



ANNA UNIVERSITY
Chennai-25.
Syllabus for

B.Tech. Textile Technology

MA037 Special Functions, Difference Equations and Z-transforms 3 1 0 100

1 . IMPROPER INTEGRALS AND SERIES SOLUTIONS 9

Improper integrals-Gamma and Beta functions, Series solutions-Ordinary point, regular singular point of second order linear ordinary differential equation, series solution to a second order linear ordinary differential equation about an ordinary point and a regular singular point.

2 . BESSEL FUNCTIONS 9

Bessel's equation, Bessel functions, recurrence relations, orthogonality property, generating function, equations reducible to Bessel's equation, modified Bessel functions. Applications to boundary value problems.

3 . LEGENDRE POLYNOMIALS 9

Legendre's equation, Legendre Polynomials, Rodrigue's formula generating function, recurrence relations, orthogonality property, Applications to boundary value problems.

4 . HERMITE AND LAGUERRE POLYNOMIALS 9

Hermite and Laguerre equations and their solutions-Polynomials, Rodrigue's formula, generating functions, recurrence relations, orthogonality property.

5 . DIFFERENCE EQUATIONS AND Z-TRANSFORM 9

Linear difference equation with constant coefficients, elementary properties of z transform applications of z transform, application of z transform to difference equations.

6 . TUTORIAL 15

Total No of periods: 60

Text Book :

1. Andrews.L.A., " Special Function for Scientist and Engineers ", McGraw-Hill, 1992.

References:

- 1. Narayanan, S.Manicavachagam Pillay and Ramanaiah.G, " Advanced Mathematics for Engineering Students ", Vol II and III S.Viswanathan Printers Private Limited, Madras, 1985.*
- 2. Grewal, B.S., " Higher Engineering Mathematics ", Khanna Publishers, Delhi, 1989.*
- 3. Andrews, L.C., and Shivamoggi, B.K., " Integral Transforms for Engineers and applied Mathematicians ", MacMillan, New York, 1988.*

1 . LEVELLING 10

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.

2 . NEP AND HOOK REMOVAL 5

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

3 . WASTE CONTROL 5

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.

4 . STATIC GENERATION 4

Generation of static electricity ; its influence on spinning processing control of static generation.

5 . 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.

6 . YARN QUALITY ANALYSIS 7

Analysis of within length and between length variations and spectrogram; yarn faults classifications; causes and remedies for yarn defects.

7 . MAN-MADE FIBRE PROCESSING 5

Processing conditions required for man-made-fibres like polyester, viscose in the spinning machinery.

Total No of periods: 45

Text Books:

1. *Garde A.R. and Subramaniam T.A., " Process control in Spinning ", ATIRA Publicaitons, Ahmedabad, 1989.*
2. *Lord P.R., Yarn Production; Science, " Technology and Economics ", The Textile Institute, Manchester,1999.*

References:

1. *Furter R., " Evenness Testing in Yarn Production Part I and Part II ", The Textile Institute, Manchester, 1982.*
2. *Van der Sluijs M and Hunter L., " Neps in Cotton Lint, Textile Progress ", The Textile Institute,Manchester, 1999.*
3. *Klein W., " Man-made Fibres and their Processing ", The Textile Institute, Manchester, 1994.*
4. *Slater K.Yarn Evenness, " Textile Progress ", The Textile Institute, Manchester, 1986.*
5. *Townend P.P., " Nep Formation in Carding ", Wira; U.K., 1982.*

1 . INTRODUCTION 2

Outline of weaving process. Different types of looms.

2 . SHEDDING MOTIONS 20

Principles of tappet, dobby and jacquard shedding mechanisms. Types of sheds. Positive and negative shedding mechanisms. Reversing mechanisms Limitations of various shedding mechanisms. Motion of the heald shafts. Principles of single lift and double lift dobbies and jacquards. Modern developments in shedding mechanisms. Special jacquards.

3 . SHUTTLE PICKING AND BEAT UP 10

Shuttle picking mechanisms. Shuttle flight and timing. Acceleration and retardation of the shuttle. Power required for picking Kinematics of sley.Sley eccentricity. Timing of the primary motions.

4 . SECONDARY AND AUXILLARY MOTIONS 6

Take up and let-off motions used in power looms. Cloth formation. Warp protector and weft fork motion. Plain loom accessories.

5 . PROCESS CONTROL IN WEAVING 7

Loom stoppages and efficiency. Fabric defects and value loss. Fabric shrinkage in the loom-causes and control. Fabric engineering.

Total No of periods: 45

Text Books:

1. Marks, R and Robinson, T.C., " Principles of weaving ", The Textile Institute, Manchester, 1989, ISBN: 0900739 25 8.
2. Talukdar, M.K., Sriramulu, P.K and Ajgaonkar, D.B., " Weaving : Machines, Mechanisms, Management ", Mahajan Publishers, Ahmedabad, 1998, ISBN:81-85401-16-0.

References:

1. Lord, P.R. and Mohamed., M.H. " Weaving; Conversion of yarn to fabric ", Merrow, 1992, ISBN:090409538X.
2. Booth, J.E., " Textile Mathematics: Volume 3 the Textile Institute ", Manchester, 1977, ISBN:090073924X.

TT337 Fabric Structure

2 2 0 100

1 . INTRODUCTION 10

Cloth geometry, Cover factor, Theory of colour use of point paper.

2 . STANDARD WEAVES 16

Plain and its derivatives, Twill and derivatives. Satin and sateen honey comb, brighton honeycomb, mock leno, huck-a-back, crepe distorted weaves, Bedford cords, welts and piques, Backed fabrics.

3 . SPECIAL WEAVES 14

Extra warp, Extra welt, Double cloth, Gauze and Leno, pile fabrics, Damasks, ply fabrics.

4 . SPECIAL JACQUARDS 10

Application of special jacquards

5 . PRINCIPLES OF ORNAMENTATION 10

Various types of Ornamentation, Designing pattern for weaving on jacquards, Lappet and swivel system for ornamentation.

Total No of periods: 60

Text Books:

1. Grosicki, " *Watson's Textile Design and color* ", Butter worths, Vol.I, 1989.
2. Grosicki, " *Watson's Advanced Textile Design* ", Butter worths, Vol.II, 1989.

References :

1. Goener.D., " *Woven Structure and Design* ", part I: *Single cloth construction*, WIRA, 1986.
2. Geoner. D., " *Woven Structure and Design* ", part II, *Compound Structures*, BTT6, 1989.

1 . STRUCTURE OF FIBRES 4

Structure of textile natural and man-made fibres physical, Chemical and morphology.

2 . INVESTIGATION OF FIBRE STRUCTURE 4

Electron microscopy-Sample preparation techniques, X-ray diffraction methods, Infra-red radiation techniques.

3 . MOISTURE ABSORPTION STUDY IN FIBRES 8

Hygroscopic nature of fibres-Effect of fibre structure and climate conditions. Heat of sorption-types -relation to fibre structure. Conditioning of fibres-mechanism-factors influencing conditioning.

4 . MECHANICAL PROPERTIES OF FIBRES 12

Tensile characteristics-stress-strain relation-influence of humidity and temperature on tensile characteristics. Elastic properties-Recovery-Elastic recovery and its relation to stress and strain; Mechanical conditioning-advantages-creep phenomena. Torsional Rigidity-its relation to other fibre properties-measurement techniques. Flexural Rigidity-its relation to other fibre properties-Measurement techniques.

5 . OPTICAL AND FRICTIONAL PROPERTIES 7

Lustre Index-Refractive index-Birefringence-Factors influencing Birefringence-Refractive Index measuring techniques-polarised light method-wave length method. Role of friction in fibre processing-measurement of friction.

6 . ELECTRICAL AND THERMAL PROPERTIES 10

Electrical resistance of fibres-Measurement -Di electricity-Factors influencing di-electricity. static electricity-problems-elimination techniques. Flammability of fibres-thermal conductivity-Heat setting.

Total No of periods: 45

Text Books:

1. Meredith. R and Hearle, J.W.S., " *Physical methods of investigation of Textiles* ", Wiley Publication, NY, 1989.
2. Morton W.E and Hearle, J.W.S., " *Physical Properties of Textile Fibres* ", The Textile Institute, England, 1993.

References:

1. Meredith R. " *Mechanical properties of Textile Fibres* ", North Holland, Amsterdam 1986.
2. Milton Harris, M. " *Hand Book of Textile Fibres* ", Haris Research Lab. Inc., Washington, 1984.
3. Hearle, J.W.S., " *Polymers and their properties* ", Vol. 1, *Fundamentals of Structure and Mechanics*, Ellis Horwood, England, 1982.
4. Carty, P " *Fibre Properties* ", From word, U.K. 2nd Ed.1994.
5. Greaves P.H. and Aville B.P., " *Microscopy of Textile Fibres* ", Bios Scientific U.K., 1995
6. Saville, " *Physical Testing of Textiles* ", M.K.Book Distributors, 1998.

1 . STRUCTURE AND PROPERTIES 5

Chemical structure and chemical properties of textile fibres.

2 . PREPARATION FOR COLOURATION AND FINISHING 20

Singeing, desizing-hydrolytic and oxidative techniques, scouring, mercerization, bleaching and heat setting.

3 . PROCESSING MACHINES 15

Loose stock processing machine, hank and package processing machines, yarn singeing machines. gas singeing machine for woven and tubular knits, shearing and raising machines, kiers, mangles ,jigger, winch, jet and soft flow machines, yarn mercerizer, chain and chainless mercerizers, circular mercerizing machine, continuous scouring and bleaching machines, washing ranges, hydro extractors, detwisters, dryers, stenters and stretching devices.

4 . IDENTIFICATION AND ESTIMATION OF BLEND PROPORTION 5

Total No of periods: 45

Text Books:

1. Trotman, E.R., " Dyeing and chemical Technology of Textile Fibres ", Charles Griffin and Co Ltd., London. 1990.

References:

- 1.. Hall A.J., " Textile Chemistry ", American Elsevier Publishing Co. Inc., New York , 1986.
2. Peters, R.H., " Textile Chemistry Vol.I, II and III ", Elsevier Publishing Co.Inc., New York, 1985.
3. Vaidya A.A. and Trivedi S.S., " Textile Auxilliaries and finishing chemicals ", ATIRA, Ahmedabad, 1985.
4. Shenai, V.A., " Textile Fibres ", Sevak Publications, Bombay, 1986.
5. Marsh J.T., " An Introduction to Textile Finishing ", B.I. Publication, Bombay, 1989.
6. Marsh J.T., " Mercerizing ", Chapman and Hall Ltd., London, 1041.
7. Menachem Lewin and Stephen B.Sello, " Handbook of fibre science and Technology; Vol.I, Fundamentals and preparation-Part A ", Marcel Dekker Inc., New York, 1983.
8. Shenai, V.A. " Technology of Bleaching and Mercerzing-Vol.III ", Sevak Publications Chennai, 1991.
9. Bhagwat R.S " Handbook of Textile Processing ", Colour Publication, Mumbai, 1999.
10. " Identification of Textile Materials ", 7th Edition, published by The Textile Institute , Manchester, 1975.

TT340 Cloth Analysis

0 0 3 100

45

The Following cloth samples are to be analysed for design, structure and other quality particulars.

(* Minimum 10 Experiments shall be offered)

1. Extra warp and extra weft
2. Gaberdine
3. Quilts
4. Pile fabrics
5. Velvet and Velveteen
6. Gauze
7. Leno
8. Double and triple cloth
9. Crepe
10. Long cloth and Mull Shirting
11. Canvas
12. Towelling Fabric.
13. Tapestry and Upholstery
14. Cord fabrics
15. Denim

Total No of periods: 45

1 . PREPARATION FOR HIGH SPEED WEAVING 3

Yarns quality requirements for high speed automatic shuttle looms and shuttle less looms. Warp and weft Preparation for high speed looms.

2 . AUTOMATIC SHUTTLE LOOMS 12

Automatic weft replenishment in shuttle looms-pirn changing and shuttle changing looms. Mechanisms involved in automatic weft replinshment-feelers, cutters, design of shuttle, three try motions. Warp stop motions, let off motions, Multi shuttle looms pile fabric weaving looms, tape looms.

3 . SHUTTLELESS LOOMS 15

Principles of weft insertions in shuttle less looms, Weft accumulators and selvages used in shuttleless looms. Mechanisms of weft insertion by projectile, rapier air jet and water jet. Techno economics of shuttleless weft insertion systems. Multi phase weaving systems. Quick style change.

4 . WEAVING WITH DIFFERENT TYPES OF YARNS 7

Preparation and weaving of open end yarns, blended yarns filament yarns, Data systems.

5 . BONDED FABRICS 8

Web forming techniques for dry method of web preparation. Production of bonded fabrics by mechanical chemical and thermal methods. Production of spun bonded and melt blown fabrics. End uses of bonded fabrics.

Total No of periods: 45

Text Books:

1. Marks, R and Robinson, T.C., " Principles of weaving ", The Textile Institute, Manchester, 1989, ISBN: 0 900739 25 8.
2. Talukdar, M.K., Sriramulu, P.K and Ajaonkar, D.B., " Weaving; Machines, Mechanisms, Management ", Mahajan Publishers, Ahmedabad, 1998, ISBN: 81-85401-16-0.

References :

1. Lord, P.R and Mohamed, M.H., " Weaving: Conversion of yarn to fabric ", Merrow, 1992, ISBN: 090409538X
2. L.Vangheluwe., " Air-jet weft insertion ", Textile progress, Vol-29, No.4, Textile Institute Publication, 1999, ISBN:1870372255.
3. J.Lunenschloss, W.Albrecht and David Sharp., " Non-woven Bonded Fabrics ", Ellis Horwood Ltd, New York, 1985, ISBN:0-85312-636-4.
4. " Weaving: The knowledge in technology ", Textile Institute, Manchester, 1998, ISBN:1870372182.

1 . DYEING 15

Introduction to theory of dyeing, properties and application of direct, azoic, vat, sulphur, reactive, acid, mordant, metal-complex, disperse and basic dyes, Dyeing of blends.

2 . PRINTING 10

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

3 . FINISHING 10

Introduction, Calendering, starching, creping, softening, crease proofing, anti shrinking; felting, non-felting

4 . TESTING 5

Fastness properties of dyed and printed goods. Assessment of finishes imparted to textiles.

5 . FINISHING OF KNITS, GARMENT PROCESSING 5**Total No of periods: 45**

Text Books:

1. Trotman, E.R., " *Dyeing and Chemical Technology of Textile fibres* ", Charles Griffin and Co. Ltd. London 1990.

References :

1. Shenai, V.A., " *Introduction to the chemistry of dyestufts* ", Sevak Publications, Chennai, 1991.
2. Shenai, V.A., " *Chemistry of dyes and principles of dyeing* ", Sevak Publications, Bombay, 1995.
3. Cegerra, J., Puente, P. and Valladepars, J. " *The Dyeing of Textile Materials* ", Textile Institute, Manchester, 1993.
4. Shenai, V.A., " *Technology of Printing* ", Sevak Publications, Bombay, 1996.
5. LWC Miles., (Editor) " *Textile Printing* ", Dyers company of Publications trust, U.K, 1981.
6. Hall, A.J., " *Textile Finishing* ", Elsevier Publishing Co, Ltd, 1986.
7. Marsh, J.T., " *An Introduction to Textile Finishing* ", Chapman and Hall Ltd., London, 1979.
8. Shenai, V.A., " *Technology of Textile Finishing* ", Sevak Publications, Bombay, 1995.

1 . INTRODUCTION	2
The aims of quality assessment. Online and off line testing techniques	
2 . THE THEORY OF QUALITY CONTROL SYSTEMS	3
The design of experiments. Statistical tools for quality control. Testing according to end use. Quality control systems for the shop floor.	
3 . FIBRE TESTING	12
Fibre testing-Length & Length Uniformity-Fineness-Strength-Maturity-Trash content-Moisture content. Traditional methods and modern high volume testing instrument and techniques.	
4 . YARN TESTING	14
Determination of -Count-Twist-strength-Eveness-Friction & Hardness of yarns. Testing of Lap, Silver and Roving irregularity. "Ring Data " and other on line testing systems, Grading of yarn.	
5 . FABRIC TESTING	14
Determination of-Construction parameter-Fabric strength-Comfort properties & durability. Determination and control of weaving defects. Objective evaluation of fabrics.	

Total No of periods: 45

Text Books :

1. Booth J.E., " Principles of Textiles Testing ", Butterworth, London, 1989.
2. Kothari, V.K, *Progress in Textile Technology, Vol.I, Testing and Quality Management, IAFL Publications, New Delhi, 1999.*

References:

1. Skinkle J., " Textile Testing ", Taraporevala & Sons, Bombay, 1987.
2. Cassidy . C and Bishop D., " Characterisation and evaluation of sensory and mechanical properties of fabrics ", T.P. Vol.26, No.4, Textile Inst. 1995.
3. Slater K. " Physical testing and Quality control ", TP vol.23, No.1/2/3, Textile Inst.1993.
4. Furter R, " Strength and elongation testing of single and Ply yarns ", Textile Inst., 1985.
5. Furter, R. " Evenness testing in yarn Production Part I and Part II ", Textile Inst., 1993.
6. Steadman R.G, " Cotton Testing, Textile Progress ", Textile Institute, Manchester, 1997, ISBN:1870812859.
7. Savile B.P., " Physical Testing of Textiles ", Textile Institute, Manchester, 1998, ISBN:1855733676.

1 . CONDENSED YARN SPINNING 7**CONDENSED YARN SPINNING**

Principle of condensed yarn spinning; working of different models of condensed yarn spinning; advantages of this method over conventional ring spinning method.

2 . ROTOR SPINNING 12

Description of the working of the rotor spinning methods, requirements of the raw materials ; preparation of the silver for rotor spinning; yarn formation and its structure; yarn withdrawal and winding; rotor design and its implications on production and yarn quality; production limits; comparison with ring spinning.

3 . FRICTION SPINNING 10

Detailed study of the DREF-2, DREF-3 and master spinner machines working on the principles of friction spinning; the use of raw materials; application of these machines for different end products; the economics; technological limitations.

4 . AIR-JET SPINNING 8

Description of the yarn production in air jet spinning machine; feasibility of higher draft applied in this machine; Structure and quality of the air-jet spun yarn; raw materials requirement ; production of yarn in PLY fil spinning process applying similar principle; comparison with other spinning methods.

5 . OTHER SPINNING TECHNOLOGIES 8

Working details of the production of double-rove yarns and wrap yarns; use of raw materials; economics of these methods of yarn production ; yarn characteristics and their application.

Total No of periods: 45

Text Book :

1. *Oxtoby E., " Spun Yarn Technology ", Butterworths, London, 1987.*

References:

1. *Klein W., " New Spinning Methods ", The Textile Institute, Manchester, 1993.*
2. *Dyson E., " Rotor Spinning, Technical and Economics Aspects ", Textile Trade Press, New Mills, Stock Port,1975.*
3. *Salhotra K.R. and Ishtiaque S.M., " Rotor Spinning; its advantages ", Limitations and Prospects in India, ATIRA, Ahmedabad, 1995.*
4. *Lord P.R., " Yarn Production; Science, Technology and Economics ", The Textile Institute, Manchester, 1999.*
5. *Trommer G., " Rotor Spinning Meliand Textilebenchte Gmb H, Rohrbacher, 1995.*
6. *Lawerence C.A and Chen K.Z., " Rotor Spinning ", Textile Progress, The Textile Institute, Manchester, 1984.*

1 . GARMENT CLASSIFICATION	4
Introduction, Body dimensions, Mass Production, Uniforms selection, Specifications.	
2 . DRESS AND DESIGNING	14
Garment Specification - Pattern development - Grading - Marker planning, requirements - methods - spreading and cutting methods.	
3 . SEWING	14
Seams-Stitches-Sewing machine feeding systems-Sewing needles-Sewing threads-Fibre types-construction-finishes-Thread sizes-Thread Packages-Basic sewing machine and its associated work aids.	
4 . COMPONENTS AND TRIMS	5
Labels-Linings-Inter linings-Wading-Lace-Braid-Elastic-Hook and loop fastening-Shoulder pads-Zip fasteners-buttons.	
5 . PRESSING	4
Categories of pressing-equipment-Plating.	
6 . GARMENT PROCESSING	4
Garment dyeing, Printing and finishing.Protective Garments.	

Total No of periods: 45

Text Books :

1. Cooklin, G., " *Introduction to clothing manufacture* ", Blackwell Science U.K., 1991.
2. Carr, H. and Latham, B., " *The technology of clothing manufacture* ", Blackwell Science, U.K., 1994.

References:

1. Hayden peggal, " *The Complete Dress Maker* ", Marshall Cavindish, London, 1984.
- 2 Hayden peggal, " *Introduction to dress making* ", Marshall Cavindish, London, 1985.
- 3 Laing, R., " *Fundamentals of stitches and seams* ", Textile Inst., Manchester 1995.
4. Chuter, A.J., " *Introduction to clothing production management* ", Blackwell Science, U.K., 1995.
5. Bray N. " *Dress pattern Designing : The basic Principles of cut & fit* ", Blackwell Science, 1996.

1. Scouring of Cotton
2. Cotton bleaching with hypochlorites
3. Cotton bleaching with hydrogen peroxide
4. Degumming of silk
5. Dyeing of cotton with direct dyes.
6. Dyeing of cotton with reactive dyes.
7. Dyeing of cotton with sulphur dyes.
8. Dyeing of cotton with azoic dyes.
9. Dyeing of cotton with vat dyes.
10. Dyeing of silk with acid and metal complex dyes.

Total No of periods: 30*Apparatus Required:**Chemical and dyes.**HTHP Beaker dying machine Spectro photo meter.**Pilot Winch, Jigger, Hank dying machine, sample cone/chese dyeing machine. Pilot curing chamber, padding mangle.**pH meter, oven, burners, glasswares, water bath, thermometer, stirrer, ager, balance.*

(* Minimum of Ten Experiments shall be offered)

1. Fibre length and length uniformity
2. Fibre fineness and maturity
3. Fibre Strength
4. Fibre moisture study
5. Sliver and roving hank study
6. Yarn count
7. Yarnlea strength
8. Single yarn strength
9. Yarn twist (single)
10. Yarn twist (ply)
11. Yarn evenness
12. Yarn impact strength
13. Yarn abrasion
14. Yarn Friction
15. Fabric Tensile Strength
16. Fabric tear Strength
17. Fabric Stiffness
18. Fabric crease recovery
19. Fabric Abrasion Resistance
20. Fabric Air Permeability
21. Fabric bursting strength
22. Fabric Drape
23. Fabric colour fastness
24. Crimp study in fabrics
25. GSM study in fabrics

Total No of periods: 30

MACHINES/INSTRUMENTS/EQUIPMENTS/OTHERS REQUIRED

*Fibrograph/Baer Sorter
Fibre fineness and maturity tester
Stealometer/Presley Strength tester
Conditioning oven and balance
Wrap block
Quadrant balance, Wrap reel and balance.
Lea strength tester
Single yarn Strength
Untwist - twist tester
Ply yarn twist tester
Evenness tester
Ballistic tester
Yarn abrasion tester
Fabric Tensile strength tester
Fabric Tear strength
Fabric Bending length tester
Fabric Crease recovery tester
Fabric Abrasion tester
Fabric Air permeability tester
Fabric Bursting strength
Fabric Drape meter
Wash fastness, Light fastness, Rubbing fastness and Perspiration fastness tester.
Crimp tester
GSM Cutter*

NOTE: Electronic balance, Scissors, counting glass have to be used for most of the experiments.

1 . COMPONENTS OF ENVIRONMENT 9

Components - Water, air and land - Inter-relationship between components - Subcomponents; Ecosystem - Structure and functional components of ecosystem - Development and evolution of ecosystem - Energy flow and material cycling in ecosystem - Natural and man made impacts on water, air and land; Environment and development - Concept of sustainable development.

2 . SCIENCE OF ENVIRONMENT 9

Chemistry, Physics and biology of water, air and land; Stress on the Chemistry, Physics and Biology of water, air and land owing to the impacts; Environmental quality objective and goals - Policies on development projects and their impacts, with emphasis on the branch of engineering of the student.

3 . CURRENT ENVIRONMENTAL ISSUES 9

Current Environmental issues at Country level - management of municipal sewage, municipal solid waste, Hazardous waste and Bio-medical waste - Air pollution due to industries and vehicles; Global issues - Biodiversity, Climatic change, Ozone layer depletion.

4 . ENGINEERING INTERVENTIONS TO REDUCE THE ENVIRONMENTAL STRESSES 9

Minimisation of Stress - Principles of Physics, chemistry and biology in engineering interventions such as waste treatment - Flow sheets of engineering interventions relevant to the Engineering discipline of the student - Waste minimisation techniques - Clean technology options - Standards of performance of the interventions.

5 . 9

(A) TOOLS FOR ENVIRONMENTAL MANAGEMENT 6

Environmental impact assessment; Precautionary Principle and Polluter Pays Principle; Constitutional provisions, Legal and economic instruments in Environmental Management; Role of Non-government organisations - Community participation environmental management works; International conventions and protocols; Pollution Control Boards and Pollution Control Acts.

(B) FIELD STUDY 3

In-depth study of environmental issues at least one environmentally sensitive site relevant to the discipline of the student and preparation of a report thereupon.

Total No of periods: 45

Text Books:

1. *G.M.Masters, " Introduction to Environmental Engineering & Science ", Prentice Hall, New Delhi, 1997*
2. *J.G. Henry and G. W. Heike, " Environmental Science & Engineering ", Prentice Hall International Inc., New Jersey, 1996.*

References:

1. *S. K. Dhameja, Environmental Engineering and Management, S. K. Kataria and Sons, New Delhi, 1999.*
2. *State of India's Environment - A Citizen's Report, Centre for Science and Environment and Others, 1999.*
3. *Shyam Divan and Armin Rosencranz, Environmental Law and Policy in India, Cases, Materials and Statutes, Oxford University Press, 2001.*

1 . PART A: 21**1. PRINCIPLES OF MANAGEMENT AND ORGANISATION 7**

Planning, organisation, staffing, coordination, directing, controlling, communicating, organisation as a process and a structure; types of organisations.

2. PRODUCTION AND MANAGEMENT 10

Method study; work measurement techniques; basic procedure; motion study; motion economy; principles of time study; elements of production control; forecasting; planning, routing; scheduling; despatching; costs and costs control, inventory and inventory control.

3. QUALITY AND QUALITY CONTROL 4

Elements of quality control, role of control charts in production and quality control.

2 . PART B: 24**1. ENGINEERING ECONOMICS FOR PROCESS ENGINEERS 1****2. INTEREST, INVESTMENT COSTS AND COST ESTIMATION 8**

Time Value of money; capital costs and depreciation, estimation of capital cost, manufacturing costs and working capital, invested capital and profitability.

3. PROFITABILITY, INVESTMENT ALTERNATIVE AND REPLACEMENT 10

Estimation of project profitability, sensitivity analysis; investment alternatives; replacement policy; forecasting sales; inflation and its impact.

4. ANNUAL REPORTS AND ANALYSIS OF PERFORMANCE 3

Principles of accounting; balance sheet; income statement; financial ratios; analysis of performance and growth.

5. ECONOMIC BALANCE 2

Different unit operations with single and multiple variables.

Total No of periods: 45

References:

1. *Davis, G.S, " Chemical Engineering Economics and Decision Analysis ", CENDC, I.I.T., Madras, 1981.*
2. *Holand, F.A., Watson, F.A and Wilkinson, J.K., " Introduction to process Economics ", John Wiley, 1974.*
3. *Sumanth, D.T., " Production Engineering and Management ", McGraw-Hill, 1984.*
4. *Shukla, M.C., " Business Organisation and Management ", Sultan Chand and Sons, 1975.*

1 . 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 - professions and professionalism - professional ideals and virtues - theories about right action - self-interest-customs and religion - uses of ethical theories

2 . ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as experimentation - engineers as responsible experimenters - codes of ethics-a balanced outlook on law-the challenger case study

3 . ENGINEER'S RESPONSIBILITY FOR SAFETY 9

Safety and risk - assessment of safety and risk - risk benefit analysis-reducing risk-the three mile island and Chernobyl case studies.

4 . RESPONSIBILITIES AND RIGHTS 9

Collegiality and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - intellectual property rights (IPR)-discrimination.

5 . GLOBAL ISSUES 9

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 No of periods: 45

Text Book:

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York 1996.

References :

- 1. Charles D. Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 1999.*
- 2. Laura Schlesinger, "How Could You Do That: The Abdication of Character, Courage, and Conscience", Harper Collins, New York, 1996.*
- 3. Stephen Carter, "Integrity", Basic Books, New York, 1996.*
- 4. Tom Rusk, "The Power of Ethical Persuasion: From Conflict to Partnership at Work and in Private Life", Viking, New York, 1993.*

1 . INTRODUCTION 5

Comparison between knitted and woven fabrics. Warp knitting and weft knitting. Knitting needles.

2 . CIRCULAR KNITTING 25

Fundamentals of formation of knit, tuck and float stitches. Basic knitted structures and their production i.e., plain, rip, interlock and purl. Quality of yarn required for knitting. Yarn preparation for knitting. Circular knitting mechanics used for the production of basic structure. various machine elements. production of various weft knitted structures needle control in circular knitting machines. Factors affecting the formation of loop. Effect of loop length and shape on fabric properties. Faults in knitted fabrics, causes and remedies. Production calculation.

3 . FLAT KNITTING 9

Basic principles; Elements of flat knitting machines. different types of flat knitting machines-manual , mechanical and computer controlled knitting machines. Production of various fabric designs with flat knitting machines.

4 . WARP KINTTING 6

Warp knitting fundamentals. Machine classification. preparation of yarn for warp knitting .

Total No of periods: 45

Text Book :

1. D.B Ajgaonkar ., " Kintting Technology ", Universal Publication Corporation, Mumbai, 1998.
ISBN:81-85027-34-X

References :

1. Chandrasekhar Iyer, Bernd Mammal and Wolfgang Schach., "Circular Kintting ", Meisenbach GmbH, Bamberg, 1995, ISBN:3-87525-066-4.
2. D.J.Spencer., " Knitting Technology ", Textile Institute, Manchester, 1989, ISBN:1855733137.
3. Samuel Raz., " Flat Knitting ; The new generation ", Meisenbach GmbH, Bamberg, ISBN:3-87525-054-0.
4. Samuel Raz., " Warp Knitting Production ", Melliand Textilberichte GmbH, Rohrbacher, 1987.
ISBN:3-87529-022-4

(* Minimum of Ten Experiments shall be offered)

1. Study of ginning machines.
2. Study of blowroom machinery.
3. Settings and production calculations in blowroom.
4. Card - Draft and production calculations.
5. Card - Settings.
6. Construction details of Drawframe.
7. Draft calculation in Drawframe.
8. Study of comber preparatory machines.
9. Construction details of comber.
10. Draft calculation in comber.
11. Construction details of speedframe.
12. Draft calculation in speedframe.
13. Twist calculation in speedframe.
14. Study of builder motion mechanism in speedframe.
15. Construction details of ringframe.
16. Draft calculation in ringframe.
17. Twist calculation in ringframe.
18. Study of builder motion mechanism in ringframe.

Total No of periods: 30

MACHINES REQUIRED

Any two type of ginning machine

Bale breaker, Hopper feeder, Opener, beater, scutcher

Carding machine

Draw frame machine

Silver lap and Ribbon lap (OR)

Super lap former

Comber

Simplex machine

Ring frame.

(* Minimum of Ten Experiments shall be offered)

1. Study of drum winding machine.
2. Study of pirn winding machine.
3. Evaluation of splicer.
4. Study of warping machine.
5. Sizing of warp yarns.
6. Tappet shedding.
7. Dobby shedding.
8. Jacquard shedding.
9. Shuttle picking mechanism.
10. Shuttle checking mechanism.
11. Beat up mechanism.
12. Take up mechanism.
13. Negative let off mechanism.
14. Positive let off mechanism.
15. Warp protector mechanism.
16. Weft fork mechanism.
17. Study of pirn changing mechanism.
18. Study of warp stop motion.
19. Terry fabric weaving.
20. Study of drop box loom.
21. Study of plain, interlock and rib knitting machine.

Total No of periods: 30

APPARATUS REQUIRED:

Drum Cone Winding machine

Pirn winding machine

Splicer

2 Warping Machine

Sizing machine

Tappet loom

Dobby loom

Jacquard loom

Loom with under (or) over pick mechanism

Loom with positive (or) negative let off mechanism

Looms with looser fast reed mechanism

Looms with warp stop motion

Terry loom

Plain circular knitting machine, v-bed rib knitting machine, Interlock machine.

TT452 Industrial Training**0 0 0 100**

At the end of the fourth semester or sixth semester each student should under go in-plant training in Textile industry. The total training period should not be less than 15 days. Students have to submit a report before the seventh semester examination. Professor in-charge U.G programme will evaluate the report and award credits.

Total No of periods:

1. INTRODUCTION**9**

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

2. TQM PRINCIPLES**9**

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

3. STATISTICAL PROCESS CONTROL (SPC)**9**

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

4. TQM TOOLS**9**

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

5. QUALITY SYSTEMS**9**

Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, QS 9000, ISO 14000 – Concept, Requirements and Benefits.

TEXT BOOK:

1. Dale H.Besterfield, et al., Total Quality Management, Pearson Education Asia, 1999. (Indian reprint 2002).

REFERENCES:

1. James R.Evans & William M.Lindsay, The Management and Control of Quality, (5th Edition), South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).
2. Feigenbaum.A.V. “Total Quality Management, McGraw-Hill, 1991.
3. Oakland.J.S. “Total Quality Management Butterworth – Heinemann Ltd., Oxford. 1989.
4. Narayana V. and Sreenivasan, N.S. Quality Management – Concepts and Tasks, New Age International 1996.
5. Zeiri. “Total Quality Management for Engineers Wood Head Publishers, 1991.