

**ANNA UNIVERSITY TIRUCHIRAPPALLI****Tiruchirappalli – 620 024****Regulations 2008****Curriculum****B.TECH. TEXTILE TECHNOLOGY****SEMESTER III**

| S.No.            | Subject Code | Subject                                       | L | T | P | C         |
|------------------|--------------|---|---|---|---|-----------|
| <b>Theory</b>    |              |   |   |   |   |           |
| 1                | MA1201       | Transforms and Partial Differential Equations | 3 | 1 | 0 | 4         |
| 2                | EE1209       | Electrical Engineering                        | 3 | 0 | 0 | 3         |
| 3                | HS1201       | Environmental Science and Engineering         | 3 | 0 | 0 | 3         |
| 4                | CE1214       | Mechanics of Solids                           | 3 | 0 | 0 | 3         |
| 5                | ME1208       | Mechanical Engineering                        | 3 | 0 | 0 | 3         |
| 6                | TT1201       | Spun Yarn Technology I                        | 4 | 0 | 0 | 4         |
| <b>Practical</b> |              |   |   |   |   |           |
| 7                | EE1210       | Electrical Engineering Laboratory             | 0 | 0 | 3 | 2         |
| 8                | ME1209       | Mechanical Engineering Laboratory             | 0 | 0 | 3 | 2         |
| 9                | TT1202       | Spun Yarn Technology Laboratory I             | 0 | 0 | 3 | 2         |
| <b>Total</b>     |              |   |   |   |   | <b>26</b> |

**SEMESTER IV**

| S.No.            | Subject Code | Subject                                    | L | T | P | C         |
|------------------|--------------|--|---|---|---|-----------|
| <b>Theory</b>    |              |  |   |   |   |           |
| 1                | TT1251       | Chemistry for textiles                     | 3 | 0 | 0 | 3         |
| 2                | EI1254       | Electronics and Instrumentation            | 3 | 0 | 0 | 3         |
| 3                | TT1252       | Fabric Manufacture I                       | 3 | 0 | 0 | 3         |
| 4                | MA1256       | Probability and Statistics                 | 3 | 1 | 0 | 4         |
| 5                | TT1253       | Spun Yarn Technology II                    | 3 | 0 | 0 | 3         |
| 6                | TT1254       | Structure and Properties of Fibers         | 3 | 0 | 0 | 3         |
| <b>Practical</b> |              |  |   |   |   |           |
| 7                | EI1255       | Electronics and Instrumentation Laboratory | 0 | 0 | 3 | 2         |
| 8                | TT1255       | Fabric Manufacture Laboratory I            | 0 | 0 | 3 | 2         |
| 9                | TT1256       | Spun Yarn Technology Laboratory II         | 0 | 0 | 3 | 2         |
| <b>Total</b>     |              |  |   |   |   | <b>25</b> |

### SEMESTER V

| S.No.            | Subject Code  | Subject                                  | L | T | P | C         |
|------------------|---------------|--|---|---|---|-----------|
| <b>Theory</b>    |               |  |   |   |   |           |
| 1                | <b>GE1301</b> | Professional Ethics and Human values     | 3 | 0 | 0 | 3         |
| 2                | <b>TT1301</b> | Knitting Technology                      | 3 | 1 | 0 | 4         |
| 3                | <b>TT1302</b> | Process and Quality Control in Spinning  | 4 | 0 | 0 | 4         |
| 4                | <b>TT1303</b> | Fabric Manufacture II                    | 4 | 0 | 0 | 4         |
| 5                | <b>TT1304</b> | Textile Chemical Processing I            | 4 | 0 | 0 | 4         |
| 6                | <b>TT1305</b> | Textile Quality Evaluation               | 4 | 0 | 0 | 4         |
| <b>Practical</b> |               |  |   |   |   |           |
| 7                | <b>TT1306</b> | Fabric Manufacture Laboratory II         | 0 | 0 | 3 | 2         |
| 8                | <b>TT1307</b> | Textile Quality Evaluation Laboratory    | 0 | 0 | 3 | 2         |
| 9                | <b>HS1301</b> | Communication and Soft Skills Laboratory | 0 | 0 | 3 | 1         |
| <b>Total</b>     |               |  |   |   |   | <b>28</b> |

### SEMESTER VI

| S.No.            | Subject Code  | Subject  | L | T | P | C         |
|------------------|---------------|--|---|---|---|-----------|
| <b>Theory</b>    |               |  |   |   |   |           |
| 1                | <b>TT1351</b> | Quality assurance in Fabric Manufacture and Garment Production | 4 | 0 | 0 | 4         |
| 2                | <b>TT1352</b> | Textile Chemical Processing II                                 | 4 | 0 | 0 | 4         |
| 3                | <b>TT1353</b> | Garment Technology   | 4 | 0 | 0 | 4         |
| 4                | <b>TT1354</b> | Woven Fabric Structure   | 3 | 1 | 0 | 4         |
| 5                | <b>E1****</b> | Elective I   | 4 | 0 | 0 | 3         |
| 6                | <b>E2****</b> | Elective II  | 4 | 0 | 0 | 3         |
| <b>Practical</b> |               |  |   |   |   |           |
| 7                | <b>TT1355</b> | Knitting and Garment Laboratory                                | 0 | 0 | 3 | 2         |
| 8                | <b>TT1356</b> | Cloth Analysis Laboratory                                      | 0 | 0 | 3 | 2         |
| 9                | <b>TT1357</b> | Textile Chemical Processing Laboratory                         | 0 | 0 | 3 | 2         |
| <b>Total</b>     |               |  |   |   |   | <b>28</b> |

## SEMESTER VII

| S.No.            | Subject Code  | Subject                                  | L | T | P | C         |
|------------------|---------------|--|---|---|---|-----------|
| <b>Theory</b>    |               |  |   |   |   |           |
| 1                | <b>MG1351</b> | Principles of Management                 | 3 | 1 | 0 | 4         |
| 2                | <b>TT1401</b> | Quality assurance in Chemical Processing | 4 | 0 | 0 | 4         |
| 3                | <b>TT1402</b> | Textile Mechanics                        | 4 | 0 | 0 | 4         |
| 4                | <b>TT1403</b> | Computer Application in Textiles         | 4 | 0 | 0 | 4         |
| 5                | <b>E3****</b> | Elective III                             | 3 | 0 | 0 | 3         |
| 6                | <b>E4****</b> | Elective IV                              | 3 | 0 | 0 | 3         |
| <b>Practical</b> |               |  |   |   |   |           |
| 7                | <b>TT1404</b> | Presentation skills and Seminar          | 0 | 0 | 3 | 2         |
| 8                | <b>TT1405</b> | Production Process Laboratory            | 0 | 0 | 3 | 2         |
| 9                | <b>TT1406</b> | Project work (Phase I)                   | 0 | 0 | 3 | 2         |
| <b>Total</b>     |               |  |   |   |   | <b>28</b> |

## SEMESTER VIII

| S.No.            | Subject Code  | Subject                    | L | T | P  | C         |
|------------------|---------------|----------------------------|---|---|----|-----------|
| <b>Theory</b>    |               |                            |   |   |    |           |
| 1                | <b>MG1301</b> | Total Quality Management   | 3 | 0 | 0  | 3         |
| 2                | <b>MG1453</b> | Safety and Risk Management | 3 | 0 | 0  | 3         |
| 3                | <b>E5****</b> | Elective V                 | 3 | 0 | 0  | 3         |
| <b>Practical</b> |               |                            |   |   |    |           |
| 4                | <b>TT1455</b> | Project Work (Phase II)    | 0 | 0 | 12 | 6         |
| <b>Total</b>     |               |                            |   |   |    | <b>15</b> |

## LIST OF ELECTIVES

| S.No.               | Subject Code  | Subject  | L | T | P | C |
|---------------------|---------------|--|---|---|---|---|
| <b>Elective I</b>   |               |  |   |   |   |   |
| 1                   | <b>TT1001</b> | Textured Yarn Technology                           | 3 | 0 | 0 | 3 |
| 2                   | <b>TT1002</b> | Silk Technology                                    | 3 | 0 | 0 | 3 |
| 3                   | <b>TT1003</b> | Mechanics of Textile Structures                    | 3 | 0 | 0 | 3 |
| <b>Elective II</b>  |               |  |   |   |   |   |
| 4                   | <b>TT1004</b> | Fashion art and Design                             | 3 | 0 | 0 | 3 |
| 5                   | <b>TT1005</b> | Technical Textiles                                 | 3 | 0 | 0 | 3 |
| 6                   | <b>TT1006</b> | Nonwoven Fabrics                                   | 3 | 0 | 0 | 3 |
| <b>Elective III</b> |               |  |   |   |   |   |
| 7                   | <b>TT1007</b> | Apparel Product Engineering and Plant Layout       | 3 | 0 | 0 | 3 |
| 8                   | <b>TT1008</b> | Textile Machinery Maintenance                      | 3 | 0 | 0 | 3 |
| 9                   | <b>TT1009</b> | Garment Production Machinery and Equipment         | 3 | 0 | 0 | 3 |
| <b>Elective IV</b>  |               |  |   |   |   |   |
| 10                  | <b>TT1010</b> | Apparel Production Control                         | 3 | 0 | 0 | 3 |
| 11                  | <b>TT1011</b> | Apparel Marketing and Merchandising                | 3 | 0 | 0 | 3 |
| 12                  | <b>TT1012</b> | Creativity, Innovation and New Product Development | 3 | 0 | 0 | 3 |
| <b>Elective V</b>   |               |  |   |   |   |   |
| 13                  | <b>TT1013</b> | Export Documentation and Global Marketing          | 3 | 0 | 0 | 3 |
| 14                  | <b>TT1014</b> | Costing of Apparel Products                        | 3 | 0 | 0 | 3 |
| 15                  | <b>ME1015</b> | CAD / CAM for Apparel Products                     | 3 | 0 | 0 | 3 |

# ANNA UNIVERSITY TIRUCHIRAPPALLI

Tiruchirappalli – 620 024

Regulations 2008

Syllabus

## B.TECH. TEXTILE TECHNOLOGY

### SEMESTER III

#### MA1201 – TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

#### UNIT I      **FOURIER SERIES**      **9**

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of Fourier Series – Parseval's identity – Harmonic analysis.

#### UNIT II      **FOURIER TRANSFORMS**      **9**

Fourier integral theorem (without proof) – Fourier transform pair – Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

#### UNIT III      **PARTIAL DIFFERENTIAL EQUATIONS**      **9**

Formation of partial differential equations – Lagrange's linear equation – Solutions of standard types of first order partial differential equations – Linear partial differential equations of second and higher order with constant coefficients.

#### UNIT IV      **APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS**      **9**

Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional equation of heat conduction (Insulated edges excluded) – Fourier series solutions in cartesian coordinates.

#### UNIT V      **Z -TRANSFORMS AND DIFFERENCE EQUATIONS**      **9**

Z-transforms – Elementary properties – Inverse Z-transform – Convolution theorem – Formation of difference equations – Solution of difference equations using Z-transform.

**L: 45   T: 15   Total: 60**

## **TEXT BOOK**

1. Grewal, B.S, “Higher Engineering Mathematics”, 40th Edition, Khanna publishers, 2007.

## **REFERENCES**

1. Bali.N.P and Manish Goyal, “A Textbook of Engineering Mathematics”, 7th Edition, Laxmi Publications (P) Ltd., 2007.
2. Ramana.B.V., “Higher Engineering Mathematics”, Tata Mc-GrawHill Publishing Company limited, 2007.
3. Glyn James, “Advanced Modern Engineering Mathematics”, 3rd Edition, Pearson Education, 2007.
4. Erwin Kreyszig, “Advanced Engineering Mathematics”, 8th edition, Wiley India, 2007.

**UNIT I INTRODUCTION 9**

SI units law – Series and parallel circuits – Kirchhoff's laws – Mechanical – Star-delta transformation – Magnetic circuits – Force on a current carrying conductor – Electromagnetic induction – Faraday's Law, Lenz's law – Effects of hysteresis and eddy currents – Self and mutual inductances.

**UNIT II CIRCUITS 9**

Generation of an alternating EMF – Average and RMS values of alternating quantity – Representation of alternating quantities by phasors – Single phase circuits – Resonance – Three phase balanced systems – Single and three phase power calculations.

**UNIT III DC MACHINES 9**

Principle of operation of DC machines – EMF equation – Types of generators – Magnetization and Load characteristics of DC generators – Types and characteristics of DC motors – Torque equation – DC motor starters (three point) – Efficiency calculation and Swinburne's test O Speed control.

**UNIT IV TRANSFORMERS AND MOTORS 9**

Construction and principle of operation of single phase transformer – EMF equation O.C. and S.C. tests – Efficiency and regulation – 3F Transformers, transmission and distribution – Principle and operation of three phase induction motors – Types – Slip torque characteristics – Principle and operation of alternators – O.C. and S.C. tests – Regulations by synchronous impedance method.

**UNIT V INSTRUMENTS 9**

Basic principles of indicating instruments – Moving coil and moving iron instruments – Dynamometer type wattmeters – Induction types energy meter – Measurement of single and three phase power.

**Total: 45****TEXT BOOKS**

1. Del Toro "Electrical Engineering Fundamentals", 2nd edition, Prentice Hall Publishers, 2002
2. Ashfaq Husain "Fundamental of Electrical Engineering", 2nd edition, Dhanpat Rai and Co, 2007

**REFERENCES**

1. Edward Hughes "Electrical Technology", 6<sup>th</sup> Edition, ELBS, 1998.
2. Naidu and Kamakshiah "Introduction to Electrical Engineering", TMH, 1998.
3. Kothari, D.P., and Nagrath, I.J., "Theory and Problems of Basic Electrical Engineering", PHI Publishers, 1998.
4. Mittle, V.N., "Basic Electrical Engineering", TMH 2002.

**UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES 9**

Definition, scope and importance – Need for public awareness – Forest resources – Use and over – Exploitation – Deforestation – Case studies – Timber extraction – Mining – Dams and their ground Water – Floods – Drought – Conflicts over water – Dams – Benefits and problems – Mineral resources – Use effects on forests and tribal people – Water resources – Use and over-utilization of surface 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

**UNIT II ECOSYSTEMS AND BIODIVERSITY 9**

Concepts 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

**UNIT III ENVIRONMENTAL POLLUTION 9**

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 – Solid waste management:- Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management:- Floods, earthquake, cyclone and landslides

**UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 9**

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 – 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 – Issues involved in enforcement of environmental legislation – Public awareness.

## **UNIT V HUMAN POPULATION AND THE ENVIRONMENT**

**9**

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.

Field study of local area to document environmental assets – River/Forest/Grassland/Hill/ Mountain.

Field study of common plants, insects and birds – Field study of simple ecosystems – Pond, river, hill slopes, etc.

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

**Total: 45**

### **TEXT BOOKS**

1. Masters, G.M., “Introduction to Environmental Engineering and Science”, 2nd Edition, Pearson Education, 2004.
2. Miller, T.G. Jr., “Environmental Science”, Wadsworth Pub. Co.
3. Townsend C., Harper, J. and Begon, M., “Essentials of Ecology”, Blackwell Science, 2003.
4. Trivedi, R.K., and Goel, P.K., “Introduction to Air Pollution”, Techno-Science Publications.

### **REFERENCES**

1. Erach, B., “The Biodiversity of India”, Mapin Publishing Pvt. Ltd., Ahmedabad, India.
2. Trivedi, R.K., “Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards”, Vol-I and II, Envio Media.
3. Cunningham, Cooper, W.P. and Gorhani, T.H., “Environmental Encyclopedia”, Jaico Publishing House, Mumbai, 2001.
4. Wages, K.D., “Environmental Management”, W.B. Saunders Co., Philadelphia, USA, 1998.



## ME1208 – MECHANICAL ENGINEERING

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### UNIT I LAWS OF THERMODYNAMICS 9

Basic concepts and hints – Zeroth law – First law of thermodynamics – Statement and application – Steady flow energy equation – Second law of Thermodynamics – Statement – Limitations heat engine – Heat pump, Available energy, Kelvin-Planck statement and Clausius statement – Equivalence entropy – Reversibility – Entropy charts – Third law of thermodynamics – Statement – Expressions for : Work done; Internal energy, Hyperbolic and polytropic processes – Free expansion and throttling.

### UNIT II AIR STANDARD EFFICIENCY AND I.C. ENGINES 9

Carnot cycle – Stirlings cycle – Joule cycle – Otto cycle – Diesel cycle – Dual combustion cycle – Engine nomenclature and classifications – SI engine – CI engine – Four stroke cycle two stroke cycle – Performance of I.C. engine – Brake thermal efficiency – Indicated thermal efficiency – Specific fuel consumption.

### UNIT III STEAM AND ITS PROPERTIES 9

Properties of steam – Dryness fraction – Latent heat – Total heat of wet steam – Superheated steam – Use of steam tables – Volume of wet steam – Volume of superheated steam – External work of evaporation – Internal energy – Entropy of vapour – Expansion of vapour – Rankine cycle – Modified Rankine cycle.

### UNIT VI STEAM ENGINES AND TURBINES 9

Hypothetical indicator diagram of steam engine – Working of a simple steam engine – Steam turbines – Impulse and reaction types – Principles of operation.

### UNIT V FLY WHEEL AND DRIVES 9

Kinematic link – Kinematic pair – Kinematic chain – Slider Crank mechanism and inversions – Double slider crank mechanism and inversions – Turning moment diagram – Fluctuation of energy – Design of fly wheel – Belt and rope drives – Velocity ratio – slip – Ratio of tensions – Length of belt – Maximum HP – simple, compound and Epicyclic gear trains – Balancing of rotating masses in same plane – Balancing of masses rotating in different planes.

**Total: 45**

### TEXT BOOKS

1. Smith, Chemical Thermodynamics, Reinhold Publishing Co., 1977.
2. Bhaskaran, K.A., and Venkatesh, A., Engineering Thermodynamics, Tata McGraw-Hill, 1973.

### REFERENCES

1. Pandya, A., and Shah, “Theory of Machines”, Charatakar Publisheres, 1975.
2. NAG, P.E., “Engineering thermodynamics”, 2nd Edition, Tata McGraw-Hill Publishing Co., Ltd., 1995.

## TT1201 – SPUN YARN TECHNOLOGY I

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

### UNIT I      GINNING AND BLOWROOM      12

Objectives of ginning – Study of working of different gins – Knife roller gin – Saw gin – Ginning out-turn – Effect of ginning performance on yarn quality – Power requirement in ginning.

Objectives of blowroom – Principle and description of opening – Cleaning and blending machines – Concepts of opening intensity and cleaning efficiency – Settings and speeds of various Openers/cleaners – Sequence of machines in modern blowroom line – Blowroom line for cotton and man-made fibres and their blends – Dust extractors, filters, waste collection – Mechanism of lap formation, chute feed – Power requirement in blowroom.

### UNIT II      CARDING      12

Objectives of carding – Basics of opening – Cleaning and fibre individualization – Study of working of semi high production – High production cards – Speeds and setting of functional elements – Concept of auto levelling in carding – Drives, card clothing and production calculation – Concept of cylinder loading and the factors influencing it – Latest developments in carding to increase production and sliver quality.

### UNIT III      DRAWFRAME      12

Basic principles of doubling and drafting – Description of working of various drafting systems – Concept of roller flutes, roller setting, roller pressure, web condensation and roller lapping – Study of stop motions – Draft and production calculation – Effect of roller defects, roller setting, roller pressure, break draft and draft distribution on sliver quality – Process parameters for processing cotton, man-made fibres and blends – Working of autoleveller on drawframe – Developments in drawframe machines – Influence of drawframe sliver quality on yarn characteristics.

### UNIT IV      COMBER      12

Requirement and objectives of comber preparatory process – Methods of lap preparation – Lap doubling process, sliver doubling process, their merits and limitations – Objectives and principles of combing – Working of comber – Sequence and timing of operations in combing – Types of feeding – Concurrent feed and counter feed – Degree of combing – Combing efficiency – Concept of piecing waves, asymmetric web condensation – Comber waste in relation to pre-comber draft, direction of fibre hooks, type of feed, top comb setting – Settings and production calculation – Determining optimum level of comber waste for different mixings and yarn counts – Introduction to modern combers.

### UNIT V      SPEEDFRAME      12

Objectives of speedframe – Principle of working of modern speedframe – Differences between bobbin lead / flyer lead roving processes – Mechanism of winding and bobbin building – Settings and speeds – Draft, twist and production calculations – Effect of roller setting, roller pressure, apron spacing on roving quality – Importance of roving quality on ringframe performance and yarn quality.

**Total: 60**

## **TEXTBOOKS**

1. Klein W., Vol. 1-3, "The Technology of Short Staple Spinning", "A Practical Guide to Opening and Carding" and "A Practical Guide to Combing, Drawing, and Roving frame", The Textile Institute, 1998.
2. Chattopadhyay R. (Ed), "Advances in Technology of Yarn Production", NCUTE, IIT Delhi, 2002.

## **REFERENCES**

1. Chattopadhyay R., Technology of Carding, NCUTE, IIT Delhi, 2003.
2. Chattopadhyay R. and Rengasamy R., "Spinning, Drawing, Combing & Roving, NCUTE Pilot Programme.
3. Salhotra K. R. and Chattopadhyay R., "Book of papers on "Blowroom and Carding", IIT Delhi 1998.
4. Duraiswamy I, Chellamani P and Pavendhan A., "Cotton Ginning" Textile Progress, The Textile Institute, 1993.

## EE1210 – ELECTRICAL ENGINEERING LABORATORY

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 2 |

1. Open circuit characteristics of D.C. shunt generator.
2. Load characteristics of D.C. shunt generator
3. Load characteristics of D.C. compound generator
4. Load test on D.C. shunt motor
5. Study of D.C. motor starters
6. O.C. and S.C. tests on single phase transformer
7. Load test on single phase transformer
8. Load test on 3 - phase squirrel cage induction motor
9. Study of 3 - phase induction motor starters
10. Load test on 3 - phase slip ring induction motor
11. O.C. and S.C. tests on 3 - phase alternator
12. Synchronization and V-curves of alternator

**Total: 45**

## ME1209 – MECHANICAL ENGINEERING LABORATORY

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 2 |

### EXPERIMENTS

1. Heat balance on Diesel engine
2. Mechanical load test on petrol engine
3. Morse test on multi cylinder petrol engine
4. Volumetric efficiency on Diesel engine
5. Volumetric efficiency on two state reciprocating compressor
6. COP in compression refrigeration cycle
7. Test on Air conditioning system
8. Viscosity Index, Flash and Fire point of Lubricant
9. Valve timing diagram in Diesel engine
10. Port timing diagram

### EQUIPMENTS

1. Diesel Alternator Set
2. Diesel Engines
3. Petrol Engines
4. Multi Cylinder Petrol engine
5. Two stroke Reciprocating Compressor
6. Compression Refrigeration Cycle
7. Air Conditioning System
8. Viscosity, Flash and Fire point apparatus
9. Steam power plant
10. Two stroke engines
11. Bomb calorimeter
12. Orsat apparatus
13. Gas calorimeter

**Total: 45**

## TT1202 – SPUN YARN TECHNOLOGY LABORATORY I

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 2 |

### EXPERIMENTS

(Minimum of Ten Experiments shall be offered)

1. Study of ginning machine
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

### MACHINERY REQUIRED

1. Lab model Ginning machine
2. Miniature Blowroom line
3. Carding machine
4. Drawframe
5. Comber Preparatory machines
6. Comber
7. Speedframe

**Total: 45**

# SEMESTER IV

## TT1251 – CHEMISTRY FOR TEXTILES

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### UNIT I CARBOHYDRATES 9

Introduction – Mono, di-saccharides – Important reactions – Polysaccharides – Starch and cellulose – Structure and properties – Reactions of cellulose – Derivatives of cellulose – Carboxy-methyl cellulose, secondary cellulose acetate, cellulose triacetate – Lignin – Structure and properties – Delignification of lignocelluloses – Chemistry and mechanism – Preparation – Physical and chemical properties of regenerated cellulose and its textile uses.

### UNIT II AMINOACIDS AND PROTEINS, OILS, FATS AND WAXES 9

Classification of proteins – Test for proteins – Denaturation – Wool and silk – Chemical composition – Properties (chemical and physical) – Structural aspects and application – Analysis of oils and fats – Classification of waxes – Fatty, waxy / gummy and protein materials present in natural fibres (Cotton, silk, wool etc) and their removal.

### UNIT III BLEACHING AGENTS 9

Oxidative (Chlorite, Hypochlorite and Hydrogen peroxide) and reductive substances (Borohydrides, Sulphites, Hydrosulphites etc.) – Bleaching agents and their mechanism of action in textile bleaching – Heterocyclic compounds furan – Thiophene – Pyrrole – Pyridine and indole – Their important derivatives.

### UNIT IV DYES 9

Colour and constitution – Light absorption properties of dyes – Beer, Lambertz law – Dye estimation by spectrophotometer – Classification of dyes and intermediates viz, azines, oxazines, thiazine, acridine, thiazole, equinoline, cyanide dyes, diphenyl and triphenyl methane dyes – Structure and synthesis of important azo dyes (methyl orange, congo red and methyl red), diphenyl methane dyes (malachite green, para rosaniline) and anthraquinone dyes (alizarin) – Indigoid, thioindigoid, Solubilized vat dyes – Reducing agents in vat dyeing and their reduction potentials – Sulphur color, phthalocyanine and phthalin dyes – Reactive dyes and mordant dyes – Disperse dyeing and its mechanism – Cationic dyestuff – Natural dyes – Source, extraction and the structure of the dye component – Fluorescent brightening agents – Their chemistry, preparation and uses.

### UNIT V THEORY OF DYEING 9

Polymer – Dye interactions – Substantivity and affinity – Kinetics and thermodynamics of dyeing – Derivation of affinity equation – Various adsorption isotherms in dyeing and their thermodynamic derivations – Dye diffusion (Ficks first and second laws) – Equilibrium adsorption – Partition coefficient – Time of half – Dyeing – Dye ability and dye diffusion temperature – Derivation of William Landed Ferry (WLF) equation and its significance – Free volume and solubility parameter concepts in dyeing.

**Total: 45**

## **TEXT BOOKS**

1. Shenai, V.A., "Introduction to Chemistry of Dyestuffs", Sevak Publications, 1995.
2. Peters, R.H., "Textile Chemistry the Physical Chemistry of Dyeing", Vol. 3, Elsevier, 1975.

## **REFERENCES**

1. Bahl, B.S. and Arun Bahl., "Advanced Organic Chemistry", Sultanchand and Sons, 1994.
2. Anonymous, "The Chemistry of Synthetic Dyes", Vol. 1 and 2, Academic Press, 1971.
3. Bird, C.L. and Boston, W.S., "The Theory of Colouration of Textiles", Dyers Company Publications Trust, 1975.
4. Trotman, E.R. and Kent, E. A., "Dyeing and Chemical Technology of Textile Fibres", 1987.

## EI1254 – ELECTRONICS AND INSTRUMENTATION

|          |          |          |          |
|----------|----------|----------|----------|
| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>3</b> | <b>0</b> | <b>0</b> | <b>3</b> |

### **UNIT I PRINCIPLES 9**

Electronic principles – PN devices – Semi conductor diodes – Transistors – Basics – Integrated circuits – Operational amplifier ICS – Characteristics and pin details analog circuits – Amplifiers using operational amplifier IC – Inverting, noninverting, differential, summers, integrators, differentiators – Other signal conditioning circuits – Basics of passive and active filters.

### **UNIT II DEVICES 9**

Addition, subtraction devices – Function generation – Linearization – Digital circuits – Clock – Gates – Truth table – Decoders, encoders, ROM and RAM – Flip -lops – Counters -ripple, divide by N and up down counters – Microprocessor based systems – An elementary introduction of the chips and organization – Analog to digital conversion – Digital applications of signal conditioning.

### **UNIT III MEASUREMENTS 9**

General measurement system – An introduction – Static and dynamic measurement – System response – Rise time – Distortion – Impedance matching – Basic input circuits – Ballast – Voltage divider and bridge circuits – Sensitivity and loading error of these circuits – Motion measurement – translational, rotary and relative displacement transducers, resistive transducers – Capacitive, inductive pick ups – LVDT.

### **UNIT IV INSTRUMENTS 9**

Strain gauges – Basics and types – Piezo resistance gauge factor – Mounting of strain gauges and strain bridges – Calibration and balancing – Force measurement – Torque and load cells – instrumentation – Temperature measurement – Standards and calibration – Thermal expansion methods – Thermo electric sensors – Basics – Types – Materials – Circuits – Bridge compensation – Cold junction circuits – Electric resistance and semiconductor temperature sensors – Flow measurement – Velocity – Magnitude and direction measurement – Anemometers – Discharge measuring sensors – Mass flow meters, pH, viscosity, liquid level, humidity measurement. Spectrophotometry – Calorimetry – Gas Chromatography.

### **UNIT V INSTRUMENTATION 9**

Speed measurement and event counting using photo electric and reluctance principles – Proximity sensors – Instrumentation specific to textile processing industry – Indicating and recording devices – Basic analog and digital meters – Standards and calibration – Cathode ray oscilloscopes and XY plotters and digital printers and plotters – Magnetic disc and tape storage – Data loggers. Industrial instrumentation – Dielectric heating – Electronic relay circuits – SCR, DIAC, and TRIAC – elementary power electronics – Elementary temperature control circuits – Types of process controllers – Proportional and PDI control – Open loop and feed back control systems – servomechanisms – Its response – Typical self – Balancing relayed – Chopper based and On-off controllers – Computerised data acquisition and control in the textile processing industry.

**Total: 45**

## **TEXT BOOKS**

1. Doebelin, O.E., "Measurement System", Mc Graw Hill International Book Co., 1983.
2. Ralph, B. and Nathan, W., "Industrial Electronic Circuits and Applications", Prentice Hall India Ltd., 1972.

## **REFERENCES**

1. Human, J.P., "Experimental Methods for Engineers", McGraw – Hill Book Co., 1978.
2. Millman and Halkian., "Electronic Fundamentals and Applications", McGraw Hill, 1972.

## TT1252 – FABRIC MANUFACTURE I

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### UNIT I BASICS OF WINDING 9

Classification of winders – Characteristics of parallel winding cross winding and precision winding – Types and working principles of yarn clearers, knotters and splicers – Classification of yarn faults – Types of tensioners, guides – Cop unwinding characteristics – Stop motions – Cone defects, causes and rectification.

### UNIT II WINDING 9

Features of automatic cheese and cone winders – Winding of synthetic yarns, blended yarns and sewing threads – Package quality for dyeing – Productivity calculations of winding machine – Types and working principle of Pirn winding machines – Bunching, stop motions – Features of automatic pirn winding machine – Production and efficiency calculation – Process control in pirn winding – Pirn defects – causes and remedies.

### UNIT III WARPING 9

Beam warping machines – Types – Creels – Stop motion – Brakes – Length measuring motion – Features of modern warping machines – Sectional warping machine – Creel – Lease reed – Stop motion – End breaks in warping – Quality control – Beam defects – Causes – Remedies.

### UNIT IV SIZING 9

Types and selection of ingredients for sizing – Size preparation and storage equipments – Sizing machines – Multi-cylinder and hot air – Marking and measuring motion – Control systems in sizing machines – Mechanism of cylinder drying – Beam pressing devices – Mechanical, pneumatic, hydraulic.

### UNIT V DEVELOPMENTS IN SIZING AND DRAWING-IN 9

Single end sizing machines – Sizing of blended and filament yarns – Process control in sizing – Sizing faults – Causes and remedies – Modern development in sizing – Efficiency and production calculations.

Need for drawing-in operation – Working principles of manual – Semiautomatic and automatic drawing in machines – Knotting, pinning machines.

**Total: 45**

### TEXT BOOKS

1. Ajgaonkar, D.B., Talukdar, M.K. and Wedekar, “Sizing: Material Methods and Machineries”, Mahajan Publications, 1999.
2. Lord, P.R. and Mohammed, M.H., “Weaving – Conversion of Yarn to Fabric”, Merrow Publication, 1992.

### REFERENCES

1. Modi, J.R.D., “Sizing Ingredient”, Mahajan Publications,
2. Ormerod, A., “Modern Preparation and Weaving”, Merrow Publication Co, 1988.
3. Sengupta, E., “Yarn Preparation”, Vol. 1 and 2, Popular Prakasam, 1970.
4. Talukdar M.K., “An Introduction to Winding and Warping”, Testing Trade Press.

## MA1256 – PROBABILITY AND STATISTICS

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

### UNIT I      RANDOM VARIABLES

9

Discrete and continuous random variables – Properties – Moments – Moment generating functions and their properties – Binomial, poisson, geometric, negative binomial, uniform, exponential, gamma, and weibull distributions.

### UNIT II      TWO DIMENSIONAL RANDOM VARIABLES

9

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Regression – Function of a random variable – Transformation of random variables – Central limit theorem.

### UNIT III      TESTING OF HYPOTHESIS

9

Sampling distributions – Testing of hypothesis for mean, variance, proportions and differences using Normal, t, Chi-square and F distributions – Tests for independence of attributes and goodness of fit.

### UNIT IV      DESIGN OF EXPERIMENTS

9

Analysis of variance – One-way classification – CRD – Two-way classification – RBD – Latin square.

### UNIT V      RELIABILITY AND QUALITYCONTROL

9

Concepts of reliability – Hazard functions – Reliability of series and parallel systems – Control charts for measurements (x and R charts) – Control charts for attributes (p, c and np charts).

**L: 45   T: 15   Total: 60**

### TEXT BOOKS

1. Milton, J. S. and Arnold, J.C., “Introduction to Probability and Statistics”, 4th Edition, Tata McGraw Hill, 2007.
2. Johnson, R.A. and Gupta, C.B., “Miller and Freund’s Probability and Statistics for Engineers”, 7th Edition, Pearson Education, 2007.

### REFERENCES

1. Walpole, R. E., Myers, R. H., Myers, R. S. L. and Ye. K., “Probability and Statistics for Engineers and Scientists”, 7th Edition, Pearsons Education, 2002.
2. Navidi, W., “Statistics for Engineers and Scientists”, Tata McGraw Hill Publishing Company Ltd, 2008.
3. Spiegel, M.R., Schiller, J. and Alu Srinivasan, R., “Schaum’s Outlines Probability and Statistics”, Tata McGraw Hill Publishing Company Ltd, 2007.

## TT1253 – SPUN YARN TECHNOLOGY II

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### UNIT I RING SPINNING

9

Principle of ring spinning – Detailed study of modern ring frame creel – Suspension type of bobbin holder – Drafting system – Angle of roller stand, fluted rollers – Types of flutes – Cots, aprons and their specifications – Types of top roller loading systems – Spring loading, pneumatic loading – Functions of yarn guide, balloon control ring, separators, rings and travellers – Symmetric and asymmetric rings-ring / traveller interaction and profile matching – Antiwedge ring and elliptical traveller, orbit ring / traveller, zenith ring / traveler – Spindles – Spindle size, spindle drives – Traveller lag – Traveller burning and control – Cop building – Ring rail movements, builder motion, doffing procedure – Process parameters, speeds, settings – Draft-production particulars for cotton, synthetics and blends.

Condensed yarn spinning – Principle of compacting drafted fibre strand – Different methods of condensed yarn manufacture – Condensed yarn properties vis-à-vis conventional ring-spun yarn properties – Benefits and limitations of condensed yarn spinning.

### UNIT II ROTOR SPINNING

9

Principle of open end rotor spinning – Mechanism of yarn formation – Fibre individualisation – Fibre assembling – Integration of fibres into open end of yarn – Twist insertion, yarn withdrawal – Yarn structure – Fibre orientation and extent, fibre migration, twist structure, packing of fibres in yarn – Raw material specification and fibre characteristics for optimum performance and yarn quality – Process parameters influencing spinning performance and yarn quality – Opening roller speed and wire profile, rotor diameter, rotor speed, groove design, profile of doffing tube – Yarn characteristics – Strength and extension – Unevenness and imperfections – Hairiness, flexural rigidity, abrasion resistance – Latest developments in rotor spinning – Economic benefits – Technological and economic limitations for production of finer yarns – End uses of rotor – Spun yarns.

### UNIT III FRICTION SPINNING

9

Introduction – Principle of operation – History of machine developments – PSL Masterspinner – DREF-1 Friction Spinner – DREF-2 Friction Spinner – DREF-3 Friction Spinner – DREF-5 Friction Spinner – DREF-2000 Friction Spinner – DREF-3000 Friction Spinner – Yarn Formation process – Fibre feed, fibre assembly, twist insertion, yarn withdrawal – Yarn structure – Structure of open end friction spun yarn, structure of core-sheath type (DREF-3) friction spun yarn – Raw material requirement and fibre characteristics for friction spinning – Influence of process parameters – Spinning drums' speed, yarn withdrawal rate, friction ratio, suction air pressure, core-sheath ratio – Factors influencing fibre slip and twisting efficiency – Applications fields for open-end and core-sheath type friction-spun yarns – Merits and demerits of friction spinning – Latest developments in friction spinning.

## UNIT IV AIR-JET SPINNING

9

Introduction to false twisting – Basic principles and methods of fasciated yarn manufacture – Dupont's rotofil process – Toray air-jet spinning process – Murata jet spinning – Murata vortex spinning – Importance of fibre characteristics for optimum spinning performance and yarn quality – Classification of fasciated yarn structure – Yarn properties – Yarn quality in relation to various process parameters, air pressure, draft, delivery rate, ribbon width, feed ratio – Developments in air-jet spinning – 5-line high drafting system – Murata twin spinning – Murata roller jet spinning – Murata vortex spinning – MVS 851, MVS 861. Applications of air-jet spun yarns.

## UNIT V OTHER SPINNING METHODS

9

**Wrap spinning** – Principle of operation – Yarn structure and properties – Spinning limits – Applications of yarns.

**Double-rove spinning** – Operating principle – Process monitor – Effect of strand spacing on spinning performance and yarn quality – Process limitation – Introduction to solo-spun technology – difference between siro spinning and solo spinning, end uses of siro-spun and solo-spun yarns.

**Core yarn spinning** – Basic principle and requirements of core yarn spinning – Different methods of core yarn production – Manufacture of core yarn in ring spinning, rotor spinning, friction spinning, air-jet spinning, raw materials for core yarn spinning – Applications of core-spun yarns.

**Twistless and Self-twist spinning** – Basic principles of yarn manufacture – Yarn characteristics and end uses – Latest developments.

**Total: 45**

## TEXT BOOKS

1. Klein, W., "A Practical Guide to Ring Spinning, 1987" Vol.4 and 5, and "New Spinning Systems, 1993" The Textile Institute, Manchester, 1987.
2. Gowda, R.V.M., "New Spinning Systems", NCUTE, IIT Delhi, 2003.

## REFERENCES

1. Chattopadhyay, R., "Advances in Technology of Yarn Production", NCUTE, IIT Delhi, 2002.
2. Lawrence, C.A. and Chen, K.Z., "Rotor Spinning", Textile Progress, Vol. 13, Textile Institute, 1981.
3. Basu, A., "Progress in Air-jet Spinning", Textile Progress, Vol. 29, Textile Institute, 1997.
4. Ishtiaque, S.M., Salhotra, K.R. and Gowda R.V.M., "Friction Spinning", Textile Progress, Vol. 33, Textile Institute, 2001.

## TT1254 – STRUCTURE AND PROPERTIES OF FIBRES

| L | T | P | C |
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9

### UNIT I STRUCTURE OF FIBRES

Basic requirements for fibre formation – Structure of natural and man-made textile fibres – Chemical structure, fine structure, and morphological structure of cotton, viscose, acetate, polyester, polyamide, polyacrylonitrile, polyethylene, polypropylene and bast fibres – Basic concepts of intra- and inter-molecular forces, degree of order, degree of orientation of molecular chains, ordered and disordered regions – Models of fibre structure – Fringed micelle model, modified-fringed micelle model, fringed fibril model – Investigation of fibre structure – Electron microscopy, x-ray diffraction methods, infra-red radiation techniques, density measurement.

### UNIT II MOISTURE ABSORPTION PROPERTIES OF FIBRES

9

Definitions of humidity – Absolute humidity and relative humidity, moisture content and regain – Hygroscopic nature of fibres – Regain curves – Measurement of regain and determination of correct invoice mass in fibres – Hysteresis in moisture absorption – Equilibrium absorption of moisture by fibres – Effect of fibre structure – Hydrophilic groups and non-crystalline regions on moisture absorption – Effect of ambient conditions – Relative humidity and temperature on regain of fibres – Heats of sorption – Differential and integral – Relation with fibre structure and regain, measurement of heat of wetting – Conditioning of fibres – Mechanism of conditioning – Factors influencing rate of conditioning – Effect of conditioning on fibre properties – Swelling of fibres, axial swelling, transverse swelling, area swelling and volume swelling.

### UNIT III MECHANICAL PROPERTIES OF FIBRES

9

Tensile testing of fibres – Cotton, viscose, acetate, modal, lyocel, polyester, polyamide, polyacrylonitrile, jute and flax fibres – Definitions of terms – Load, elongation, breaking strength, breaking extension, tensile stress, tensile strain, mass specific stress, yield point, initial modulus, work of rupture and work factor – Stress-strain curves for various textile fibres and their significance – Influence of fibre structure – Humidity and temperature on stress-strain characteristics of fibres – Methods of tensile testing – Constant rate of loading and constant rate of extension – Differences between the two methods of test – Elastic properties – Elasticity, elastic recovery and its relation to stress and strain, typical values of elastic recovery and work recovery for various textile fibres – Mechanical conditioning of fibres – Advantages – Time effects – Stress relaxation and creep phenomena – Dynamic tensile testing of fibres – Torsional rigidity – Its relation to other fibre properties – Measurement techniques – Flexural rigidity – Its relation to other fibre properties, measurement techniques.

### UNIT IV OPTICAL AND FRICTIONAL PROPERTIES

9

Refractive index of fibres – Definition – Factors influencing and measurement – Birefringence – Measurement techniques – Effect of factors like fibre orientation, density and regain – Optical orientation factor – Its relation with refractive index and birefringence – Reflection of light – Specular and diffused reflection, lustre, lustre index – Factors influencing luster – Absorption of light – dichroism, dichroic ratio – Introduction to fibre friction – Theories of friction – Amonton's law – Bowden's adhesion shearing mechanism – Lincoln's law – Measurement of friction – Friction between single fibres – Friction between fibre assemblies – Factors influencing fibre friction – Role of friction in fibre processing – Friction in wool – Directional frictional effect, felting.

Definition of electrical resistance – Electrical resistance of fibres – Measurement of resistance in fibres – Factors influencing electrical resistance – Dielectric properties – Factors influencing dielectricity – Static electricity – Generation of static charge and measurement – Problems encountered during processing – Elimination techniques – Thermal properties – Specific heat, thermal conductivity, thermal expansion and contraction – Structural changes in fibres on heating, thermal transitions – Glass transition and melting, heat setting – Flammability characteristics of fibres.

**Total: 45**

**TEXT BOOKS**

1. Morton, W.E., and Hearle, J.W.S., “Physical Properties of Textile Fibres”, The Textile Institute, Manchester, 1993.
2. Meredith, R., and Hearle, J.W.S., “Physical Methods of Investigation of Textiles”, Wiley Publication, 1989.

**REFERENCES**

1. Gupta, V.B., “Textile Fibres: Developments and Innovations”, Vol. 2, IAFL Publications, 2000.
2. Meredith, R., “Mechanical Properties of Textile Fibres”, North Holland, 1986.
3. Murthy, H.V. S., “Introduction to Textile Fibres”, The Textile Association, India, 1987.
4. Mishra, S.P., “Fibre Science and Technology”, New Age International Publishers, 2000.

## EI1255 – ELECTRONICS AND INSTRUMENTATION LABORATORY

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 2 |

1. Introduction to measuring and testing instruments – multimeter and oscilloscope.
2. Circuit practice on 741 op-amp applications – I
3. Circuit practice on 741 op-amp applications – II
4. Building timer based circuits using 555 IC.
5. Power supplies – building basic rectifier supplies.
6. Using TTL counter ICS to build event counters.
7. LDR transducer for displacement sensing
8. Strain guage transducer – mounting and wiring
9. Capacitive rotational displacement transducer.
10. Inductive pick up- Piezoelectric pick up.
11. Photoelectric and variable reluctance pick up.
12. Thermo couple – use and calibration.
13. Experiments on RTD – Thermistor and expansion gauges.
14. Using pH meters, discharge meters and anemometers.  
study of 8085 and 8031 microprocessor kits – their functions
15. Data loggers – Computerized data acquisition and data processing.

**Total:45**

### LIST OF EQUIPMENTS

1. Multimeter and oscilloscope.
2. TTL counter
3. LDR transducer
4. LDR transducer
5. Strain guage transducer
6. Displacement transducer
7. pH meters
8. Discharge meters
9. anemometers
10. 8085 and 8031 microprocessor kits
11. Data loggers

**TT1255 – FABRIC MANUFACTURE LABORATORY I**  
(Minimum of 10 experiments shall be offered)

**L   T   P   C**  
**0   0   3   2**

**LIST OF EXPERIMENTS**

Specification, Mechanism, Settings, Drives and Assembly of parts for the following machines

1. Conventional Cone Winder
2. Automatic cone Winder
3. Conventional/Automatic Pirn Winder
4. Sectional/Beam Warping machine
5. Study of Knotters/Splicers
6. Study of yarn unwinding from cop and yarn tensioner
7. Preparation of size paste and measurement of its characteristics
8. Measurement of Adhesive Power of size (Roving method)
9. Hank/Single end sizing of cottong warp
10. Study of cone characteristics
11. Study of pirn characteristics
12. Mechanisms for regulating pirn dimensions and characteristics

**Total: 45**

**LIST OF MACHINES REQUIRED**

1. Drum winding machine
2. Pirn winding machine
3. Sizing chemicals
4. Warping machine

## TT1256 – SPUN YARN TECHNOLOGY LABORATORY II

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 2 |

### LIST OF EXPERIMENTS

1. Study of construction details and technical specifications of different makes/models of ring frames
2. Speed and draft calculations in ring frame
3. Study of various settings on ring frame
4. Twist and production calculations in ring frame
5. Study of builder motion mechanism in ring frame
6. Production and twist calculation of Two-For-One twister (TFO)
7. Studies on influence of TFO process variables on two-fold yarn quality
8. Production and quality characterization of two-fold spun and blended yarns
9. Production of fancy yarns on TFO
10. Production and twist calculation in rotor spinning

**Total: 45**

### LIST OF MACHINERY REQUIRED

1. Ring frame (lab model)
2. TFO (lab model - Desirable)
3. Rotor spinning machine (lab model - Desirable)

## SEMESTER V

### GE1301 – PROFESSIONAL ETHICS AND HUMAN VALUES

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

#### UNIT I HUMAN VALUES 9

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – 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 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 Ethics (Specific to a particular Engineering Discipline).

**Total: 45**

#### TEXT BOOKS

1. Mike Martin and Roland Schinzinger, "Ethics in engineering", McGraw-Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, " Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

#### REFERENCES

1. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)
2. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

## TT1301 – KNITTING TECHNOLOGY

L T P C  
3 1 0 4

### UNIT I BASIC CONCEPTS 9

Properties of woven and knitted fabrics – Terms and definitions used in knitting – Yarn quality requirements for knitting – Comparison of warp and weft knitting – Classification of warp and weft knitting machines – Knitting needles: Spring – Beard – Latch – Compound needles.

### UNIT II WEFT KNITTING 9

Classification of weft Knit structure – Technical terms and symbolic representation of weft knit structure – Characteristics of plain, rib, interlock, purl knit structures – Rib, interlock and purl circular knitting machines – Fundamentals of formation of knit, tuck and float stitches – Factors affecting the formation of loop – Effect of loop length and shape on fabric properties – Faults in knitted fabrics – Causes and remedies – Production calculation.

### UNIT III FLAT KNITTING 9

Basic principles and 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 – Jacquard knitting – Pattern wheel, pattern drum – Tape patterning devices – Electronic devices.

### UNIT IV WARP KNITTING 9

Warp knitting fundamentals – Basic warp knitted structures – Closed lap and open lap stitches – Classification of warp knitting machines – Knitting elements of Raschel and Tricot knitting machine – Difference between Raschel and Tricot knitting machine – Representation of warp – Knit structure.

### UNIT V YARN REQUIREMENTS, DEFECTS & CALCULATIONS 9

Basic Yarn Properties for Weft and Warp Knitting – Defects in weft and Warp Knitted fabrics, causes and remedies – Test for Weft Knit quality – Knitting Calculations for Weft Knits and Warp Knits.

**L: 45 T: 15 Total: 60**

### TEXT BOOKS

1. Ajgaonkar, D.B., “Knitting Technology”, Universal Publication Corporation, 1998.
2. Spencer, D.J., “Knitting Technology”, Textile Institute, 1989.

### REFERENCES

1. Chandrasekhar Iyer, Bernd Mammal and Wolfgang Schach., “Circular Knitting”, Meisenbach GmbH, 1995.
2. Samuel Raz., “Flat Knitting; The new generation”, Meisenbach GmbH.
3. Samuel Raz., “Warp Knitting Production”, Melliand Textilberichte GmbH, 1987.

## TT1302 – PROCESS AND QUALITY CONTROL IN SPINNING

|   |   |   |   |
|---|---|---|---|
| L | T | P | C |
| 4 | 0 | 0 | 4 |

### UNIT I      PROCESS CONTROL CONCEPT AND STATISTICAL APPLICATION      12

Scope of process control in spinning – Identification of process variables and product characteristics to control process in the blowroom – Card – Drawframe – Comber – Speedframe and yarn spinning – Concepts of developing norms and standards for spinning process – Application of statistical techniques in process and quality control.

### UNIT II      CONTROL OF RAW MATERIAL QUALITY      12

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

### UNIT III      CONTROL OF YARN REALIZATION AND WASTE      12

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

### UNIT IV      YARN QUALITY CONTROL      12

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

### UNIT V      PRODUCTION CONTROL      12

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

**Total: 60**

#### TEXT BOOKS

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

#### REFERENCES

1. Chattopadhyay R., “Advances in Technology of Yarn Production”, NCUTE Publication, 2002.
2. Van der Sluiji, M., and Hunter L., “Neps in Cotton Lint”, Textile Progress, The Textile Institute, 1999.
3. Klein W., “Man-made Fibre and their Processing”, The Textile Institute, 1994.
4. Slater K., “Yarn Evenness”, Textile Progress, The Textile Institute, 1986.

## TT1303 – FABRIC MANUFACTURE II

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

### UNIT I BASIC CONCEPTS 12

Basic weaving motions – Warp let-off, shedding – Filling insertion – Beat-up – Take-up auxiliary functions – Classification of looms – Loom timing diagram for different motions – Negative and positive cam shedding – Negative and positive dobby shedding – Cross border dobby – Pick finding device and dobby pegging.

### UNIT II PRIMARY MOTIONS 12

Jacquard shedding – Single lift – Single cylinder – Double lift – Single cylinder – Double lift – Double cylinder jacquards – Electronic jacquards – Card cutting lasing – Cone overpick – Side leverpick – Cone underpick – Ruti underpick – Swell checking – Check straps – Hydraulic swell checking – Check straps – Hydraulic checking – 4 bar 6 bar linkage – Beat up mechanism – Crank arm types.

### UNIT III SECONDARY AND AUXILIARY MOTIONS 12

Weaving accessories –Types and selection of heald wires – Heald frames – Reeds – Shuttles – Picking accessories – Drop wires – Temples.  
Negative let off and positive let off – Five and seven wheel take up motions – Continuous take up motion – Loose reed and fast reed mechanisms – Types of warp stop motions – Multiple box motions – Pick at will motion.

### UNIT IV SHUTTLELESS WEAVING 12

Weft feelers – Different types – Pirn transfer mechanisms – Thread cutters – Eye and temple cutters – Yarn quality requirements for shuttleless looms – Principles of weft insertion in shuttleless loom – Weft accumulators – Selvedges – Mechanisms of weft insertion by projectile – Rapier – Airjet and waterjet – Technoeconomics of shuttleless weaving.

### UNIT V DEVELOPMENTS IN WEAVING 12

Multiphase looms – Quick style changes – Weaving of rotor spun yarns – Blended Yarns – Filament yarns – Denim – Warp preparation and weaving of terry fabrics – Improving productivity.

**Total: 60**

## **TEXT BOOKS**

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

## **REFERENCES**

1. Lord P.R. and Mohamed M.H., “Weaving: Conversion of Yarn to Fabric”, Merrow Publications, 1992.
2. Chakravorthy B., “Mechanism of Weaving Machines”, Smt.Chakravorthy serampore W.B.1982.
3. Ormerod, “Modern Preparation and Weaving”, Butterworths and Co. Ltd., 1983.
4. Talavasek, O.,and Svaty, V., Shuttleless Weaving Machines, Elsevier Scientific Pub. Co., 1981.
5. Adanur S., “Handbook of Weaving”, Technomic Publishing Co., Inc., 2001.

## TT1304 – TEXTILE CHEMICAL PROCESSING I

|          |          |          |          |
|----------|----------|----------|----------|
| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>4</b> | <b>0</b> | <b>0</b> | <b>4</b> |

### **UNIT I SINGEING AND DESIZING 12**

Wet process sequences for cotton, wool, silk, blended fabrics – Singeing – Yarn singeing machines – Gas singeing machine for woven and tubular knits – Classification of desizing methods – Hydrolytic methods and oxidative methods – Enzymatic desizing – Scouring – Kier boiling – Saponification – Emulsification – Detergency-lime boil Vs soda boil – Types of Kier-Wool carbonizing – Degumming of silk.

### **UNIT II BLEACHING AND MERCERISATION 12**

Bleaching of cotton: Hypochlorite – Hydrogen peroxide – Sodium chlorite – Batchwise – Semi-continuous and Continuous processes – Continuous scouring and bleaching machines – Washing ranges – Hydro extractors – Bleaching of viscose / linen, cotton / viscose and polyester / cotton blends.

Mercerisation: Theory of processes – Methods – Chemicals-effects – Yarn mercerizer – Chain and Chainless mercerisers – Circular mercerizing machine – Liquid ammonia treatment – Equipments – Kier-J box-Pad roll, Mangles, Jigger, Winch, Jet and Softflow machines – Dryers – Stenter and stretching devices.

### **UNIT III DYEING 12**

Dyeing: Introduction to dyeing of natural and synthetic fibres – Fabrics and blends with various dye classes – Recent developments in dyeing of natural fibres – Synthetic fibres and their blends – Problems in dyeing and their solutions – Eco-friendly chemicals and banned dyes.

### **UNIT IV PROCESSING MACHINES 12**

Mechanical and economic aspects of fibre, yarn, and fabric scouring – Bleaching and dyeing machines for woven and knits – Loose stock, bale, hank, package, jigger, winch, HT beam, jet, padding mangles and garment dyeing machines.

### **UNIT V TESTING 12**

Colour measurement: Application of computer colour matching system to evaluate strength of dye – Shade matching – Whiteness / Yellowness index – Fastness properties of dyed products.

**Total: 60**

### **TEXT BOOKS**

1. Trotman, E.R., “Dyeing and Chemical Technology of Textile Fibres”, Charles Griffin and Co. Ltd., 1990.
2. Shenai, V.A. “Technology of Bleaching and Mercerizing – Vol. III”, Sevak Publications, 1991.

### **REFERENCES**

1. Shenai, V.A., “Fundamentals of Principles of Textile Wet Processing”,
2. Marsh J.T., “Mercerizing”, Chapman and Hall Ltd., 1041.
3. Bhagwat R.S “Handbook of Textile Processing”, Colour Publication, 1999.
4. Shenai, V.A., “Principle and Practice of Dyeing”, Sevak Publisher.
5. T.L.Vigo, “Textile Processing and Properties”, Elsevier, 1994.

## TT1305 – TEXTILE QUALITY EVALUATION

|          |          |          |          |
|----------|----------|----------|----------|
| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>4</b> | <b>0</b> | <b>0</b> | <b>4</b> |

### **UNIT I BASIC CONCEPTS 12**

Definition of quality – Product based – User based – Manufacturing based – Value based – Types of quality – Quality of design – Quality of conformance – Quality of performance – Quality control and quality assurance – Factors influencing quality – Reasons for quality evaluation – Terms used in sampling – Fibre sampling from bulk – Fibre sampling from combed slivers – Rovings and yarn – Yarn sampling – Fabric sampling.

### **UNIT II STATISTICAL EVALUATION 12**

Measures of central tendency and dispersion – Determination of number of tests – Types of error – Sources of error – Design of experiments – Factorial designs – Response surface designs – Taguchi designs – Repeatability – Reproducibility.

### **UNIT III FIBRE QUALITY EVALUATION 12**

Measurement of fibre fineness and its importance – Measurement of fibre length and its uniformity – Principles of various fibre testing instruments – High volume instrument – Advanced fibre information system – Principles of measurement of single fibre fineness, strength and crimp characteristics of man-made fibres – Lenzing technik's vibroscope, vibrodyn, vibrojet and vibrotex – Principle of fibre strength measurement by stelometer, determination of moisture content and regain in fibres – Innovations in fibre quality evaluation.

### **UNIT IV YARN QUALITY EVALUATION 12**

Linear density – Twist – Evenness – Hairiness – Bulk – Friction and abrasion – Tensile properties of yarn – Tensile testing of yarn at high speeds – Uster tensojet – Lenzing speedy – Textechno's statimat – Influence of test speed, specimen length, humidity and temperature on yarn tensile characteristics – Classification of yarn imperfections and faults – Yarn appearance assessment – ASTM yarn grades – Electronic inspection board – Latest developments in yarn testing instruments.

### **UNIT V FABRIC QUALITY EVALUATION 12**

Tensile strength – Tear strength – Bursting strength – Dimensional stability – Serviceability – Air permeability – Water repellency – Abrasion resistance and pilling – Colour fastness – Comfort – Objective evaluation of fabric handle – Advances in fabric quality evaluation.

**Total: 60**

### **TEXT BOOKS**

1. Kothari, V. K.(Ed), "Testing and Quality Management", Vol.1, IAFL Publications, 1999.
2. Saville, B. P., "Physical Testing of Textiles", Woodhead Publishing Ltd., 1999.

### **REFERENCES**

1. Booth, J.E., "Textile Testing", Butterworth Heinemann Ltd., 1996.
2. Basu, A., "Textile Testing; Fibre, Yarn and Fabric", SITRA, 2001.
3. Box, G.E.P., Hunter, W.G., and Hunter, J.S., "Statistics for Experimenters", John Wiley and Sons, Inc., 1978.

## TT1306 – FABRIC MANUFACTURE LABORATORY II

(Minimum of ten experiments shall be offered)

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 2 |

### EXPERIMENTS

1. Tappet Shedding
2. Dobby and method of pegging.
3. Side Weft Fork Mechanism
4. Loose Reed
5. Fast Reed
6. Loom Brake and Clutch Mechanism
7. 4x1 Drop Box Mechanism
8. 4 x 4 Drop Box Mechanism and Pick at will Motion
9. Positive Let off
10. Warp Stop Motion
11. Automatic Pirn Changing
12. Centre Weft Fork Motion
13. Shuttleless Loom

### EQUIPMENTS REQUIRED

- |  |          |
|--|----------|
| 1. Tappet shedding – positive / negative                   | - 1 each |
| 2. Shuttle picking mechanism – Over pick or under pick     | - 1 each |
| 3. Beat up mechanism                                       | - 1      |
| 4. Take up mechanism (Five wheel or Seven wheel)           | - 1 each |
| 5. Negative let-off mechanism                              | - 1      |
| 6. Positive let-off mechanism                              | - 1      |
| 7. Warp protector mechanism – loose reed and fast reed     | - 1 each |
| 8. Weft fork mechanism                                     | - 1      |
| 9. Automatic pirn changing mechanism (Desirable)           | - 1      |
| 10. Automatic warp stop motion (Desirable)                 | - 1      |
| 11. Drop box loom  | - 1      |
| 12. Terry fabric weaving (Desirable)                       | - 1      |
| 13. Plain, Interlock and Rib knitting machines (Desirable) | - 1 each |

**Total: 45**

## TT1307 – TEXTILE QUALITY EVALUATION LABORATORY

| L | T | P | C |
|---|---|---|---|
|---|---|---|---|

### **EXPERIMENTS**

1. Measurement of Fibre Length.
2. Measurement of Fibre Strength.
3. Measurement of Fibre Fineness.
4. Measurement of Fibre Maturity.
5. Measurement of Fibre Trash & Lint.
6. Measurement of Fibre Nep content.
7. Measurement of Fibre Linear density of sliver, roving and yarn.
8. Measurement of single yarn and ply yarn twist.
9. Measurement of single yarn strength and Lea strength.
10. Measurement of Yarn Evenness.
11. Measurement of Yarn Impact Strength.
12. Measurement of Fabric thickness, Stiffness and Crease recovery.
13. Measurement of Fabric Tensile Strength.
14. Measurement of Fabric Bursting strength and Colour fastness.
15. Measurement of Abrasion Resistance.
16. Measurement of Fabric Pilling.
17. Crimp study, GSM study in Fabric and Fabric engineering.

### **TESTING EQUIPMENTS REQUIRED**

1. Baer Sorter.
2. Fibre Bundle Strength Tester.
3. Fibre Fineness Tester.
4. Trash Analyser.
5. Nep Count Template.
6. Wrap Reel.
7. Electronic Twist Tester.
8. Single Yarn Strength Tester.
9. Ballistic tester.
10. Thickness Tester.
11. Stiffness Tester.
12. Crease Recovery Tester.
13. Bursting Strength Tester.
14. Martindale Abrasion Resistance Tester.
15. Crock meter.

**Total: 45**

(Common to All Branches of III Year B.E./ B.Tech students of Anna University Tiruchirappalli and affiliated colleges)

The aim of the course is two-fold: to enable the students to develop communication skills in the language laboratory and to arrange discussions for developing soft skills in the lab and or the classroom. Each lab session shall last for three periods.

**List of activities that are to be carried out:**

**(15 sessions x 3 periods = 45)**

Lab session # 1: Listening and speaking practice exercises with communicative functions. Learning material: the ACD of Spoken English: A Foundation Course for Speakers of Indian Languages (Orient Longman, 2008)

Lab session # 2: Practice with more advanced communicative functions. Learning material: the ACD of Spoken English: A Foundation Course for Speakers of Indian Languages (Orient Longman, 2008)

Lab session # 3: Pronunciation exercises with Oxford Advanced Learners' Dictionary of Current English or any other standard Dictionary

Lab session # 4: Making an oral presentation in English. Learning Material: Professional Presentations VCD (Cambridge University Press)

Lab session # 5: Listening to telephone conversations in English and completing the tasks. Learning material: Essential Telephoning in English ACD (Cambridge University Press)

Lab session # 6: Giving an exposure to and practice with model group discussion and interviews. Learning material: How to Prepare for Group Discussion and Interview Audio Cassette (McGraw-Hill)

Lab session # 7: Giving insights into the format and the task types in the IELTS (International English Language Testing System). Learning Material: Objective IELTS, Intermediate Level (CUP)

Lab session # 8: Understanding the format and the task types in the TOEFL (Test of English as a Foreign Language). Learning Material: Understanding the TOEFL (Educational Testing Services, Princeton)

Lab session # 9: Administering the BEC (Business English Certificate) Diagnostic Test. Learning Material: BEC Practice Materials (British Council, Chennai)

Lab session # 10: Completing the steps involved in Career, Life Planning and Change Management. Learning Material: Developing Soft Skills (Pearson Education)

Lab session # 11: Setting goals and objectives exercises. Learning Material: Developing Soft Skills (Pearson Education)

Lab session # 12: Prioritizing and time planning exercises. Learning Material: Managing Time Multimedia Program CD

Lab session # 13: Taking a Personality Typing/ Psychometric Test Learning Material: 200 Psychometric Test prepared by the CUIC, Anna University Chennai

Lab session # 14: Critical and creative thinking exercises.

Lab session # 15: Improving body language and cross-cultural communication with pictures.  
Learning material: Body Language (S. Chand and Co.)

For a detailed plan, refer to the topics given below;

## **UNIT I LISTENING AND SPEAKING PRACTICE IN COMMUNICATIVE FUNCTIONS**

Introductions and meetings – Talking about studies and/ or job – Expressing likes and dislikes – Describing daily routines and current activities – Talking about past states and events – Talking about future plans and intentions – Expressing preferences – Giving reasons – Expressing opinions, agreement and disagreement – Seeking and giving advice – Making suggestions

## **UNIT II SPEAKING APPLICATIONS**

Making an oral presentation – Preparing the presentation – Performing the presentation – Beginning – Language – Visual aids and body language – Voice – Ending – Questions – Telephone conversations – Group Discussion and Interview

## **UNIT III UNDERSTANDING AND PREPARING FOR INTERNATIONAL ENGLISH LANGUAGE EXAMINATIONS**

Graded Examinations in Spoken English (GESE) – Spoken English for Work (SEW) – International English Language Testing System (IELTS) – Test of English as a Foreign Language (TOEFL) – Business English Certificate (BEC)

## **UNIT IV SOFT SKILLS (1)**

Preparing for and dealing with change – Motivation, goal-setting and self-esteem – Managing time and stress – Career and life planning – Team work – Leadership traits

## **UNIT V SOFT SKILLS (2)**

Multiple Intelligences – Learning Styles and Personality typing – Critical and creative thinking – People, cultures and self – Intercultural Communication

## **RESOURCES**

1. Kamalesh Sadanand and Susheela Punitha, “**Spoken English: A Foundation Course**” for Speakers of Indian Languages, Part 2 Audio CD, Hyderabad: Orient Longman, 2008
2. Malcome Goodale, “**Professional Presentations**”, (VCD) New Delhi: Cambridge University Press, 2005
3. Barbara Garside and Tony Garside, **Essential Telephoning in English** (Audio CD), Cambridge: Cambridge University Press, 2002
4. Hari Mohan Prasad and Rajnish Mohan, **How to Prepare for Group Discussion and Interview** (Audio Cassette) Tata McGraw-Hill Publishing
5. **Graded Examinations in Spoken English** and **Spoken English for Work** downloadable materials from Trinity College, London
6. **International English Language Testing System** Practice Tests, CUP
7. **Business English Certificate** Materials, Cambridge University Press
8. **Personality Development** (CD-ROM), Times Multimedia, Mumbai
9. Interactive Multimedia Programs on **Managing Time and Stress**
10. Robert M. Sherfield and et al “**Developing Soft Skills**” 4<sup>th</sup> edition, New Delhi: Pearson Education, 2009

## SEMESTER VI

### TT1351 – QUALITY ASSURANCE IN FABRIC MANUFACTURE AND GARMENT PRODUCTION

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

#### UNIT I QUALITY

12

Introduction – Definition of quality – Quality control and its necessity – Inspection and its importance – Functions of inspection – Systems of inspection – Types of inspection – Hundred percent inspections – Sampling inspection – Comparison of 100% inspection and sampling inspections – AQL standards – Quality assurance – Difference between quality assurance and quality inspection.

#### UNIT II STANDARDS AND TECHNIQUES

12

Quality standards, statistical quality control – Control charts, applications – Sampling – Importance and use of sampling techniques – ISO 9000-Quality management system – Total quality management – Quality circles.

#### UNIT III TYPES

12

Types of control forms – Basic production systems – Principles for choosing a production system – Evaluating systems – Flow process and grid charts – Flow process grid for production control – Scheduling calculations – Graph method – Schedules for producing many styles simultaneously – Producing many styles continuously in one line.

#### UNIT IV QUALITY CONTROL

12

Quality control for fabrics – Different types of defects in fabrics – Major and minor faults – Fabric inspection system – Quality control in pattern making, grading, marking and marker efficiency – Quality control in stitching and production analysis – Co-coordinating department activities – Distribution of tickets and maintenance of records – Establishing merchandising standards – The quality control of trims and accessories.

#### UNIT V SYSTEM AND STANDARDS

12

Tolerance and quality standards for fabrics, processing, cutting, stitching in garment industry, tolerances and quality standard for finished garments – Quality control and inspection agencies – Government and private agencies – AEPC – Textiles committee quality control system and standards for packing and packed goods, ware housing and shipping – Cost of quality – Cost of conformance – Cost of non-conformance.

**Total: 60**

#### TEXT BOOKS

1. Glock, R.E., Kunz, G. I., “Apparel Manufacturing Sewn Product Analysis”, Blackwell Scientific Publications. (1983).
2. Paliwal M.C. and Kimothy P.D., “Process Control in Weaving ATIRA 1983.

#### REFERENCES

1. Jacco Solinger, “Apparel Manufacturing Handbook”, Prentice Hall, 1993.
2. Sammel Eliou, “Production Planning & Control”, Wiley Eastern Pvt. Ltd
3. Grover E .G., and Hamby D. S., “Handbook of Textile Testing and Quality Control”, Wiley Eastern Pvt. Ltd., 1969.
4. Kothari V. K. “Testing and Quality Management” Volume 1, IAFL Publications.
5. Quality Control for Textile and Apparel Industries, WorkShop Manual – May 1997, IIT, New Delhi.

## TT1352 – TEXTILE CHEMICAL PROCESSING II

|          |          |          |          |
|----------|----------|----------|----------|
| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>4</b> | <b>0</b> | <b>0</b> | <b>4</b> |

### **sUNIT I PRINTING 12**

Methods and styles of printing – Direct, discharge, resist, printing machines, essential ingredients of printing paste – Printing with direct – Reactive – Acid – Disperse vat dyes and pigments – Fixation and after- treatment processes – Recent developments in printing.

### **UNIT II FINISHING 12**

Introduction to finishing – Objects – Mechanical and chemical finishing – Durable and temporary finishes on cotton fabrics: Back filling-starch calendaring – Swishing – Chasing – Friction – Schreiner – Embossing – Anti shrink finish – Principles of shrinkage – Compressive – Relaxed shrinkage – Compacting – Creping – Softening – Crease proofing – Felting – Non-felting – Enzymes in finishing.

### **UNIT III SPECIAL FINISHES 12**

Crease resist finish – Cross linking agents – Nitrogenous and non nitrogenous resins – Properties and uses – Wash-n-wear – Durable press finish – Water proof and repellent finishes for cotton and synthetics – Flame resistance finishes for cellulosics and blends – Anti microbial finishes – Insect-resist finishes – Softeners.

Finishing of knits, garment processing: Value added finishing of garments.

### **UNIT IV EFFLUENT TREATMENT 12**

Textile effluent – Textile waste characteristics – Textile waste water problems – Chemicals used in textile industry – Treatment of textile effluents – Techniques for effluent treatment – Chlorine trioxide treatment – Ozone treatments, reverse osmosis, enzymatic decolourisation – Concepts of ISO 14000.

### **UNIT V WASTE CONTROL 12**

Waste minimization and its opportunities – Need for waste minimization – Chemical and auxiliaries conservation – Water conservation – Energy conservation – Pollution control – Workers awareness – Export market requirements – Waste minimization potential

**Total: 60**

### **TEXT BOOKS**

1. Shenai, V.A., “Technology of Textile Finishing”, Sevak Publications, 1995
2. Shenai, V.A., “Technology of Printing”, Sevak Publications, 1996.

### **REFERENCES**

1. LWC Miles, (Editor) “Textile Printing”, Dyers Company of Publications trust, 1981.
2. Marsh, J.T., “An Introduction to Textile Finishing”, Chapman and Hall Ltd., 1979.
3. Padmavankar, Textile Effluent NCUTE, IIT, Publication, 2002.
4. From waste to Profits, Technical Manual Series III, National Productivity Council, 1998.



## **TEXT BOOKS**

1. Jacob Solinger., "Apparel Manufacturing Handbook", VanNostrand Reinhold Company (1980).
2. Glock, R. E., and Kunz, G. I., "Apparel Manufacturing Sewn Product Analysis", Blackwell Scientific Publications. (1983).

## **REFERENCES**

1. Hudson, P.B., "Guide to Apparel Manufacturing" MEDIApparel Inc (1989).
2. Carr.H, Latham.B., "The Technology of Clothing Manufacture" Blackwell Scientific Publications (1988).
3. Gerry Cooklin, "Introduction to Clothing Manufacture" Blackwell Science Ltd., 1995.
4. Laing, R., "Fundamentals of Stitches and Seams", Textile Institute, 1995.
5. Chuter, A.J., "Introduction to Clothing Production Management", Blackwell Science, 1995.

## TT1354 – WOVEN FABRIC STRUCTURE

**L T P C**  
**3 1 0 4**

### **UNIT I BASICS & STANDARD WEAVES 9**

Cloth geometry – Cover factor – Use of point paper – Elementary weaves – Plain and its derivatives – Twill and derivatives, Satin – Sateen and derivatives; Ordinary and Brighten Honey Comb, Huck-a-Back and modification – Mock Leno – Distorted Mock leno – Crepe weaves.

### **UNIT II ARRANGEMENT OF FIGURES 9**

Bedford cords: Plain and Twill faced – Wadded welts and piques – Wadded piques – Loose and fast back welts and piques – Spot figuring – Arrangement of figures – Drop designs half drop bases – Sateen system of distribution.

### **UNIT III COLOUR AND WEAVE 9**

Colour theory – Light and pigment theory – Modification of colour – Application of colours – Colour and weave effects – Extra warp and extra weft figuring – With two colours.  
Backed fabrics: Warp and weft backed – Reversible and non-reversible.

### **UNIT IV SPECIAL WEAVES 9**

Pile fabrics – Warp pile – Fast wire pile – Terry weaves – Terry stripe and checks – Weft pile – Plain back and Twill back velveteen – Lashed pile corduroy – Weft plush.  
Double cloth: Classification – Types of stitches – Wadded double cloth – Warp and weft wadded double cloth – Centre warp and weft stitched double cloth.

### **UNIT V PRINCIPLES OF ORNAMENTATION 9**

Gauze and Leno weaves – Russian cord – Net Leno – Madras muslin structures – Damasks – Ply fabrics – Brocades – Tapestry – Swivel – Lappet – Designs for ornamentation of Fabrics – Application of special jacquards – Self twilling – Inverted hook – Border jacquards.

**L: 45 T:15 Total: 60**

### **TEXT BOOKS**

1. Grosicki Z.J, “Textile Design and Colour”, Butterworths, 1950.
2. Grosicki Z.J, “Advanced Textile Design and Colour” Butterworths, 1952.

### **REFERENCES**

1. Goerner D, “Woven Structure and Design”, Part – I – WIRA, 1986.
2. Goerner D, “Woven Structure and Design”, Part – II – BTT6 – 1989.

## TT1355 – KNITTING AND GARMENT LABORATORY

|          |          |          |          |
|----------|----------|----------|----------|
| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>0</b> | <b>0</b> | <b>3</b> | <b>2</b> |

### EXPERIMENTS

1. To study the working Principle of Circular Weft Knitting machine
2. To study the features of various types of Knitting needles
3. Effect of Stitch length on Knitted fabric quality
4. Setting of various machine parameters on Circular Knitting machine
5. Preparing samples for different types of basic hand stitches
6. Preparing samples for seams and seam finishes
7. Developing patterns for children's wear
8. Developing pattern for ladies wear.
9. Developing patterns for men's wear.
10. Development of embroidery designs – hand and sewing machine

### EQUIPMENTS

1. Single jersey knitting machine
2. Sewing machine
3. Embroidery circular wooden frame
4. Hand sewing needles
5. Steel scales, Brown sheets, Measuring tapes, Scissors
6. Skein threads, Machine embroidery threads, marking chalk

**Total: 45**

## TT1356 – CLOTH ANALYSIS LABORATORY

(Minimum of Ten Experiments shall be offered)

**L T P C**  
**0 0 3 2**

### EXPERIMENTS

1. Plain / Twill / Satin / Sateen Weaves.
2. Honey comb weave.
3. Huck-a-Back weave.
4. Extra Warp / Extra Weft.
5. Pile Fabrics (Warp & Weft)
6. Welts and Pique.
7. Backed Fabrics.
8. Gauze and Leno.
9. Double cloth.
10. Crepe.
11. Tapestry.
12. Mock Leno.
13. Bedford cords.
14. Colour and Weave Effects.
15. Knitted – Single Jersey, Interlock, Rib Structures.

### EQUIPMENTS REQUIRED

| S.No | Description                        | Quantity required   |
|------|------------------------------------|---------------------|
| 1.   | Counting glass                     | Students must bring |
| 2.   | Electronic balance (0.01g to 300g) | 1                   |
| 3.   | GSM cutter                         | 1                   |
| 4.   | Beesley balance                    | 1                   |

**Total: 45**

**TT1357 – TEXTILE CHEMICAL PROCESSING LABORATORY**  
(Minimum of Ten Experiments shall be offered)

| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|----------|----------|----------|----------|
| <b>0</b> | <b>0</b> | <b>3</b> | <b>2</b> |

**EXPERIMENTS**

1. Identification of dyes on fibre
2. Scouring of cotton fabrics
3. Bleaching of cotton using hypochlorite
4. Bleaching of cellulosic fibres using hydrogen peroxide
5. Yarn and fabric mercerization.
6. Dyeing of cotton / viscose yarns using direct dyes
7. Dyeing of cotton yarn using vat dyes
8. Dyeing of cotton yarn using reactive dyes
9. Dyeing of cotton fabric with reactive dyes pad-batch methods
10. Dyeing of cotton using naphthol dyes
11. Dyeing of polyester using carrier
12. Dyeing of polyester / cotton blends
13. Dyeing of silk, wool with acid, basic dyes

**EQUIPMENTS REQUIRED**

1. Stainless vats (500 ml)
2. Water bath, Thermometers
3. Stirrer
4. Steam ager, Pilot padding mangle
5. HTHP Beaker dyeing machine
6. Pilot curing chamber
7. Fastness tester for Washing, Rubbing

**Total: 45**

## SEMESTER VII

### MG1351 – PRINCIPLES OF MANAGEMENT

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

#### UNIT I HISTORICAL DEVELOPMENT

Definition of management – Science or Art – Management and administration – Development of management thought – Contribution of Taylor and Fayol – Functions of management – Types of business organization.

#### UNIT II PLANNING

Nature and purpose – Steps involved in planning – Objectives – Setting objectives – Process of Managing by objectives – Strategies – Policies and planning premises – Forecasting – Decision-making.

#### UNIT III ORGANISING

Nature and purpose – Formal and informal organization – Organization chart – Structure and Process – Departmentation by difference strategies – Line and staff authority – Benefits and limitations – De-centralization and delegation of authority – Staffing – Selection process – Techniques – HRD – Managerial effectiveness.

#### UNIT IV DIRECTING

Scope – Human factors – Creativity and innovation – Harmonizing objectives – Leadership – Types of leadership motivation – Hierarchy of needs – Motivation theories – Motivational techniques – Job enrichment – Communication – Process of communication – Barriers and breakdown – Effective communication – Electronic media in communication.

#### UNIT V CONTROLLING

System and process of controlling – Requirements for effective control – The budget as control technique – Information technology in controlling – Use of computers in handling the information – Productivity – Problems and management – Control of overall performance – Direct and preventive Control – Reporting – The global environment – Globalization and liberalization – International management and global theory of management.

**L: 45 T: 15 Total: 60**

#### TEXT BOOKS

1. Harold Kooritz and Heinz Weihrich “Essentials of Management”, Tata McGraw-Hill, 1998.
2. Massie, J. L., “Essentials of Management”, Prentice Hall of India, (Pearson) 4th Edition, 2003.

#### REFERENCES

1. Tripathy, P.C., And Reddy, P.N., “Principles of Management”, Tata McGraw-Hill, 1999.
2. Decenzo David, and Robbin Stephen, A., “Personnel and Human Reasons Management”, Prentice Hall of India, 1996
3. JAF Stomer,. Freeman, R.E., and Gilbert, D. R., “Management”, Pearson Education, 6th Edition, 2004.
4. Fraidoon Mazda, “Engineering Management”, Addison Wesley, 2000.

## TT1401 – QUALITY ASSURANCE IN CHEMICAL PROCESSING

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

### UNIT 1      **QUALITY AND PROCESS CONTROL**      **12**

Role of quality and process control: Selection and standardization of incoming raw materials – Auxiliaries evaluation of the end products – Development of auxiliary products for in house consumption – Major areas of process and quality control bleaching, dyeing, printing and finishing.

### UNIT II      **EVALUATION OF DESIZING**      **12**

Determination of impurities of natural and man made fibres – Cotton; wax content, ash content, colouring matter, Silk – Degumming – Wool percentage of vegetable impurities, oils and greases – Synthetic materials – Fibre finishes.

Evaluation of desizing efficiency residual size content – Evaluation of scouring efficiency – Drop absorbency, residual wax, weight loss, degree of impurities.

### UNIT III      **EVALUATION OF BLEACHING AND MERCERISATION**      **12**

Evaluation of bleaching – Degree of whiteness – Change in mechanical properties – Presence of carboxyl groups and aldehyde groups – Fluidity – Ash content – Uniformity of grey preparation – Evaluation of mercerisation – Deconvolution count – Lustre – Change in mechanical properties – Barium activity number – Change in dye absorbency.

### UNIT IV      **QUALITY EVALUATION**      **12**

Quality evaluation of dyed / printed materials – Colour fastness to washing, light, crock (dry and wet), perspiration, bleaching, sublimation, uniformity of dyeing, shade matching.

Quality evaluation of finished fabric for water repellency – Air permeability – Stiffness – Crease flame resistance – Anti static and soil release.

### UNIT V      **TESTING INSTRUMENTS**      **12**

Brief introduction to testing instruments for above methods and quality standards – ISO – AATCC  
Computer colour matching: Theory – Concepts and recipe production.

**Total: 60**

### TEXTBOOKS

1. Shenai, V. A ., “Evaluation of Textile Chemicals” Sevak Publication, 1980.
2. Vaidya, A. A., and Trivedi, S. S., “Textile Auxiliaries and Finishing Chemicals”, Publication, ATIRA.

### REFERENCE

1. Chemical Processing Tablet “Process and Quality Control in Chemical Processing”- TAI, Publication, 1984.

**UNIT I BELTS AND ROPE DRIVE 12**

Speed ratio – Centrifugal tension condition for maximum power transmission and speed – PIV drives – Electro magnetic drives – Gears nomenclature – Velocity ratio – Speed calculations – Epicyclic gear trains – Speed ratio of differential motion.

**UNIT II MACHINES 12**

Scutcher cone drum profile design and construction – Flyframe cone drum profile design and construction.

Different types of cams used in textile machines – Design of ring frame builder motion cam – Plain and twill cams for roller followers in looms.

**UNIT III EQUATIONS OF MOTION 12**

Fundamental equation of motion – Linear – Reciprocation – Oscillation movements – Equation of force – Mass – Momentum – Work – Power – Shuttle velocity – Picking force and power – Ring frame traveller velocity and power consumption.

**UNIT IV ENERGY CALCULATION 12**

Kinetic and potential energy calculation the textile application – Principles of moments – Scutcher calender roller – Ring frame top arm loading – Forces in heald reversing system.

**UNIT V CLUTCHES 12**

Friction: Static, Dynamic and Coil friction – Coefficient of friction – Frictional force and power – Warp tension calculation.

Clutches: Single plate – Multiple plate – Cone Clutches, Band and block Brakes – Internal expanding shoe Brakes – Sley displacement – eccentricity relation with crank radius and connecting arm length – velocity – Acceleration – Beat-up force.

**Total: 60**

**TEXT BOOKS**

1. Slater. K., “Textile Mechanics, Vol. I” Textile Institute, 1997.
2. Booth .J. E., “Textile Mathematics, Vol. I, II and III” Textile Institute, 1977.

**REFERENCES**

1. Grosberg, P., “Structural Mechanics of Fibres, Yarns and Fabrics” Wiley Inter Science, Publication, 1969.
2. Hearle, J .W .S., “Mechanics of Textile Fibre Assemblies”, Marzland, 1980.
3. Faires, V.M., “Design of Machine Elements”, Macmillan and Co, 1967.
4. Grosberg P, “Introduction to Textile Mechanics”, Enest Benn Ltd.



## **UNIT V      DESIGNING APPLICATIONS**

**12**

Design and development of programs for various textile applications – Programs to compute CSP of a spun yarn – Yarn tenacity – Fabric cover using empirical relationships and input data set – Designing spin plan – Weave plan using VB – Plotting a given set of data and establish relationships between the dependant and independent variables in the form of regression equation using MSEXcel or Systat – Working with database systems, etc.

**Total: 60**

### **TEXT BOOKS**

1. Parameswaran, R., “Computer Applications in Business”, 2nd Edition, S. Chand and Company Ltd., 1999.
2. Sinha, P. K., and Preethi Sinha, “Computer Fundamental Concepts, Systems and Applications”, First Indian Edition, BPB Publications, 2003.

### **REFERENCES**

1. Ram B., “Computer Fundamentals: Architecture and Organisation”, 2nd Edition, New Age International (P) Ltd., Publishers, 1998.
2. Jayaraman S., “Computer Science and Textile Science, Textile Progress, Vol.26, No.3, Textile Institute, 1995.
3. Barella A., “On-line Quality Control in Spinning and Weaving”, Textile Progress, Vol.17, No.1, Textile Institute, 1988.
4. Sigmon D.M., Grady P.L., and Winchester, S.C., 'Computer Integrated Manufacturing and Total Quality Management', Textile Progress, Vol. 27, No.4, Textile Institute, 1995.
5. Phiroz Dastoor, “Application of CAD in the Industrial Fabrics”, Journal of the Textile Institute, Part I, Textile Institute, U.K., 1993.
6. Aldrich, W., (Ed), “CAD in Clothing and Textiles: A Collection of Experts Views”, Blackwell Science, 2nd Edition, U.K., 1994.

## **TT1404 – PRESENTATION SKILLS AND TECHNICAL SEMINAR**

| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|----------|----------|----------|----------|
| <b>0</b> | <b>0</b> | <b>3</b> | <b>2</b> |

During the seminar session each student is expected to prepare and present a topic on engineering/ technology, for a duration of about 8 to 10 minutes. Three periods per week are to be allotted and 15 students are expected to present the seminar. A faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain attendance also.

Students are encouraged to use various teaching aids such as over head projectors, power point presentation and demonstrative models.

This will enable them to gain confidence in facing the placement interviews.

## TT1405 – PRODUCTION PROCESS LABORATORY

|          |          |          |          |
|----------|----------|----------|----------|
| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>0</b> | <b>0</b> | <b>3</b> | <b>2</b> |

### EXPERIMENTS

(Minimum of 10 experiments shall be offered)

1. Studies on determination of cylinder load and transfer efficiency in carding
2. Studies on influence of process variables on ring-spun yarn quality
3. Studies on productivity improvement in ring spinning
4. Studies on influence of process variables on rotor-spun yarn quality
5. Studies on productivity improvement in rotor spinning
6. Studies on influence of process variables on siro-spun and siro-fil yarns
7. Studies on production of mélange yarns
8. Studies of production of core-spun yarns
9. Studies on influence of process important variables on air-jet-spun yarn quality
10. Studies on influence of important process variables on friction-spun yarn quality
11. Studies on the effect of settings / process parameters removal of objectionable faults in cone winding.
12. Studies on production of defect free pirns with cotton, pc bended and polyester filament yarns
13. Study on troubleshooting in warping and sizing
14. Studies on manufacturing of special fabrics – denims and fabrics for technical textiles
15. Studies on productivity improvement in weaving
16. Studies on various techniques for effluent treatment
17. Studies on influence of enzymes textile chemical processing
18. Studies on garment washing process
19. Studies on effect of aesthetic and functional finishes on woven fabrics
20. Studies on effect of aesthetic and functional finishes on knitted fabrics

**Total: 45**

### LIST OF EQUIPMENTS REQUIRED

The equipments / machineries listed for the Spun Yarn Technology Lab I & II, Fabric Manufacturing Lab I & II, Textile Quality Evaluation Lab and Textile Chemical processing Lab can be used.

The project may be considered as the ultimate exercise presented to the final semester student before graduation to measure accumulated engineering knowledge and experience. At the same time, the project itself should provide the students with some new skills, innovation and information, and strengthen the acquired ones.

The project programme consists of different assignment, allotted time, submission of report under internal faculty guidance and evaluation by external member along with internal faculty.

The activities performed during a project may cover one or more of the following;

- Data collection
- Critical literature review
- Laboratory experience and tests
- Mathematical modeling
- Software application
- Industrial visits
- Design and/or assembly
- Process analysis

The major project may be assigned to a group of two or three students. The project topic allotted may be of theoretical, experimental or industrial projects to be carried out under the supervision of internal guide and external guide (in case of industrial projects).

Major projects are to be executed strictly as per the project schedule prepared during VII semester. A committee of departmental faculty members comprising the project guide, one more faculty member and the head of department will monitor and review the progress achieved by the student at various stages. The internal assessment will be done by the committee based on the progress achieved on completion of the project work.

On completion of the project work, each student has to prepare a project report and submit the same in triplicate to the department. The project work and the report will be evaluated by the internal assessment committee for a total of 50 marks. The external university examination, which carries a total of 50 marks, will have report evaluation and viva voce examination conducted by a committee of one external examiner and one internal examiner appointed by the university

## SEMESTER VIII

### MG1301 – TOTAL QUALITY MANAGEMENT

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

#### UNIT I 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.

#### UNIT II 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 – PDSA cycle – 5S, kaizen – Supplier partnership – Partnering, sourcing – Supplier selection – supplier rating – Relationship development – Performance measures – Basic concepts – Strategy – Performance measure.

#### UNIT III 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.

#### UNIT IV 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.

#### UNIT V 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.

**Total: 45**

#### TEXT BOOKS

1. Besterfield, D.H., “Total Quality Management”, Prentice Hall of India Pvt. Ltd., 3rd Edition, 2007.
2. Kanishka Bedi, “Quality Management”, Oxford Press, 2006.

#### REFERENCES

1. Shridhara Bhat, K., “Total Quality Management”, Himalaya Publishing House, 1st Edition, 2002.
2. Lal, H., “Total Quality Management – A Practical Approach”, New Age International Publishers, 2004.
3. Nagarajan, R.S., “Total Quality Management”, New Age International Publishers, 2005.

## MG1453 – SAFETY AND RISK MANAGEMENT

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### UNIT I INDUSTRIAL SAFETY 9

Concepts of safety – Hazard classification chemical, physical, mechanical, ergonomics, biological and noise hazards – Hazards from utilities like air, water, steam.

### UNIT II HAZARD IDENTIFICATION AND CONTROL 9

HAZOP, job safety analysis – Fault tree analysis – Event tree analysis – Failure modes and effect analysis and relative ranking techniques – Safety audit – Plant inspection – Past accident analysis.

### UNIT III RISK MANAGEMENT 9

Overall risk analysis – Chapains model, E and FI model– Methods for determining consequences effects: Effect of fire, Effect of explosion and toxic effect – Disaster management plan – Emergency planning – Onsite and offsite emergency planning – Risk management – Gas processing complex, refinery – First aids.

### UNIT IV SAFETY PROCEDURES 9

Safety in plant design and layout – Safety provisions in the factory act 1948 – Indian explosive act 1884 – ESI act 1948 – Advantages of adopting safety laws.

### UNIT V SAFETY IN HANDLING AND STORAGE OF CHEMICALS 9

Safety measures in handling and storage of chemicals – Fire chemistry and its control – Personnel protection – Safety color codes of chemicals.

**Total: 45**

### TEXT BOOKS

1. Blake, R.P., “Industrial Safety”, Prentice Hall, 1953.
2. Lees, F.P., “Loss Prevention in Process Industries”, 2nd Edition, Butterworth Heinemann, 1996.

### REFERENCES

1. Geoff Wells, “Hazard Identification and Risk Assessment”, I.ChE.
2. John Ridley and John Channing, “Safety at Work”, 6th Edition. Butterworth-Heinemann, 2003.
3. Raghavan, K.V. and Khan, A.A., “Methodologies in Hazard Identification and Risk Assessment”, Manual by CLRI, 1990.

## TT1455 – PROJECT WORK (PHASE II)

|          |          |           |          |
|----------|----------|-----------|----------|
| <b>L</b> | <b>T</b> | <b>P</b>  | <b>C</b> |
| <b>0</b> | <b>0</b> | <b>12</b> | <b>6</b> |

The project may be considered as the ultimate exercise presented to the final semester student before graduation to measure accumulated engineering knowledge and experience. At the same time, the project itself should provide the students with some new skills and information, and strengthen acquired ones.

The project programme consists of different assignment, allotted time, submission of report under internal faculty guidance and evaluation by external member along with internal faculty.

The activities performed during a project may cover one or more of the following;

- Data collection
- Critical literature review
- Laboratory experience and tests
- Mathematical modeling
- Software application
- Industrial visits
- Design and/or assembly
- Process analysis

The mini and major project may be assigned to a group of two or three students. The project topic allotted may be of theoretical, experimental or industrial projects to be carried out under the supervision of a internal and external suites (in case of industrial projects). The same topic may be done as phase-I as mini project and its continuous Phase-II as Major project work or different topic may be taken as mini and major project work.

Both mini and major projects are to be executed strictly as per the project schedule prepared during VII & VIII semesters. A committee of departmental faculty members comprising the project guide, one more faculty member and the head of department will monitor and review the progress achieved by the student at various stages. The internal assessment will be done by the committee based on the progress achieved on completion of the project work, each student has to prepare a project report and submit the same in triplicate to the department.

Extension and completion of project work started in the previous semester. On completion of the project work, each student has to prepare a project report and submit the same to the department. In the Phase II, the project work and the report will be evaluated by the internal assessment committee for a total of 100 marks. The external university examination, which carries a total of 100 marks, will have report evaluation and viva voce examination conducted by a committee of one external examiner and one internal examiner appointed by the university

# ELECTIVE I

## TT1001 – TEXTURED YARN TECHNOLOGY

| L | T | P | C |
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### UNIT I INTRODUCTION 9

Need for bulking of synthetic fibres – Texturing – Basic definition and classifications – Developments in high speed spinning – POY.

### UNIT II HEAT SETTING 9

Heat setting – Need-factors involved – Types of setting – Effects on fibre morphology and mechanical properties – Fundamentals of thermo-mechanical texturing – Helanca process.

### UNIT III FALSE-TWIST TEXTURING 9

Basics of false – Twist texturing – Texturability of various fibres – Process parameters – Time, temperature, twist, tension suitability of POY and UDY for FT texturing – Draw texturing – Simultaneous and sequential draw texturing – Twisting devices – Testing of textured yarns.

### UNIT IV AIR JET TEXTURING 9

Basics of air jet texturing – Types of yarns produced – Feed material structure and properties of air-jet texturing machines – Nozzles – Evaluation of air-jet textured yarn vis-à-vis spun and filament false twist textured yarns.

### UNIT V OTHER TEXTURING TECHNIQUES 9

Stuffer box and edge crimping methods – Principles – Limitations and applications – Knit-de-knit and gear crimping methods – Bi-component filament texturing – Texturing of polypropylene and jute fibres – Chemo-mechanical and thermo-mechanical texturing.

**Total: 45**

### TEXTBOOKS

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

### REFERENCES

1. Guirajani M.L. (Edr.), “Annual Symposium of Texturing”, I.I.T Delhi, 1977.
2. Wilson D.K. and Kollu T., “Production of Textured Yarns by the False Twist Technique”, Textile Progress, Vol. 21, No.3, Textile Institute, 1991.
3. Gupta V.B. (Edr.), “Winter School on Man-made Fibers – Production, Processing, Structure, Properties and Applications”, Vol. 1, 1988.
4. Wilson D.K. & Kollu T., “Production of Textured Yarns by Methods Other than False Twist Technique”, Text. Prog., Vol. 16, No.3. Textile Institute, 1981.
5. Demir & H. El-Behery, “Synthetic Yarn Production”, Prentice Hall Inc., 1996.

## TT1002 – SILK TECHNOLOGY

|          |          |          |          |
|----------|----------|----------|----------|
| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>3</b> | <b>0</b> | <b>0</b> | <b>3</b> |

### **UNIT I INTRODUCTION 9**

Overview of the silk industry and the features of silk – Present day silk industry – Varieties of silk – Mulberry leaf varieties and production – Biology of the silkworm – Silkworm rearing – Harvesting – Characteristics of the cocoon – Physical characteristics – Composition of the cocoon – Properties of silk. Cocoon quality – Factors influencing cocoon quality – Classification of cocoons – Cocoon testing and grading.

### **UNIT II REELING 9**

Cocoon drying – Storage and Sorting: Objective of cocoon drying – Mechanism of cocoon drying – Various methods of stifling / drying – Degree of drying – Types of drying machines and methods – Effects of drying conditions on reeling results – Cocoon storage – Sorting of cocoons – Cocoon Cooking and Raw Silk Reeling: Introduction – Cocoon cooking methods – Degree of cocoon cooking – Adjustments to cooking conditions – Effects of cocoon cooking conditions on reeling result – Various silk reeling devices – Methods of silk reeling – Quality control during raw silk reeling.

### **UNIT III RE-REELING AND FINISHING 9**

Re-reeling – Re-reeling machine and apparatus – How to re-reel raw silk – Re-reeling efficiency – Silk end tying and skein lacing – Booking and packing – Storage of silk – Factory Planning: Annual requirement of cocoons – Equipment for installation – Location and space – Quality and quantity of filature water – Selection of proper machinery.

### **UNIT IV UTILIZATION OF BY-PRODUCTS 9**

Introduction – Dupion silk reeling – Reeling of non-mulberry cocoons – Manufacture of spun silk – Degumming – Opening-up – Finishing – Count of spun silk yarn – Wild silk yarn.

### **UNIT V MARKETING OF SILK YARN 9**

Silk throwing – Soaking – Hydroextracting – Drying – Winding – Doubling – Primary and secondary twisting – Tram – Organdine – Crepe twist – Warping – Weaving – Handloom – Powerloom – Shuttleless weaving – Degumming and dyeing of yarn and fabrics – Types of silk fabrics.

**Total: 45**

### **TEXT BOOKS**

1. Sonwalkar, T.N., “Handbook of Silk Technology”, Wiley Eastern Ltd., 1993.
2. Dandin, S.B., Jayaswal, J., and Giridhar (Eds.), K., “Handbook of Sericulture Technologies”, Central Silk Board, 2001.

## TT1003 – MECHANICS OF TEXTILE STRUCTURES

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### UNIT I      YARN GEOMETRY      9

Basic geometry of twisted yarn – The idealized helical yarn structure – Yarn count and twist factor – Twist contraction and theoretical calculations – Limits of twists – Real and idealized yarns – Packing of fibres in yarn – Idealized packing – Derivations from ideal forms of packing – Packing in actual yarns – Specific volume of yarns – Relation between twist – Diameter and twist angle.

### UNIT II      FIBRE MIGRATION      9

Ideal migration – Observation of the paths of individual fibres – Migration in spun yarns – Characterization of migration behaviour – Tension variation as a mechanism of migration – Criteria for interchange of position – Theory of migration – Conditions for migration and frequency of migration – Forms of yarn twisting – Cylindrical and ribbon twisting.

### UNIT III      MECHANICS OF STAPLE FIBRE YARNS      9

Theoretical analysis of yarn geometry – Stress-strain distribution in yarn – Fibre obliquity and slippage – Influence of fibre length, fineness and friction on fibre slippage and yarn strength – Yarn breakage – Strength of blended yarns – Hamburger's model – Analysis of tensile behaviour – Prediction of breakage – Analysis of yarn mechanics by energy method – Observed extension and breakage of staple fibre yarns.

### UNIT IV      MECHANICS OF FILAMENT YARNS      9

Theory of extension of continuous filament yarns – Analysis of tensile forces – Stress-strain relations of the filaments – Effects of large extensions – Filament behaviour at large extensions – Prediction of breakage – Load-extension curve near break – Tenacity – Breaking extension – Initial modulus – Work of rupture.

### UNIT V      FABRIC GEOMETRY AND DEFORMATION      9

Elements of woven fabric geometry – Pierce and Olofsson models – Jamming of threads – Cover factor – Crimp interchange in woven fabrics – Modification to Pierce model – Race track – Saw tooth and Bilinear models – Form factor – Degree of set – Extension behaviour of woven fabric – Prediction of modulus – Tensile properties in bias direction – Geometry of plain knitted structures – Mechanics of non-woven fabrics.

**Total: 45**

### TEXTBOOKS

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

### REFERENCES

1. Hearle, J.W.S., Thwaites, J.J., and Amirbayat, J., "Mechanics of Flexible Fibre Assemblies", Marryland, 1980.
2. Postle, R., De Jong, S., and Carnaby, G.A., "The Mechanics of Wool Structures", Ellis Horwood, 1988.

## ELECTIVE II

### TT1004 – FASHION ART AND DESIGN

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

#### UNIT I CLOTHING 9

Origin of clothing – Grouping of dress out of painting, cutting and other methods – Role of costumes as a status symbol, sex appeal, fashion and seasons – Costumes of ancient civilizations – Egypt, Greece, Roman, English, French empires during renaissance 1500 – 1600 AD.

#### UNIT II COSTUMES IN INDIA 9

Costumes of India – History of Indian costumes up to Mughal period – History of Indian costumes post Mughal period – Traditional costumes of different states – Factors influencing costumes changes in India – Accessories and garments used in India – Costumes of Pakistan, Srilanka, Burma, China and Japan.

#### UNIT III FASHION 9

Lines – Colours, light theory of colour, prang of color system – Proportions – Rhythm – Balance – Emphasis – Harmony – Sketching and drawing – Fashion – Classification and types of fashion – Origin of fashion language – Philosophy and design – Street fashion – Study of leading fashion designers – French, Italian, American, Indian and English.

#### UNIT IV DESIGN 9

Concepts of design – Background to the world of fashion design – Definition of fashion designing – Initial steps of fashion designing – Ingredients of fashion designing – Designing equipments – Computer aided designing – Knowledge of latest fashions – Based on age, sex, nationality, occupation, socio-economic status.

#### UNIT V CASE STUDIES 9

Study of dacca muslin, jamdhani, himrus and amrus, carpets, kashmir shawls, kancheepuram and baluchari saris, paithani saris, bandhani, patola, Ikkat, kalamkari and other styles of printing and dyeing textiles – Factors determining changes in costumes from period to period.

**Total: 45**

#### TEXT BOOKS

1. Russel Gillow and Nicholas Barnard, “Traditional Indian Textiles”, Thames and Hudson Ltd.
2. Elizabeth Rouse, “Undertaking Fashion”, Blackwell Scientific Publication, Oxford, 1989.

#### REFERENCES

1. Dar, S.N., “Costumes of India and Pakistan”, D.B Tataporevala Sons and Co. Ltd. 1982.
2. Churye, G.S., “Indian Costume”, Ramdas Bhaatkal for Popular Prakashan Pvt. Ltd., Bombay, 1995.
3. Corter Ernestine, “The Changing World of Fashion”, OM Book Service, 1900 to present.
4. Hatanaka Kokyo Collection – “Textile Arts of India”, Chronide Books, 1996.
5. Madhubani, Prakash, K., “An Invaluable book on Original Art Tradition”, Design Point, 1994.

## TT1005 – TECHNICAL TEXTILES

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

### **UNIT I TECHNICAL TEXTILES AND FIBRES – AN OVERVIEW 9**

Definition and scope of technical textiles – Milestones in the development of technical textiles – Textile processes – Applications – Globalization of technical textiles – Future of the technical textiles industry – Introduction – High strength and high modulus organic fibres – High chemical and combustion-resistant organic fibres – High performance inorganic fibres – Ultra-fine and novelty fibres – Fibres used in civil and agricultural engineering – Automotive and aeronautics – Medical and hygiene applications – Protection and defence applications.

### **UNIT II TEXTILE-REINFORCED COMPOSITE MATERIALS 9**

Composite materials – Textile reinforcement – Woven fabric-reinforced composites – Braided reinforcement – Knitted reinforcement – Stitched fabrics.  
Textiles in Filtration: Introduction – Dust collection – Fabric construction – Finishing treatments – Yarn types and fabric constructions – Fabric constructions and properties – Production equipment – Finishing treatments – Fabric test procedures.

### **UNIT III TEXTILES IN CIVIL ENGINEERING AND MEDICAL TEXTILES 9**

Geosynthetics – Geotextiles – Essential properties of geotextiles – Engineering properties of geotextiles – Geotextile structure – Frictional resistance of geotextiles – Introduction – Fibres used – Non-implantable materials – Extra-corporeal devices – Implantable materials – Healthcare / hygiene products.

### **UNIT IV PROTECTIVE TEXTILES 9**

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

### **UNIT V TEXTILES IN TRANSPORTATION 9**

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

**Total: 45**

### **TEXT BOOKS**

1. Horrocks, A.R., and Anand (Edrs.), S.C., “Handbook of Technical Textiles”, The Textile Institute, Manchester, U.K., 2000, Woodhead Publishing Ltd.
2. Adanur “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., Lancaster, Pennsylvania, ISBN: 1-56676-340-1, 1995.

### **REFERENCES**

1. John, N.W.M., “Geotextiles”, Blackie, ISBN: 0-216-91995-9, 1987.
2. Mukhopadhyay, S.K., and Partridge, J.F., “Automotive Textiles”, Text. Prog, Vol. 29, No.1/2, 1998, ISBN: 1870372212.
3. Anand, S., “Medical Textiles”, Text. Inst., 1996, ISBN: 185573317X.

## TT1006 – NONWOVEN FABRICS

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### UNIT I HISTORY 9

Definitions and classification of nonwoven fabrics – Historical development – Fibres used production and sales – Raw materials used for making nonwovens.

### UNIT II WEB FORMING 9

Methods of making the spun fibre web using carding machines – Parallel laying, cross laying, air laying and wet laying – Webs manufactured from filaments.

### UNIT III BONDING 9

Bonded fabric production by needling, stitch-bonding, hydro entangling, thermal and by chemical methods – Production of bonded fabrics by spun bonding and melt blown processes – Structure – Property relationship in nonwoven fabric – Effect of process parameters on the properties of nonwoven fabrics.

### UNIT IV FINISHING AND END USES 9

Dry finishing and wet finishing of nonwoven fabrics – Various end uses of nonwoven fabrics made from different fabrics such as spun laced, melt blown and spun bond techniques.

### UNIT V TESTING 9

Methods of testing raw materials for nonwovens and nonwoven fabrics – Testing of fibres and bonding agents – Testing characteristics for specific uses such as clothing/shoes – Home furnishing textiles, household, bed and table linen – Medical textiles – Technical textiles.

**Total: 45**

### TEXT BOOKS

1. Lunenschloss, J., Albrecht, W., and David Sharp, “Nonwoven Bonded Fabrics”, Ellis Norwood Ltd., 1985, ISBN –085312-636-4.
2. Albin Turbak, “Nonwovens: Theory, Process, Performance and Testing”, 1993.



## TT1008 – TEXTILE MACHINERY MAINTENANCE

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

### **UNIT I TYPES 9**

Objects of maintenance – Types of maintenance – Organizational structure – Duties of maintenance personnel – System and procedures of maintenance – Need for system and procedures – Planning – Scheduling – Controlling – Implementation of planned maintenance – Backlogs – Rescheduling. Maintenance schedule (frequency – Man power – Time required – Special tools – Gauges – Lubricants) for blow room – Carding – Drawframe – Comber – Speed frame – Ring frame – Doubler and Rotor spinning machines.

### **UNIT II SCHEDULES 9**

Maintenance schedule for cone winding – Reeling – Bundling – Baling – Warping – Sizing – Pirn winding – Plain and auto looms – Kiers – Washing machines – Stenters – Jiggers – Padding mangles and calendering machines – House keeping – Machinery lay out – Cleanliness – Material handling and equipments – Machinery audit – Maintenance recording – Maintenance ledger – Machine cards – Maintenance cost control.

### **UNIT III MAINTENANCES 9**

Maintenance of power house: Electrical powerhouse, equipments – Motors – Starters – Lightings – Humidification plant – Generators – Lubrication: Lubricant types – Characteristics – Equipments – Roller eccentricity and its control – Tolerance for drafting rollers – Textile machinery erection procedures: Levelling – Instruments used – Erection of carding machine – Ring frame – Looms – Maintenance Details: Maintenance of card clothing – Wire inspection – Grinding procedure – burnishing – Wire mounting and tops clipping – Flat end milling.

### **UNIT IV TOP ROLLER MAINTENANCE 9**

Top roller maintenance – Cot selection and cot mounting procedure – Equipment – Buffing frequency – Grinding stone type – Berkolising – Cot lift – Top roller greasing – Spindle oil characteristics – Specifications – Topping – Replenishing – Shuttle care – Selection – Seasoning – Life of shuttle – Maintenance of reed cleaning – Rectification of damages in pitch – Bound and all metal reeds – Drop wires – Types and maintenance.

### **UNIT V PICKER MAINTENANCE 9**

Maintenance of picker – Picking bands – Healds – Heald frames – Pirns – Modernization and renovation: Economics – Priorities – Modernization versus replacement – Policy decision factors – Modernization programmes for card, speed frame, ring frame, sizing and loom.

**Total: 45**

### **TEXTBOOKS**

1. “Spinning, Weaving and Processing Machinery Maintenance in Textile Mills”, TAIRO.
2. “Maintenance Management in Spinning”, SITRA.

### **REFERENCES**

1. “Maintenance Schedules, Practices and Checkpoints in Spinning”, BTRA.
2. “Process Control in Weaving”, ATIRA.



## ELECTIVE IV

### TT1010 – APPAREL PRODUCTION CONTROL

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

#### UNIT I      **BASICS**      **9**

Control parameters – Apparel production parameters – Planning and lead-time – Product development: Steps from prototype to production model – Importance of pre-production activities – Introduction to timetable concepts.

Product data management: Understanding and interpretation of specification sheet.

#### UNIT II      **OPERATION SEQUENCE DEVELOPMENT**      **9**

Garment breakdown with machine and attachment details – Development of production grid for garment construction – Development of production flowchart.

#### UNIT III      **BUNDLE TICKETS AND LAY LOT PLANNING**      **9**

Guidelines for bundle ticket design – Functions of bundle tickets – Bundle ticket control – Different manufacturing systems: Make through and assembly line manufacturing – Advantages and disadvantages – Numerical exercises on lay lot planning to optimize cutting cost – Bundling – Ticketing and cutting room control formats.

#### UNIT IV      **PLANNING AND CONTROL**      **9**

Capacity calculation for cutting – Sewing and finishing – Determination of machine requirements for new factory – Line balancing: determination and allocation of manpower – Machine for balanced production in existing plant for a given target.

#### UNIT V      **QUALITY IN PRODUCT DEVELOPMENT**      **9**

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

**Total: 45**

#### TEXT BOOKS

1. Chuter, A.J., “Introduction to Clothing Production Management”, Blackwell Scientific Publications.
2. Tyler, D.J., “Materials Management in Clothing Production”, Blackwell Scientific Publications Professional Books.

## TT1011 – APPAREL MARKETING AND MERCHANDISING

| L | T | P | C |
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### UNIT I ORGANIZATION OF THE APPAREL BUSINESS 9

Introduction to apparel industry – Organization of the apparel industry types of exporters – Business concepts applied to the apparel industry – International trade.

### UNIT II MARKETING 9

Functional organization of an apparel firm – Responsibilities of a marketing division – Marketing objectives and strategies – Marketing research – Types of markets: Retails and wholesale strategies for merchandise distribution – Retailers – Sourcing flows and practices – Marketing plan – Labeling and licensing.

### UNIT III MERCHANDISING 9

Definition of merchandising – Functions of merchandising division – Role and responsibilities of a merchandiser – Different types of buyers – Communications with the buyers – Awareness of current market trends – Product development – Line planning line presentation.

### UNIT IV SOURCING 9

Need for sourcing – Sourcing materials – Manufacturing resources planning – Principles of MRP – Overseas sourcing – Sourcing strategies – Supply chain and demand chain analysis – Materials management for quick response – JIT technology.

### UNIT V DOCUMENTATION 9

Order confirmation – Various types of export documents – Pre-shipment post – Shipment documentation – Terms of sale – Payment – Shipment etc. – Export incentives: Duty drawback – DEPB, I / E license – Exchange control regulation – Foreign exchange regulation acts – Export management risk – Export finance – WTO / GATT / MFA – Functions and objectives – Successes and failures.

**Total: 45**

### TEXT BOOKS

1. Sinha, D., " Export Planning and Promotion ", - IIMS, 1989.
2. Nandi, T. K., "Import - Export Finance ", - IIMS, 1989.
3. Elaine Stone and Jean A. Samples., - "Fashion Merchandising McGraw Hill Book Company (1985) ISBN: 0 - 07 - 061742 - 2.

### REFERENCES

1. Shivaramu, S., " Export Marketing - A practical guide to Exporters ", Wheeler Publishing, 1996, ISBN: 81-7544-166-6.
2. Jarnow, J.A., Guerreiro, M., and B.Judelle., - " Inside the Fashion Business " ,Macmillan Publishing Company,1987. ISBN: 0-02-360000-4.

## TT1012 – CREATIVITY, INNOVATION AND NEW PRODUCT DEVELOPMENT

| L | T | P | C |
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### UNIT I BASIC CONCEPTS 9

The process of technological innovation – Factors contributing to successful technological innovation – The need for creativity and innovation – Creativity and problem solving – Brain storming – Different techniques.

### UNIT II PROJECT SELECTION AND EVALUATION 9

Collection of ideas and purpose of project – Selection criteria – Screening ideas for new products (evaluation techniques).

### UNIT III NEW PRODUCT DEVELOPMENT 9

Research and new product development – Patents – Patent search – Patent laws – International code for patents – Intellectual property rights (IPR).

### UNIT IV NEW PRODUCT PLANNING 9

Design of proto type – Testing – Quality standards – Marketing research – Introducing new products.

### UNIT V DESIGN AND TESTING 9

Creative design – Model preparation – Testing – Cost evaluation – Patent application.

**Total: 45**

### TEXTBOOKS

1. Brain Twiss, “Managing Technological Innovation”, Pitman Publishing Ltd., 1992.
2. Watton, H. B., “New Product Planning”, Prentice Hall Inc., 1992.

### REFERENCES

1. Harry Nystrom, “Creativity and Innovation”, John Wiley and Sons, 1979.
2. Khandwalla, N., “Fourth Eye (Excellence through Creativity) – Wheeler Publishing”, 1992.
3. I.P.R. Bulletins, TIFAC, 1997.

## ELECTIVE V

### TT1013 – EXPORT DOCUMENTATION AND GLOBAL MARKETING

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

#### UNIT I EXPORT CREDIT 9

Export credit – Short term, anticipatory letter of credit, and packing of credit – Negotiation of bills, source of short-term credit, medium-term and long-term export credits, methods, roll of terms of payment in international marketing – Factors responsible for counter trade growth.

#### UNIT II TRADES 9

Domestic trade Vs international trade – Regional trade blocks – Foreign exchange market – Nature of foreign exchange market – Main functions – Business and environment – Social environment – Logical environment – Business ethics.

#### UNIT III PAYMENT 9

Balance of payment – Deficit in balance of payment – Debits and credits – Foreign exchange market – Commercial bank credit for export trade.

#### UNIT IV POLICIES 9

Standard policies – Indian trade police – India's foreign trade policy – Exports and imports policy.

#### UNIT V DOCUMENTS 9

Major documents for exports – International codes for products and services – Principal documents – Auxiliary documents – Documents for claiming export assistance.

**Total: 45**

#### TEXT BOOKS

1. Jeannette Jamow, Dickerson, K. G., “Inside the Fashion Business”, Prentice Hall, 1997.
2. Hill, R.M., Alexander, R.S., and Cross, J.S., “Industrial Marketing”, Aitbs Publishers and Distributors, 1998.



