

# BIJU PATNAIK UNIVERSITY OF TECHNOLOGY, Orissa

## Textile Engineering

3 <sup>RD</sup> Semester				4 <sup>th</sup> Semester			
Theory		Credit Hrs	Credit	Theory		Credit Hrs	Credit
BSCM1205	Mathematics- III	3-1-0	4	BSCM1210	Mathematics - IV	3-1-0	4
BSCC1208	Chemistry-II	2-0-0	3	HSSM3205	Organisational Behavior OR	3-0-0	3
BECS2212	C++ and Objected Oriented Programming.	3-0-0	3	HSSM3204	Engg. Economics & Costing	3-0-0	
HSSM3204	Engg. Economics & Costing OR	3-0-0	3	BECS2208	Database Management System	3-0-0	3
HSSM3205	Organisational Behaviour			PCTX4203	Fibre Science & Technology-II	2-0-0	2
PCTX4201	Fibre Science & Technology-I	2-0-0	2	PCTX4204	Yarn Manufacture-II	3-0-0	3
PCTX4202	Yarn Manufacture-I	3-0-0	3	PCTX4205	Fabric Manufacture-I	3-0-0	3
	<b>Total</b>		<b>18</b>		<b>Total</b>		<b>18</b>
<b>Practicals / Sessionals</b>				<b>Practicals / Sessionals</b>			
HSSM7203	Communication & Interpersonal skills for Corporate Readiness Lab	0-0-3	2	PCTX7203	Fibre Science & Technology-II Lab.	0-0-3	2
BECS7212	C++ and Objected Oriented Programming Lab	0-0-3	2	PCTX7204	Yarn Manufacture-II Lab	0-0-3	2
PCTX7201	Fibre Science & Technology-I Lab.	0-0-3	2	PCTX7205	Fabric Manufacture-I Lab	0-0-3	2
PCTX7202	Yarn Manufacture-I Lab.	0-0-3	2	BECS7208	Database Management System Lab	0-0-3	2
	<b>Total</b>		<b>8</b>		<b>Total</b>		<b>8</b>
			<b>26</b>				<b>26</b>

## BSCM1205 **Mathematics - III**

### **Module-I**

**(18 hours)**

Partial differential equation of first order, Linear partial differential equation, Non-linear partial differential equation, Homogenous and non-homogeneous partial differential equation with constant co-efficient, Cauchy type, Monge's method, Second order partial differential equation The vibrating string, the wave equation and its solution, the heat equation and its solution, Two dimensional wave equation and its solution, Laplace equation in polar, cylindrical and spherical coordinates, potential.

### **Module-II**

**(12 hours)**

Complex Analysis:

Analytic function, Cauchy-Riemann equations, Laplace equation, Conformal mapping,

Complex integration: Line integral in the complex plane, Cauchy's integral theorem, Cauchy's integral formula, Derivatives of analytic functions

### **Module –III**

**(10 hours)**

Power Series, Taylor's series, Laurent's series, Singularities and zeros, Residue integration method, evaluation of real integrals.

### **Text books:**

1. E. Kreyszig, "Advanced Engineering Mathematics", Eighth Edition, Wiley India  
Reading Chapters: 11,12(except 12.10),13,14,15
2. B.V. Ramana, "Higher Engineering Mathematics", McGraw Hill Education, 2008  
Reading chapter: 18

### **Reference books:**

1. E.B. Saff, A.D.Snyder, "Fundamental of Complex Analysis", Third Edition, Pearson Education, New Delhi
2. P. V. O'Neil, "Advanced Engineering Mathematics", CENGAGE Learning, New Delhi

# BSCC1208 **Chemistry - II**

## **Module I**

**1. Water Technology:** Hardness of Water : Types of hardness, Units of hardness and their interrelation, Determination of hardness(EDTA method only). Disadvantage of hard water . Water softening technology (internal and external (limesoda,zeolite,and ion exchange methods ) Desalination(electrodialysis, reverse osmosis, Sterilization of water by bleaching power, chlorine, ozone, chloramine. Determination of B.O.D and C.O.D of water sample.

**2. Corrosion:** Theories of corrosion , Types of corrosion , Factors affecting corrosion, Corrosion Control: (Proper design and fabrication procedure, Cathodic protection, Passivation).

## **MODULE-II**

**1. Fuels:** Classification of fuels, calorific value, (Determination by Dulong's formula),G.C.V&N.C.V

Liquid fuel: Classification of petroleum, Refining of petroleum , Cracking, Knocking and anti knocking,cetane and octane numbers . Unleaded petrol, synthetic petrol, power alcohol

Gaseous Fuel : Producer gas, Water gas, LPG , CNG, Kerosene gas

Combustion Calculation.

## **2. Battery technology**

Introduction, Batteries and cells, Basic components of battery, its Classification characteristics,Chemical batteries(dry, Lead acid & gel batteries) Alkaline batteries(zinc-air,aluminium-air,Nickel metal hydride battery) Reserve batteries(magnesium-copper,Gordan-magnesium battery) Nickel cadmium battery

## **Module III**

**1. POLYMER .** Polymer: Types, polymerization process and mechanisms

Conducting polymers(poly aniline, poly acetylene),polymer composite(carbon fiber)

Preparation. Properties and uses of following polymer(polyethylene,PMMA,PTFE

Bakelite,polyurethanes,polycarbonate)

## **2 Nano materials**

Nano material; Carbon nano tube,(synthesis, properties and application.) Application of nano material in medicine, fuel cell, catalysis (only general idea)

## **Text Books:**

1. Engineering chemistry by Putti R.vIjayasrarhy ,PHI Ltd
2. Engineering chemistry by P.C jain and M. jain

## **Reference Books:**

1. Engineering chemistry by N Krishnamurthy ,p vallinaygam, Dmadhavan, PHI Ltd
2. Engineering chemistry by mary,jane.shultz ,Cengage learning publication
3. Engineering chemistry by R.Gopalan,D.venkaapaya,and SNagarajan, Vikas publishing house.

# BECS2212 C++ & Object Oriented Programming

## Module I

(08 hrs)

Introduction to object oriented programming, user defined types, structures, unions, polymorphism, encapsulation. Getting started with C++ syntax, data-type, variables, strings, functions, default values in functions, recursion, namespaces, operators, flow control, arrays and pointers.

## Module II

(16 hrs)

Abstraction mechanism: Classes, private, public, constructors, destructors, member data, member functions, inline function, friend functions, static members, and references.

Inheritance: Class hierarchy, derived classes, single inheritance, multiple, multilevel, hybrid inheritance, role of virtual base class, constructor and destructor execution, base initialization using derived class constructors.

Polymorphism: Binding, Static binding, Dynamic binding, Static polymorphism: Function Overloading, Ambiguity in function overloading, Dynamic polymorphism: Base class pointer, object slicing, late binding, method overriding with virtual functions, pure virtual functions, abstract classes.

Operator Overloading: This pointer, applications of this pointer, Operator function, member and non member operator function, operator overloading, I/O operators.

Exception handling: Try, throw, and catch, exceptions and derived classes, function exception declaration.

## Module III

(08 hrs)

Dynamic memory management, new and delete operators, object copying, copy constructor, assignment operator, virtual destructor.

Template: template classes, template functions.

Namespaces: user defined namespaces, namespaces provided by library.

## Text Books:

1. Object Oriented Programming with C++ - E. Balagurusamy, McGraw-Hill Education (India)
2. ANSI and Turbo C++ - Ashoke N. Kamthane, Pearson Education

## Reference Books:

1. Big C++ - Wiley India
2. C++: The Complete Reference- Schildt, McGraw-Hill Education (India)
3. "C++ and Object Oriented Programming" – Jana, PHI Learning.
4. "Object Oriented Programming with C++" - Rajiv Sahay, Oxford
5. Mastering C++ - Venugopal, McGraw-Hill Education (India)
6. "Object Oriented Programming with C++", David Parsons, Cengage Learning.

# HSSM3204 **Engineering Economics & Costing**

## **Module-I: (12 hours)**

Engineering Economics – Nature and scope, General concepts on micro & macro economics. The Theory of demand, Demand function, Law of demand and its exceptions, Elasticity of demand, Law of supply and elasticity of supply. Determination of equilibrium price under perfect competition (**Simple numerical problems to be solved**). Theory of production, Law of variable proportion, Law of returns to scale.

## **Module-II: (12 hours)**

Time value of money – Simple and compound interest, Cash flow diagram, Principle of economic equivalence. Evaluation of engineering projects – Present worth method, Future worth method, Annual worth method, internal rate of return method, Cost-benefit analysis in public projects. Depreciation policy, Depreciation of capital assets, Causes of depreciation, Straight line method and declining balance method.

## **Module-III: (12 hours)**

Cost concepts, Elements of costs, Preparation of cost sheet, Segregation of costs into fixed and variable costs. Break-even analysis-Linear approach. (Simple numerical problems to be solved)

Banking: Meaning and functions of commercial banks; functions of Reserve Bank of India. Overview of Indian Financial system.

### **Text Books:**

1. Riggs, Bedworth and Randhwa, “Engineering Economics”, McGraw Hill Education India.
2. M.D. Mithani, Principles of Economics.

### **Reference Books :**

1. Sasmita Mishra, “Engineering Economics & Costing “, PHI
2. Sullivan and Wicks, “ Engineering Economy”, Pearson
3. R.Paneer Seelvan, “ Engineering Economics”, PHI
4. Gupta, “ Managerial Economics”, TMH
5. Lal and Srivastav, “ Cost Accounting”, TMH

# HSSM 3205 **Organizational Behaviour**

## **Module I :**

The study of Organizational Behaviour : Definition and Meaning, Why Study OB

Learning – Nature of Learning, How Learning occurs, Learning and OB.

Foundations of Individual Behaviour : Personality – Meaning and Definition, Determinants of Personality, Personality Traits, Personality and OB.

Perception – Meaning and Definition, Perceptual Process, Importance of Perception in OB. Motivation – Nature and Importance, Herzberg's Two Factor Theory, Maslow's Need Hierarchy Theory, Alderfer's ERG Theory, Evaluations.

## **Module II :**

Organizational Behaviour Process : Communication – Importance, Types, Gateways and Barriers to Communication, Communication as a tool for improving Interpersonal Effectiveness, Groups in Organizations – Nature, Types, Why do people join groups, Group Cohesiveness and Group Decision-making Managerial Implications, Effective Team Building. Leadership-Leadership & Management, Theories of Leadership-Trait theory, Leader Behaviour theory, Contingency Theory, Leadership and Follower ship, How to be an effective Leader, Conflict-Nature of Conflict and Conflict Resolution. An Introduction to Transactional Analysis (TA).

## **Module-III :**

Organization : Organizational Culture – Meaning and Definition, Culture and Organizational Effectiveness. Introduction to Human Resource Management-Selection, Orientation, Training and Development, Performance Appraisal, Incentives Organizational Change – Importance of Change, Planned Change and OB techniques. International Organisational Behaviour – Trends in International Business, Cultural Differences and Similarities, Individual and Interpersonal Behaviour in Global Perspective.

## **Text Books :**

1. Keith Davis, Organisational Behaviour, McGraw-Hill.
2. K.Asathappa, Organisational Behaviour, Himalaya Publishing House.

## **Reference Books :**

1. Stephen P. Robbins, Organisational Behaviour, Prentice Hall of India
2. Pradip N. Khandelwal, Organizational Behaviour, McGraw-Hill, New Delhi.
3. Uma Sekaran, "Organizational Behaviour", TATA McGraw-Hill, New Delhi.
4. Steven L McShane, Mary Ann Von Glinow, Radha R Sharma" Organizational Behaviour" , TATA McGraw- Hill.
5. D.K. Bhattachayya, "Organizational Behaviour", Oxford University Press
6. K.B.L.Srivastava & A.K.Samantaray, "Organizational Behaviour" India Tech
7. Kavita Singh, "Organizational Behaviour", Pearson

# PCTX4201 Fibre Science & Technology - I

## Module-I

( 10 Hrs)

### Introduction:

- a) Classification of textile fibres according to their nature and origin,
- b) essential and desirable properties of textile fibres,
- c) staple fibre and continuous filaments,

### Natural fibres:

- a) cotton: concept of varieties; ginning, baling ,
- b) jute, Flax:- varieties, retting process ( extraction of fibre from bast),
- c) protein fibres:- wool:- classification, grading, scouring, silk:- classification, concept of sericulture, degumming, throwing, reeling.

## Module-II

( 10 Hrs )

### Man-made fibres:

- a) Principles of melt spinning, dry spinning and wet spinning,
- b) Manufacturing process of regenerated fibres - viscose & diverse forms of viscose, cuprammonium and acetate rayon
- c) Manufacturing of synthetic fibres - principles of polycondensation with reference to polyesters, polyamides, principles of poly addition with reference to acrylics
- d) concept of quenching operation and finish application,

## Module-III

( 10 Hrs)

### Properties of Fibres

**Physical properties: Fibre length** - Technical significance of fibre length, introduction to length distributions, Measurement of fibre length of cotton fibre - Baer sorter diagram, 2.5% and 50 % span length, Uniformity ratio, **Fibre fineness** : Fibre linear density, Technical significance of fibre fineness; methods of measuring fineness of cotton fibres, jute, flax, wool, silk and man-made fibres, Maturity of cotton fibre and its influence on fineness. Determination of maturity of cotton fibre by different methods. Maturity Co-efficient. concept of micro denier fibre **Moisture Content and Regain:** Moisture content and regain, relative and absolute humidity, effect of moisture on fibres, **Fibre density, Crimp** - Significance, measurement. **Tensile Strength** - Tensile strength of single fibre, bundle strength of cotton,

**Chemical Properties of Fibres** : Chemical properties of different cellulosic, protein and synthetic fibres such as cotton, jute, flax, pineapple, wool, silk, polyester, polyamide, polyacrylonitriles etc.

### Text Books:

1. Manmade Fibres - R.W. Moncrieff,
2. Textile Fibre - V.A. Shenai
3. Dyeing and Chemical Technology of Textile Fibres by E.R. Trotman,

### Reference Books :

4. Man-made Fibres Science and Technology, Vol. 1,2,3 - H.F. Mark, S.M. Atlas and E. Cernia,
5. Polyester Fibres Chemistry and Technology - H. Ludwig,
6. Textbook of Polymer Science by F.W. Billmeyer.
7. Production of Man-made Fibres – A.Vaidya
8. Principle of Testing – J.E.Booth

# PCTX4202 Yarn Manufacture – I

## Module – I

( 20 hrs )

**1. Short Staple fibre Spinning** (brief idea): Introduction, raw materials, opening and cleaning - the need for opening and cleaning, mixing/blending, drafting, Principle of yarn formation systems.

### 2. Blow Room:

Basic operations in the blow room - opening, cleaning, feeding, dust removal, Blow room line - sequence of machines- need for various types of machines , study of various openers and cleaners used in a modern Blow room line -their classification - principle of operation-position etc, study of components such as feed apparatus- feed with two clamping cylinders, feed with a roller and pedals; grid- grid as an opening device, elements of grid, waste collection under the grid, grid adjustment; different type of mixer/blender. General factors influencing opening and cleaning; Idea of accessories and associated equipment (dust removing and disposing devices; material transport devices, material flow control devices, metal extractors, fire eliminator, chute feed system). Production calculations; Performance assessment of blow room line -: cleaning efficiency, degree of opening, waste, nep generation, lap weight variation and rejection, lap build, norms for blow room operations- Miantanace schedule..

## Module – II

( 10 hours)

### 3. Carding:

Objects of Carding. Principle of carding, stripping and brushing actions. Study of different parts, functions and constructional features of a Carding Machine. Study of card clothing - geometry and specification of licker-in, cylinder, flat and doffer metallic wire, Analysis of carding force. Theoretical treatment of fibre configuration in card sliver, Mechanics of fibre entanglement and fibre transfer during carding, Mechanics of neps and hook formation and its effect on yarn quality, Features of a high production card. Modern developments in Carding. Draft, production and calculation in card. Gauging and setting at different zone in a card. Method of stripping and its effect on yarn quality, Defects in card web:- Causes and remedies. Maintenance schedules. Auto leveller in card.

## Module –III

( 15 hours)

### 4. Draw Frame:

Objects of Draw frame, Operation principle, Principle of roller drafting , Drafting wave, Drafting Force, behaviour of the fibres in the drafting zone, friction fields, distribution of draft, additional effects of draft; perfect and real drafting; nature of drafting irregularities; Equalizing: unevenness of fibre strands, basic possibilities of equalizing, doubling, levelling; Study of various drafting system, Drafting Rollers arrangement, Doubling, blending and hook removal at draw frame, , coiling- delivery, condensing, sliver coiling, can changing. Gearing and production calculation, Design and principle of Auto leveler- open loop and close loop . Maintenance schedule. Recent development in Draw frame.

**5. Combing:** Introduction, Objects of combing process, types of comber, sequence of operation in a comber ( combing cycle) ; Methods of lap preparation for combing: process - outline, operating principles of sliver lap machine, ribbon lap machine and sliver doubling machine; comparative assessment of web doubling and sliver doubling processes; combing: parameters influencing combing operation- raw material, material preparation, factors associated with machine setting, ambient conditions, influence of feed stock on combing, parallelisation of fibres in the sheet, sheet thickness (wt.), evenness of the lap sheet, disposition of hooks, number of draw frame passages, degree of combing, noil theory, noil elimination with forward feed and backward feed, influence of machine components and settings on combing, feed distance moved per cycle, type of feed, detachment setting, points on the combs, depth of penetration of the top comb, piecing;

### Text Books:

1. A Practical Guide to Opening and Cleaning - W.Klien
2. A Practical guide to Carding – W.Klien
3. A Practical Guide to Combing & Drawing - W. Klein

### Reference Books:

- 4.. Spun Yarn Technology - Oxtoby
5. Spun Yarn Technology, Vol. I & II - V. ubramani
6. Manual Cotton Spinning- F. Charnley
7. The Principle of Roller Drafting & The Irregularity of Drafted Materials by G. A. R. Foster,

# HSSM7203 **Communication & Interpersonal skills for Corporate Readiness Lab.**

**Lab**

**30 hours**

This course will focus on communication in professional (work-related) situations of the kind that BPUT graduates may expect to encounter on entering the professional domain. Some typical forms of work-related communication, oral or written, are listed below. Practice activities for all four skills can be designed around these or similar situations.

1. Gaining entry into an organization
  - i. Preparing job-applications and CVs
  - ii. Facing an interview
  - iii. Participating in group discussion (as part of the recruitment process)
  
- 2 In-house communication
  - a. Superior/ Senior → subordinate / junior (individual → individual / group)
    - i. Welcoming new entrants to the organization, introducing the workplace culture etc.
    - ii. Briefing subordinates / juniors : explaining duties and responsibilities etc.
    - ii. Motivating subordinates / juniors ('pep talk')
    - iii. Instructing/ directing subordinates/ juniors
    - iv. Expressing / recording appreciation, praising / rewarding a subordinate or junior
    - v Reprimanding / correcting / disciplining a subordinate/junior (for a lapse) ; asking for an explanation etc.
  
  - b. Subordinate / Junior → Superior / Senior
    - i. Responding to the above
    - ii. Reporting problems / difficulties / deficiencies
    - iii. Offering suggestions

# BECS7212 **C++ & Object Oriented Programming Lab**

1. Programs on concept of classes and objects.(1 class)
2. Programs using inheritance.(1 class)
3. Programs using static polymorphism.(1 class)
4. Programs on dynamic polymorphism.(1 class)
5. Programs on operator overloading.(1 class)
6. Programs on dynamic memory management using new, delete operators.(1 class)
7. Programs on copy constructor and usage of assignment operator.(1 class)
8. Programs on exception handling .(1 class)
9. Programs on generic programming using template function & template class.(1 class)
10. Programs on file handling.(1 class)

## PCTX7201 **Fibre Science & Technology – I Lab.**

- 1.To calculate the moisture regain and moisture content of a given Cotton sample by hot air oven method.
- 2.To trace the Fibre length-cumulative frequency percentage by means of sorter diagram.
3. To measure the Maturity co-efficient of Cotton fibre by caustire method.
4. To measure the fineness of a given sample by Air flow method.
5. To determine the bundle strength of cotton fibre using Stelometer.
6. To calculate Trash Content % of a given Cotton sample by the TRASH ANALYSER.
7. To measure the diameter of Wool fibre.
8. To determine the denier of silk fibre.
9. To find the crimp % of fibre.
10. To measure the tensile strength of single fibre.

## PCTX7202 **Yarn Manufacture – I Lab.**

1. To study the flow of materials through various organs of a Blow room line.
2. To study and sketch the working mechanism of various openers, cleaners, blenders and lap formation unit in a Blow-Room line.
3. To study and sketch the working mechanism of various operations of a card with respect to flow of material
4. To study different settings of the card
5. To study the gearing plan and calculation of draft constant, draft and production constant of a Card.
- 6, To study and sketch the working mechanism of draw frame with respect to flow of material
7. To study and sketch the working mechanism of drafting zone of draw frame.
8. To study the ratch setting of draw frame drafting system
9. Calculation of draft constant and draft of a drawframe.
10. General study of different parts of comber and their operations.

## BSCM1210 Mathematics – IV

### Module-I

(20 hours)

#### Numerical methods:

Approximation and round of errors, Truncation error and Taylor's series

Roots of equation: The bisection method, the false-position method, fixed point iteration, the Newton-Raphson method, Muller's method

Linear algebraic equation: LU decomposition, the matrix inverse, Gauss-Seidel method

Interpolation: Newton divided difference interpolation, Lagrange Interpolation, Newton's forward and backward interpolation.

Numerical integration: The trapezoidal rule, The Simpson's rules, Gauss quadrature

Ordinary differential equation: Euler's method, Improvement of Euler's method, Runge-Kutta methods

### Module-II

(10 Hours)

#### Probability:

Probability, Random variables, Probability distributions, Mean and variance of distribution,

Binomial, Poisson and Hypergeometric distributions, Normal distribution, Distribution of several random variables.

### Module-III

(10 Hours)

#### Mathematical Statistics:

Random sampling, Estimation of Parameters, Confidence Intervals, Testing of hypothesis,

Acceptance sampling, Chi square test for goodness of fit, Regression Analysis, Fitting Straight Lines, Correlation analysis.

#### Text books:

1. S. C. Chapra and R. P. Canale, "*Numerical methods for Engineers*", Fifth Edition, McGraw Hill Education  
Reading Chapters : 2, 3(3.1, 3.2), 4(4.2, 4.3), 5(5.1, 5.2, 5.3), 6(6.4), 9(9.1, 9.2), 10(10.2), 13(13.1,13.2,13.5), 16(16.1, 16.2), 17(17.3), 20(20.1, 20.2, 20.3)
2. E. Kreyszig," *Advanced Engineering Mathematics*:", Eighth Edition, Wiley India  
Reading Chapters: 22, 23( except 23.5 and 23.8)

#### Reference books:

1. Jay L. Devore, "Probability and Statistics for Engineering and Sciences", Seventh Edition, Thomson/CENGAGE Learning India Pvt. Ltd
2. P. V.O'Neil, "*Advanced Engineering Mathematics*", CENGAGE Learning, New Delhi

# BECS2208 **Database Management System**

## **Module I :** (10 hours)

Database System Architecture - Data Abstraction, Data Independence, Data Definitions and Data Manipulation Languages. Data models - Entity Relationship(ER), Mapping ER Model to Relational Model, Network .Relational and Object Oriented Data Models, Integrity Constraints and Data Manipulation Operations.

## **Module II :** (12 hours)

Relation Query Languages, Relational Algebra and Relational Calculus, SQL.  
Relational Database Design: Domain and Data dependency, Armstrong's Axioms, Normal Forms, Dependency Preservation, Lossless design.

Query Processing Strategy.

## **Module III:** (10 hours)

Transaction processing: Recovery and Concurrency Control. Locking and Timestamp based Schedulers.

Database Recovery System: Types of Data Base failure & Types of Database Recovery, Recovery techniques

### Text Books:

1. Database System Concepts by Sudarshan, Korth (McGraw-Hill Education )
2. Fundamentals of Database System By Elmasari & Navathe- Pearson Education

### References Books:

- (1) An introduction to Database System – Bipin Desai, Galgotia Publications
- (2) Database System: concept, Design & Application by S.K.Singh (Pearson Education)
- (3) Database management system by leon &leon (Vikas publishing House).
- (4) Fundamentals of Database Management System – Gillenson, Wiley India
- (5) Database Modeling and Design: Logical Design by Toby J. Teorey, Sam S. Lightstone, and Tom Nadeau, “”, 4<sup>th</sup> Edition, 2005, Elsevier India Publications, New Delhi

# PCTX4203 Fibre Science and Technology – II

## Module-I

( 10 hours)

1. **Mechanical properties of Textile fibres** :Basic definition- true stress, specific stress, tenacity and breaking length, recapitulation of elastic and plastic deformation, Hook's law and Poisson's ratio; stress-strain curves; comparative stress-strain diagrams of different fibres.
2. **Elastic recovery, strain recovery, work recovery**; Shear, bending, torsion and compression;
3. **Other properties**  
a) Optical Properties, b) Thermal properties, c) Fibre friction and d) Dielectric properties.

## Module-II

( 10 hours)

### 4. Structure of Fibres :

- a. **Morphological structure** : Longitudinal and cross-sectional view of natural and man-made fibres.
- b. **Chemical structure** :: chemical structure of synthetic fibres, chemical structure of natural fibres-vegetable or cellulosic, animal or polypeptide fibres, recapitulation of bonding in polymer fibres – primary bonding, secondary bonding, methods of investigating structure-idea of infrared spectroscopy, x-ray, microscopy, NMR etc;
- c. **Microstructure and macrostructure of fibres**; Recapitulation of crystalline and non-crystalline materials –structure of crystals, polymer crystals, X-ray diffraction and crystallinity, thermal analysis of polymers by DTA, TGA and DSC.

## Module-III

( 10 hours)

5. **Texturing**: Introduction, purpose, bulked and textured yarns, methods of texturing thermoplastic and non-thermoplastic yarns- basic principles, feed material characteristics-study of twist-set-detwist, false twist, edge crimp, stuffer box crimp; knit de-knit techniques of texturing and the techniques of modified stretch yarn; , properties and uses of textured.
6. High performance fibres.: Introduction to Polyurethane, Kevlar , Nomex, Glass fibre, Carbon fibre, PVA fibre, PVC fibre etc.

## Text Books

1. Physical Properties of Textile Fibres by W.E. Morton and J.W.S. Hearle
2. Manmade Fibres - R.W. Moncrieff,
3. Textile Fibre, V.A. Shenai
4. Dyeing and chemical Technology of Textile Fibres " , Trotman, E.R., Charles Griffin and Co Ltd., London. 1990.

## Referene Books :

1. Fiber Science by Steven B. Warner,
2. Mechanical Properties of Solid Polymers by I. M. Ward,
3. Textile- Motivate Series by A. Wynne, Macmillan.
4. Textile Chemistry , American Elsevier Publishing Co. Inc., New York , 1986.
- 5.. Peters, R.H., " Textile Chemistry Vol.I, II and III " , Elsevier Publishing Co.Inc., New York, 1985.
- 6 . Menachem Lewin and Stephen B.Sello, " Handbook of fibre science and Technology; Vol.I, Fundamentals and preparation-Part A " , Marcel Dekker Inc., New York, 1983.

# PCTX4204 Yarn Manufacture –II

## Module-I

( 10 hours)

### 1. SPEED FRAME:

Principles and objects of Speed Frame.  
Study of flow of material and different parts  
Study of various parts of drafting system, roller weighting and setting, distribution of  
Principle of twisting, parts and function of flyer, development of a flyer.  
Principle of Winding, Flyer leading and bobbin leading systems  
Principles of differential mechanism in a Simplex.  
Function and description of building mechanism, cone drum arrangements.  
Features of a modern Simplex Frame, recent developments.  
Defects and remedies in Simplex process.  
Lubrication and maintenance schedule for Speed Frame.  
Calculations pertaining to speed, production, draft and twist, coils/inch, etc.

## Module-II

( 20 hours)

### 2. RING FRAME:

Objects and principles of Ring Spinning Machines.  
Constructional features and identification of different parts.  
Study of creel, Principles of drafting systems on Ring Frames, High drafting and Super High Drafting System, Weighting System on Ring Frame. Twisting and winding operation.  
Study of Rings, Travellers, Spindles for their designs and efficient working.  
Study of building mechanism. Factors affecting yarn tension and its control in spinning. Methods of driving ring frame, variable and dual motor drive.  
Study of special attachment such as Automatic doffing and pneumatic waster extraction.  
Study of common defects in ring spun yarn and their methods of analysing yarn defects due to roller vibrations, roller slip and roller eccentricity.  
Modifications to be effected while spinning polyester, viscose and blends on Ring Frame.  
Calculation regarding speed, production and efficiency in Ring Frame, Study of twist factor for single yarn and twist, strength and count relationship.  
General idea about Lubrication and maintenance of High Speed Ring Frame.

## Module – III

( 15 hours)

### 3. DOUBLING:

Principles and objects of doubling, wet and dry doubling, different methods of threading, detailed study of creels, building motions, rings, travellers and spindles on doublers. Concept of balanced twist in doubled yarn, direction of twist in doubled yarn and its relation to single yarn. TFO- Principle, technique, Fancy doublers, different systems of fancy yarn production.

### 4. REELING:

Brief study of machines used for reeling, straight and cross reeling, advantages and disadvantages, doffing systems, Calculation.

### 5. NEW SPINNING SYSTEM:

- Open end spinning systems: principle of rotors spinning system, constructional features and different parts rotor spinning m/c. Economics and quality of rotor spun yarn.
- Principle of Friction Spinning, Features of DREF – I, DREF-II and DREF-III spinning system.
- Airjet Spinning: Principle,
- Comparison of the properties among Rotor, DREF, Air jet and Ring spun yarn.

## Text Books:

1. A Practical Guide to Ring Spinning, W.Klien
2. A Practical guide to Combing and Drawing. W.Klien

## Reference Books:

1. Manual of Cotton Spinning (Vol-IV) Part-I & II, The Textile Institute, Manchester
2. Manual of Cotton Spinning (Vol-V), The Textile Institute, Manchester
3. Open End Spinning, O. Neil
4. New Spinning System, W.Klein
5. Spun Yarn Technology, Oxtoby
6. TFO- Technology & Techniques, HVS Murty

# PCTX4205 Fabric Manufacture – I

## Module – I

( 15 hours)

1. **Introduction:** a) The fabric, b) methods of fabric formation, c) phases in the formation of fabric by weaving, d) a technical introduction to weaving mechanism.
2. **Preparatory processes:** Introduction, sequence of processes. Objects of different processes.
3. **Winding and Warping:**  
Single –end Warp Winding-a) Winding machines-basic function - study of different parts of warp winding m/c- classification of winding machines, spindle and drum driven machines- driving the package e.g., constant surface speed, constant angular speed, varying angular speed. - Types of yarn clearers and their merits and demerits, yarn tensioner, anti patterning device etc.b) Different types of packages and package build-parallel, near parallel wind & cross wound packages, standard package formats (cop, cone, cheese, pineapple etc.) c) winding techniques-random, precision and combined, d) winding parameters: winding rate, wind and traverse ratio, gain, winding angle, e) winding faults; pattern formation, principles of pattern breaking.  
**Single –end Weft winding-** a) Introduction b) need, c) shape and build of the pirn, c) basic requirements, d) elements of the pirn winding machines, e) concept of basic terms-pirn density, cohesion, consistency of pirn diameter, bunch building, chase, winding and binding coils, yarn tails and back wind, spindle speed, direction of rotation, f) degree of automation, g) description of features of a pirn winding machine with respect to a latest commercially available machine.

## Module-II

( 20 hours)

**Warping:** a) Introduction, b) principal methods of warping, c) warping process, d) warping creels- continuous chain creel, truck creel, magazine creel, automatic creel, unrolling creel e) yarn tension in warping, f) stop motions and measuring motions, g) leasing and beaming, h) beam warping or direct warping- process, machines, i) section warping- process, machines, section building and relating drum storage capacity to beam flange diameter.

**4. Sizing:** a) Introduction, b) sizing process, c) size ingredients, d) factors which affect the properties of sized yarns, f) preparation of the size paste- formulation and equipments, g) techniques of sizing, h) types of sizing, i) concept of factors governing the pick up of size, j) principal machine elements- creel, size box, drying arrangements, head stock, tension control mechanisms, measuring and marking mechanisms etc., k) modern trends in sizing.

**Reaching in and Drawing in :** a) Introduction, b) need, c) process, d) modernization, e) related calculations.

## Module –III

( 10 hours)

**5. Basic mechanism of Loom (weaving) -** a) Classification of looms, history of loom development b) Study of different parts of a Handloom and Powerloom c) Study of basic operations i.e Shedding – types of shedding - study of tappet shedding, Picking and checking mechanism, Beating up etc, Eccentricity of the sley, Timing and seating.

**Text Books and Reference Books:**

1. Winding – Silver Jubilee Monograph by BTRA,
2. Sizing – Materials, Methods, Machinery Ajoankar, Talukdar & Wadekar,
3. Weaving Conversion of Yarn to Fabric Lord & Mohammed,
4. Textile Maths Volume III J.E.Booth,
5. Cotton Weaving Gordeev, Volkov, Blinov & Svyantenko,
6. Weaving Mechanism – Pat-I & II N.N.Banerjee
7. Handbook of Weaving Preparation D.S. Verma,
- 8.
9. Plain Weaving Motion K.T Aswani

## PCTX7203 **Fibre Science and Technology – II Lab.**

1. To study the stress-strain behavior of different fibres.
2. To study the longitudinal and cross-sectional views of different fibres.
3. To learn the identification of different cellulosic, protein and synthetic the fibres by burning test, touching, observing the cross- section .
4. To learn the identification of different cellulosic, protein and synthetic fibres by chemical testing
5. To determine % of blend composition of different variety of blended yarn ( minimum 5 Varieties)

## PCTX7204 **Yarn Manufacture –II Lab.**

1. Study of different parts and flow of material in a Simplex Machine.
2. Study of building mechanism in Simplex.
3. Study of the Gearing Diagram of Simplex and calculation of Draft Constant and Twist constant.
4. Study of drafting rollers setting in Speed frame.
5. Study of different parts and flow of material in a Ring Frame .
6. Study of the Gearing Diagram of a Ring Frame and calculation of Draft Constant and Twist constant.
7. To learn the roller setting, spindle gauging and lappet centering of a Ring Frame
8. Study of Building mechanism in a Ring Frame
9. Study of different parts of Rotor Spinning Frame.
10. Study of different parts of a Ring Doubler
11. Study of different parts of Reeling, Bundling, Baling M/c.
12. To Produce a yarn from a given roving/sliver in Ring Frame/ Rotor Frame

## PCTX7205 **Fabric Manufacture - I Lab**

1. Study of the passage of yarn through winding machine and its various parts.
2. To convert some ring bobbins to cone/cheese by adjusting the tension and slub catcher.
3. Study of mechanism of a pirn-winding machine.
4. Study of passage of yarn through a sectional warping m/c and its different parts.
5. Study of path of warp sheet in a multi cylinder-sizing machine.
6. To prepare a size paste for a given sort.
7. To study the working of a automatic knotter on a winding machine
8. To study the passage of yarn and different parts of a plain loom.
9. To study the operational mechanism and different motion in a Power loom
10. To have practice of synchronizing body movements for shedding, picking and beat-up on the handloom by producing a meter of fabric with least fabric faults.

## BECS7208 **Database Managements System Lab**

1. Use of SQL syntax: insertion, deletion, join, updation using SQL. (1 class)
2. Programs on join statements and SQL queries including where clause. (1 class)
3. Programs on procedures and functions. (1 class)
4. Programs on database triggers. (1 class)
5. Programs on packages. (1 class)
6. Programs on data recovery using check point technique. (1 class)
7. Concurrency control problem using lock operations. (1 class)
8. Programs on ODBC using either VB or VC++. (1 class)
9. Programs on JDBC. (1 class)
10. Programs on embedded SQL using C / C++ as host language. (1 class)

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