEMESTER V

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
PTTT8501	Chemical Processing of Textile Materials I	3	0	0	3
PTTT8502	Process control in spinning	3	0	0	3
PTTT8503	Quality Evaluation of Fibres and Yarns	3	0	0	3
PTTT8504	Technology of Bonded Fabrics	3	0	0	3
PTTT8505	Technology of Manufactured Fibre Production	3	0	0	3
	TOTAL	15	0	0	15

SEMESTER VI

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
PTTT8601	Chemical Processing of Textile Materials II	3	0	0	3
PTTT8602	Fabric Quality Evaluation	3	0	0	3
PTTT8603	Garment Manufacturing Technology	3	0	0	3
PTTT8604	Mechanics of Textile Machinery	3	0	0	3
	Elective I	3	0	0	3
PRACTICAL					
PTTT8611	Quality Assurance Laboratory	0	0	3	2
	TOTAL	15	0	3	17

SEMESTER VII

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
PTTT8701	Clothing Comfort	3	0	0	3
PTTT8702	Operations Research for Textile Industry	3	0	0	3
	Elective II	3	0	0	3
PRACTICAL					
PTTT8711	Project Work	0	0	9	6
	TOTAL	9	0	9	15

TOTAL NUMBER OF CREDITS: 109**LIST OF ELECTIVES FOR TEXTILE TECHNOLOGY**

CODE NO.	COURSE TITLE	L	T	P	C
PTGE8551	Engineering Ethics and Human Values	3	0	0	3
PTTT8001	Apparel Accessories and Embellishments	3	0	0	3
PTTT8002	Apparel Marketing and Merchandising	3	0	0	3
PTTT8003	Apparel Production Machinery	3	0	0	3
PTTT8004	Characterization of Polymers	3	0	0	3
PTTT8005	Coated Textiles	3	0	0	3
PTTT8006	Colour Science	3	0	0	3
PTTT8007	Financial Management for Textile and Apparel Industries	3	0	0	3
PTTT8008	High Performance Fibres	3	0	0	3
PTTT8009	Human Resources Management	3	0	0	3
PTTT8010	Industrial Engineering in Apparel Industry	3	0	0	3
PTTT8011	Medical Textiles	3	0	0	3
PTTT8012	Production and Application of Sewing Threads	3	0	0	3
PTTT8013	Production and Operations Management for textile Industry	3	0	0	3
PTTT8014	Protective Garments	3	0	0	3
PTTT8015	Smart Garments	3	0	0	3
PTTT8016	Structural Mechanics of Yarns	3	0	0	3
PTTT8017	Structural Mechanics of Fabrics	3	0	0	3
PTTT8018	Supply Chain Management for Textile Industry	3	0	0	3
PTTT8019	Technical Textiles	3	0	0	3
PTTT8020	Textile and Apparel EXIM Management	3	0	0	3
PTTT8021	Textile Costing	3	0	0	3
PTTT8022	Textile Reinforced Composites	3	0	0	3
PTTT8023	Total Quality Management for Textile Industry	3	0	0	3
PTGE8071	Disaster Management	3	0	0	3
PTGE8072	Human Rights	3	0	0	3

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.

REFERENCES

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

PTCY8152

ENGINEERING CHEMISTRY

L T P C
3 0 0 3

OBJECTIVES

- To understand about the chemical thermodynamics.
- To impart knowledge in the basics of polymer chemistry.
- To develop sound knowledge on kinetics and catalysis.
- To impart basic knowledge on photochemistry and spectroscopy.

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: Criteria of spontaneity; Helmholtz and Gibbs free energy functions; 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 - Grothuss-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 NANO CHEMISTRY**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 JayadevSreedhar, "Polymer Science", New Age International P (Ltd.), Chennai, 2006.

PTGE8151**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.

PTGE8152**ENGINEERING GRAPHICS****L T P C
3 0 0 3****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)

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**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**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**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**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**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)

Introduction to drafting packages and demonstration of their use.

TOTAL : 45 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.

- 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 scioentis & engineering 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

4. Rajasekaran, S and Sankarasubramanian, G., "Engineering Mechanics Statics and Dynamics", 3rd Edition, Vikas Publishing House Pvt. Ltd., (2005).
5. Bhavikatti, S.S and Rajashekarappa, K.G., "Engineering Mechanics", New Age International (P) Limited Publishers, (1998).
6. Kumar, K.L., "Engineering Mechanics", 3rd Revised Edition, Tata McGraw-Hill Publishing company, New Delhi (2008)

**PTEE8253 PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING L T P C
3 0 0 3**

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

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)

**PTTT8301 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.

UNIT V ELASTIC RECOVERY BEHAVIOUR OF FIBRES 9

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

**PTTT8302 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 short staple and long staple spinning system; yarn numbering systems- direct, indirect and conversions; influence of characteristics of raw material – fibre fineness, length, strength, elongation, stiffness, fibre friction, cleanliness on spinning performance; spinnability

UNIT II GINNING AND BLOWROOM MACHINERY 9

Description and working of different types of gins; selection of right type of gins; ginning performance on yarn quality; objects, principle and description of opening, cleaning and blending machines used in blowroom; chute feed; cleaning efficiency, production calculations.

UNIT III CARDING MACHINE 9

Objects and principle of carding; detailed study of flat card; autolevelling; card clothing and its maintenance; drives and production calculation

UNIT III COMBER 9

Objectives of comber preparatory; detailed study of sliver lap, ribbon lap and super lap formers; objects and principles of combing; sequence of combing operation; combing efficiency and production calculation.

UNIT IV DRAWING MACHINE AND ROVING MACHINE 9

Tasks of drawing machine; drafting systems used in modern drawing machines; autolevelling; draft and production calculation; objectives of roving machine; working of roving machine; bobbin builder mechanism – mechanical and electro-mechanical; draft, twist and production calculations.

TOTAL : 45 PERIODS

REFERENCES

1. Oxtoby E., "Spun Yarn Technology ", Butterworth, London, 1987
2. Klein W., "The Technology of Short-staple Spinning ", The Textile Institute, Manchester, 1998
3. Klein W., "A Practical Guide to Opening and Carding ", The Textile Institute, Manchester, 1999
4. Klein W., "A Practical Guide to Combing, Drawing and Roving Frame ", The Textile Institute, Manchester, 1999
5. Lord P.R., "Yarn Production: Science, Technology and Economics ", The Textile Institute, Manchester, 1999
6. Salhotra K.R. and Chattopadhyay R., "Book of papers on Blowroom and Card ", Indian Institute of Technology, Delhi, 1998
7. Iredale J., "Yarn Preparation: A Handbook ", Intermediate Technology, 1992
8. Doraiswamy I., Chellamani P. and Pavendhan A., "Cotton Ginning, Textile Progress", The Textile Institute, Manchester, 1993

PTTT8303

TECHNOLOGY OF PRE WEAVING PROCESS

L T P C
3 0 0 3

UNIT I BASICS OF WINDING

9

Objects of winding; principles of cheese and cone winding machines; uniform build of yarn package; types of drums – half accelerated and fully accelerated drums; control of balloons; Classification of yarn faults and its removal; concepts in yarn clearing – mechanical, optical and electronic clearers; knotters and splicers

UNIT II PROCESS CONTROL IN WINDING

9

Faults in wound packages, their causes and remedies; winding synthetic and blended yarns; weft winding; winding for colouration; quality of knots and splices; study of modern automatic winders. winding performance; productivity; maintenance; quality control; material handling.

UNIT III WARPING

5

Objectives of warping, material flow in beam warping and creels used in warping machines; sectional warping machines.

SIZING

9

objectives of sizing; sizing materials and recipii used for different types of fibers; size preparation equipment; sizing machines; sizing filament yarns; concept of single end sizing, combined dyeing and sizing. Control concepts in modern sizing; energy conservation in sizing; Sizing defects and production calculations.

UNIT IV PROCESS CONTROL IN WARPING AND SIZING

9

process control in warping (production calculation, machine and labor productivity, control of end breaks, quality and hard waste in warping); Control systems used in sizing machine.

UNIT V DRAWING-IN

4

Need for drawing-in operation; manual and automatic drawing- in, leasing, knotting and pinning machines; selection and care of reeds, healds and drop pins, control of cross ends and extra ends and calculations.

TOTAL : 45 PERIODS

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

- 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

PTTT8402

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 III

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

PTTT8403

KNITTING TECHNOLOGY

L T P C
3 0 0 3

UNIT I

INTRODUCTION

9

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 I INTRODUCTION TO WEAVING 9

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 9

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 9

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 9

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 9

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 : 45 PERIODS**REFERENCES**

1. Talukdar M.K., Sriramulu P.K. and Ajaonkar 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", Merrow, 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

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

1. Study of blow room machinery
2. Card-Draft and production calculations and setting
3. Draft and production calculation in draw frame
4. Study of comber
5. Draft and twist calculations of speed frame and ring frame
6. Study of weaving preparatory machines
7. Study of primary motions
8. Study of secondary motions
9. Study of auxiliary motions

10. Study of circular and flat knitting machine
11. Securing and bleaching of cotton
12. Dyeing of cotton with different classes of dyes
13. Degumming and dyeing of silk
14. Dyeing of synthetic fibre
15. Printing of cotton fabrics
16. Colour measurement

TOTAL: 45 PERIODS

PTTT8501	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 Gubitza 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

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 Publications, 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 Progress ",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

- 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

PTTT8504

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

PTTT8505

TECHNOLOGY OF MANUFACTURED FIBRE PRODUCTION

L T P C
3 0 0 3

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

PTTT8601	CHEMICAL PROCESSING OF TEXTILE MATERIALS II	L T P C
		3 0 0 3

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 Valladepears 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

PTTT8602**FABRIC QUALITY EVALUATION****L T P C
3 0 0 3****UNIT I CONSTRUCTION CHARECTERISTICS****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

**PTTT8603 GARMENT MANUFACTURING TECHNOLOGY L T P C
3 0 0 3**

UNIT I 9
Anthropometry, mass-production, mass-customization; pattern making, grading, marker planning, spreading & cutting

UNIT II 9
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 9
Labels, linings, interlinings, wadding, lace, braid, elastic, hook and loop fastening, shoulder pads, eyelets and laces, zip fasteners, buttons

UNIT IV 9
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 9
Garment dyeing, printing and finishing; pressing categories and equipment, packing

TOTAL : 45 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

6. Determination of seam strength
7. Determination of fabric tensile strength
8. Determination of air permeability
9. Determination of fabric bursting strength
10. Determination of fabric drape
11. Determination of fabric crease recovery and wrinkle recovery
12. Determination of fabric abrasion resistance and pilling
13. Determination of fabric colour fastness (light, rubbing, washing and perspiration)
14. Assessment of fabric faults
15. Assessment of garment faults

TOTAL : 45 PERIODS

PTTT8701	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

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 III ENGINEERING AS SOCIAL EXPERIMENTATION**9**

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law – The Challenger Case Study

UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS**9**

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – The Three Mile Island and Chernobyl Case Studies
Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

UNIT V GLOBAL ISSUES**8**

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Sample Code of Conduct

TOTAL : 45 PERIODS**TEXTBOOK**

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.

REFERENCES

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Thompson Wadsworth, A Division of Thomson Learning Inc., United States, 2000
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001

WEB SOURCES

1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org

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 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.

UNIT II MARKETING FOR APPAREL AND TEXTILE PRODUCTS**9**

Defining marketing, marketing mix the objectives of marketing department, market research, different types of markets, marketing strategies with respect to a product/brand, Indian apparel houses international marketing strategies and domestic marketing strategies, marketing models, B to B marketing, B to C marketing, direct marketing, digital marketing.

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

**PTTT8004 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 dielectric 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

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 Plastisols-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

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
1. Kuehni R.G., "Computer Colorant Formulation", Lexington Books, 1975, ISBN 0-669-03335-9
2. Choudhury A. K. R., "Modern Concepts of Colour and Appearance", Oxford and IBH Publishing Ltd., 2000
3. McLaren K., "The Colour Science of Dyes & Pigments", Adam Hilger Ltd., 1983, ISBN 0-85274-426-9
4. D. Travis, "Effective Colour Displays", Academic Press, 1991, ISBN 0-12-697690-2

PTTT8007 FINANCIAL MANAGEMENT FOR TEXTILE AND APPAREL INDUSTRIES

**L T P C
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

PTTT8008

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. Thermo plastic 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

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
3. Mamoria C.B. and Mamoria S., "Personnel Management", Himalaya Publishing Company, 2007
4. Bernadin, "Human Resource Management", Tata Mcgraw Hill ,6th edition 2006
5. Eugence Mckenna and Nic Beach, "Human Resource Management", Pearson Education Limited, 2007
6. Wayne Cascio, "Managing Human Resource", McGraw Hill, 2007

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

PTTT8011

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

PTTT8012

PRODUCTION AND APPLICATION OF SEWING THREADS

L T P C
3 0 0 3

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

PTTT8013	PRODUCTION AND OPERATIONS MANAGEMENT FOR TEXTILE INDUSTRY	L T P C
		3 0 0 3

UNIT I	9
Factors of production; environmental and social concerns of operations; design of production system; forecasting in production and operation management – various qualitative and quantitative techniques	
UNIT II	9
Capacity planning; facility planning – objectives; different types of layouts, developing process layout, product layout; job design techniques	
UNIT III	9
Aggregate production planning – procedure, importance; scheduling in operation management – mass production system, batch and job shop	
UNIT IV	9
Material management – material planning, purchase, stores, material handling and disposal; inventory models; MRP-objectives, elements of MRP, MRP computation, implementation	
UNIT V	9
Concepts - Total Productive Maintenance, Just In Time, Total Quality Management; Automated Technology, CIM, CAD, FMS, GT, CAM, CAPP	

TOTAL : 45 PERIODS

REFERENCES

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

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

PTTT8014

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., Mirafat M. and Rajendran S., "Medical Textiles and Biomaterials for Health Care", Wood head Publishing Limited, Cambridge, UK, ISBN: 1-85573-683-7, 2006

PTTT8015

SMART GARMENTS

L T P C
3 0 0 3

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

PTTT8016

STRUCTURAL MECHANICS OF FABRICS

L T P C
3 0 0 3

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

15

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 10
 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 10
 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

PTTT8017 STRUCTURAL MECHANICS OF YARNS L T P C
3 0 0 3

UNIT I GEOMETRY OF TWISTED YARNS 9
 Idealized helical yarn structure; yarn count and twist factors, twist contraction; Limits of twist.

UNIT II PACKING OF FIBERS IN YARNS 9
 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 9
 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 9
 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 9
 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 : 45 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

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

PTTT8020 **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.,

PTTT8021	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. Bhav 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.

PTTT8022

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

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.

OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and

- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

UNIT I INTRODUCTION TO DISASTERS 9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS 9

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TOTAL: 45 PERIODS

OUTCOMES:

The students will be able to

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context,
- Disaster damage assessment and management.

TEXTBOOKS:

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. **ISBN-10:** 1259007367, **ISBN-13:** 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IAS and Sage Publishers, New Delhi, 2010.

REFERENCES

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

PTGE8072

HUMAN RIGHTS

L T P C
3 0 0 3

OBJECTIVES :

- To sensitize the Engineering students to various aspects of Human Rights.

UNIT I

9

Human Rights – Meaning, origin and Development. Notion and classification of Rights – Natural, Moral and Legal Rights. Civil and Political Rights, Economic, Social and Cultural Rights; collective / Solidarity Rights.

UNIT II

9

Evolution of the concept of Human Rights Magna carta – Geneva convention of 1864. Universal Declaration of Human Rights, 1948. Theories of Human Rights.

UNIT III

9

Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

UNIT IV

9

Human Rights in India – Constitutional Provisions / Guarantees.

UNIT V

9

Human Rights of Disadvantaged People – Women, Children, Displaced persons and Disabled persons, including Aged and HIV Infected People. Implementation of Human Rights – National and State Human Rights Commission – Judiciary – Role of NGO's, Media, Educational Institutions, Social Movements.

TOTAL : 45 PERIODS

OUTCOME :

- Engineering students will acquire the basic knowledge of human rights.

REFERENCES:

1. Kapoor S.K., "Human Rights under International law and Indian Laws", Central Law Agency, Allahabad, 2014.
2. Chandra U., "Human Rights", Allahabad Law Agency, Allahabad, 2014.
3. Upendra Baxi, The Future of Human Rights, Oxford University Press, New Delhi.