

Biju Patnaik University of Technology, Orissa

Fashion Technology

3 rd Semester			4 th Semester		
Theory	Credit Hrs	Credit	Theory	Credit Hrs	Credit
BSCM1205 Mathematics -III	3-1-0	4	BSCM1210 Mathematics - IV	3-1-0	4
BSCC1212 Polymer Chemistry and Fiber Science	3-0-0	3	PCFT4203 Elements of Design & Colour.	3-0-0	3
PCFT4201 Elements of Fashion.	3-0-0	3	PCFT4204 Fabric Manufacture	3-0-0	3
PCFT4202 Yarn Manufacture	3-0-0	3	PCFT4205 GarmentManufacturing Technology-I	3-0-0	3
BECS2212 C++ & Object Oriented Programming	3-0-0	3	BECS2208 Database Management System.	3-0-0	3
HSSM3204 EngineeringEconomics & costing OR	3-0-0	3	HSSM3205 Organization Behavior OR	3-0-0	3
HSSM3205 Organisation Behaviour			HSSM3204 Engg. Economics & costing		
Credits (Theory)		19	Credits (Theory)		19
Practical					
BECS7212 C++ & Object Oriented Programming Lab	0-0-3	2	BECS7208Database Management System Lab	0-0-3	2
PCFT7202 Yarn Manufacture Lab.	0-0-3	2	PCFT7203 Basic Design Concept Lab.	0-0-3	2
PCFT7206 Fashion Illustration Lab.	0-0-3	2	PCFT7204Fabric Manufacture Lab	0-0-3	2
HSSM7203 Communication and Interpersonal Skills for Corporate Readiness Lab	0-0-3	2	PCFT7205Garment Pattern Making & Garment Construction Lab-1	0-0-3	2
Credits (Practicals / Sessionals)		8	Credits (Practicals / Sessionals)		8
		27			27

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

BSCC1212 **Polymer Chemistry & Fiber Science**

Module-I

(12 hours)

Introduction to polymers, Classification of polymers, Chemistry of polymerization-condensation polymerization & addition polymerization, polymerization technique, bulk, solution, and emulsion polymerization with special reference to textile & clothing material. Molecular weight- weight average molecular, number average molecular weight, molecular weight and degree of polymerization, polydispersity and molecular weight, size of polymer molecule, geometrical structure of polymer molecules. Polymer degradation.

Module – II

(12 hours)

Classifications of Textile Fibers according to their nature and origin. Characteristics of good textile fiber, essential and desirable properties of apparel grade textile fibers & technical grade textile fibers

Natural Fibres :- (Vegetable fibers)

Seed Fibres : Cotton - Cultivation and harvesting practices, Grading, morphological structure, physical and chemical properties and its applications.

Bast Fibres : Jute - Cultivation and Harvesting, Retting, Scutching, woollenisation of jute, structure of jute fibre, Physical & Chemical properties of jute fibre, applications of jute fibre.

Short description about other bast fibres - Hemp, flax, ramie, linen fibre , their Physical & Chemical properties and applications.

Leaf fibres - pineapple fibres, their properties & applications.

Natural Fibres :- (Protein Fibres)

Silk : Sericulture, Type of Silk fibers, Pre and post cocoon operation Degumming, Reeling, morphological structure of silk fiber etc. Physical and chemical properties of the silk fiber.

Wool : Wool - types of wool, grading of wool, morphological structure of wool fiber, physical & chemical properties of wool fiber and its application.

Module – III

(12 hours)

Production Process of Man made fibers.

Cellulose base fibers: Out line of the manufacturing of viscose rayon ,Polynosic , high weight modulus fiber, Cupramonium rayon, acetate and triacetate fiber,

Synthetic base Fiber: Out line of the manufacturing process of filament and Staple fiber with special reference to polyester, polyamide, poly propylene and acrylic fiber. Basic principles and need for drawing and heat setting for synthetic fibers.

Short description of high-tech fibers like Kevlar, nomex, carbon, glass, etc.

Textured Yarn Technology :- Importance of texturing. Brief description about different processes in textured yarn technology.

Reference Books :

1. Textile Fibre, V. A. Shenai
2. Introduction to Textile Fibres, H. V. Sreenivas Moorthy
3. Dyeing & Chemical Technology of Textile Fibres, E. R. Trotman
4. Introduction to textiles, M. Joseph
5. Fibre Science and Tecnology, S.P.Mishra
6. Polymer Chemistry by Dr. S.K Mishra
7. Polymer Chemistry by V.R Gowariker, Viswanathan and sreedhar
8. Manmade fiber Technology by V.A.Shenai
9. Manmade fiber by A.K.Vaidy

PCFT4201 **Elements of Fashion**

Module-I

(12hrs)

Origin of fashion, Origin of clothing, Fashion language, Philosophy of design, Nature of fashion .Elements of fashion, Terminology of fashion: style, design, taste, classic, fad. Component of fashion: Silhouette, Texture, Details. Study of leading fashion designers; French, Italian, American, Indian. Costumes of ancient civilization; Egypt, Roman, French. Fashion trends,

Module-II

(10 hrs)

Principle of fashion. Environmental factor Demographic & Psychographics, Economic factors, Sociological factor, Psychological factor. Fashion influence & theories of fashion adoption. Movement of fashion, the cycle of fashion; stages of cycle. Factors influencing fashion movement (accelerating & retarding factors). Fashion prediction

Module-III

(13 hrs)

Leaders of fashion, Birth of fashion; designers role, manufacturer's role, retailer's role, insight & intuition of sources of design. trade shows, fashion promotion and advertisement. Retailing: an overview on different types of retail store. Merchandising: role of a merchandiser, little idea about visual merchandising.

Reference Books:

- 1.Inside Fashion Design -Kitty G.Dikerson
2. Inside Fashion Business -Kitty G. Dikerson
- 3.Elements of color & design –Sumathi G.J.

PCFT4202 Yarn Manufacture

Module I

(16 hours)

Cotton Ginning & mixing:

Objects of ginning, study of different ginning machines.

Objects of Mixing, general consideration for preparation of cotton mixing, scientific bale management, Methods of mixing and blending.

Blow Room: Principal action in opening and cleaning.. Study of various openers & cleaners like Mixing bale opener, unifloc, blendomat, monocylinder, axiflow cleaner, uniclean, CVT, etc. Measuring of opening and cleaning efficiency of different opener and cleaner. Comparison of lap forming unit and chute feed mechanism. Process parameters of Blow Room, Waste control in Blow Room.

Carding: Objects of Carding. Constructional Features of Carding Machine. Principles of carding & stripping actions, Study of different parts and function of a Carding Machine.. Mechanical and Actual draft. Card waste –types and control.. Defects in card Sliver and their causes and remedies. Production calculation. Study of the function of Auto leveler in Card.

Draw Frame: Objects of Drawing. Principles of doubling and drafting. Study of different parts and function of high speed Draw Frame Machine.. Design and principle of Auto leveler. Quality and Process parameters of Draw Frame department and its evaluation.

Speed frame: Objects of speedframe. Study of different parts and function of a modern speed frame machine. principles of drafting, twisting and winding in speed frame, Mechanism of package formation, process parameter and maintenance schedule.

Combing: Objects of Comber. Preparatory processes (of lap preparation for comber Machine. Mechanism of combing operation (Combing Cycle Process parameters & evaluation.

Module-II

(12hours)

Ring spinning: Objects of ring spinning, Study of different parts and function, Principles of drafting, twisting, winding and mechanism of package formation, Common defects in ring spun yarn causes and remedies.

Post spinning: Objects of doubling, working principle and process parameters of ring doublers, TFO, dry and wet doubling, twist in doubled yarn, working principle of reeling Machine

Module-III

(10hours)

New spinning system: Production process in rotor, air jet, friction spinning machines. Structure and properties of these yarns,

Study of different types of yarn: (ply, core spun, sewing thread, Slub, and melange yarn)

Reference Books:

1. Manual Cotton Spinning-Vol.to 5, Textile Institute
2. A practical Guide to Opening & cleaning, W. Klien
Draw frame, Speed frame & Comber, Ring Spinning (All parts)
3. The Institute of Technology, Szalowski USE series on Textile Processing
4. Recent Advances in Spinning Technology, Salhotra
5. Spun Yarn Technology, Oxtoby

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. D.M. Mithani, Principles of Economics. Himalaya Publishing House

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.Aswathappa, 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

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)

PCFT7202 **Yarn Manufacture Lab.** (0-0-3)

1. Study of flow of materials in a Blow room line.
2. Study of flow of material in a Carding Machine. Various parts of the machine and functions.
3. Study of the different parts of the Draw Frame and the Flow of materials in the machine.
4. Study of the different parts of Speed Frame.
5. Study of the different parts of Ring Frame and the Flow of materials in the machine.
6. Study of the different parts of a Rotor spinning Frame and the Flow of materials in the machine.
7. Study of Flow of materials and different parts of a Ring doublers.
8. Study of Reeling, Bundling and Bailing Machine.

PCFT7206 **Fashion Illustration Lab.** (0-0-3)

1. Human figure drawing with the help of blocks.
2. Sketching of different body parts (normal figures & fashion figures).
3. To learn & practice free-hand sketching techniques.
4. Sketch cloque figure with pencil in different postures.
5. To learn media & techniques for illustration: fashion figure with pencil shading, pencil / steedler color, wax crayons, water color & micro tip pen.
6. Kid's fashion: illustration of different types of kids wear.
7. Casual & formal wear illustration.
8. Adult fashion: Illustration of --- wedding wear, party wear, seasonal wear, sports wear, etc.....

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
Offering suggestions

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

PCFT4203 **Elements of Design and Colour**

Module-I

(12 hours)

1. Elements of an Art and Principles of Design:

Basic concept of Line, Direction, Shape, Size, Texture Value, Colour.

Repetition, Alternation, Harmony, Gradation, Contrast, Dominance and subordination, Unity, Balance.

2. Study of different types of motifs: - Natural Motif, Decorative Motif, Geometric Motif, Abstract Motif.

Module-II

(12 hours)

3. Colour Theory :

Definition of colour theories, Light Theory of colour, Chromatic Circle, Pigment Theory of Colour, Colour Wheel, Colour schemes- triad, mono chromatic, achromatic, polychromatic, analogous, Complementary Colour schemes . Attributes of Primary and Secondary Colours. Psychological effect of Colour; warm & cool colour. Rainbow colour

4. Colour Modification and Colour Harmony:

Modification of colour as a formation of tints, shades & colour greys

High Key, Low Key and Mid Key.

Change in Hue, Change in value, Neutralized Colour or coloured grey.

Achromatic Harmony, Monochromatic Harmony, Analogues Harmony,

Complementary Harmony, Polychromatic Harmony.

Module-III

(8 hours)

5. Methods of Composing Textile Design :

All Over Repeating Design, Half Drop, Diamond, Ogee base, Waved Line, Rectangular Drop Reverse, Sateen.

6. Application of Colour to woven and printed textiles. Factors influencing the Appearance and Ornamentation of Fabrics with reference to raw-material, weave and finish.

Reference Books:

1. WATSONS Textile Design and Colour, Gosciki Z. J.
2. Inside Fashion Design, Sharon Lee Tats
3. Pattern Design, Lewis F. day
4. Colour Harmony, Bride N. Whelan, Rockport Publishers.
5. The Costumes and Textiles of India, Jamila Brij Bhusan
6. Soamn, Jullian, 'Professional Fashion illustration' B.T. Batslord, London 1995
7. Drake, Nicholas, 'Fashion illustration today' Thamesis Hudson. London Publication

PCFT4204 **Fabric Manufacture**

Module – I

(12 hours)

Yarn Preparation:

Winding - Objects of warp and weft winding, types of winding (precession and non precession), types of winding defects and their remedies, path of yarn in a modern winding machine.

Warping - Objects of warping, types of warping (Direct and Sectional types), path of yarn in a modern warping machine,

Sizing - Objects of sizing, sizing ingredients and their function, preparation of sizing paste, path of yarn in a slasher sizing machine.

Drawing in - Objects drawing and denting Method of drawing in, knotting gating.

Module-II

(15 hours)

General Loom elements and mechanism. Primary Motions - Shedding, types of shedding mechanism, tappet shedding mechanism, timing of shedding, healed staggering, reversing motions. Picking, types of picking mechanism, over and under picking mechanism and their Comparison. Shuttle checking. Beating up mechanism, Function of reed, types of reed and reed count.

Module-III

(12 hours)

Secondary and Auxiliary Motions in loom: Take up motion, working of the (5 wheel, 7 wheel and continuous) take up motion, Basic concepts of the let off motion, working of the let off motion,. Warp protector mechanisms (loose and Fast Reed Types), Principle and working of side weft fork, mechanical warp stop and electrical warp stop motion.

Fancy Fabric Formation: Functions of Dobby, Types of Dobby, Function of Jacquard, Drop Box Mechanism, Working of cow burn and pecks drop box motion. Production calculations related to a weaving machine, Different types of fabric defects their causes and remedies.

Shuttle Less Weaving Machines- Brief idea about Gripper, Rapiers, Air Jet and Water Jet Weaving Machines.

Book for Reference:

1. An introduction to Warping and Winding- Dr.M.K.Talukdar
2. Industrial Practice in Yarn Winding- NCUTE
3. Sizing : Material,Method & Machine – D.B.Ajgaonkar
4. Weaving Mechanism – N.N.Banerjee
5. Weaving Mechanism – Robinson & Marks
6. Modern Preparation and Weaving machine – A.Ormerod.
7. Weaving Calculation - Sengupta

PCFT4205 **Garment Manufacturing Technology - I**

Module-I

(14 hours)

Garment Classification: Men, Women and Children, Fabric Selection: selection of fabric according to dress style, occasion, and figure.

Pattern making- Objectives, Importance of paper pattern, Types of paper patterns, Methods of pattern making- a) Drafting b) Flat pattern c) Draping, Measurements and its importance. Tracing and marking terminology- Chalked marking, chalked thread, colour coding, pin marking, tailors tacks, thread tracing.

Pattern layout- according to types of fabrics, different types of lays, economy of fabrics in layouts, cloth layouts. Working with different fabrics. Principle of fitting- ease, line, grain, set, balance. Grading.

Module-II

(12 hours)

Marker Planning: Requirement of the marker planning Efficiency of marker plan, methods of marker panning and marker use.

Spreading: The requirements of the Spreading process, methods of spreading, the nature of fabric packages.

Cutting: The objectives of cutting, Requirements of cutting, Bundling- labeling. Cutting room layout, cutting room organization.

Tools & equipment for cutting – Band knife, click press, electrical notcher, Straight knife, Circular knife, Cutting Board, Cutting Table, Drill, Pattern perforator, Shears .

Module-III :

(12 hours)

Basic Sewing techniques:

Stitch definition, classification & designation

Hand stitches - Hand stitch needle , Back stitch (Half back, Prick) , Blanket stitch, Blind stitch, Catch stitch, Felling stitch, Pick stitch ,saddle stitch, Button hole/eyelets, Over hand stitch, Running stitch, hemming.

Machine Stitches – Chain stitch, Blind stitch, Lock stitch, Zigzag stitch, Over edge machine stitch, Safety stitch, Lettuce edging, Shirring stitch

Seam terminology – curved seam, enclosed seam, exposed seam, extended seam allowances, intersecting seam, Rolled seam edges.

Classification of different types of seam – Plain seam, Flat seam, French seam, Edge seam, Flat fell seam, Run and fell seam, lapped seam, Bound seam, Corded seam, Slot seam, piped seam, fused seam, Padded seam, Seams of fur, Seam of lace, Top stitched seam, Tucked seam, Welt seam, Taped seam, Zigzag seam, Safety stitched seam

Seam finishing – different methods.

Books for References:

1. Apparel Manufacturing hand book — Jacob Solinger.
2. Clothing Technology – R.L. Friend,
3. Clothing Technology – Carr & Latham,
4. The Technology of Clothing Manufacture – Carr and Latham

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, “”, 4th Edition, 2005, Elsevier India Publications, New Delhi

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)

PCFT7203 **Basic Design Concept Lab**

(Colour and Design)

1. To develop some design using basic concept of line, shape and texture through gradation, repetition, proportion and emphasis.
2. To develop design using different type of motifs (Natural Motif, Decorative Motif, Geometric Motif, Abstract Motif).
3. To produce floral, geometrical abstract and boarder design. Enlargement and deduction of design.
4. To develop Colour mixtures according to pigment theory of colour and show arrangement of the primary, secondary and intermediate Colour.
5. To develop Colour mixture according to light theory of Colour with primary, secondary and intermediate Colour.
6. To develop Colour modification using change in hue, change in value (tints and shades) and coloured grey.
7. To produce monochromatic contrast and to produce polychromatic contrast.
8. To study composition of design / motif using the followings:-
All over unit repeat, half drop, diamond base, ogee base, sateen and wave line etc.
9. To produce at least five sketches by using different colour shades with own imagination.
10. Creation and manipulation of Colour using computers.

PCFT7204 **Fabric Manufacturing Lab**

1. Study of passage of yarn through various parts of winding machine (Warp and Weft).
2. Study of passage of yarn through direct and sectional warpers.
3. Study of passage of yarn through slasher sizing machine.
4. Study of tappet shedding mechanism
5. Study of Different picking mechanisms.
6. Study of 5 & 7 wheel take up mechanism.
7. Study of the let off and loose reed mechanism.
8. Study of fast reed and warp stop motion
9. Study of dobby and jacquard
10. Study of Drop Box.
11. Study of shuttle less loom
12. Study of air jet loom.

PCFT7205 **Garment Pattern Making and Garment Construction Lab-I**

Pattern Makeing :

1. Method of taking important body measurements for gents and ladies garments.
2. Developing and creating different patterns by using of 3 techniques.
i) Drafting, ii) Flat Pattern Technique, iii) Draping
3. Drafting basic bodice blocks for Child, Adult (men & women)
4. Drafting of skirts, sleeves, collars, yokes
5. Making of paper pattern of kids garment through design variations.

Garment Construction :

1. Study of the Sewing machineries, different parts and functions.
2. Preparation of sample of basic stitches (Hand & machine)
3. Preparation of sample of different types of seam
4. Preparation of sample of different types of pockets
5. Preparation of sample of different types of Plackets
6. Preparation of sample of different necklines using facing and piping.
7. Preparation of sample of different type of sleeves & collars.
8. Making of sample of different cut and stitch – Kids.

BIJU PATNAIK UNIVERSITY OF TECHNOLOGY, ORISSA

FASHION TECHNOLOGY

5 th Semester			6 th Semester		
Theory	Credit Hrs	Credit	Theory	Credit Hrs	Credit
HSSM3301 Principles of Management OR HSSM3302 Optimisation Engineering	3-0-0	3	HSSM3302 Optimisation Engineering OR HSSM3301 Principles of Management	3-0-0	3
PCFT4301 Garment manufacturing Technology-II	3-0-0	3	PCFT4303 Garment Processing & Finishing.	3-0-0	3
PCFT4302 Textile Chemical Processing	3-0-0	3	PCFT4304 Knitting and Non- Woven	3-0-0	3
Professional Elective (Any One)			Professional Elective –III (Any One)	2-0-0	2
PEFT5304 Woven Textile Design & Traditional Textiles	3-0-0	3	PEFT5305 Computer Aided garment Design. PEFT5306 Fashion Designing using CAD		
PEFT5303 Textile Design by using CAD			Free Elective – II (Any One)	3-0-0	3
Professional Elective-II (Any One)			PETX5305 Technical Textiles PCCS4304 Operating System		
PEFT5301 Textile and Garment Testing			Free Elective – III (Any One)	3-0-0	3
PEFT5302 Statistical Quality Control & Analysis of Textile & Garments	3-0-0	3	PCBT4308 Industrial Biotechnology		
Free Elective – I (Any One)	3-0-0	3	PCIT4301 Internet & web technology		
PCCS4301 Computer Organisation PCEC4301 Microprocessor			Total		17
Total		18			
Practical / Sessionals			Practical / Sessionals		
PCFT7301 Garment pattern making & garment construction Lab- II	0-0-3	2	PCFT7304 Design Idea & Fashion Coordination Lab.	0-0-3	2
PEFT7301 Textile and Garment Testing Lab	0-0-3	2	PEFT7305 Computer Aided Garment Design Lab.	0-0-3	2
PEFT7302 Textile Design Lab	0-0-3	2	PCFT7303 Garment Chemical Processing Lab.	0-0-3	2
PCFT7302 Textile Chemical Processing Lab	0-0-3	2	Total		6
Total		8			
		26			23

HSSM3301 **PRINCIPLES OF MANAGEMENT** (3-0-0)

Module I: Functions of Management

Concept of Management, Management as an Art or Science, The Process of Management, Managerial Skills, Good Managers are Born, not Made, Management is concerned with Ideas, Things and People, How a Manager Induces Workers to Put in Their Best, Levels and Types of Management, **Evolution of Management Thought:** Managerial Environment, The process of Management-Planning, Organizing, Directing, Staffing, Controlling.

Module II: Marketing Function of Management.

Modern Concept of Marketing, The Functional Classification of Marketing, Functions of a Marketing Management, Marketing Mix, Fundamental Needs of Customers, The Role of Distribution channels in Marketing, Advertising, Marketing, Consumerism and Environmentalism.

Module III: Financial Function & HRM Functions.

Financial Functions, Concept of Financial Management, Project Appraisal, Tools of Financial decisions making, Overview of Working Capital.

HRM Function of Management: Human Resource Management, Human Resource Development, Importance of HRM, Overview of Job Analysis, Job Description, Job Specification, Labour Turnover. Manpower Planning, Recruitment, Selection, Induction, Training and Development, Placement, Wage and Salary Administration, Performance Appraisal, Grievance Handling, Welfare Aspects.

Reference Books:

1. *Business Organization & Management, CR Basu, TMH*
2. *Business Organization & Management, Tulsia, Pandey, Pearson*
3. *Marketing Management, Kotler, Keller, Koshi, Jha, Pearson*
4. *Financial Management, I.M. Pandey, Vikas*
5. *Human Resource Management, Aswasthapa, TMH.*
6. *Modern Business Organisation & Management by Sherlekar, Himalaya Publishing House.*

HSSM3302 **OPTIMIZATION IN ENGINEERING** (3-0-0)

Unit-I (10 Hours)

Idea of Engineering optimization problems, Classification of optimization algorithms, Modeling of problems and principle of modeling.

Linear programming: Formulation of LPP, Graphical solution, Simplex method, Big-M method, Revised simplex method, Duality theory and its application, Dual simplex method, Sensitivity analysis in linear programming

Unit-II (10 Hours)

Transportation problems: Finding an initial basic feasible solution by Northwest Corner rule, Least Cost rule, Vogel's approximation method, Degeneracy, Optimality test, MODI method, Stepping stone method

Assignment problems: Hungarian method for solution of Assignment problems

Integer Programming: Branch and Bound algorithm for solution of integer Programming Problems

Queuing models: General characteristics, Markovian queuing model, M/M/1 model, Limited queue capacity, Multiple server, Finite sources, Queue discipline.

Unit-III (10 Hours)

Non-linear programming: Introduction to non-linear programming.

Unconstrained optimization: Fibonacci and Golden Section Search method.

Constrained optimization with equality constraint: Lagrange multiplier, Projected gradient method

Constrained optimization with inequality constraint: Kuhn-Tucker condition, Quadratic programming

Introduction to Genetic Algorithm.

Recommended text books

1. A. Ravindran, D. T. Philips, J. Solberg, " *Operations Research- Principle and Practice*", Second edition, Wiley India Pvt Ltd
2. Kalyanmoy Deb, " *Optimization for Engineering Design*", PHI Learning Pvt Ltd

Recommended Reference books:

1. Stephen G. Nash, A. Sofer, " *Linear and Non-linear Programming*", McGraw Hill
2. A.Ravindran, K.M.Ragsdell, G.V.Reklaitis," *Engineering Optimization*", Second edition, Wiley India Pvt. Ltd
3. H.A.Taha,A.M.Natarajan, P.Balasubramanie, A.Tamilarasi, " *Operations Research*", Eighth Edition, Pearson Education
4. F.S.Hiller, G.J.Lieberman, " *Operations Research*", Eighth Edition, Tata McDraw Hill
5. P.K.Gupta, D.S.Hira, " *Operations Research*", S.Chand and Company Ltd.

PCFT4301 **GARMENT MANUFACTURING
TECHNOLOGY - II(3-0-0)**

Module- I (8 hours)

Sewing needles – their type, characteristic and use.

Sewing threads – fibre types, thread composition, thread finishes , thread properties and their relationship with needles.

Sewing Machine feeding mechanism and sewing machine beds.

Module- II (16 hours)

Detailed Knowledge on different kind of Stitching machines – Chain, lock ,blind, zigzag, button hole, multineedle and multithread Stitching m/c, their mechanism , function .and different parts.

Principle and utility of the following machine used in garment manufacturing – Bar tacking machine, Over edging m/c, Interlock m/c, Double need high speed m/c, Button attaching and button hole making m/c.

Trims and use of other components : Labels and motif, Lining, Interlining, Wadding ,Lace, Braid , Elastic, Hook and loop fastening, Zip Fasteners, Buttons, Shoulder pad, Tuck button, snap fastener etc.

Defects and remedies, Care and maintenance of sewing machines.

Sewing problems : Problems in stitch formation, problems of pucker, problems of damage to the fabric along the stitches.

Module-III (16 hours)

Pressing : Need of pressing, Types of pressing, Pressing equipments and methods, Pleating , State of pressing. Garment finishing machines.

Fusing Technology : Requirement of fusing, method of fusing, Fußsing process.

Module-IV (6 hours)

Introduction to Garment Factory - Small and large garment manufacturing firms, Production ,Planning and Control at each and every stages of garment manufacturing from Raw material sourcing ,pattern making , cutting ,stitching to finishing.

Packing : different types of packing, packing materials, labels and tags.

Books for References:

1. Apparel Manufacturing hand book — Jacob Solinger.
2. Clothing Technology – R.L. Friend,
3. Clothing Technology – Carr & Latham,
4. The Technology of Clothing Manufacture – Carr and Latham

PCFT4302 **TEXTILE CHEMICAL PROCESSING** (3-0-0)

Module I (10hours)

Objects of singeing and different methods of singeing. Objects & methods of desizing. Sourcing process of cotton, wool and synthetic fibres. Degumming of silk. Bleaching of cotton, silk, wool and man made fibres. Objects of mercerization. Mercerization of cotton yarns and fabrics.

Module II (10hours)

Classification of dyes, theory and procedure of dyeing of natural and manmade textiles with different suitable dyes like direct, acid, basic, vat, sulphur, azo, reactive, disperse. Study of different dyeing faults and remedies.

Module III (14hours)

Objects of printing, printing paste ingredients, Styles and methods of printing and study of different printing machineries. Finishing: Important of finishing, classification of finishing. Study of different chemical and mechanical finishing (calendaring, heat setting, stiffening & softening, crease resistance, abrasion, moth proof and rot proof)

Books for References :

1. Chemical Technology of Scouring and Bleaching: E. R. Trotman, Griffin.
2. Handbook of Bleaching: V.A. Shenai, Sevak Publication,
3. Technology of Dyeing : V.A. Shenai , Sevak Publication.
4. Dyeing & Chemical Technology of Textile Fibres : E. R. Trotman,
5. Chemistry of Dyes and Principle of Dyeing : V.A. Shenai , Sevak Publication
6. Technology of Dyeing : V.A. Shenai , Sevak Publication.
7. Textile Printing: L.W.C. Miles
8. Technology of Textile Printing: R. S. Prayog
9. An Introduction to Textile Finishing: J. T. Marsh
10. Technology of Textile Finishing: V. A. Shenai

Professional Electives-I

PEFT5304 **WOVEN TEXTILE DESIGN & TRADITIONAL TEXTILES** (3-0-0)

Module-I **(15 hours)**

Basic Concepts: Importance of fabric structure, Classification of fabrics, Notation of weave, Drafting plan, Peg plan and Denting

Plain Weave and It's Derivative. Application of these weaves in Fabrics.

Twill weaves and it's Derivatives, effect of twist on prominence of twill lines. Drafting plan, Peg plan and Denting, Application of these weaves in fabrics.

Satin and Sateen weaves, Crepe weave, Honeycomb, Mock leno, Huck-a-back, Bedford Cord, Pique, Cork Screw, Diamond fabrics.

Module-II **(10 hours)**

Decorative Weaves:, Extra Warp and Extra Weft figuring. Backed Cloth , Double Cloth , Pile fabric (Warp and Weft), Damask and Brocade fabric design, Computer Aided Textile Design. Advantage of using CAD,

Module-III **(12hours)**

Traditional textile and their relation with, Religion, culture, climatic & socio economic conditions. Traditional textiles of different states of India (Ikat, Brocade, Patola, Himro)

Books for Reference :

1. Garmmar of Textile Desing: H. Nisbet
2. Textile Design and Colour-Watson
3. Advanced Textile Design - Watson
4. Fabric Structure and Design - N. Gokaneshan
5. Woven Cloth Construction - Marrys and Robinson
6. Design of Woven Fabric - MIR Publication
7. Textile Design - W. S. Murphy
8. Traditional Indian Textiles, Gillow & Bernard by Thames & Hudson, London
9. Traditional Textile Designs of India, B.K. Behera, IIT, Delhi.
10. Hand woven fabrics of India by Dhaninja & Jain, Mapin Publishing, Ahamedabad.
11. The costumes and Textiles of India, Jamila Brij Bhusan.

PEFT5303 **TEXTILE DESIGN BY USING CAD** (3-0-0)

Module – I (10 hours)

Fundamentals of CAD-Definition, Hardware &Software requirement of CAD. Design process ,Application and use, Creating the manufacturing Data base & benefits of CAD.

Hardware in CAD: Introduction, Design work station, Graphics terminal, input &output devices, central processing unit &secondary storage.

Computer graphics software &database: Introduction ,Software configuration of a graphic system, function of a graphic package, Extruding, Transformation, Corel draw, Adobe photo shop,

Module – II (10 hours)

Basic drawing techniques: Drawing line, Circle, Rectangle, Arc, Polyline, Ellipse, Elliptical Arc , Polygon, Doubts, Creating point objects, Changing point styles, Free hand sketching, Removing objects, Displacing, Duplicating, Orientation.

Principles of woven design creation on computers. Principles & elements of colour, colour selection & application through CAD .Weave simulation ,Draping & 3D image on CAD.

Module – III (10 hours)

Operational principles of various tools of CAD software for woven ,knitted & Printed design. Principles of CAD for woven design making & developing , use of Anthropometric data for CAD based textile design.

Working principle of electronic dobby ,electronic jacquard & electronic punching m/c. Concept and procedure of textile design developing CAD software.

REFERENCE BOOK:

1.CAD/CAM by Groover & zimmer

Professional Electives-II

PEFT5301 **TEXTILE & GARMENT TESTING** (3-0-0)

Module –I (14hours)

Introduction to textile testing, moisture in relation to textiles, relative humidity, and absolute humidity, standard testing atmosphere, measurement of moisture content and moisture regain

Fibre dimension: Methods of measurement of fibre length, fine ness, strength, maturity of cotton,

Yarn dimension : Yarn linear density-direct and indirect system; Conversion from one system to another, Measurement of yarn count, linear density of plied and cable yarn, Yarn twist – Type of twist and it's measurement technique.

Yarn evenness – Importance of yarn evenness and instrument used for its measurement. Yarn hairiness . ASTM yarn grading.

Module-II (10 hours)

Measurements of different dimensional and Physical properties of fabrics :- length, width ,thickness, weight / area, threads / unit length, crimp, stiffness, crease recovery, drape, fabric cover and fabric handle, shrinkage, air permeability, water permeability, Abrasion and pilling resistance of the fabric, Thermal insulation, flammability .

Module-III (16 hours)

Mechanical properties of Textiles : Measurement of mechanical behavior of textiles; stress- strain curve; Yarn tensile strength and elongation. Fabric strength testing - Tensile strength, Tearing strength. Bursting strength.

Garment Testing:- Seam strength , Seam slippage, Shrinkage, pulled strength .

Chemical Testing: - Color fastness to washing, light, rubbing, water etc. shade difference in one color ,problem related to embroidery fabric. FAST and KAWABTTA evaluation system for fabric handle.

Eco- parameters requirement for garments.

Reference Books:

1. Textile Testing by J.E Booth
2. Physical Properties of textiles by Harley & Morton
3. rinciple of Textile Testing: J.E. Booth
4. Textile Mathematics, Vol-I, II, III : J. E. Booth
5. Textile Yarn: B. C. Goswami
6. Physical Methods of Investigating Textiles: Meredith and Hearle
7. Finishing of Garments and Knits - NCUTE Publications

Free Electives-I

PCCS4301 **COMPUTER ORGANIZATION** (3-0-0)

Module –I

12 Hrs

Basic structures of Computers: Functional units, operational concepts, Bus structures, Software, Performance, Computer Architecture vs Computer Organization.

Machine Instruction and Programs: Memory location and addresses, Big-endian and Little-endian representation. Memory Operations, Instructions and instruction Sequencing, Addressing modes, Assembly Language, Basic Input/output operations, subroutine, additional Instructions.

Module – II

12 Hrs

Arithmetic : Addition and subtraction of signed Numbers, Design of Fast Adders, Multiplication of positive Numbers, Signed-operand multiplication , Fast multiplication, Integer Division, Floating- point Numbers, (IEEE754 s...) and operations.

Module – III

12 Hrs

Basic Processing units: Fundamental concepts, execution of complete Instructions, Multi bus organization, Hardwired control, Micro programmed control, RISC vs CISC architecture.

Memory System: Basic Concepts, cache Memory, Cache memory mapping policies, Cache updating schemes, performance consideration, Virtual memories, Paging and Page replacement policies, Memory Management requirement, secondary storage.

Text Books:

1. Computer Organization: Carl Hamacher, Zvonkovranesic, Safwat Zaky, Mc Graw Hill, 5th Ed
2. Computer Organization and Design Hardware/ Software Interface: David A. Patterson, John L. Hennessy, Elsevier, 4th Edition.

Reference Book :

1. Computer Architecture and Organization: William Stallings, Pearson Education.
2. Computer Architecture and Organizations, Design principles and Application: B. Govinda Rajalu, Tata McGraw-Hill Publishing company Ltd.
3. Computer Architecture: Parhami, Oxford University Press
4. Computer system Architecture: Morris M. Mano PHI NewDelhi.
5. Computer Architecture and Organization: John P. Hayes Mc Graw Hill introduction.
6. Structured Computer Organization: A.S. Tanenbum, PHI
7. Computer Architecture And Organization: An Integrated Approach, Murdocca, Hering Willey India, 1st Edition.

PCEC4301 **Microprocessor** (3-0-0)

Unit I:

Organization of Microprocessor

Introduction to the general concept of microprocessor organization, I/O sub-systems, programming the system, ALU, instruction execution, instruction word format, addressing modes, address/data/control bus, tristate bus, interfacing I/O devices, data transfer schemes, architectural advancements of microprocessor, evolution of microprocessors.

Unit II:

Intel 8086- Hardware Architecture:

Introduction, Bus interface unit(BIU), Execution unit(EU), pin description, register organization, instruction pointer, data register, pointer and index registers, status register, stack, external memory addressing, bus cycle (minimum mode):memory or I/O read/write for minimum mode, clock generator Intel- 8284A, bidirectional bus trans-receiver 8286/8287, bus controller 8288, bus cycle memory read/write for minimum mode, 8086 system configuration (minimum mode as well as maximum mode), memory interfacing, interrupt processing; software interrupts, single step interrupt, non-maskable interrupt, maskable interrupt, interrupt priority, DMA, Halt State, Wait for Test state, comparison between 8086 and 8088.

Unit III:

Instruction set and programming:

Programmer's model of Intel 8086, operand type, addressing modes 8086 assembler directives, instruction set, programming examples on data transfer group, arithmetic-logical groups, control transfer groups (loop and loop handling instruction), conditional and unconditional group, procedures and stack operations, string instructions.,branch program structure like IF-THEN-ELSE REPEAT-UNTIL and WHILE-DO,

I/O Interfacing ;

8-bit input- output port 8255 PPI, memory mapped i/o ports,8254 programmable Interval Timer, 8273 Programmable Direct Memory Access Controller, 8251 USART, 8279 Programmable Keyboard/Display Controller.

Text Books:

- 1.The 8088 and 8086 Microprocessors Programming, Interfacing, Softw, Hardware and Application; by Walter A. Triebel & Avtar Singh ; Pearson India.
2. Microprocessors and Interfacing; by Douglas V Hall ; McGraw Hill.

Reference Book:

1. Microprocessors and Micro controllers Architecture, programming and system Design 8085, 8086, 8051, 8096: by Krishna Kant; PHI.
2. The 8086 Microprocessor: Programming & Interfacing the PC- Kenneth J. Ayala, Delmar Cengage Learning, Indian Ed.

PCFT7301 **GARMENT PATTERN MAKING AND GARMENT CONSTRUCTION LAB-II** (0-0-3)

1. Drafting of different unisex garment (Kids)
2. Style variation of dart manipulation
3. Make samples of sleeves
4. Make samples of different types of skirt
5. Make samples of gathers, tucks, pleats, flares, gored and godet.
6. Ladies top with yoke as a special feature
7. A traditional Indian Garment.
8. Gents Kalidar Kurta
9. Gents Shirt
10. Grade Paper-Pattern to various sizes according to body measurements

PEFT7301 **TEXTILE & GARMENT TESTING LAB** (0-0-3)

1. To determine the fibre length, yarn count and twist of single and double yarn.
2. To find out the thickness , cover factor and GSM of a given fabric sample .
3. To find the Bending length & Flexural rigidity, Bending Modulus of a given fabric/garment Sample.
4. To find the Air Permeability & Flammability of a given fabric sample.
5. To find the crease recovery, Pilling assessment of a given fabric/garment Sample.
6. To find the drape and shade difference of a given fabric sample.
7. To find the abrasion resistance of a fabric .
8. To find the tensile strength and tearing strength of given fabric sample
9. To measure the seam strength and bursting strength of garment.
10. To determine the blend composition of fabrics used for garment.

PEFT7302 **TEXTILE DESIGN LAB** (0-0-3)

Analysis of following cloths in respect to fabric parameter and design with drafting lifting plan,:

1. Plain & its derivatives
2. Twill & its derivative
3. Sateen & satin
4. Honey comb,
5. huck- a- back,
6. Muck leno,
7. Bed ford cord,
8. Extra warp and extra weft
9. Pile fabric
10. Back cloth & double cloth

PCFT7302 **TEXTILE CHEMICAL PROCESSING LAB**(0-0-3)

1. Desizing ,Degumming of Silk and Scouring of Cotton, wool yarn / Fabric.
2. Bleaching and Mercerization of cotton fabrics.
3. Dyeing of cotton yarn/fabric by Direct, Reactive, Vat, Azoic and Sulphur Dyes.
4. Dyeing of Silk yarn / fabric using acid dye.
5. Dyeing of polyester fabrics using Disperse Dye.
6. Various methods of Block printing for surface ornamentation.
7. Various methods of Screen printing for surface ornamentation.
8. Study the tie and die method for yarn and fabric.
9. Study of different chemical finishing for cotton fabrics.

PCFT4303 **GARMENT PROCESSING & FINISHING** (3-0-0)

Module– I

(14 hours)

Brief study on Machineries for dyeing of Fabric - Jigger, Padding Mangle, Winch, rotary drum, H.T.H.P dyeing, Jet dyeing machine, their functions and uses.

Garment Dyeing : different Garment dyeing method and procedure for knitted and woven garments. Dyeing processes and fastness properties.

Module–II

(10 hours)

Garment Printing – study of different method of printing example flat bed printing, screen printing and roller printing. Study of different type of printing used on Garment – Khadi Printing. Foam Printing, ,Metallic Printing, Fluorescent Printing, Plastizol Printing, High Density printing. Transfer Printing techniques.

Garment Finishing – Finishing process for garments made of woven fabric, Process for finishing garment made of denim fabric, Finishing of Knitted Garment, Enzyme Finishing for garments, Garment Finishing machinery. Fire retardant, foam and soil release finish for garment.

Module III

(10 hours)

Functional finishing of garment for specific use- medical application, environ protection, space application, marine application, sports application, defence application etc.

Care of Garment – Suitable techniques for removal of stains on clothing (due to coffee, tea, curry, blood, oil, ink, mildew, paints, rust, etc. Techniques of Dry cleaning for clothing of different textile fibre, Equipment in laundering. Use of washing machine. Indigenous Laundering agent and their uses.

REFERENCE BOOKS:

1. Dyeing and Chemical Technology of Textile Fibres E. R. Trotman
2. Technology of Bleaching, V. A. Shenai
3. Technology of Dyeing, V. A. Shenai
4. Finishing of Garments and Knits, NCUTE Publication.
5. Finishing of Garments & Knitwears, NCUTE pilot programme
6. Garment Manufacturing Technology, NCUTE Publication
7. The care of Textile Product, Phyllis G.Torota

PCFT4304 **KNITTING & NONWOVEN** (3-0-0)

Module- I

(10 hours)

Definition of knitting, General classification of Knitting Machine - Flat & Circular, Knit, Tuck & Float Stitches & their uses. Knitting Needles – Latch, beard & compound needles.

Basic weft Knitted structure - Plain, Single jersey, double jersey, Rib, Interlock & Purl - their characteristics & uses in detail, ornamentation, derivatives of the structure & their properties.

Module-II

(12 hours)

Warp Knitted Structure from Tricot and raschel Warp Knitting Machine. Machine parts, functions and knitting cycle.

Warp Knitted fabrics and their structure - single bar fabrics, tricot two full set guide bar structure (full tricot, lock knit, reverse lock knit, satin), open work effects (Marquisette, sand fly net, hexagonal net, raschel laces), crepe fabrics.

Module-III

(13 hours)

Classification of Non woven fabrics, types of fibre used & end uses, methods of web preparation, methods of bonding of webs, Production of non-woven fabrics by needle punching, adhesive bonding, spun bonding, melt blown process & characteristics of these fabrics, study of structure & properties of wet laid fabrics

REFERENCE BOOKS :

1. Knitting Technology, D. J. Spenner
2. Knitting Technology, H. Wirnatt
3. Introduction to Weft Knitting, J. A. Smirfitt
4. Knitting, H. Wingall
5. Manuals of Non woven – Crema
6. Non woven textiles NCUTE publication

PEFT5305 **COMPUTER AIDED GARMENT DESIGN** (2-0-0)

Module – I (10 hours)

Elements of designs and their development using CAD software. Principles of motif generation on computers / motif for border, motif for all over design. Principles & elements of colour. Colour selection & application through CAD.

Module–II (10 hours)

Operational principles of various tools of CAD software for woven knitted & Printed design. Weave simulation, Draping & 3D image on CAD. Principles of Development of basic weave design & their derivatives. Concept of garment design developing & cutting in fashion studio using CAD software.

Module–III (10 hours)

Principles of CAD for pattern making , Pattern grading and pattern layout. Use of Anthropometric data for CAD based garment manufacturing. Detailed study on various Computer Aided Cutting & sewing machineries.

REFERENCE BOOK:

1.CAD/CAM by Groover & zimmer

PEFT5306 **FASHION DESIGNING USING CAD
SOFTWARE** (2-0-0)

Module – I (10 hours)

Elements of designs and their development using CAD software. Principles of motif generation on computers / motif for border, motif for all over design. Principles & elements of color. color selection & application through CAD.

Module – II (10 hours)

Different types of layers – Top, Fashion, Model, and Background.

Library –Pattern, , Fold, Texture, colour, Decoratation

Module – III (10 hours)

Developing of various dress designs using the software tools

E – Style and Sketch Studio

E – material and colour way studio – colour change, change of pattern, fabric structure etc.

E – Photo and draping studio – changing of textures of existing photos and samples
Layout size

Reference Books:

1. Inside Fashion Design -Kitty G.Dikerson
2. Inside Fashion Business -Kitty G. Dikerson
3. Elements of color & design –Sumathi G.J.

Free Electives - II

PETX5305 **TECHNICAL TEXTILES** (3-0-0)

Module-I (15 hours)

Introduction: Definition and scope for technical textiles, present status and future of technical textile. Brief idea about technical fibres - Carbon fibres-Aramid and related fibres, Glass threads, composite material.

Filtration textiles: Definition of filtration parameters, theory of dust collection and solid liquid separation, filtration requirements, concept of pore size and particle size, role of fiber, fabric construction and finishing treatments.

Geotextiles: Brief idea about geo-synthetics and their uses, essential properties of geotextiles, geotextile testing and evaluation, application examples of geotextiles.

Module-II (15 hours)

Medical textiles: Classification of medical textiles. Medical Textiles: Surgical Textiles and Sutures. Cardio Vascular Textiles (Knitted cardiac biological valves). Dialytic Textiles, Hollow fibres as dialysis membrane, Hospital Textiles- operating and post operating clothing, disposable drapes. Textiles for sanitary applications.

Protective Clothing: Brief idea about different type of protective clothing, functional requirement of textiles in defence including ballistic protection materials and parachute cloth, temperature and flame retardant clothing, chemical protective clothing, water proof breathable fabrics.

Module-III (15 hours)

Sports and recreation textiles: Functional requirement of different types of product and their construction.

Automotive textiles: Brief idea about the important properties and requirements in automotive textiles, textiles components in tyre, tyre structure and design.

Other uses of technical textile: Textiles in agriculture, electronics, power transmission belting, hoses, canvas covers and tarpaulins.

Books Remmended

1. "*Handbook of Technical Textiles*", Ed. A R Horrocks and S C Anand, Woodhead Publication Ltd., Cambridge (2000).
2. "*Engineering with Geosynthetics*", Ed. G V Rao and G V S Raju, Tata McGraw Hill Publishing Co. Ltd., New Delhi (1990).
3. "*Industrial Textile*", Ed., J Svedova, Elsevier, New York (1990).
4. "*Modern Textile Characterization Methods*", Ed. M Raheel, Marcel Dekker, Inc. (1996).
5. Mukhopadhyay S K and Partridge J F, "*Automotive Textiles*", Vol. 29, No. ½, The Textile Institute (1999).
6. Sabit Adanur, "*Wellington Sears Handbook of Industrial Textiles*", Technomic publishing company Inc., USA, 1995
7. Pushpa, B., and Sengupta, A.K., "Industrial Application of Textiles for Filtration and Coated fabrics", *Textile Progress* Vol.14, 1992

PCCS4304 **OPERATING SYSTEM** (3-0-0)

MODULE-I

12 Hours

INTRODUCTION TO OPERATING SYSTEM:

What is an Operating System? Simple Batch Systems, Multiprogramming and Time Sharing systems. Personal Computer Systems, Parallel Systems, Distributed Systems and Real time Systems.

Operating System Structures: Operating System Services, System components, Protection system, Operating System Services, system calls

PROCESS MANAGEMENT:

Process Concept, Process Scheduling, Operation on Processes, Interprocess communication, Examples of IPC Systems, Multithreading Models, Threading Issues, Process Scheduling Basic concepts, scheduling criteria, scheduling algorithms, Thread Scheduling.

MODULE-II

12 Hours

PROCESS COORDINATION: Synchronization: The Critical section problem, Peterson's solution, Synchronization hardware, Semaphores, Classical problems of synchronization, Monitors.

Deadlocks: System model, Deadlock Characterization Methods for Handling Deadlocks, Deadlock Prevention, Deadlock avoidance, Deadlock Detection, recovery from Deadlock.

MEMORY MANAGEMENT: Memory Management strategies, Logical versus Physical Address space, swapping, contiguous Allocation, Paging, Segmentation.

Virtual Memory: Background, Demand paging, performance of Demand paging, Page Replacement, Page Replacement Algorithms. Allocation of frames, Thrashing, Demand Segmentation.

MODULE-III

11 Hours

STORAGE MANAGEMENT:

File System Concept, Access Methods, File System Structure, File System Structure, File System Implementation, Directory implementation, Efficiency and Performance, Recovery, Overview of Mass Storage Structure, Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, I/O System Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Request to Hardware Operation.

CASE STUDIES: The LINUX System, Windows XP, Windows Vista

TEXT BOOK:

1. **Operating System Concepts** – Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 8th edition, Wiley-India, 2009.
2. **Mordern Operating Systems** – Andrew S. Tanenbaum, 3rd Edition, PHI
3. **Operating Systems: A Spiral Approach** – Elmasri, Carrick, Levine, TMH Edition

REFERENCE BOOK:

1. **Operating Systems** – Flynn, McHoes, Cengage Learning
2. **Operating Systems** – Pabitra Pal Choudhury, PHI
3. **Operating Systems** – William Stallings, Prentice Hall
4. **Operating Systems** – H.M. Deitel, P. J. Deitel, D. R. Choffnes, 3rd Edition, Pearson

Free Electives- III

PCBT4308 **INDUSTRIAL BIOTECHNOLOGY** (3-0-0)

Module I

10 hours

Introduction to fermentation technology; Large scale production using microorganisms: submerged, solid and semi-solid fermentation; Microbiological processes for production of organic acids, solvents, antibiotics, enzymes, polysaccharides, lipids, pigments and aroma.

Module II

10 hours

Isolation, selection and characterization of industrially important microorganisms, genetically engineered strain, Induced mutation, over producing decontrolled mutants, media development for industrial production; fermentation.

Module III

10 hours

Application of enzymes in industry (Food and beverages, Textile, Leather, pulp and paper), analytical purpose; Biochemical Reactions: Group transfer redox, Elimination, isomerization and rearrangement, C-C bond cleavage; Enzyme immobilization.

Books

1. Industrial Microbiology, Prescott and Dunn,
2. Biochemical Engineering and Biotechnology Handbook, Atkinson, B and Marituna, F.,
The Nature Press, Macmillan Publ. Ltd.
3. Biochemical Engineering Fundamentals, Bailey & Ollis. MGH.

PCIT4301 **INTERNET AND WEB TECHNOLOGY** (3-0-0)

Module –I (Lecture Hour 12)

The Internet and WWW

Understanding the WWW and the Internet, Emergence of Web, Web Servers, Web Browsers, Protocols, Building Web Sites

HTML

Planning for designing Web pages, Model and structure for a Website, Developing Websites, Basic HTML using images links, Lists, Tables and Forms, Frames for designing a good interactive website

Module –II (Lecture Hour 12)

JAVA Script

Programming Fundamentals, Statements, Expressions, Operators, Popup Boxes, Control Statements, Try.... Catch Statement, Throw Statement, Objects of Javascript: Date object, array object, Boolean object, math object

CSS

External Style Sheets, Internal Style Sheets, Inline Style, The class selector, div & span tag

DOM

HTML DOM, inner HTML, Dynamic HTML (DHTML), DHTML form, XML DOM

Module –III (Lecture Hour 11)

CGI/PERL

Introduction to CGI, Testing & Debugging Perl CGI Script, Using Scalar variables and operators in Perl

Java Applet

Introduction to Java, Writing Java Applets, Life cycle of applet

Textbooks

1. Web Warrior Guide to Web Design Technologies, Don Gosselin, Joel Sklar & others, Cengage Learning

Reference Books

1. Web Programming: Building Internet Applications, Chris Bates, Wiley Dreamtech
2. Programming the World Wide Web, Robert W Sebesta, Pearson
3. Web Technologies, Uttam K Roy, Oxford
4. Web Technology: A developer perspective, Gopalan & Akilandeswari, PHI

PCFT 7304 DESIGN IDEA AND FASHION COORDINATION LAB. (0-0-3)

Designing and sketching the following

1. **Types of Necklines** : Jewel, Round, U Neck, V-Neck, Scoop, Sweet heart, off shoulder, Off one shoulder , boat.
2. **Sleeves** : plain, bush shirt, puff, leg-o-motion, cap half cop, ruffle, megxar, dolman, kimmo, raglon, kurta, shirt, tulip, hanky.
3. **Collars** : petar pan, flat, cape, wing, high bias, low bias, chines, mandrain, shirt, tennis, chesea, silors, bishop, Bowtie, Shawl, Coat, Cowl.
4. **Skirts** : Gathered, pkated, Gored, Novelty, Layered, tulip, peg wrap around, pencil, draped, jumper suspende.
5. **Trousers** : Boyshorts, Jamica shorts, Bermunda, Ducker pants, capri, classic, Jeans, Jumpsuit or Dungicee, Cullotes.
6. **Yokes** : round, U shaped, Triangle, Pointed edge, square, straight, Asymmetrical saddle.
7. **Pleats** : Knife pleats, Kick pleat, Box pleat, Inverted pleat, Accordion , sunray.
Tucks : Pin, Spaced, Cross, Blind, Skeu.
8. **Waistlines** : Normal, Low, Empair.
9. **Pockets** : Patch, flap, round, slit, cross, wett, straight or side seam.
10. **Silhouettes** : A line, straight shift, princess line. Tunic,
(Collect minimum 3 picture cutting of all these fashion details from fashion magazines and make a fulder)

PEFT7305 COMPUTER AIDED GARMENT DESIGN LAB

(0-0-3)

1. Study of principles of pattern making using CAD.
2. Principles of computerized cutting & sewing using CAD.
3. Colour selection & application through CAD.
4. Development of basic weave design & their derivation through CAD.
5. Motif generation on computer.
6. To study the working principle of Electronic dobby and Electronic jacquard.
7. 3D imaging on CAD.
8. Development of different Men's wear garment using CAD
9. Development of different Ladies wear garment using CAD
10. Development of different kids wear garment using CAD

PCFT7303 GARMENT CHEMICAL PROCESSING LAB.(0-0-3)

1. Measurement of fastness properties to washing of dyed garments
2. Measurement of fastness properties to light of dyed garments
3. Measurement of fastness properties to rubbing of dyed garments.
4. Printing of fabric using hand block method.
5. Printing of fabric using screen printing method.
6. Garment dyeing by suitable method.
7. Laundering of garments.
8. Drying of garments
9. Finishing of the Garment using various techniques.
10. Measurement of washing fastness of different fabric by launder meter.

Biju Patnaik University of Technology, Orissa

Fashion Technology

7 th Semester				8 th Semester			
Theory		Credit Hrs	Credit	Theory		Credit Hrs	Credit
PCFT4401	Process Control in Apparel Manufacturing & Quality control	3-0-0	3	HSSM3402	Environmental Engineering	3-0-0	3
PCFT4402	Embroidery and Surface Ornamentation	3-0-0	2	PETX5413	Professional Elective -III Apparel Production, planning, controlling and scheduling.	3-0-0	3
PCFT4403	Apparel Marketing, Retailing and Merchandising	3-0-0	3	PEFT5405	Apparel Product Development		
PEFT5401	Professional Elective -I Home Furnishing & Interior Design	3-0-0	3	PEFT5406	Supply Chain Management & Logistics in Apparel Industry		
PEFT5402	Fashion Co-ordination & Communication			PEFT5407	Professional Elective -IV Export management	3-0-0	3
PEFT5403	Professional Elective -II Smart Textiles & Functional Garments	3-0-0	2	PEFT5408	Entrepreneurial Development in Fashion and Apparel Industry		
PEFT5404	Environmental management in Garment Industry			PETX5408	Free Elective- V Textile Mill Planning & Organization	3-0-0	3
PCTX4401	Free Elective - IV Theory of Textile Structure	3-0-0	3	PECS5406	Digital Image Processing		
PCCS4401	Computer Graphics			PETX5414	Microbial Technology		
Total			16	Total			12
Practical / Sessional				Practical / Sessional			
PCFT7401	Embroidery and Surface Ornamentation Lab	0-0-3	2	PCFT7404	Major Project 50% External evaluation	0-0-14	7
PCFT7402	Minor Project :- Craft Documentation	0-0-6	3	PCFT7405	Comprehensive Viva	0-0-3	2
PCFT7403	Seminar on Design Collection & Internship	0-0-5	3				
Total			8	Total			9
			24				21

PCFT **PROCESS CONTROL IN APPAREL MANUFACTURING & QUALITY CONTROL (3-0-0)**

Module-I

(12hours)

1. Application of process control approach in apparel manufacturing through estimation of labor productivity, m/c productivity, quality and cost control
2. Quality control parameters from raw fabric to finished garment for monitoring Process.
-Raw material stage, In process, pattern to finishing, Final:- Assessment of fit while final inspection to be tested against size chart for specific garments.

Module-II

(14hours)

3. Quality parameters to be checked for finished garment to eliminate rejection- garment checking in 3 zones on basis of specification sheet.
4. Quality parameters in trims- buttons, linings, interlinings, zippers and others
5. Inspection, defects analysis and estimation of value loss both for fabric and Finished garment, classification of on 4-point system, 6-point system, 10-point System, major and minor defects, garments rejection. AQL, AOQL estimation

Module-III

(14hours)

6. Evaluation of sewing process to assist process control in apparel manufacturing
-Evaluation of sewability.
-Evaluation of thread tension.
-Evaluation of damage on thread, fabric needle for control of sewing speed, needle heating, thread tension.

Modern Fabric evaluation technique to support product development : KES instrument, FAST instrument and other subjective and objective evaluation methods for assessing product performances. HVI instrument.

7. Knowledge on standard norms for various process and quality parameters. Statistical Quality Control (SQC)- acceptance sampling. Introduction to TQM, ISO, six sigma

REFERENCE BOOKS:

1. Basic process and clothing construction: SHERIE DOONGALI
2. Managing productivity in apparel industry: Rajesh Bheda
3. Apparel manufacturing hand book: Jacob Solinger
4. Journals on Apparel Industry/Manufacturing
5. Apparel production: sewn product analysis: Glock and Kunz- Prentice Hall
6. Managing quality in apparel industry- Mehta P V and Bhardwaj ,Blackwell/ Om book service
7. An introduction to quality control for apparel industry- P Mehta

PCFT EMBROIDERY AND SURFACE ORNAMENTATION (3-0-0)

Module-1

(13 hours)

Basics principles of hand embroidery, m/c embroidery, computerized embroidery.
Embroidery kits, tools, & equipments for embroidery.
Stitch families: Straight stitch, looped stitch, knotted, laid, couched and cross Stitch.
Machine embroidery- running, cording, monogram

Module-1I

(13 hours)

Embroidery pattern: -
Embroidered pattern used to decorate interior spaces, cushion, table cloth
Curtains, Matts, traditional accessories.
Embroidered pattern used for female wardrobe, shawls, belts, handkerchief
Head scarves etc . Introduction to fringes, tassels, pompons, sequene and beads
Regional embroidery : Study of motifs, fabrics, colour threads, stitches used for design in
Sind /Gujurat, Punjab, Bengal, Karnataka, U.P, Himachal

Embroidering with gold & silver thread:- Materials and method used .

Module-III

(13 hours)

Patch work, Applique design, drawn & thread work,raised work, mirror work ,quilting,
various method of refilling the open spaces .

Tapestry weaving:- Principles, appliances and materials, bobbins & needles,Comb,
embroidery frames treated as a loom.

Reference Books:

- 1.Encyclopedia of embroidery by Reader digest
- 2.Traditional Indian textiles-John Gillow
- 3.USHA & SINGER publication on embroidery

**PCFT APPAREL MARKETING, RETAILING AND
MERCHANDISING (3-0-0)**

Module-1

(12hours)

Introduction to apparel marketing, objectives of marketing. Scope & potential of apparel product in domestic & International market, exploration of fashion industry , concept of fashion forecasting.

Present scenario of apparel industry in India – challenges & prospects of these industries.

Instruments of trade policy

Module – II

(15 hours)

Introduction to retailing. Types of retailers, Types of retail ownership, elements of retail mix, types of retail locations, Benefits of retailing, Role of a retail merchandiser and buyer. Merchandise planning, Retail pricing and repricing, Retail pricing polies/ strategies (Market Skimming, Market Penetration, Price bundling, Leader pricing, Everyday low pricing, Odd pricing, etc.) Retail Store Design & Visual merchandising. Promotion of fashion.

Module-III

(13 hours)

International marketing environment, identifying foreign apparel markets, International marketing mix- PLC model, pricing decision, channels of distribution.

Export procedure & documentation, export assistance- various scheme, sources of information, role of export promotion counseling, INCO terms, terms of payment, export finance.

Working of export houses, categories – star trading export house & buying houses. Concept of Out sourcing

Reference Books:

1. International marketing management – Vasshney & Bhattachary
2. Nabhi's Publication on export- Govt. Handbook
3. International marketing – Cateora
4. Retail Management Text & Cases 2nd Edition (Tata McGraw-Hill)- Swapna Pradhan,

PEFT HOME FURNISHING & INTERIOR DESIGNING (3-0-0)

Module-1 (13 hours)

Classification of Textiles: Clothing, Home furnishing and Technical Textiles

Introduction to furnishing fabric according to

- Classification based on end use & application
- Properties & Performance Required
- Raw materials used

Bed linen- Bed covers, pillow covers, mattress and blanket covers, duvet covers, cushions, throw pillows, shams, etc.

Kitchen linen : Disc cloth, cheese cloth, table runner, hand towel, freeze cover, covers for other appliances such as tea kettle cover, table cloth , kitchen apron, Wipers-woven & non woven wiper

Module-II (13 hours)

Floor covering - carpets, rugs/durries, wooden and metal tiles, bamboos

Wall covering – lighting, wall art, wall hanging and decoratives frames,

Home decorative –Furniture, Draperies, Curtains, Decorating Accessories(flower vases, sculptures, decorative plants, aquarium, etc.).

Furnishings:- Requirements in terms of decoration according to different rooms, (drawing, Bedroom, dining, reading, kitchen, store room, guest room, bath room, floor covering, use of acoustic fabric inside the room)

Module – III (13 hours)

Factors affecting house planning – Finance, space, grouping, privacy , circulation , sanitation , ventilation , practical consideration , flexibility, furniture requirement.

Planning of different room (Technical Specification):- Kitchen, Dining Room, Living room, bath room, bed room, staircase, garage.

Designing: - Association, accomplishment, organization, use of color in interior decoration.

Arrangement: - flower arrangement, furniture arrangement

Reference Books:

1. Textile And clothing by Garg, Saini& Gupta
2. Elements of Fashion And Apparel Design by Sumati G.J
3. Textile & Clothing -Garg, Saini, Gupta

PEFT FASHION CO-ORDINATION & COMMUNICATION (3-0-0)

Module – I

(14hours)

Objectives of fashion co-ordination

Terms associated with fashion co-ordination.

Color ideology and Colour selection- according to figure, age, season, occasion etc...

Colour modification, Qualities of Colour, Fabrication-Spring wear, summer wear, Sports wear(For children, men, & women) Concept of balancing and proportion.

Objectives of communication.

Means of communication: advertising, publicity & other promotional practices, display-visual communication (color, design), special event etc.

Market survey, Strategic choice, development of market mix, Business image methodology to create & implement image

Module – II

(13 hours)

Fashion Accessories: - Definition & classification. Usage of different raw material as leather, fur, beads, metals etc. Various notion & trims used in fashion accessories.

Study of different fashion accessories and their balancing aspect with garments-footwear, bags, jewellery, gloves, hats, scarves etc.

Module-III

(13hours)

Fashion trends: past, present, future survey, presentation techniques.

Commercial art using computer & IT.

Portfolio preparation & presentation.

Fashion brochure preparation.

Fashion shows: production & co- ordination of the creative aspect (booking, styling etc).

Phases of the planning of an event.

Briefing, ideation & preparation of the budget after the event.

Reference Books:

1. Fashion Source Book by Kathryn Mckelvey.
2. Dress designing by Monmeet Sodhia.
3. Inside Fashion Designing. By Sharon Lee Tate .
4. Elements of fashion and apparel designe by Sumathi G.J
5. Fashion source book- Peacock J.-Thames & Hudson
6. Fashion apparels and accessories- Diamond J E- Delmar

PEFT SMART TEXTILES & FUNCTIONAL GARMENTS (3-0-0)

MODULE –I

(12 hours)

Concept of Smart Textiles. Detailed study (objectives, properties, fibres used & end uses) of the Smart Garments like

Chameleonic Garments, Garment made from Shape memory and Phase Change Material, Self Cleaning Fabrics, Wearable Electronics (Garments with sensors and computing devices).

MODULE –II

(13 hours)

Study (objectives, properties, fibres used & end uses) of functional fabrics like thermal protective fabrics , water proof & water breathable fabrics, high tenacity fabrics etc.

Flame retardant & Fire fighters clothings,

.

MODULE –III

(14 hours)

High performance Sports wear.

Radiation Protective clothing from uv , x-ray, alpha ray, beta ray , gamma ray.

Bullet proof and ballistic protective clothing. Defence clothings,

Space suit.

Garment for medical & hospital use, Antimicrobial textile wear, Pathogen resistant surgical gown , Clothing for protection against chemicals & necluer

Reference Books:

1. Industrial Textile by Sabit Adnoor.

PEFT ENVIRONMENTAL MANAGEMENT IN GARMENT INDUSTRY (3 -0-0)

Module-I

(15hours)

Ecological concept & Natural Resources: Ecological perspective & value of environment. Environmental auditing, ecosystem process, Indian environmental law, Global perspective.

Water pollution in garment industry: Water quality standards & parameters, assessment of water quality, Aquatic pollution, organic content parameters, Transformation process in water bodies.

Air pollution: Air pollution & pollutant, global climatic change- green house gases, emission standard from industrial sources. Atmospheric dispersion.

Noise pollution: Physical property of sound, noise standard, noise control.

Module-II

(13 hours)

Solid waste management in garment industry: Source classification & composition of MSW, MSW management, Waste minimization of MSW. Compliance issues in environment management.

Module-III

(10 hours)

Waste minimization: Concept, Elements of waste minimization, Benefits of waste minimization. Waste reduction technique.

Reference Books:

1. Environmental Engineering Mcgraw Hill international edition.
2. Managing quality in apparel industry – Pradip V. Mehta

Module-I (14 Hours)

1. Yarn Geometry: Basic geometry of twisted yarns, the idealized helical yarn structure and its deviation. Yarn diameter and count, Twist contraction and retraction, specific volume, packing of the fibres in yarn, packing fraction of yarn

2. Fibre Migration: Ideal migration, Parameters affecting migration, characterization of migration behaviour, mechanism of migration in single and plied structure.

Module-II (14 Hours)

3. Structural Mechanics: Analysis of tensile behaviour of continuous filament. Small extension theory without and with considering lateral contraction, prediction of breakage, nature of rupture for continuous filament yarn, extension and breakage of spun yarn: traditional view and approach by Hearle and E1-Sheikh.

4. Study of the blended yarn structure, Hamburgers Theory. Structure- property relationship of ring, rotor, air-jet, friction spun yarn.

Module-III (12 Hours)

5. Fabric Geometry: Engineering approach to the analysis of fabric, Pierce geometrical model relationship between h , p and c , Crimp interchange, Jammed Structure, concept of similar cloth. Maximum possible cover factor, Race track geometry, close limit of weaving, concept of pierce elastic thread model, Geometry of plain knitted fabric.

6. Fabric Properties: An elementary idea about tensile, bending, shear and drape behaviour of fabric. An elementary idea about fabric objective measurement

Books Recommended

1. Hearle J W S, Grosberg P and Backer S, "*Structural Mechanics of Fibres Yarns and Fabrics*", Wiley Interscience, New York (1969).
2. Goswami B C, Martindale J G and Scardino F, "*Textured yarn technology, structure and applications*", Wiley Interscience Publisher, New York (1995).
3. Peirce F T and Womersley J R, "*Cloth Geometry*", reprint, The Textile Institute, Manchester (1978).
4. Hearle J W S, Thwaites J J and Amirbayat, "*Mechanics of Flexible Fibre Assemblies*", Sijthff and Noordhoff International Publishers BV, Alphen aan den Rijn, Netherlands (1980).
5. "*Textile Research Journal*", Princeton, USA and "*Journal of Textile Institute*", Manchester, UK

COMPUTER GRAPHICS

Module – I (10 hours)

Overview of Graphics System: Video Display Units, Raster-Scan and Random Scan Systems, Graphics Input and Output Devices.

Output Primitives: Line drawing Algorithms: DDA and Bresenham's Line Algorithm, Circle drawing Algorithms: Midpoint Circle Algorithm and Bresenham's Circle drawing Algorithm.

Two Dimensional Geometric Transformation: Basic Transformation (Translation, rotation, Scaling) Matrix Representation, Composite Transformations, Reflection, Shear, Transformation between coordinate systems.

Two Dimensional Viewing: Window-to- View port Coordinate Transformation.

Module –II (12 hours)

Line Clipping (Cohen-Sutherland Algorithm) and Polygon Clipping (Sutherland-Hodgeman Algorithm).

Aliasing and Antialiasing, Half toning, Thresholding and Dithering, Scan conversion of Character.

Polygon Filling: Seed Fill Algorithm, Scan line Algorithm.

Two Dimensional Object Representation: Spline Representation, Bezier Curves and B-Spline Curves.

Fractal Geometry: Fractal Classification and Fractal Dimension.

Three Dimensional Geometric and Modeling Transformations: Translation Rotation, Scaling, Reflections, shear, Composite Transformation.

Projections: Parallel Projection and Perspective Projection.

Module –III (8 hours)

Visible Surface Detection Methods: Back-face Detection, Depth Buffer, A- Buffer, Scan-line Algorithm and Painters Algorithm.

Illumination Models: Basic Models, Displaying Light Intensities.

Surface Rendering Methods: Polygon Rendering Methods: Gouraud Shading and Phong Shading.

Computer Animation: Types of Animation, Key frame Vs. Procedural Animation, methods of controlling Animation, Morphing.

Virtual Reality: Types of Virtual reality systems, Input and Output Virtual Reality devices.

Textbook

1. Computer Graphics with Virtual Reality System, Rajesh K.Maurya, Wiley-Dreamtech.
2. Computer Graphics, D. Hearn and M.P. Baker (C Version), Pearson Education

Reference Books

1. Computer Graphics Principle and Practice , J.D. Foley, A.Dam, S.K. Feiner, Addison, Wesley
2. Procedural Elements of Computer Graphics- David Rogers (TMH)
3. Computer Graphics: Algorithms and Implementations – D.P Mukherjee & Debasish Jana (PHI)
4. Introduction to Computer Graphics & Multimedia – Anirban Mukhopadhyay & Arup Chattopadhyay (Vikas)

PCFT EMBROIDERY & SURFACE ORNAMENTATION LAB (0.0.3)

1. Basic hand embroidery stitches.
2. Samples of machine embroidery stitches.
3. One embroidery from each state of study- chikan, kantha, mirror, appliqué, chamba, mochi, phulkari
4. Application of hand embroidery stitches on home furnishing
5. Making of ornamentations like fringes, tassels, pompons, sequance and beads
6. Application of any embroidery/surface ornamentation on a menswear
7. Application of different embroidery/surface ornamentation on kids wear.
8. Application of different embroidery /surface ornamentation on ladieswear

Minor Project :- CRAFT DOCUMENTATION (0-0-6)

One renowned craft of Orissa or adjacent states has to be studied, researched & documented. The method of production of the craft should be understood and applicability on garments researched. The final outcome of the project will be a project report submitted along with practical samples of craft with application in garments.

SEMINAR ON DESIGN COLLECTION PORTFOLIO & FASHION SHOW AND INTERNSHIP (0-0-5)

The student have to collect various designs related to different themes ; such as seasonal, traditional, bridal, western wear, sports wear, party wear, men's wear ,women's wear, kid's wear etc. They should prepare a collection of atleast 6 garments on any of the chosen themes and arrange a fashion display of the products on a matching background.

The students have to take internship after their 6th semester exam. They should present a seminar about the said internship with proper documentation on the activities of the industry visited.

ENVIRONMENTAL ENGINEERING (3-0-0)

Objective: This course introduces the students to the environmental consequences of Industries, development actions etc. and the methods of minimizing their impact through technology and legal systems.

Module – I

Ecological Concepts and Natural Resources: Ecological perspective and value of environment. Environmental auditing, Biotic components, Ecosystem Process: Energy, Food Chain, Water cycle, Oxygen cycle, Nitrogen cycle etc., Environmental gradients, Tolerance levels of environment factor, EU, US and Indian Environmental Law, Global Perspective.

Chemistry in Environmental Engineering: Atmospheric chemistry, Soil chemistry, Material balances and Reactor configurations.

Module – II

Water Pollution: water quality standards and parameters, Assessment of water quality, Aquatic pollution, Estuarine water quality, Marine pollution, Organic content parameters, Ground water Contamination, Water table and Aquifer, Ground water recharge. Water quality parameter and standards.

Water Treatment: Water treatment processes, Pre-treatment of water, Conventional process, Advanced water treatment process.

Waste Water Treatment: DO and BOD of Waste water treatment process, pretreatment, primary and secondary treatment of waste water, Activated sludge treatment: Anaerobic digestion and its microbiology, Reactor configurations and methane production. Application of anaerobic digestion.

Air Pollution : Air pollution and pollutants, criteria pollutants, Acid deposition, Global climate change –green house gases, non-criteria pollutants, emission standard form industrial sources, air pollution metereology, Atmospheric dispersion.

Industrial Air Emission Control:

Characterization of air stream, Equipment selection, Equipment design, Special Methods: Flue gas desulphurization, NOx removal, Fugitive emissions.

Module – III

Solid Waste Management Source classification and composition of MSW: properties and separation, storage and transportation, MSW Management, Waste minimization of MSW, Reuse and recycling,

Hazardous Waste Management, Hazardous waste and their generation, Transportation and treatment of hazardous waste: Incinerators, Inorganic waste treatment, handling of treatment plant residue. Waste minimization techniques.

Noise Pollution: Physical Properties of sound, Noise criteria, Noise Standards, Noise measurement, Noise control.

Environment impact Assessment, Origin and procedure of EIA, Project Screening for EIA, Scope studies, Preparation and review of EIS.

Text Book

1. Environmental Engineering Irwin/ McGraw Hill International Edition, 1997, G. Kiely,
- 2.Environmental Engineering & Safety by Prof B.K. Mohapatra, Seven Seas Publication, Cuttack

Reference Books

1. Environmental Engineering by Arcadio P. Sincero & Gergoria A.Sincero PHI Publication
2. Principles of Environmental Engineering and Science, M. L. Davis and S. J. Masen, McGraw Hill International Edition, 2004
3. Environmental Science, Curringham & Saigo, TMH,
4. Man and Environment by Dash & Mishra
5. An Introduction to Environmental Engineering and Science by Gilbert M. Masters & Wendell P. Ela - PHI Publication.

PEFT **APPAREL PRODUCTION PLANNING , CONTROLLING & SCHEDULING (3-0-0)**

Module-I

(14 hours)

1. Introduction to production ,Operations ,Concept of production, Productivity components of production, Different production systems (customized, divisional, batch. Progressive bundle, line, Modular production system, unit production system & mass customization)
2. Definition, Objectives and fuctions of Production planning, control, loading and Scheduling, organization of various departments in apparel industry. Development of MIS for production.
3. Introduction to plant layout- criteria for evaluation, determining minimum space requirement, calculation grid, plant size location, basic production layout

Module-II

(15 hours)

4. Work measurement: Uses of work measurement, data, and basic procedure of work measurement.
5. Motion & Time study: Definition & scope of motion & time study, Data for sewing work study & GSD, improvement of production efficiency, principle of work cycle timing, concept of measuring operator efficiency, Quantitative Production analysis, Line balancing. Calculation of SMV and SAM
6. Introduction to supply chain management

Module-III

(11hours)

7. Production planning order preparation, material resource planning and Material management Co-ordination of activities in a garment manufacturing unit: Layering & marker planning , Cutting room planning, planning of sewing room,in clothing production.
8. Quick response in apparel manufacturing- concept of lean manufacturing, kanban, JIT, ERP

Reference Books:

- 1) Introduction to clothing production management : A.J. Chutter
- 2) production management in apparel industry : Rajesh Bheda
- 3) Plant layout & materials handling- Apple J M- Ronald Press
- 4) Motion and time study- Barnes Ralph- John Wiley & Sons

Module – I**(14 hours)**

Definition of product, classification. New product development Strategy. Factors affecting product development(market potential, sale, demand and cost, etc.). Apparel product development- Range planning and range presentation. Developing a new line of product by designers. Functions of a designer in product development. Types of product developers in apparel industry (Manufactures, Private label retailers, Free-lance designers). Introduction to product life cycle and stages- type of consumers operating in different stages

Basic Principles of product development in apparels

- Artistic view point
- Engineering view point
- Fashion consideration
- Market factors

Module – II**(12 hours)**

Mission and Vision Statement of a company. Types of core strategies followed (Product, Operation and Customer Core Strategy), Evaluation and analysis of a new product – product costing , evaluation of product portfolio.

Development of new product in textile (Apparel sector) for various end uses. Study of quality requirement and product specification on the basis of

- Requirement of comfort
- Requirement of hand
- Requirement of Aesthetics aspects.

Module – III**(12hours)**

Method of apparel product survey, market research. Concept of fashion & trend forecasting.

Study of international trends like premiere vision.

Reference Books:

1. Managing Quality in the Apparel Industry. By Mehta & Bharadwaj.
2. Dress designing by Monmeet Sodhia.
3. Fashion forecasting- EL Brannon- Fairchild publication
4. Fashion from concept to consumer- GS Fringe- Prentice Hall

**PEFT SUPPLY CHAIN MANAGEMENT & LOGISTICS IN
APPAREL INDUSTRY (3-0-0)**

Module-I

(15 hours)

Value chain: Definition, value chain perspective in garment industry, value chain sequence

Sourcing of raw material: material cost negotiation, pre-production & production costing.

Fabric, trim & accessories specification. Determining production capacity.

Pre production & production process.

Quality management from initial to final stage of manufacturing.

Human resource development.

Module -II

(12 hours)

Developments in supply through e-application of marketing. Different market studies, needs of market, types of market- classical, shop & concession market.

Distribution: channels of distribution, elements of distribution policy, criteria for selection of channel, sources of information for channel decisions.

Module - III

(12 hours)

Logistics, sales & evaluation in garment industry:

Logistics: shipment via sea / air, terms of payment of goods through credit /LC,

Documentation submission, customs clearance & duty payment, distribution center audit & inspection.

Sales: display at retail, advertising & promotion, initial sales, recorders, POS information.

Evaluation: sales analysis, custom return analysis, competitor comparison, trend identification.

Reference books:

1. International marketing management by Varshney and Bhattacharya.

PEFT EXPORT MANAGEMENT (3-0-0)

Module-I

(14 hours)

Frame work of International marketing:

-Definition and scope of International marketing; International marketing versus Domestic marketing, cultural dimension of International marketing.

-Regional economic grouping.

Trends in India's Foreign Trade:

-A Review of trends; Trade policy since 1991, Composition of India's Export and Import.

-India's trade policy: Medium term Export strategy 2002-2007, Export – Import policy 2002-2007.

Product planning for Export:

Need for product planning, Product adoption & standardization, Product life cycle in international marketing, Packaging as an element of product planning.

Module-II

(14 hours)

Pricing for Exports:

Export pricing & cost factors Elements of cost for export price quotation

Export pricing strategy, Basic data required for export pricing decision.

Market entry and overseas distribution system: Methods of entry in a foreign market, export distribution channel Factors affecting channel decision .

Role of export or trading houses

Module – III

(12 hours)

Promotion of products internationally, Nature & rule of international advertisement .Define promotional method.

Overseas market research – need for market research, methodology of market research, conducting overseas market research

Management of Risk in international marketing

Detail discussion of various types of risks involve in international market

Reference Books:-

1. International marketing management - B.L. Bhattachary

**PEFT ENTREPRENEURIAL DEVELOPMENT IN FASHION AND
APPAREL INDUSTRY (3-0-0)**

Module-I

(15 hours)

1. Introduction and definition of Entrepreneur, Characteristics of Entrepreneur, Functions of Entrepreneur, Types of entrepreneur, Entrepreneur vs. Entrepreneurship, Role of an Entrepreneur in Industrial Development
2. Promotion of a business venture- Business opportunity analysis, Market Survey, External Environment Analysis, Legal Requirements for establishing a new unit, Raising of funds.
3. Project Formation & Finance to Entrepreneur: Identification of Business opportunities- Project ideas & Identification through Trade fair, Exhibition, Agencies, etc.

Module-II

(12 hours)

4. Financial Management – Meaning & Importance, Types of Capital (Fixed & Working), Components of balance sheet & Profit-loss Account, Break- even Analysis, Cost Control (Elements of cost, Overhead Cost, Unit Cost, Standard Cost), Pay-back period
5. Forms of business organization: Sole Proprietorship, Partnership, Joint Hindu Family, Joint Stock Companies, Co-operative Society, Public limited company, Private Ltd. Company

Module-III

(12 hours)

6. Role of financial institutions – SSI, DIC, IDBI, IFCI, KVIC, Entrepreneurship Development Institute of India.
7. Selection of Project : Factors to consider for selection of a project Technology, Marketing, Labor, Location, Equipment
8. Factories Act, 1948, Industrial dispute Act, 1947, the Employees State Insurance Act, 1948, Minimum wages Act, 1948, Payment of Wages Act, The Trade Union Act.

Reference Books:

1. Entrepreneurship for Engineers by Bhramabar Badhai (Dhanpat Rai & Co. Pvt. Ltd.)
2. Entrepreneurship for Engineers by P.K Mishra (Alok Publication)
3. Entrepreneurial Development, P.Saravanel.
4. Business organization – Bhusan Y.K.
5. Principle of economics – M.C.Seth
6. Organization & Management of small scale industry – Vasanth Desai

PETX TEXTILE MILL PLANNING & ORGANISATION (3-0-0)

Module-I (15 Hours)

- 1. Location and Layout Planning :** Plant location and site selection, Factors affecting location, Plant layout, Different types of layouts, Principles of machinery lay-outs and different flow plans of material for spinning , weaving and process house. Calculation for balancing of different machines in a Textile mill
- 2. Plant services:** Ventilation and lighting plan. Humidification systems used in Textile Mills, Developments in humidification systems, Utilization of steam and power, Power consumption - Energy consumption in textile machines, Measures to reduce power consumption.
- 3. Material handling:** Importance of material handling, Methods and equipment employed-classification of material handling equipments, control of wastes.
- 4. Store Routine** – Function of stores, procedure for material procurement, effective stores management, ABC analysis, basic inventory control; stock evaluation.

Module-II (15 Hours)

5. Human Resource Management: Organizational structure, patterns, communication. Selection, recruitment and training, Different categories of labour required in various section of spinning, weaving and processing departments, work load, work assignment, Calculation for work assignment, Idea of productivity calculations of spinning / weaving mill and factors affecting productivity.

Labour laws, labour welfare activities, methods of wage remuneration, wage determination process, job evaluation, payments by results, motivation, financial & non-financial incentives, disciplinary action – warning, showcause notice, suspension and dismissals, retrenchment & VRS

6. Maintenance Management: Maintenance systems - types of maintenance practices and concepts, planned & unplanned maintenance, corrective & design maintenance, routine and preventive maintenance, Work Study in maintenance and, planning of maintenance work, making schedules, recording of maintenance activities. Accidents and safety engineering, Fire prevention and protection

Module-III(10 Hours)

7. Cost Accounting and Control : Introduction, costing - its importance & use, Elements of cost -Cost classification - Total cost analysis, Costing the products, Control and accounting of materials, labour and overhead.

8. Financial Management: Preparation of Balance sheet - Capital and running cost - profit and loss account, Break even analysis. Financial ratios - their analysis and interpretation

Books Recommended

1. Dudeja V D, "*Management of Textile Industry*", Textile Trade Press, Ahmedabad (1981).
2. Ormerod A, "*Textile Project Management*", The Textile Institute, Manchester UK (1992).
3. Talukdar M K, Sriramulu P K and Ajgaokar D B, "*Weaving – Machine, Mechanism and Management*", Mahajan Publisher Private Ltd., Ahmedabad, India (1998).
4. Garde A R and Subramanian T A, "*Process Control in Spinning*", 3rd Ed., ATIRA Ahmedabad, (1987).
5. Higgins, "*Handbook of Maintenance Management*", Prentice Hall New York (1999).

DIGITAL IMAGE PROCESSING

Module: 1 (12 hours)

Introduction: Digital Image fundamentals: Image sampling and quantization, relationship between pixels, Intensity transformations and spatial filtering, some basic intensity transformation functions, Histogram processing, spatial filters for smoothing and sharpening (Chapt: 2 & 3 of Text book 1)

Module: 2 (12 hours)

Filtering in the Frequency Domain: preliminary concepts, 2D DFT and its properties, basic filtering in the frequency domain, image smoothing and sharpening (Chapt: 4 of Text book 1)

Image Restoration and Reconstruction: Image restoration/degradation model, noise models, restoration in the presence of noise only, estimating the degradation function (Chapt: 5 of Text Book 1)

Module: 3 (12 hours)

Color Image Processing: color models, Color transformation (Chapt: 6 of Text book 1)

Wavelets and Multi-resolution Processing: multiresolution expansions, wavelet transforms in one and two dimension (Chapt: 7 of Text book 1)

Image Compression: Fundamentals, Some basic compression methods (Chapt: 8 of Text book 1)

Morphological Image Processing: Erosion and Dilation, opening and closing (Chapt: 9 of Text book 1)

Text Books:

1. R.C. Gonzalez, R.E. Woods, *Digital Image Processing*, 3rd Edition, Pearson Education
2. R C Gonzalez, Woods and Eddins, *Digital Image Processing using Matlab*, 2nd Edition, Tata McGraw Hill

Reference Books:

1. S.Sridhar, *Digital Image Processing*, Oxford University Press, 2011

FEBT MICROBIAL TECHNOLOGY (3-0-0)

Module-I (10 Hours)

Introduction to Microbial Kingdom- Bacteria, Viruses, Fungi and Yeast; Classical and Modern approaches of microbial taxonomy; Methods of Microbiology- Culture media, Sterilization, Establishment of pure culture, Staining of bacteria (Gram's, Acid Fast, Capsule), Micrometry and Microscopy(Bright Field, Fluorescence, Phase Contrast and Electron).

Module-II (15 Hours)

Microbial Processes and fermentation technology: Introduction to fermentation technology, Microbial growth and product formation kinetics in batch, continuous and feed batch fermentation, Large scale production: submerged, solid and semi-solid fermentation; Microbiological processes for production of antibiotics, enzymes.

Module-III (15 Hours)

Enzyme technology – nature of enzymes, application of enzymes, limitations of microbial cells used as catalysts in fermentation, multi-enzyme reactors, genetic engineering & protein engineering of enzymes, technology of enzyme production, use of immobilized cells and enzymes (Ca-alginate beads, polyacrylamide), industrial applications of immobilized enzymes.

Books Recommended:

1. Text book of Microbiology by Stanier.
2. Microbiology, R.S. Mehrotra, Tata McGraw Hill
3. Microbiology by Pelczar
4. Brock Biology of micro-organisms
5. Microbiology by Prescott.
6. Microbial Genetics- Freifelder
7. Microbiology by Atlas
- 8..Principle of Fermentation Technology , P.F.Stanbury,A. Whitaker & S.J.Hall, Elsevier
9. Industrial Microbiology, Prescott and Dunn,

PCFT MAJOR PROJECT

In this semester, students are required to present a dissertation reporting all the aspects of the research work and defend the reports. The final assessment is to be done through a viva-voce test in presence of external examiner and the quality of report writing as per university norms.
