**SYLLABUS**

###  FOR

**FOUR-YEAR B. TECH PROGRAMME**

 **IN**

**FASHION TECHNOLOGY**

**DEPARTMENT OF FASHION TECHNOLOGY**

 **ODISHA UNIVERSITY OF TECHNOLOGY AND RESEARCH**

#  (FORMERLY COLLEGE OF ENGINEERING & TECHNOLOGY)

 **(An Autonomous and Constituent College of BPUT, Odisha) Techno Campus, MahalaxmiVihar, Ghatikia,**

**Bhubaneswar-751029, Odisha, INDIA** [**www.cet.edu.in**](http://www.cet.edu.in/)

**Ph. No.: 0674-2386075 (Off.), Fax: 0674-2386182**

**1st SEMESTER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl.****No.** | **Subject Type** | **Subject Code** | **Subject Name** | **Teaching Hours/Week** | **Credit** | **Maximum Marks** |
| **L** | **T** | **P** | **IA** | **EA** | **PA** | **Total** |
| 1 | Basic ScienceCourse | UBSCH101 | CHEMISTRY | 3 | 1 | 0 | 4 | 30 | 70 | 0 | 100 |
| 2 | Basic ScienceCourse | UBSMH102 | MATHEMATICS -I | 3 | 1 | 0 | 4 | 30 | 70 | 0 | 100 |
| 3 | Engineering ScienceCourse | UESCS103 | PROGRAMMING FOR PROBLEM SOLVING | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 4 | Basic ScienceCourse | ULCCH101 | CHEMISTRY LAB | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
| 5 | Engineering ScienceCourse | ULCCS102 | PROGRAMMING FOR PROBLEM SOLVING LAB | 0 | 0 | 4 | 2 | 0 | 0 | 100 | 100 |
| 6 | Engineering ScienceCourse | ULCME103 | ENGINEERING GRAPHICS AND DESIGN LAB | 1 | 0 | 4 | 3 | 0 | 0 | 100 | 100 |
| **7** | Engineering ScienceCourse | UESIE102 | BASIC ELECTRONICS ENGINEERING | 2 | 0 | 0 | 2 | 30 | 70 | 0 | 100 |
| **8** | Engineering ScienceCourse | ULCIE102 | BASIC ELECTRONICS ENGINEERING LAB | 0 | 0 | 2 | 1 | 0 | 0 | 100 | 100 |
| 9 | Mandatory Course | INDUCTION TRAINING(21 DAYS) |  |  |  | 0 |  |  |  |  |
|  |  |  | **Total** |  |  |  | **20.5** |  |  |  | **800** |

**2nd SEMESTER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl.****No.** | **Subject Type** | **Subject Code** | **Subject Name** | **Teaching Hours/Week** | **Credit** | **Maximum Marks** |
| **L** | **T** | **P** | **IA** | **EA** | **PA** | **Total** |
| 1 | Basic ScienceCourse | UBSPH201 | PHYSICS | 3 | 1 | 0 | 4 | 30 | 70 | 0 | 100 |
| 2 | Basic ScienceCourse | UBSMH202 | MATHEMATICS-II | 3 | 1 | 0 | 4 | 30 | 70 | 0 | 100 |
| 3 | Engineering ScienceCourse | UESEE203 | BASIC ELECTRICAL ENGG. | 3 | 1 | 0 | 4 | 30 | 70 | 0 | 100 |
| 4 | Humanities &SocialSciences | UHSMH205 | ENGLISH | 2 | 0 | 0 | 2 | 30 | 70 | 0 | 100 |
| 5 | Basic ScienceCourse | ULCPH201 | PHYSICS LAB | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
| 6 | Engineering ScienceCourse | ULCEE202 | BASIC ELECTRICAL ENGG. LAB | 0 | 0 | 2 | 1 | 0 | 0 | 100 | 100 |
| 7 | Engineering ScienceCourse | ULCME205 | WORK SHOP/BASIC MANUFACTURING PROCESS LAB | 1 | 0 | 4 | 3 | 0 | 0 | 100 | 100 |
| 8 | HS | ULCMH204 | ENGLISH LAB | 0 | 0 | 2 | 1 | 0 | 0 | 100 | 100 |
|  |  |  | Total |  |  |  | **20.5** |  |  |  | **800** |
| **9** | **Summer Internship programme (4 to 8 weeks) is mandatory as per AICTE rule** |

**3rd SEMESTER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl.****No.** | **Subject Type** | **Subject Code** | **Subject Name** | **Teaching Hours/Week** | **Credit** | **Maximum Marks** |
| **L** | **T** | **P** | **IA** | **EA** | **PA** | **Total** |
| 1 | Core Course | UPCFT301 | Fiber Science | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 2 | CoreCourse | UPCFT302 | Concept of Fashion | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 3 | Core Course | UPCFT303 | Yarn Manufacturing | 3 | 1 | 0 | 4 | 30 | 70 | 0 | 100 |
| 4 | Engg. Science Course | UESIT311 | Data Structure and Algorithm | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 5 | Basic ScienceCourse | UBSMH301 | Mathematics-III | 3 | 1 | 0 | 4 | 30 | 70 | 0 | 100 |
| 6 | Humanities Science Course | UHSMH306 | Organizational Behavior | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 7 | LabCourse | ULCFT301 | Concept of Fashion Lab. | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
| 8 | LabCourse | ULCIT311 | Data Structure and Algorithm Lab. | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
|  |  |  | **Total** |  |  |  | **23** |  |  |  | **800** |

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

**4th SEMESTER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl.****No.** | **Subject Type** | **Subject Code** | **Subject Name** | **Teaching Hours/Week** | **Credit** | **Maximum Marks** |
| **L** | **T** | **P** | **IA** | **EA** | **PA** | **Total** |
| 1 | Core Course | UPCFT401 | Fashion Sketching and Illustration | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 2 | Core Course | UPCFT402 | Fashion Designand Color Theory | 3 | 1 | 0 | 4 | 30 | 70 | 0 | 100 |
| 3 | Core Course | UPCFT403 | Fabric Manufacturing | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 4 | Engg. Science Course | UPCIT403 | Data BaseManagement System | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 5 | Humanities ScienceCourse | UHSMH407 | Engineering Economics | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 6 | Lab Course | ULCFT401 | Fashion Sketchingand Illustration Lab. | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
| 7 | Lab Course | ULCFT402 | Fashion Design and Color TheoryLab. | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
| 8 | Lab Course | UPCIT403 | Data BaseManagement System Lab | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
| 9 | Mandatory Course | UMCCE401 | **Environmental Science** | 2 | 0 | 0 | 0 | 30 | 70 | 0 | 100 |
|  |  |  | **Total** |  |  |  | **20.5** |  |  |  | **900** |
| **10** | **Summer Internship programme (4 to 8 weeks) is mandatory as per AICTE rule** |

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

**5th SEMESTER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl.****No.** | **Subject Type** | **Subject Code** | **Subject Name** | **Teaching Hours/Week** | **Credit** | **Maximum Marks** |
| **L** | **T** | **P** | **IA** | **EA** | **PA** | **Total** |
| 1 | Core Course | UPCFT501 | GarmentManufacturing Technology-I | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 2 | Core Course | UPCFT502 | Testing ofTextile Materials | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 3 | Core Course | UPCFT503 | Embroidery andSurface Ornamentation | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 4 | Core Course | UPCFT504 | IndianTraditional Textile Design | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 5 | Programme Elective-I | UPEFT505/ UPEFT506 | Garment Processing and Finishing / ClothingScience andTechnology | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 6 | Open Elective-I |  |  | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 7 | Lab Course | ULCFT501 | Garment ManufacturingTechnology-I Lab. | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
| 8 | Lab Course | ULCFT502 | Testing ofTextile Materials Lab. | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
| 9 | Lab Course | ULCFT503 | Embroidery and Surface OrnamentationLab. | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
|  |  |  | **Total** |  |  |  | **22.5** |  |  |  | **900** |

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**6th SEMESTER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl.****No.** | **Subject Type** | **Subject Code** | **Subject Name** | **Teaching Hours/Week** | **Credit** | **Maximum Marks** |
| **L** | **T** | **P** | **IA** | **EA** | **PA** | **Total** |
| 1 | Core Course | UPCFT601 | Garment ManufacturingTechnology-II | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 2 | Core Course | UPCFT602 | Fabric Structure and Design Analysis | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 3 | Programme Elective-II | UPEFT601/ UPEFT602 | Apparel Production Planning, Controlling and Scheduling/Sustainable Apparel Production/ Logistics and SupplyChainManagement in ApparelIndustry. | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 4 | Programme Elective-III | UPEFT603/ UPEFT604 | Fashion Photography and Visual Merchandising/ Fashion Forecasting Techniques/ Fashion Styling and Promotion | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 5 | Open Elective-II |  |  | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 6 | Lab Course | ULCFT601 | GarmentManufacturing Technology-II Lab. | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
| 7 | Lab Course | ULCFT602 | Fabric Structure andDesign Analysis Lab. | 0 | 0 | 3 | 1.5 | 0 | 0 | 100 | 100 |
| 8 | Lab Course | ULCFT603 | Fashion CADD Lab. | 0 | 0 | 4 | 2 | 0 | 0 | 100 | 100 |
|  |  |  | **Total** |  |  |  | **20** |  |  |  | **800** |
| **9** | **Summer Internship programme (4 to 8 weeks) is mandatory as per AICTE rule** |

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

**7thSEMESTER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl.****No.** | **Subject Type** | **Subject Code** | **Subject Name** | **Teaching Hours/Week** | **Credit** | **Maximum Marks** |
| **L** | **T** | **P** | **IA** | **EA** | **PA** | **Total** |
| 1 | Programme Elective-IV | UPEFT701/ UPEFT702 | Home Furnishing and Interior Design/ Brand Design andManagement | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 2 | Programme Elective-V | UPEFT703/ UPEFT704 | Functional and Smart Apparels/ Technical Textiles | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 3 | Programme Elective-VI | UPEFT705/ UPEFT706/ | Apparel Merchandising and Retailing/ Costing and Financial Management in Apparel Industry/ Import andExport Management | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 4 | Open Elective-III |  |  | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 5 | Humanities ScienceCourse | UHSMH701 | EntrepreneurshipDevelopment | 3 | 0 | 0 | 3 | 30 | 70 | 0 | 100 |
| 6 | Project Course | UPRFT701 | Minor Project Course | 0 | 0 | 8 | 4 | 0 | 0 | 100 | 100 |
| 7 | Seminar | USEFT702 | Seminar | 0 | 0 | 2 | 1 | 0 | 0 | 100 | 100 |
|  |  |  | **Total** |  |  |  | **20** |  |  |  | **700** |

**8thSEMESTER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl.****No.** | **Subject Type** | **Subject Code** | **Subject Name** | **Teaching Hours/Week** | **Credit** | **Maximum Marks** |
| **L** | **T** | **P** | **IA** | **EA** | **PA** | **Total** |
| 1 | Project Course | UPRFT801 | Project Course / Internship | 0 | 0 | 24 | 12 | 0 | 0 | 100 | 100 |
| 2 | Core Course | USEFT802 | Comprehensive Viva-Voice | 0 | 0 | 2 | 1 | 0 | 0 | 100 | 100 |
|  |  |  | **Total** |  |  |  | **13** |  |  |  | **200** |

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# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

|  |
| --- |
| **OPEN ELECTIVE OFFERED BY OTHER BRANCHES TO****"FASHION TECHNOLOGY"** |
| **OPEN ELECTIVE - I (5TH SEM)** |
| **Sl. No** | **Branch** | **Subject Code** | **Subject** |
| 1 | CIVIL ENGINEERING | UOECE501 | Fluid Mechanics |
| 2 | ELECTRICAL ENGINEERING | UOEEE501 | Industrial Electrical Systems |
| 3 | MECHANICAL ENGG. | UOEME501 | Thermodynamics and Heat Transfer |
| UOEME502 | Applied Thermal Engineering |
| 4 | INSTRUMENTATION & ELECTRONICS ENGG. | UOEIE501 | Digital Communication |
| 5 | COMPUTER SCIENCE ENGG | UOECS504 | Real-Time Systems |
| UOECS505 | Advance Algorithms |
| UOECS506 | Parallel & Distributed Systems |
| 6 | INFORMATION TECHNOLOGY | UOEIT501 | Data Structure |
| 7 | BIOTECHNOLOGY | UOEBT501 | Physiology for Engineers |
| 8 | TEXTILE ENGG. | UOETE501 | Textile Structural composite |
| **OPEN ELECTIVE - II (6TH SEM)** |
| **Sl. No** | **Branch** | **Subject Code** | **Subject** |
| 1 | CIVIL ENGINEERING | UOECE601 | Mechanics of Solids |
| 2 | ELECTRICAL ENGINEERING | UOEEE601 | Renewable Energy Systems |
| 3 | MECHANICAL ENGG. | UOEME601 | Basic Manufacturing Process |
| 4 | INSTRUMENTATION & ELECTRONICS ENGG. | UOEIE601 | MICRO ELECTRO MECHANICAL SYSTEM (MEMS) |
| 5 | COMPUTER SCIENCE ENGG | UOECS609 | Cambinatorics & Graph Theory |
| UOECS610 | Human Computer Interaction. |
| 6 | INFORMATION TECHNOLOGY | UOEIT601 | Object Oriented Programming using C++ |
| 7 | BIOTECHNOLOGY | UOEBT601 | Introduction to Biopharmaceutical Technology |
| 8 | TEXTILE ENGG. | UOETE601 | Clothing Science and Technology |
| **OPEN ELECTIVE - III (7TH SEM)** |
| **Sl. No** | **Branch** | **Subject Code** | **Subject** |

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | CIVIL ENGINEERING | UOECE701 | Composite Materials |
| 2 | ELECTRICAL ENGINEERING | UOEEE701 | Control System Design |
| 3 | MECHANICAL ENGG. | UOEME701 | Mechanics of Solids |
| 4 | INSTRUMENTATION & ELECTRONICS ENGG. | UOEIE701 | Satellite Communication |
| 5 | COMPUTER SCIENCE ENGG | UOECS709 | Big Data Analytics |
| UOECS710 | Information Retrieval |
| UOECS711 | Machine Learning |
| 6 | INFORMATION TECHNOLOGY | UOEIT701 | Java Programming |
| 7 | BIOTECHNOLOGY | UOEBT701 | Computational Biology |
| 8 | TEXTILE ENGG. | UOETE701 | Specialty Yarn and Fabric |

**Suggested Open Electives for Other Branches:**

1. Fundamental Techniques of Apparel Design(UOEFT501)
2. Visual Art and Illustration Techniques(UOEFT601)
3. Fashion Photography(UOEFT701)

**Chemistry(3-1-0) Code –UBSCH101**

#### Course Outcomes

At the end of this course, students will be able to:

1. Understand the basics of molecularinteractions.
2. Idea about organometallic and their catalyticapplications.
3. Understand basics of fuels and corrosionchemistry.

#### Module 1: (10 Hours)

QuantumChemistryandSpectroscopy:Basicconceptsandpostulatesofquantummechanics.Introduction to Schrodinger Wave Equation, Particle in a box: Energy levels, quantum numbers and selectionrule.

Spectroscopy: Lambert Beer’s Law, Principles and applications of UV-Visible Molecular Absorption Spectroscopy; Chromophores, applications to colorimetry. Effect of conjugation on chromophores, Absorption by aromatic systems, introductory idea on Rotational and Vibrational Spectroscopy Principles and application to diatomic molecules.

The phase rule: Statement of Gibb’s phase rule and explanation of the terms involved, Phase diagram of onecomponentsystem-waterandsulfursystem,Condensedphaserule,Phasediagramoftwocomponent system - Eutectic Bi-Cdsystem

#### Module 2: (10 Hours)

Organometallics: Introduction to organometallics, EAN rule; classification, nomenclature and characteristics of organometallic compounds. Applications of organometallic compounds and catalyst in alkene isomerization hydrogenation and hydroformylation (detail mechanisms are to be excluded).

#### Module 3: (10 Hours)

Fuels: Classification of fuels, calorific value. (Determination by Dulong’s formula), G. C. V. and N. C. V. Liquid fuels: Classification of petroleum, refining of petroleum, Cracking, Knocking and anti-knocking, cetane and octane numbers. Unleaded petrol, synthetic petrol, power alcohol. Gaseous Fuel: Producer gas, Water gas, LPG, CNG, Kerosene gas, Combustion calculation.

#### Module 4: (10 Hours)

Corrosion: Electrochemical theory of corrosion, galvanic series, Types of corrosion; Differential metal corrosion, Differential aeration corrosion (Pitting and water line corrosion), Stress corrosion (caustic embrittlementinboilers),Factorsaffecting,Metalcoatings-GalvanizingandTiming,Corrosioninhibitors, cathodicprotection.

#### Text Books:

1. Text Book in Applied Chemistry by A. N. Acharya and B. Samantaray, PearsonIndia.
2. Introductory to Quantum Chemistry by A. K. Chandra, 4th Edition, McGraw HillEducation.
3. Fundamentals of Molecular & Spectroscopy by Banwell, Tata McGraw HillEducation.
4. Physical Chemistry by Gordon M. Barrow,McGraw-Hill
5. Engineering Chemistry, 12th Edition, Author: Wiley India Editorial Team PublishersWiley.
6. Engineering Chemistry: Fundamentals and Applications. Shikha Agarwal. Cambridge University Press.
7. Engineering Chemistry, Jain and Jain, Dhanpat RaiPublication.

#### Reference Books:

1. Inorganic Chemistry by Donald A. Tarr, Gary Miessler, Pearson India, ThirdEdition.
2. Quantum Chemistry by Ira N. Levine, Pearson 7thEdition.
3. Molecular Spectroscopy, Ira N. Levine, John Wiley andSons
4. Modern Spectroscopy - A Molecular Approach, by Donald McQuarrie and John Simon,published by University ScienceBooks.
5. Inorganic Chemistry by W. Overton, Rounk and Armstrong, Oxford University Press, 6thedition.

**Mathematics-I(3-1-0) Code-UBSMH102**

#### Course Outcomes

On successful completion of this course, the students will be able to:

1. Applytheprinciplesofdifferentialcalculustosolveavarietyofpracticalproblemsinengineering and appliedsciences.
2. Possess fundamental understanding of Fourier series and be able to give Fourier expansions of a function,
3. Apply the principles of vector calculus to solve a variety of basic problems in engineering and appliedscience,
4. Solve a variety of first order and higher order differential equations selecting from a variety of techniques covered in thesyllabus.

#### Module 1: (10 Hours)

Calculus:Asymptote,Curvature,Convergenceofsequenceandseries,testsforconvergence,powerseries, Taylor’s series, Fourierseries.

Partialdifferentiation,Taylor’stheoremforfunctionoftwovariables,MaximaandMinimaforfunctionof twovariables.

#### Module 2: (10 Hours)

Vector differential calculus: vector and scalar functions and fields, Derivatives, Curves, tangents and arc length, gradient, divergence, curl.

Vector integral calculus: Line Integrals, Green Theorem, Surface integrals, Gauss theorem and Stokes Theorem.

#### Module 3: (10 Hours)

Differential Equation: Differential Equation: First order differential equations, Separable Equation, Exact differentialequation,lineardifferentialequation,Bernoulli’sequationandapplicationtoElectricalcircuits.

Lineardifferentialequationofsecondandhigherorder,Homogeneousequationwithconstantco-efficient, Euler-Cauchy equations, Solution by undetermined co-efficient, Solutions by variation of parameters, Modelling of electriccircuits.

#### Module 4: (10 Hours)

Series solution of differential equations, Power series method, Legendre equation and Legendre polynomials.

Laplace transformation and its use in getting solution to differential equations, Convolution, Integral Equations.

#### Text Books:

1. Differential Calculus by Santi Narayan and Mittal, Chapters 14, 15Publication.
2. Advanced Engineering Mathematics by E. Kreyszig, Tenth Edition,Wiley.
3. Higher Engineering Mathematics by B. V. Raman, McGraw HillsEducation.

#### Reference Books:

1. Engineering Mathematics by Pal and S. Bhunia, OxfordPublication.
2. Ordinary and Partial Differential equations by J. Sinha Roy and S. Padhy, KalyaniPublishers.
3. Advance Engineering Mathematics by P. V. O’Neil,Cengage.

**Programming for ProblemSolving (3-0-0) Code –UESCS103**

#### Module 1: (10 Hours)

Introduction to Programming, Introduction to components of a computer sys- tem (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)

IdeaofAlgorithm:stepstosolvelogicalandnumericalproblems.RepresentationofAlgorithm:Flowchart/ Pseudo code with examples, From algorithms to programs; source code, variables (with data types) variables and memory lo- cations, Syntax and Logical Errors in compilation, object and executable code, Arithmetic expressions andprecedence

#### Module 2: (07 Hours)

Conditional Branching and Loops, Arrays (1-D, 2-D), Character arrays and Strings, Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference, Recursion, as a different way of solving problems.

#### Module 3: (07 Hours)

Structure & Unions, defining structures and Array of Structures, Pointers, Idea of pointers, Defining pointers, Pointers to functions, Double pointers.

#### Module 4: (06 Hours)

Dynamicmemoryallocation,useofmalloc(),calloc(),realloc(),free().Storageclasses:local,global,static & register variables. File handling: reading & writing to afile.

#### Text Books:

1. Byron Gottfried, Schaum’s Outline of Programming with C, McGrawHill.
2. E. Balaguruswamy, Programming in ASI C, Tata McGrawHill.

#### Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

**ChemistryLab(0-0-3) Code –ULCCH101**

##### List of Experiments

***(At least 10 experiments should be done)***

**Experiment List:**

1. Determination of amount of sodium hydroxide and sodium carbonate in amixture.
2. Determination of total hardness of water by EDTAmethod.
3. Estimation of calcium in calcium inlimestone.
4. Determination of percentage of available chlorine in a sample of bleachingpowder.
5. Preparation ofPhenolphthalein.
6. Acid-Base Titration byPotentiometry.
7. Preparation of buffer solution and determination of pH of a buffersolution.
8. Standardization of KMnO4 using sodium oxalate. Determination of ferrous iron in Mohr’s salt by potassiumpermanganate.
9. Determination of partition coefficients of iodine between benzene andwater.
10. Determination of rate constant of acid catalyzed hydrolysisreaction.
11. Determination of concentration of a colored substance byspectrophotometer.
12. Determination of dissolved oxygen in a sample ofwater.
13. Determination of Viscosity of a lubricating oil by Red Woodviscometer.
14. Determination of Flash point of a given oil by Pensky-Marten’s flash pointapproach.
15. Determination of Critical Micelle concentration (CMC) of an ionic surfactant (Both cationic and anionic).

## Programming for Problem Solving Lab (0-0-4) Code – ULCCS102

##### List of Experiments

***(At least 10 experiments should be done)***

**Experiment List:**

1. Familiarization with programmingenvironment.
2. Simple computational problems using arithmeticexpressions.
3. Problems involving if-then-elsestructures.
4. Iterative problems e.g., sum ofseries.
5. 1-D Arraymanipulation.
6. Matrix problems, Stringoperations.
7. Simplefunctions.
8. Programming for solving Numerical methods problems(1).
9. Programming for solving Numerical methods problems(2).
10. Recursivefunctions.
11. Pointers andstructures.
12. Fileoperations.

**Engineering Graphics and Design (1-0-4) Code – ULCME103**

#### Module 1: (05 Hours)

Introduction: Introduction to Engineering Drawing, Drawing Instruments and their uses, Dimensioning, Scale, types of lines, Lettering. (1 sheet)

Orthographic Projection: Introduction to Projection, Projection types or methods (First angle and Third angle)

PlaneofProjection,Referenceline,orthographicProjectionofPoints(pointslocatedinallfourquadrants), Projection of Straight lines (first and third quad- rant only), traces of lines. (1sheet)

Orthographic Projection of Plane Surfaces in various positions (Triangle, Square, Rectangle, Rhombus, Pentagon, hexagon and Circle), Traces of a Plane. (1 sheet)

Introduction to Solids and Types of Solids, Orthographic Projection of Solids in different Positions. (1 sheet)

#### Module 2: (05 Hours)

Sections and Development of Lateral Surface of Solids: Sectional view (half section and full section), development of surfaces of right regular prisms, pyramids, cylinders and cones. (1 sheet)

Isometric Projection: Introduction, Isometric Scale, Isomeric projection of cube, right regular prism, cylinders and cones. (1 sheet)

Applications: Orthographic and sectional view of Machine components (Screw Thread, nut and bolt). (1 Sheet)

Auto CAD: Introduction to Auto CAD. Fundamental concepts.

#### Text Books:

1. Machine Drawing by N. D. Bhatt, V. M. Panchal, Charotar PublishingHouse.
2. Machine Drawing by N. D. Junarkar, PearsonEducation.
3. Machine Drawing with AutoCAD by Goutam Pohit and Goutam Ghosh, PearsonEducation.
4. Machine Drawing includes AutoCAD by Ajeet Singh, Tata McGrawHill.

**Basic Electronics Engineering Code- UESIE102**

**Module 1: (12 Hours)**

**Semiconductor Diodes:**

Semiconductor materials- intrinsic and extrinsic types, Ideal Diode, Terminal characteristics of diodes ( p-n junction under open circuit condition, p-n junction under forward bias and reverse bias condition)p-n junction in breakdown region, Diode small signal model, Zener diode and applications , Rectifier Circuits ( Half wave, Full wave centre tap and bridge rectifiers )

**Bipolar Junction Transistors (BJTs):**

Physical structure and operation modes**,** Active region operation of transistor**,**  D.C. analysis of transistor circuits**,**  Transistor as an amplifier**,**

**Module 2: (12 Hours)**

**BJT Biasing and Modeling:**

Biasing the BJT: fixed bias, emitter feedback bias and voltage divider bias**,** Basic BJT amplifier configuration: common emitter, common base andcommon collector amplifiers

**Field Effect Transistor:**

JFET-types, Operations and their Characteristics ,MOSFETs- types, Operations and their Characteristics

**Feedback Amplifiers and Oscillators:**

Types of feedback, Advantages of Negative feedback, Barkhausen criterion, RC oscillators (phase shift, Wien bridge), LC oscillators (Hartley)

**Extra (To be taught in Department level)**

Transistor as a switch: cut-off and saturation modes, High frequency model of BJT amplifier.

**Operation Amplifier (Op-amps):**

Ideal Op-amp, Differential amplifier: differential and common mode operation, common mode rejection ratio (CMRR), Practical op-amp circuits: inverting amplifier, non -inverting amplifier, weightedsummer, integrator, differentiator

**Reference Books:**

1. A. S. Sedra and K. C. Smith, *Microelectronic Circuits: Theory and Applications*, 7th edition. Oxford, 2017.

2. B. Razavi, *Fundamentals of Microelectronics*, 2nd edition. Wiley-India, 2014.

3. R. L. Boylestad and L. Nashelsky, *Electronic Devices and Circuit Theory*, 11th edition. Pearson, 2013.

4. T. C. Carusone, D. Johns, and K. Martin, *Analog Integrated Circuit Design*, 2nd edition. Wiley-India, 2013.

5.  P. R. Gray, P. J. Hurst, S. H. Lewis, and R. G. Meyer, *Analysis and Design of Analog Integrated Circuits*, 5th edition. Wiley-India, 2009.

6. D. A. Neamen, *Electronic Circuits: Analysis and Design*, 3rd edition. Tata McGraw-Hill, 2008.

**Basic Electronics Laboratory Experiment List**

***List of Experiments***

***(At least 5 Experiments Should be done)***

|  |  |  |
| --- | --- | --- |
| **Sl No.** | **Name of the Experiment** | **Week** |
| 1 | Familiarization with electronic components&equipments (Active & Passive, Multi-meters, CROs and function generators) | 1 |
| 2 | Study of the characteristics of P-N junction diode and finding dynamic resistance. | 2 |
| 3 | Construction of half-wave rectifier and full wave rectifier circuits & study of their output waveforms by CRO and calculation of efficiency and ripple factor. | 3 |
| 4 | Study of the output characteristics of a Common Emitter Transistor | 4 |
| 5 | Design, setup and plot the frequency response of Common Source JFET/MOSFET amplifier and obtain the bandwidth. | 5 |
| 6 | Study of the characteristics of Zener diode. | 6 |
| 7 | Construction of clipper circuits & study of their output waveforms of positive clipper, negative clipper and two level clipper by CRO. | 7 |
| 8 | Construction of clamper circuits & study of their output waveforms of positive clamping, negative clamping by CRO. | 8 |

**Physics(3-1-0) Code-UBSPH201**

#### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Enhance the fundamental knowledge in Physics and its application relevant to various streams of Engineering andTechnology.
2. Understand interaction of light with matter through interference, diffraction and be able to distinguish ordinary light with a laser light and to realize propagation of lightpolarization.
3. Understand various crystal systems and their structures elaborately through opticalfibers.
4. Understand basic knowledge of quantummechanics.

#### Module 1: (16 Hours)

Classical Dynamics: Newton’s laws of motion, generalized coordinates, constraints, Principle of virtual work,D’Alembert’sPrinciple,Lagrangian,Actionprinciple,Lagrangeequationofmotion(noderivation) and its application to Simple Harmonic oscillator and simplependulum.

General properties of Matter: Stress, Strain, Hooks’ law, Young’s modulus.

Oscillation & Waves: Simple Harmonic Oscillation, damped harmonic oscillation, forced oscillator, resonance, coupled oscillation, concept of wave and wave equation.

Optics: Concept of interference, two source interference pattern, Biprism, Michelson Interferometer & measurementofwavelength.Diffraction:Huygensprinciple,Fresnel&Fraunhoferdiffraction,Zoneplate, Plane diffraction grating (formulaonly).

#### Module 2: (12 Hours)

Solid State Physics: Crystalline and amorphous solid, unit cell, Miller Indices, Reciprocal lattice, Bragg’s law, Brillouin’s zone, concept of fermions, Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein distribution function (only statement and formula), Concept of Fermions and Bosons. Classification of materials: metals, semiconductor and insulator in terms of band theory.

LASER and Fibre Optics: Principle and application, stimulated emission, population inversion, Lasing material (solid and gas), He-Ne laser, Rubi- LASER, Application of LASER (Engineering Application), Principle of optical fibre and its application to communication.

#### Module 3: (12 Hours)

Electromagnetism: Student will be familiarized with some basics used in vector calculus prior to development of Maxwell’s electromagnetic wave equations. No proof of theorems and laws included in this unit expected- statement and interpretation should sufficient.

1. Vector calculus: gradient of scalar field, divergence, curl of vector field (Only Physical significance) Gauss divergence theorem, Stoke’s theorem, Green’s theorem (Only Statements) and applications.
2. Gauss’s law of electrostatics in free space and in a medium and application (Only statements) electric displacement (D) magnetic Induction (B), Amperes circuital law (Only statements), displacement current,Faraday’slawofelectromagneticinduction(Onlystatements),BiotSavartsLaw(Onlystatements), Maxwell’s four electromagnetic equations, Wave equation for E and B fields in vacuum, Electromagnetic energy, Poynting vector (noderivation).

Quantum Physics: Elementary concepts of quantum physics formulation to deal with physical systems.

1. Need for Quantum Physics-Historical overviews, Particle aspects of radiation- Black body radiation, photoelectric effect, Compton scattering, pair production. (No derivations), Wave aspect of particles-matterwave,deBroglieHypothesis,HeisenbergUncertaintyprinciples-Statement,Interpretation and application to H-atom, Harmonic oscillator to calculate ground stateenergy.
2. Basic features of Quantum mechanics- Transition from deterministic to probabilistic, States of system-Wavefunction,probabilitydensity,superpositionprinciple,observablesandoperators,expectation values. Schrodinger equation- Time dependent and time independent, wavepackets.

#### Text Books:

1. L. Maharana, P. K. Panda, S. N. Dash, B. Ojha, Lectures in Engineering Physics,Pearson.

#### Reference Books:

1. An Introduction to Mechanics -D. Klippner & R. Kolenkow,TMH
2. Concepts of Modern Physics - ArthurBeiser.
3. Electricity & Magnetism -E. M.Purecell
4. Engineering Physics by D. K. Bhattacharya and Poonam Tandon, Oxford UniversityPress
5. Engineering Physics by D. R. Joshi, Mc GrawHill
6. Introduction to Electrodynamics- David J. Griffiths, PHIPublication
7. Optics- A. K.Ghatak
8. Physics-I for engineering degree students- B. B. Swain and P. K.Jena.
9. Quantum Mechanics -Powel &Craseman.
10. Quantum Physics -Gasiorowicz

**Mathematics-II(3-1-0) Code -UBSMH202**

***Course Outcome:***

On successful completion of this course, the students will be able to:

1. Use the basic concepts of vector and matrix algebra, including linear dependence / independence, basisanddimensionofasubspace,rankandnullityforanalysisofmatricesandsystemsoflinearequations,
2. Apply linear algebra techniques to solve various engineeringproblems,
3. Select appropriate numerical methods to apply to various types of problems in engineering and science in consideration of the mathematical operations involved, accuracy requirements, and available computational re-sources,
4. Compare different numerical methods with respect to accuracy and efficiency of thesolution.

#### Module 1: (10 Hours)

Matrices, vectors: addition and scalar multiplication, matrix multiplication: Linear systems of equations, linear independence, rank of a matrix, determinants, Cramer’s rule, inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.

Vector space, linear dependence of vectors, basis, dimension.

#### Module 2: (10 Hours)

Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank-nullity theorem, composition of linear maps, matrix associated with a linear map.

Eigenvalues, eigenvectors, symmetric, skew-symmetric and orthogonal matrices, Eigen basis, Diagonalization, Inner product spaces, Gram-Schmidt orthogonalization.

#### Module 3: (10 Hours)

Solution of polynomial and transcendental equations - Bisection method, Newton- Raphson methods and Regula-Falsi method.

Finite differences, Interpolation using Newton’s forward and backward difference formulae, Newton’s divided difference and Lagrange’s formulae, Numerical approximation of functions.

#### Module 4: (10 Hours)

Numerical differentiation, Numerical integration: Trapezoidal rule and Simpson’s 1/3rd and 3/8 rules, Gauss Legendre and Gauss quadrature rule.

Gauss Siedel iteration method for solving a system of linear equations Euler and modified Euler’s methods, Runge-Kutta methods.

#### Text Books:

1. Advanced Engineering Mathematics by E. Kreyszig, John Willey & Sons Inc. 10thEdition
2. Linear algebra and its applications by Gilbert Strang, Cengagelearning.

#### Reference Books:

1. Higher Engineering Mathematics by B. V. Ramana, McGraw Hill Edu-cation.
2. Engineering Mathematics by Pal and S. Bhunia, OxfordPublication.
3. Advance Engineering Mathematics by P. V.O’Neil.
4. Introductory methods of numerical analysis by S. S. Sastry,PHI.

## Basic ElectricalEngineering(3-1-0) Code –UESEE203

This is a foundation course aimed to expose the students the basic and under- lying principles ofElectrical circuits, Electro-mechanical energy conversion andMeasurements.

#### Course Outcomes

At the end of this course, students will be able to:

1. Understand and analyse basic electric and magneticcircuits.
2. Analysis of Transient condition in DCcircuit.
3. Understand the basic of various types of electrical machines andmeasurements.
4. Explain the under-laying principle of generation, transmission and distribution of the electrical power.

#### Module 1: (10 Hours)

Fundamentals of Electric Circuits: Fundamentals of electrical circuit, Ohm’s law, Kirchhoff’s laws, series and parallel connections, Electric Power and sign conventions, circuit elements and their characteristics. Practical voltage and current sources. Source Conversion.

ResistiveNetworkAnalysis:nodevoltageandmeshcurrentmethods,supernodeandsupermeshmethods, delta-starandstar-deltaconversions,superpositionprinciple,Thevenin’sandNorton’stheorems.maximum powertransfer.

#### Module 2: (10 Hours)

Single phase AC circuits: Single phase emf generation, Representation of sinusoidal waveforms, average, effective, peak and rms values, j operators, phasor concept, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel) Instantaneous Power in AC Circuits, Real power, reactive power, apparent power, Power Factor, Power triangle, Complex Power.

Three-phase AC circuits: Three phase emf generation, Delta-star and star- delta conversions, voltage and currentrelationsinstaranddeltaconnections.solutionofthethreephasecircuitswithbalancedvoltageand balanced load conditions, phasor diagram, measurement of power in three phasecircuits.

Transient Analysis: Writing differential equations for circuits, DC steady state solutions of first order circuits.

#### Module 3: (10 Hours)

ElectricalMeasuringinstruments:Introduction,PMMCAmmetersandVoltmeterswithextensionofrange, Moving-Iron Ammeters and Voltmeters, Dynamometer type Wattmeter, Energymeter.

Magneticcircuits:MMF,flux,reluctance,inductance.ReviewofAmpereLaw,BiotSavartLaw.Magnetic field, Electricity and Magnetism, B-H characteristics and hysteresis loss, series and parallel magnetic circuits.

Transformers:Construction,operatingprinciple,emfequationandturnsratio.Typesoftransformer,phasor diagrams for no loadoperation.

#### Module 4: (10 Hours)

DCMachines:PrincipleofOperationofgeneratorandmotor,EMFequation,TorqueEquation,methodsof excitation. Speed equation of d.c. motor, speed control of d.c. shuntmotor.

Induction motor: construction of AC inductor machines, Revolving magnetic flux, torque and slip, synchronous speed.

Power Systems: Brief idea about various generating plants (Thermal, Hydel, and Nuclear), Transmission and Distribution of Electric Energy.

#### Text Books:

1. Electrical & Electronic Technology, E. Huges, Pearson, 9thEdition.
2. Electrical Engineering Fundamentals, Vincent Del Toro, 2nd Edition,PHI.

#### Reference Books:

1. C. L. Wadhwa,” Electrical Engineering”, New Age International Publishers, 2ndEdition.
2. Basic Electrical Engineering, A. Fitzgerald, D. E. Higginbotham and A. Grabel, TMH, 5thEd.

**English(2-0-0) Code -UHSMH205**

**Course Outcome**

At the end of this course, students will be able to:

1. Equipped with the theory and practice ofcommunication.
2. Equipped with both theoretical vocabulary and basic tools which will help them develop as better communicators.

Select literary texts and establish how these texts contribute to the afore- mentionedobjectives

#### Module 1: (08 Hours)

Introduction to Communication:

Importance of Communication in English, the process of communication and factors that influence the process of communication: Sender, receiver, channel, code, topic, message, context, feedback, ’noise’. Principles of Communication. Barriers to Communication & Communication Apprehension, Verbal (Spoken and Written) and non-verbal communication, Body language and its importance in communication.

#### Module 2: (07 Hours)

Phonetics and Functional Grammar:

Sounds of English: Vowels (Monophthongs and Diphthongs), Consonants, Syllable division, stress (word, contrastive stress) & intonation, MTI and problem sounds, Review of Parts of Speech, Subject and Predicate, Tense, Voice Change, Idioms and Phrasal Verbs.

(Note:Thisunitshouldbetaughtinasimple,non-technical,applicationorientedmanner,avoidingtechnical terms as fast aspossible.)

**Module 3: (05 Hours)** Reading Literature:

Prose:

* Stephen Leacock: My Financialcareer.
* Mahatma Gandhi: from My Experiments withTruth.
* O’Henry: The Last Leaf.

Poetry:

* Nissim Ezekiel:Professor.
* Jack Prelutsky: Be glad your nose is on yourface.
* Maya Angelou: Still I rise(Abridged).

**PhysicsLab(0-0-3) Code -ULCPH101**

##### *List of Experiments*

***(At least 10 experiments should be done)***

**Experiment List:**

1. Determination of Young’s modulus by Searle’s method / Bending ofbeams.
2. Determination of Rigidity modulus by staticmethod.
3. Determination of surface tension by capillary risemethod.
4. Determination of acceleration due to gravity by Bar / Kater’spendulum.
5. Verification of laws of vibration of string usingsonometer.
6. Determination of wavelength of light by Newton’s ringapparatus.
7. Determination of grating element of a diffractiongrating.
8. Determination of wavelength of laser source by diffraction ratingmethod.
9. Determination of wavelength using MichelsonInterferometer.
10. Plotting of characteristic curve of a PN junctiondiode.
11. Plotting of characteristic curves ofBJT.
12. Determination of unknown resistance using MeterBridge.
13. Determine of reduction factor of the given tangentgalvanometer.
14. Determination of horizontal component of earth’s magnetic field by using tangentgalvanometer.
15. Determination of Hall coefficient using Hallapparatus.

## Basic Electrical EngineeringLab(0-0-2) Code-ULCEE102

##### *List of Experiments*

***(At least 10 experiments should be done)***

**Course Outcomes**

 At the end of the course the students are able to:

1. Learn about the working of different measuring instruments for measuring power, power factor, energyetc.
2. Verify different NetworkTheorems
3. Draw the Open Circuit Characteristics of dc generator andTransformer
4. Visualize the constructional details of differentmachines

**Experiment List:**

1. Basic safety precautions. Introduction and use of measuring instruments - voltmeter, ammeter, wattmeter, Rheostat, multi-meter,oscilloscope.
2. Connection and measurement of power consumption of an Incandescent, fluorescent, LED and CFL lamp and determination of power factor.
3. Power and power factor measurements in three phase system by two wattmetermethod.
4. Verification of super position, Thevenin and Norton’stheorem.
5. Plotting of B-H curve of different magnetic material and calculation of hysteresisloss.
6. Testing of a single-phase energy meter at different powerfactor.
7. Calculation of power and power factor in series R-L-C circuit excited by single-phase AC supply and draw the phasor diagram.
8. Determination of open circuit characteristics (OCC) of DC shuntgenerator.
9. Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change involtage.
10. Observationoftheno-loadcurrentwaveformofatransformeronanoscilloscopeandmeasurement of primary and secondary voltages and currents, and power at differentload.
11. Demonstration of cut-out sections of machines: dc machine (commutator- brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winding - slip ringarrangement).

## Workshop/Basic ManufacturingPractices(1-0-4) Code –UESME205

#### Module 1: (05 Hours)

Engineering materials: Classification of Engineering materials. Mechanical properties of Steel,Aluminum andPlastics.

Safety precautions in workshop.

Fitting: Knowledge of hand tools: V-block, Marking Gauge, Files, Hack Saw, Drills, Taps, Types of fitting.

#### Module 2: (05 Hours)

Welding: Study of electric arc welding tools & equipments, Models: Butt Joint, Lap Joint, T joint & L- joint.

Machining: Introduction to different machine tools: Lathe machine, Shaper machine and milling machine.

Brief introduction to other basic manufacturing processes like foundry, sheet metal operation and forming processes.

#### Text Books:

1. Elements of Workshop Technology, Vol. I and II by Hajrachoudhary, KhannaPublishers.
2. Workshop Technology by W. A. J. Chapman, VivaBooks.
3. Workshop Manual by Kannaiah/ Narayana,Scitech.

**EnglishLab(0-0-2) Code -ULCMH204**

##### *List of Experiments*

***(All the experiments should be done)***

**Course Outcome:**

At the end of the course the students are able to:

1. Acquaintedwiththeirstrengthandweaknessinexpressingthemselves,theirinterestsandacademic habits.
2. ImproveskillsofLSRW(Listening,Speaking,ReadingandWriting)throughmutualconversation and activities related to theseskills.
3. Promote the creative and imaginative practices before theteacher-trainer.

Lab sessions will give a platform for the students to indulge in activities based on the first two modules of theorytaughtintheclassroom.Allthelabclasseswillbedividedinsuchamannerthatallthefouraspects of language (LSRW) arecovered.

#### Experiment List:

1. Speaking: Ice-breaking and Introducing each other, Writing: Happiest and saddest moment of my life.
2. Listening: Listening practice (ear training): News clips, Movie clips, Presentation, Lecture or speech by a speaker, Speaking:Debate.
3. Reading: Reading comprehension, Writing: Creative writing (Short story: Hints to be given by teacher).
4. Reading:TopicsofGeneralawareness,CommonerrorsinEnglishusage,Writing:Constructionof different types ofsentences.
5. Speaking: Practice of vowel and consonant sounds, Writing: Practice of syllabledivision.
6. Speaking: My experience in the college/ or any other topic as per the convenience of the student, Writing: Phonemic transcription practice.
7. Listening: Practice of phonetics through ISIL system and also with the help of a dictionary, Speaking: Role-play ingroups.
8. Speaking: Practice sessions on Stress and Intonation, Writing: Practice sessions on Grammar (Tense and voicechange).
9. Speaking: Extempore, Writing: Framing sentences using phrasal verbs andidioms.
10. Watching a short English Movie, Writing: Critical analysis of themovie.

End-termAssignment:Studentsarerequiredtomakeaprojectofatleast5pagesonatopiconthefollowing broad streams: Technology, General awareness, Gender, Environment, Cinema, Books and the like. The assignment should involve data collection, analysis andreporting.

**Detailed Syllabus (3rd Semester)**

SUBJECT NAME: **FIBRESCIENCE(3)** CODE:**UPCFT301**

# Course Outcomes:

## After successful completion of this course, the students will be able to develop knowledge and skills of :

### Study of different polymers used fortextiles.

* + To know about different natural fibers with physical and chemicalproperties.
	+ To know the manufacturing techniques of different man-madefibers.
	+ To know about the high-tech fibers used in textile/ apparelindustry.

#### Module: I

**Fundamental Concepts (10Hrs)**

Introduction to polymers, Classification of polymers, Different polymerization techniques, with special

reference to textile& clothing material, molecular weight and degree of polymerization, polydispersity and molecular weight, size of polymer, properties of fiber forming polymers, Concept of thermoplastic and thermoset material. Concept of rubbery state and rubber elasticity. Transition from glassy to rubbery state. Melting of polymers.

Concept of fiber and Classification of fibres. Essential and Desirable properties of a textile grade fibre . Identification of Textile fibers by Physical and Chemical methods.

**Module-II**

**Natural Fiber (10Hrs)**

Sources of Natural fiber, like vegetable, protein and minerals, Brief idea on extraction of natural fibers from their sources like cotton, jute, flax, hemp, wool, silk etc. Physical and chemical structure of different natural fibers like cotton, jute, flax, hemp, wool, silk etc. Physical and chemical properties of natural fibers, cotton, jute, flax, hemp, wool, silk etc. Application of the fibers like cotton wool, silk, jute etc. Brief idea on other natural fibers like banana, ramie, pineapple, bamboo etc.

**Module-III**

**Man-Made Fiber (10Hrs)**

Basic production systems of man-made fiber, brief idea on Melt, Wet and Dry Spinning. Out line of the manufacturing of regenerated fibers like viscose rayon , Cupramonium rayon, acetate rayon soya milk fibers. Introduction to synthetic fibres, Out line of the manufacturing process of filament and Staple fiber with special reference to polyester, polyamide, polypropylene and acrylicfiber.

Brief idea on Post spinning processes like, Drawing, heat setting and texturising of synthetic fibers. Properties and applications of Glass, carbon, aramid, tencel, modal, polyurethane, micro and nano fibers. **Learning Resources:**

1. Manufactured Fiber Technology, by Kothari andGupta.
2. Textile Fibre- V.A.Shenai
3. Fibre Science and Technology byS.P.Mishra.
4. Textbook of Polymer Science by F.W.Billmeyer.
5. Production of Mand-made Fibres –A.Vaidya

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **CONCEPT OFFASHION(3)** CODE: **UPCFT302**

##### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

Express knowledge & use of appropriate fashion terminology. Express knowledge of global fashion capitals.

Understanding of difference between High fashion, Mass fashion & custom-made clothing. Express their knowledge on industrial revolution & its impact on fashion.

**Module-I Introduction: (10Hrs)**

Origin of clothing, Theories of clothing, Origin of fashion, Costumes of ancient civilization, Roman, French Egyptian; Concept of fashion, Fashion language, Nature of fashion. Elements of fashion, Classification of Fashion, Principles of Fashion, Fashion Terminology: Accessories, Apparel, Antique, Boutique, Designer, Knock off, style, design, taste, classic, fad, Fashion Trends. Component of fashion: Silhouette, Texture, Details.

**Module-II**

**Movement of Fashion: (10Hrs)**

Fashion Cycle, Stages of Fashion Cycle, Factors influencing Fashion, Environmental factor Demographic & Psychographics, Economic factor, Sociological factor, Psychological factor, Fashion: Theories of Fashion adoption, Fashion Acceptance, Fashion Leader, Fashion Role Model, Fashion follower, Fashion Victims, Fashion Forecasting, Sources of Inspiration: Newspaper, Magazines, Museums, Historical & Ethnic, Fashion Adoption Movement of fashion, Factors influencing fashion movement (accelerating and retarding factors), Fashion Prediction. Fashion Advertisement.

**Module-III**

**Fashion Design (10Hrs)**

Introduction, Definition, Role of Fashion Designer, Fashion Capital: New York, Paris, Milan, London, Tokyo, Appreciation of Western Fashion, Study of Leading Fashion Designer- Indian, Italian, American, French and UK.

Design details and their types –Neck lines, collars, sleeves, waist lines, cuffs, skirts, trousers, yokes, waist lines, pockets, pleats, tucks, frills etc; Innovative Fashion Details.

**Learning Resources:**

* 1. History of Fashion by ManmeetsSodhia
	2. DressDesigning by ManmeetsSodhia
	3. Design Studies by ManmeetsSodhia
	4. Inside Fashion Design -KittyG.Dikerson
	5. Inside Fashion Business -Kitty G.Dikerson
	6. Elements of color & design –SumathiG.J.

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **CONCEPTS OFFASHION(PRACTICAL)** CODE: **ULCFT301**

1. To explore designing & develop different designing forfashion.
2. Differentthemespickedfromvarioussources:magazines,books,films,nature, Surroundings, handicrafts, paintings,etc.
3. Presenting using different presentation: Illusion Effects: Vertical Lines, Horizontal Lines, DiagonalLines, Thick & Thin Lines, Spirallines.
4. Showing Fullness in Garment: Rendering Lace, different illusion of Drapes, Folds, Gathers, andPleats.
5. Illustration of Textures: Soft Fabrics, denim, Jersey, Rib Knit, Chiffon, Satin, TransparentFabric
6. Different Medium & Presentation Skills should be used like MoodBoard
7. Presentation Skills: Collage, Collage on Dress and Collage on Background, Theme Board: StoryBoard, SwatchBoard.
8. Range planning: Planning a Collection, Choosing a Theme- Inspiration, Design Research, FashionDesigning Presentation Board, Preparing Design DevelopmentSheets.
9. Illustrate different types of necklines, collars &sleeves.
10. Illustrate different designs of frills, gathers. pockets, tucks &pleats.

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

Subject Name: **YARNMANUFACTURING(4)** Code:**UPCFT303**

##### Course Outcomes:

**Aftersuccessfulcompletionofthiscourse,thestudentswillbeabletodevelopknowledgeandskillsof:**

* + Concepts, process parameters involved in short staplespinning**.**
	+ Production process of long staple fibers like jute, silketc.
	+ Steps involved in new spinningsystems.
	+ Concepts of post spinningoperations.
	+ Different types of yarn and theircharacteristics.

**Module-I**

**Concepts of Short Staple Spinning: (12Hrs)**

Definition and classification of yarn, Yarn numbering system, Process flow chart of short staple spinning system. Brief over view on Ginning, Opening & cleaning, blending, blow room, carding, drawing, combing, roving, ring spinning. Study of principles, objectives, functions and process parameters of different machineries involved in ginning, blow room, carding, drawing, roving and ring frame.

##### Module-II

**Modern Spinning Methods : (12Hrs)**

Principle ,working and process parameters of, Rotor spinning, Air jet spinning, Friction spinning. Comparison of yarn properties produced in the above processes. Principle ,working and process parameters of spinning system for multi fiber spinning and their blends such as woollen , worsted, spun silk , linen and jute spinning system.

##### Module-III

**Post spinning Operation: (12Hrs)**

Principle, working and Sequence of process – Doubling, reeling, Two- For- One Twister, Tow to Top conversion. Concept of balanced twist in doubled yarn, direction of twist in doubled yarn and its relation to single yarn. Study of different types of yarn: (ply, core spun, sewing thread, Slub,and melange yarn).

##### Module-IV

**Sewing Threads and Fancy yarn: (04Hrs)**

Manufacturing processes, properties and applications.

##### Learning Resources:

1. OxtobyE,―SpunYarnTechnology―,Butterworth,London,1987.
2. Cotton Spinning, Textile Association of India,Ahmedabad.
3. KleinW,―TheTechnologyofShort-stapleSpinning―,TheTextile Institute,Manchester,1998.
4. KleinW,―APracticalGuidetoCombing,Drawing andRovingFrame―,TheTextile Institute,Manchester,1999.
5. Manual of Cortton Spinning (Vol-IV ) The Textile Institute, Manchoster1968.
6. Woolen yarn manufacture, RTD Richards & A.B.Skys.

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

**Mathematics-III (3-1-0)**

## Prerequisites:

### Mathematics-I

1. Mathematics-II

**Course Outcomes**

On successful completion of this course, the students will be able to:

1. Have a fundamental knowledge of the concepts of probabilitytheory.
2. Do correlation and regression and fitting of different types ofcurves.
3. Apply sampling theory and theory of estimation in various engineering problems and do various tests of hypothesis and significance.
4. Use calculators and tables to perform simple statistical analyses for small samples and use popular statistics packages, such as SAS, SPSS, S-Plus, R or MATLAB to perform simple and sophisticated analyses for largesamples.

**Module 1: (10 Hours)**

Probability: Introduction, Probability of an event, additive rule & multiplication rule, conditional probability, Bayes’ rule, random variable, discrete and continuous probability distribution, Joint probability distribution, Mathematical expectations, Variance and Co- variance of random variables, Mean and Co- variance of linear combination of random variables, Chebyshev theorem.

**Module 2: (10 Hours)**

Discrete Probability Distribution: Binomial & Multinomial, Hyper- geo- metric, Geometric, Poisson distribution.

Continuous Probability Distribution: Uniform, Normal, Exponential Distribution, Weibull’s Distribution, Chi-square Distribution, Sampling Distribution: Sampling Distribution of S2, t Distribution, F Distribution.

**Module 3: (10 Hours)**

Estimation of parameter: methods of estimation, Estimating the mean of a single sample, Standard error, Prediction interval, Tolerance limits, Estimating the difference between means of two samples, estimating proportion and variance of single sample, Estimating the difference between two proportions and variances of two samples, maximum likelihood estimation.

**Module 4: (10 Hours)**

Testing of hypothesis: one and two tailed test, test on a single mean when variance is known & variance is unknown. Test on two means, test on single mean and two mean populations. One and two sample test for variance. χ2 test for goodness of fit and test for independence.

Introduction to linear regression: Simple regression models, method of least squares, Properties of least square estimators, Inferences concerning the regression coefficients, Coefficients of determination and its application.

Statistical quality control (Simple Idea only)

**Text Books:**

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers & Keying Ye,” Probability & Statistics for Engineers & Scientists”, Eighth Edition, 2007, Pearson Education Inc., NewDelhi.
2. Jay L. Devore,” Probability and Statistics for Engineering and Sciences”, Seventh Edition, Thomson/CENGAGE Learning India Pvt.Ltd.

**Reference Books:**

1. William Mendenhall, Robert J. Beaver & Barbara M. Beaver,” Introduction to Probability and Statistics”, 13th Edition, 2009, CENGAGE Learning India Pvt. Ltd., NewDelhi.
2. T. Veerarajan,” Probability, Statistics and Random Processes”, Tata McGrawHill
3. Ronald Deep,” Probability and Statistics”, AcademicPress

**Organizational Behaviour (3-0-0)**

**Prerequisites:**

1. English.

**Module 1: (10 Hours)**

The study of Organizational Behaviour: Definition, Meaning, Why study OB; Learning - Principles of learning and learning theories; Personality- Meaning, Determinants, Types, Personality and OB; Perception- Perceptual Process, perceptual errors, Importance of perception in organizations; Motivation-Nature and Importance, Theories of motivation (Herzberg, Maslow, McGregor).

**Module 2: (10 Hours)**

Group level: Groups in Organizations -Nature, Types, Reasons behind forming groups, Determinants, factors contributing to Group Cohesiveness, Group Decision Making- Process, advantages and disadvantages; Team- Effective Team Building; Types of Leadership- Effective Leadership, Styles of leadership, Leadership Theories-Trait Theory and Contingency Theory, Leadership and Followership; Conflict- Healthy Vs Unhealthy conflict, Conflict Resolution Techniques.

**Module 3: (10 Hours)**

Structural level: Organizational Culture: culture and organizational effective- ness; Organizational Change: Types of change, Reasons to change, Resistance to change and to manage resistance. Introduction to organizational development.

**Text Books:**

1. Stephens P. Robbins, Organizational Behaviour, PHI.
2. K. Aswatthappa, Organizational Behaviour,HPH.

**Reference Books:**

1. Kavita Singh, Organizational Behaviour, Pearson.
2. D. K. Bhattacharya, Organizational Behaviour, OUP.
3. Pradeep Khandelwal, Organizational Behaviour,TMH.
4. Keith Davis, Organizational Behaviour, McGrawHill.
5. Nelson Quick, ORGB, CengageLearning.

**Detailed Syllabus (4th Semester)**

SUBJECT NAME: **FASHION SKETCHING ANDILLUSTRATION(3)** CODE: **UPCFT401**

##### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

Gaining fashion illustration technique.

Gain knowledge of illustration from different artists.

Gain coloring techniques-markers, pencil drawing, water colours, paint, computer rendering. Development of own individual style.

**Module-I**

**Introduction to Designing: (08Hrs)**

### Sequences of the Designing process, Drawing, Layout and presentation effects, Fashion magazine. Fashion sketching-origin, importance and creative use.

**Module-II**

**Drawing Skills: (10Hrs)**

### Pencil shading-values or gradation, pressure on pencil effect, three different ways of get gradation: stocks\ hatching \cross hatching, stippling smudging. Drapery and still life-composition of fabric folds with 2D and 3D blocks: vegetable, fruit, flower andleaf.

**Module-III**

**Illustration & Figure Drawing: (12Hrs)**

Basic Block Figure- Female, Normal Figure and Fashion Figure. Fashion Block Figure-Female: 10 ½ " and 12 ½ ―: Front, Side, 3/4th, Back. Fleshing of Block Figures-Female: 10 ½ " and 12 ½ ―: Front, Side, 3/4th, Back, Different Hair Styles and make-up skin tone, hair accessories; Face, Hand, Feet, Angle and Arm Analyses in allposes.

Movement Figure: Balance movement- bent, twisted and stick figure; Movement Points and Axis; Fashion Figure Poses: Block & Flesh Poses & Attitudes, Movement of Figure in all poses.

**Learning Resources:**

* 1. Fashion Illustration by ManmeetsSodhia
	2. Inside Fashion Design -KittyG.Dikerson
	3. Elements of Fashion & Apparel Design bySumathi,G.J.
	4. Design Studies by Manmeets Sodhia Publication by KalyaniPublisher
	5. Fashion Design Drawing by Caroline Tatham Thames &Hudson

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **FASHION SKETCHING ANDILLUSTRATION(PRACTICAL)** CODE:**ULCFT401**

### To learn & practice free-hand sketchingtechniques.

1. To learn medium & techniques for illustration three different ways of gradation: stocks,hatching, cross hatching, stippling &smudging.
2. Three different ways of rendering with pencil shading, pencil / steadler color, wax, crayons,water color & micro tippen.
3. Fashion figure drawing with the help ofblocks.
4. Fleshing of block figures in 10 ½ " and 12½.
5. Sketching of different fashion bodyfigures.
6. Sketch Fashion figure with pencil in differentpostures.
7. Kid‘s fashion: illustration of different types of kidswear.
8. Female: Casual & formal wearillustration.
9. Adult fashion: Illustration of wedding wear, party wear, seasonal wear, sports wear,etc.

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **FASHION DESIGN AND COLORTHEORY(3)** CODE:**UPCFT402**

##### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

Idea about differentdesign.

Comparison the different types of lines & theircharacter. Identification of thedesign.

Understanding of the diminutions of colours. Understanding of different textile designs

**Module-I**

**Origin and Elements of Fashion: (10Hrs)**

Fashion language, Elements of fashion, Terminology of fashion. Fashion trends, 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; Study of different types of motifs: - Natural, Decorative , Geometric and Abstract Motif.

**Module-II**

**Concepts of Colour Theory: (12Hrs)**

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 Colour Modification and Colour Harmony, Modification of colour as a formation of tints, shades & colour grey; High, Low and Mid Key. Change in Hue, value, Neutralized colour. Achromatic, Monochromatic, Analogues, Complementary and PolychromaticHarmony.

**Module-III**

**Composing Textile Design :(08Hrs)**

All Over Repeating Design, Half Drop, Diamond, Ogee base, Waved Line, Rectangular Drop Reverse, Sateen. Application of Colour to woven and printed textiles. Factors influencing the Appearance and Ornamentation of Fabrics with reference to raw-material, weave and finish.

**Learning Resources:**

1. Inside Fashion Design, Sharon LeeTats
2. Pattarn Design, LewisF.day
3. Colour Harmony, Bride N. Whelan, RockportPublishers.
4. The Costumes and Textiles of India,JamilaBrijBhusan
5. Soamn, Jullian, ‗Professional Fashion illustration‘ B.T. Batslord, London1995
6. Drake, Nicholas, ‗Fashion illustration today‘ Thamesis Hudson. LondonPublication

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **FASHION DESIGN AND COLORTHEORY(PRACTICAL)** CODE:**ULCFT402**

1. To develop some design using basic concept of line, shape and texture through gradation, repetition,proportion and emphasis.
2. Todevelopdesignusingdifferenttypeofmotifs(NaturalMotif,Decorative Motif, Geometric Motif, AbstractMotif).
3. To produce floral, geometrical abstract and boarder design. Enlargement and deduction ofdesign.
4. To develop Colour mixtures according to pigment theory of colour and show arrangement of the primary, secondary and intermediateColour.
5. To develop Colour mixture according to light theory of Colour with primary, secondary and intermediateColour.
6. To develop Colour modification using change in hue, change in value (tints and shades) and colouredgrey.
7. To produce monochromatic contrast and to produce polychromatic contrast.
8. To study composition of design / motif using thefollowings:-

All over unit repeat, half drop, diamond base, ogee base, sateen and wave line etc.

1. To produce at least five sketches by using different colour shades with ownimagination.
2. Creation and manipulation of Colour usingcomputers.

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **FABRICMANUFACTURING(4)** CODE: **UPCFT403**

#### Course Outcomes:

**After successful completion of this course, the students** will **be able to develop knowledge and skills of:**

Woven fabric manufacturing preparatory. Woven fabric manufacturing machines

Different types of woven fabric manufacturing techniques Idea on knitting and nonwoven fabric manufacturing.

##### Module: I

**Weaving Preparatory Processes: (10Hrs)**

Classification of fabrics, Introduction to various fabric manufacturing methods; conversion of yarn into fabric with flow charts. Introduction to warp and weft preparatory processes. objective and principle of winding, pirn winding, warping, direct and sectional warping. Recent developments in winding and warping. Concept of knotter and splicer. Objectives of sizing, various sizing ingredients, methods of sizing, drawing in and beam gaiting.

##### Module: II Weaving: (10Hrs)

Basic concepts of looms, types of Looms, passage of a material through plain power loom, Primary, secondary and auxiliary motions of a power loom. Fancy Fabric Formation: Classifications and working principle of dobby, types of Dobby, Classificationsandworkingprinciple ofjacquard,PartsofJacquard andjacquardloom. Electronicdobbyandjacquards;

##### Module :III

**Advanced Weaving :(10Hrs)**

Brief idea about shuttleless looms like Projectile, Rapier, Air Jet and Water Jet looms. Fabric defects and value loss, classification, their causes and remedies; Basic Concept of 3D Fabrics.

##### Module :IV

**Knitting, Braiding, Narrow fabrics and Nonwoven (10Hrs)**

General classification of Knitting Machine - Flat & Circular. Knit, Tuck & Float Stitches & their uses. Knitting Needles – Latch, beard & compound needles. Weft knitted structures - Blister jacquard, plush, pile, velour and fleecy fabrics. Directionally oriented warp knitted structures. Classification of braided structure, production techniques, properties and applications. Brief idea on manufacture of narrow width products; tapes, ribbon, elastic, laces, woven labels. Basic concepts of non-woven fabrics, Classification, production, properties and applications of nonwoven fabrics.

##### Learning Resources:

* 1. P. K. Sriramalu, D. B. Ajgaonkar and M. K. Talukdar, Weaving Machines – Mechanisms, Management Mahajan publishers, Ahmedabad1998.
	2. NN Banerjee,―Weaving Mechanism",Textile House,Berhampore, 1993
	3. Woven Fabric Production I, & II NCUTE Publication, IIT, New Delhi,2002.
	4. P. Marks and A. T. C. Robinson Principles of Weaving, The Textile Institute,1989.
	5. Terry Blackenbury,‖ Knitted Clothing Technology‖, Blackwell Science,1996.
	6. DavidSpencer,―Knitting Technology‖,PergamonPress,Oxford2001.

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# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

**Engineering Economics (3-0-0)**

## Prerequisites:

### Mathematics.

1. BasicEconomics.

**Module 1: (10 Hours)**

Engineering Economics: Nature, Scope, Basic problems of an economy, Micro Economics and Macro Economics.

Demand: Meaning of demand, Demand function, Law of Demand and its exceptions, Determinants of demand, Demand Estimation and Forecasting, Elasticity of demand & its measurement (Simple numerical problems to be solved), Supply-Meaning of supply, Law of supply and its exception, Determinants of supply, Elasticity of supply, Determination of market equilibrium (Simple numerical problems to be solved).

Production: Production function, Laws of returns: Law of variable proportion, Law of returns to scale.

**Module 2: (10 Hours)**

Cost and revenue concepts, Basic understanding of different market structures, Determination of equilibrium price under perfect competition (Simple numerical problems to be solved), Break Even Analysis-linear approach (Simple numerical problems to be solved).

Banking: Commercial bank, Functions of commercial bank, Central bank, Functions of Central Bank. Inflation: Meaning of inflation, types, causes, measures to control inflation.

National Income: Definition, Concepts of national income, Method of measuring national income.

**Module 3: (10Hours)**

Time value of money: Interest - Simple and compound, nominal and effective rate of interest, Cash flow diagrams, Principles of economicequivalence.

Evaluation of engineering projects: Present worth method, Future worth method, Annual worth method, Internal rate of return method, Cost benefit analysis for public projects.

Depreciation: Depreciation of capital assert, causes of depreciation, Methods of calculating depreciation (Straight line method, Declining balance method), After tax comparison of project.

**Text Books:**

1. Riggs, Bedworth and Randhwa,” Engineering Economics”, McGraw Hill EducationIndia.
2. Deviga Vengedasalam,” Principles of Economics”, Oxford UniversityPress.
3. William G. Sullivan, Elin M. Wicks, C. Patric Koelling,” Engineering Economy”,Pearson.
4. R. Paneer Selvam,” Engineering Economics”,PHI.
5. S. P. Gupta,” Macro Economics”,TMH.
6. S. B. Gupta,” Monetary Economics”, Sultan Chand andCo.

**Course Objectives:**

**Environmental Science 4th Sem**

* + Understanding the importance of ecological balance for sustainabledevelopment.
	+ Understanding the impacts of developmental activities and mitigationmeasures
	+ Understanding the environmental policies andregulations

**Course Outcomes:**

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn help in sustainable development

**UNIT – I**

|  |
| --- |
| An Introduction to – Multidisciplinary nature of Environmental Studies. The Earth and Biosphere (The Earth Science)**Ecology:** Concept and Principle of Ecology, Ecological Succession, Population Ecology, Community Ecology, Relationship, Human Ecology, Origin and Evolution of Life, Plant and Speciation.**Ecosystems: Definition, Properties, Function and Structure of Ecosystem.** Ecological Balance: Cause, Food chains, food webs, Flow of Energy, Ecological Pyramids, Types of Ecosystem: Land, Aquatic and Artificial ecosystem. Biogeochemical cycles, Bioaccumulation, Bio magnification, ecosystem value, Degradation of Ecosystem.Bio-diversity and Conservation**Natural Resources:** Classification of Resources, Conservation of Resources, Environmental Degradation, Equitable use of Resources for Sustainable Life styles, Role of Individual in Conservation of natural Resources.**Water Resources: Sources,** Status of World and Indian’s Water Resources, Over Utilization of Water, Conservation, Flood and Control measure, Others.Mineral Resources. Land Resources, Energy Resources, Food Resources, etc.: Classification, Conservation, Environmental Impacts. |
| **UNIT – II****Environmental Pollution:** Types of Pollution and Control Measures, Role of Individual in Pollution Prevention.**Waste Management:** MSW, WM Techniques, Agricultural Solid Waste Management and Legislation on Solid Waste management.**Disaster Management:** Objectives, Type of Disaster. Elements, Organisational Set- up, NDMA, Preparedness, Mitigation, Prevention, Response.**Environment and Development:** Social Issues, environmental Ethics, Sustainable Development, Sustainable Energy and materials, Environmental Challenges,: Climate Change, Green House Effect, Global Warming, Ozone Layer Depletion, Protection of Ozone Layer, Acid Rain, EL Nino, Waste land and its ReclamationHuman Population and the Environment: Pupation Growth and Explosion, Pupation Growth and Environment, Family Welfare Programme, Women and Child welfare, HIV/ AIDS, Environment and Health, Human Rights, Value of Education.**Resettlement and Rehabilitation:** Introduction, Social Impact Assessment, Methodology of SIA, Land Acquisition and Impact, Stake holder participation and consultation, Socio-economic Issue,, Mitigation Measure.Rehabilitation Action Plan, Legal Frame work, Training and capacity Building, Grievance and Redressal Mechanism. |
| **UNIT - III****Environmental Protection**: Introduction, International efforts, Government Effort, environmental Organisations, Public Awareness, Environmental Education and Training, Green Building, Clean Development Mechanism, carbon Credits.Environmental Legislation: Environmental Legal Framework, environmental Protection Act, 1986, the Air Act 1981, Water Act 1974, Wild Life Act, 1972, Forest Conservation Act, 1980.**Environmental Management:** Environmental Impact Assessment, TOR for EIA, EIA Methodology (Brief), Baseline |
|  |
|  |

Data, Environmental Clearance, MoEF Notification Dated September 2006, Stake holder in EIA Process

Environment Management and EMP: Introduction, Issues covered, Environmental Management System- ISO-14000, Institution and Implementation Arrangement, Mitigation measures, Environmental Monitoring, Environmental Auditing.

**TEXT BOOKS:**

1. Environmental Studies(Concept, Impacts, Mitigation and management) by M. P. Poonia and S. C. Sharama, Khana Book Publishing Co. (P) T Ltd. 2019Edition
2. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
3. Environmental Studies by R. Rajagopalan, Oxford UniversityPress.

**REFERENCE BOOKS:**

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt.Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIAedition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age internationalpublishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BSPublications.

**Detailed Syllabus (5th Semester)**

SUBJECT NAME: **GARMENTMANUFACTURING-I(3)** CODE:**UPCFT501**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

The classification of garments and basics of body measurements & their importance. Classification of patterns and various constructiontechniques.

Acquire knowledge in spreading, marker planning andcutting.

Describe basic principles of different types of cutting machineries used in apparel production. Classification of the different types of stitches.

Definition and classification of different types of seams and seam finishes.

#### Module-I

**Introduction, Pattern and Marker Making: (10Hrs)**

Classification of garments for Men, Women and Children; Fabric Selection: According to Age, Occupation, Religion, Dress style, Occasion, and Figure. Basic body measurements and its importance.

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

**Module II**

**Spreading, Marker Planning and Cutting: (10Hrs)**

Spreading: The requirements of the Spreading process, methods of spreading, the nature of fabric packages. Types of Marker, Marker Planning:Requirement of the marker planning Efficiency of marker plan, methods of marker panning and marker use. The objectives of cutting, Requirements of cutting. Cutting room layout and Organization. Tools & equipment for cutting: Band knife, Round Knife click press, electrical notcher, Straight knife, Circular knife, Cutting Board, Cutting Table, Drill, Pattern perforator, Shears, Leaser, UV, Plasma and Jet Cutting.

Bundling- labeling.

**Module-III**

**Stitches and Seams: (10Hrs)**

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. Classification of different types of Seams: Curved seam, enclosed seam, exposed seam, extended seam allowances, intersecting seam, Rolled seam edge, 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 **–** differentmethods.

**Learning Resources:**

* 1. Apparel Manufacturing hand book — JacobSolinger.
	2. Clothing Technology – R.L. Friend,
	3. Clothing Technology – Carr& Latham,
	4. The Technology of Clothing Manufacture – Carr andLatham

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **GARMENT MANUFACTURINGTECHNOLOGY-I(PRACTICAL)** CODE: **ULCFT501**

### Method of taking important body measurements for gents and ladiesgarments.

* + 1. Developing and creating different patterns by using of 3techniques.
			1. Drafting, ii) Flat Pattern Technique, iii)Draping
		2. Drafting of kids basic bodiceblock.
		3. Preparation of sample of basic stitches (HandStitches)
		4. Preparation of samples of basic machinestitches.
		5. Making of sample of different cut and stitch –Kids
		6. Preparation of sample of different types ofseam
		7. Sewing practice of – superimposed seam, lappedseam.
		8. Sewing Practice of bound seam and flatseam.
		9. Assembling of various garment components using appropriateseams.

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# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **TESTING OF TEXTILEMATERIALS(3)** CODE:**UPCFT502**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* Testing parameters of textileproducts.
* Testing methods of differentyarn.
* Testing methods of different fabrics.
* Testing methods ofapparels.

##### Module-I Introduction: (05Hrs)

Concept of Sampling, population, classification of data for fiber, yarn, fabric and garment testing, Measures of dispersion –mean deviation ,standard deviation , C.V.%. Relative humidity and standard condition for testing. Moisture content and moisture regains of different fibers.

##### Module –II

**Yarn and Fabric Testing: (15Hrs)**

State the twist measurement in single and ply yarns, count of single and double yarn, , measurement of single yarn strength and Lea strength, Brief idea on CRT, CRL & CRE, Concept of CSP, concept of yarn evenness, index of irregularity, Explain methods of assessing yarn irregularity by Visual cutting and weighting , photoelectric and capacitance methods, Define Yarn Hairiness & Explain ASTM Yarn grading. Classimat yarnfaults.

Fabric Testing: Measurement of fabric physical properties like, length, width, thickness, Area density (GSM),Warp and Weft crimp, Cover factor calculations. Measurement of Comfort related fabric properties; air permeability, water vapour permeability, thermal conductivity, moisture transport; wetting, wicking, water absorption, water repellency, waterproof, hydro static head test. Measurementofhandleand mechanicalpropertieslike:Tear,Tensile,burstingstrength,FabricAbrasion,Pilling,snaggingetc.

##### Module-IV

**Apparel Testing: (10Hrs)**

Dimensions, Seam strength, Seam slippage, Adhesion between interlining and fabric, shrinkage, zippers, buttons, snap fasteners and other general garment properties Needle Cutting/Yarn severance Color fastness to washing, light, rubbing, water etc. shade difference in one color ,problem related to embroidery fabric. Eco- parameters requirement for garments.

##### Learning Resources:

1. Saville B P, Physical Testing of Textiles, Woodhead Publishing Ltd, Cambridge,2002.
2. Booth J E Principles of Textile Testing‖, CBS Publishers and Distributors, New Delhi,2008.
3. A Hand Book of Testing,Sundaram.
4. Physical Testing & Quality Control, K.Slater
5. Irfan Ahmed sheikh, Pocket textile testing & Quality expert, Irfan publisher,2009.

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **TESTING OF TEXTILEMATERIALS(PRACTICAL)** CODE:**ULCFT502**

1. Determination of Mean length , effective length , percentage of short fibres and percentage of dispersion by usingBaer sorter.
2. To determine the count of a yarn by using physical/electronicbalance.
3. To measure the Single yarn and Ply yarn twist of the given yarn sample using TwistTester.
4. To determine the single yarnstrength.
5. To Study evenness and imperfection in the given yarn and compare the results with Usterstatistics.
6. To Determine of following particulars of the given fabric: (1) Ends/inch (2) Pick/inch (3) Warp Count (4) Weft count(5) Warp and Weft contraction % (6) Grams/Sq. mt. (7) Size pick up (8) Fabriccover.
7. To determine of Tensile Strength of Fabric (Both reveled and un-revelled) by vertical fabric strengthtester.
8. To determine of Bursting Strength and abrasion Resistant of Fabric by bursting strength tester and abrasion resistant ester.
9. To determine the drape coefficient of woven and knitted fabric using the drapemeter.
10. To determine the seam strength, stitch length, stitch density ofgarment.

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **EMBROIDERY AND SURFACEORNAMENTATION(3) UPCFT503**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + To learn & identify the use embroidery tools with safety precautions in order to prepare basic sample handstitches (Temporary & permanentstitch).
	+ To learns & describe & use different types of tracing method carbon paper, tissue paper, tracing paper, water soluble pen, tracing box (light box), hot pressing and wooden blockmethod.
	+ Study to decorate garment‘s part with a suitable Embroiderydesign.
	+ Preparation of sample of different states of India like: phulkari of Punjab, kantha of Bengal, kasuti ofKarnataka, chikankari of Luckhnow, kashida of Kashmir, chamba of Himachal, kutch ofKarnatak.

##### Module- I

**Introduction to Embroidery**: **(06Hrs)**

Introduction, Definition & Types of Embroidery, General Embroidery Kits, Tools & Equipments for Embroidery, Basics Principles of hand embroidery, m/c embroidery, computerized embroidery. Hand Stitches: Chain, Back, Blanket, Button Hole, Zig Zag, Twisted Chain, Running , Straight, Seeding, Open Work, Cut Work, Drawn Thread Work, Cross Stitch, Count Thread Work. Outline Stitch, Border Stitch, Cross Stitch, Composite Band Stitches, Cut Work, Drawn Thread Work, Solid Filling Stitch, Insertion Stitches, Isolated Stitches, Edging Stitches, Pulled Thread Work

##### Module-II

**Accessories & Decoration**: **(08Hrs)**

Definition, Need & Types of Fashion Accessories. Foot Wear, Hosiery, Hand Bag, Belts, Gloves, Watches & Jewellery- Ear Rings, Nose Rings, Bangles, Necklace, Foot Rings, Payel, Anklets, Bracelets. Concept of Construction Accessories; Decoration: Introduction, Tools & Equipments used in Decoration. Types of Decoration- Beads, Mirror, Chumiki, Ribbon, Sequins. Use of Beads & Sequins.

##### Module-III

**Traditional Embroidery of India**: **(16Hrs)**

Traditional Embroidery of Jammu & Kashmir: Kasida. Traditional Embroidery of West Bengal: Kanthas. Traditional Embroidery of Himachal Pradesh: Chamba Rumal. Traditional Embroidery of Uttar Pradesh: Chickenkari. Traditional Embroidery of Uttar Pradesh: Zardozi. Traditional Embroidery of Punjab: Phulkari. Traditional Embroidery of Gujarat: Kutch.

Surface Ornamentation: Introduction of Surface Ornamentation. Tools & Equipments used in Surface Ornamentation. Types of Surface Ornamentation. Zardozi Work :Overview & Recent trends of Zardozi Work, Raw Materials used in Zardozi: Threads, Beads, Chancy, Gold Sally, White Sally, Gold Zardozi, Silver Zardozi, Mirror, Sequins. Application of Zardozi in different Garment, General Precautions to take in Zardozi work. Gold and Silver thread work – Materials and Methods used, Mirror Work, Raised Work, Appliqué, Quilting, Patch Work.

##### Learning Resources:

1. Embroidery Designs by Nirmala C Mistry ,NavneetPublisher
2. Encyclopedia of embroidery by Readerdigest
3. Traditional Indian textiles-JohnGillow
4. History of Fashion by Manmeets Sodhia KalyaniPublisher
5. Garment Construction by Manmeets Sodhia KalyaniPublisher

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **EMBROIDERY AND SURFACEORNAMENTATION(PRACTICAL)** CODE:**ULCFT503**

1. Basic hand embroiderystitches.
2. Samples of machine embroiderystitches.
3. One embroidery from each state of study -chikan, kantha, mirror, appliqué, chamba, mochi,phulkari.
4. Application of hand embroidery stitches on homefurnishing.
5. Making of ornamentations like fringes, tassels, pompons, sequins andbeads.
6. Application of any embroidery/surface ornamentation on amen‘swear.
7. Application of different embroidery/surface ornamentation on kids‘wears.
8. Application of different embroidery /surface ornamentation on women‘swear.
9. Block printing, Batik, Tie & dyetechniques.
10. Smocking, Pleats, Patch &Cutwork.

**Abbreviations Used:L = Lectures, P = Practical or Laboratory, T = Tutorial**

# IA = Internal Assessment , PA = Practical Assessment, EA = End-Semester Assessment

SUBJECT NAME: **INDIAN TRADITIONAL TEXTILEDESIGN(3)** CODE:**UPCFT504**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Ancient costumes used worldwide
	+ Traditional costumes of various states ofIndia.
	+ Surface designs induced infabrics.
	+ Differences between traditional and modern textiledesigns

##### Module-I

**History of Costumes: (08Hrs)**

Greek and Persian influence on fashion. French Costumes: French Costumes during renaissance 1400-1600. English costumes

:English Costume during Middle Ages. American costumes: American costumes from 18th to 20th centuries.

##### Module-II

**Traditional Costumes: (12Hrs)**

African and European traditional costumes, colour combination, designs, motifs and accessories. Traditional costumes of Asian countries – Japan, China, Srilanka, Indonesian, Afghanistan and Thailand. Indian Costumes: The earliest times to the beginning of the historical period: Indus valley Civilization Costumes, Indo Aryans & Vedic Age, Mauryan & the Sunga Period, Satavahana Period, Kushan Period, Gupta Period, Mughal Period. Traditional textile and Their relation with, Religion, Culture, Climatic & Socio economic conditions.

##### Module-III

**Traditional Textiles: (10Hrs)**

Traditional Textiles with the special reference of materials, colors, motifs and production processes – Ikat, Patola, Kalamkari, Chanderi, Kota, Brocades, Bandhani, Madhubani and Pattachitra, Bharat, Pathani (MH); Block Printed Textiles; Traditional Textiles with special reference to fabric, embroidery, threads, and stitches, - Chickankari, Phulkari, Kanthas, Kani Jamawar (Kasmir), Himroo, Kasuti, Applique Work – Orissa, Gujarat, Bihar and Rajasthan

##### Learning Resources:

1. ‖Historic Costumes‖ - Katherine Morris Cester, Prentice Hall2000.
2. ―TraditionalIndianTextiles‖-FillowJandBernardNThomasandHudson,PrenticeHall,India,
3. ―Historical Fashionin detailthe17thand18thCenturies‖ -HartANorthSV andAMuseum, ,McMillan, India, 1998. 4.―TraditionalTextile DesignsofIndia‖- B.K.Behera, IIT,Delhi.
4. ―The costumesandTextilesofIndia‖ - JamilaBrij Bhusan,PrenticeHall 2000.

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SUBJECT NAME: **GARMENT PROCESSING ANDFINISHING(3) UPEFT501**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Textile pre colorationprocess.
	+ Different methods of coloring the textilegoods.
	+ Different finishing application to textilegoods.
	+ Different coloring and finishing ofapparels.

##### Module: I

**Pre Coloration Process: (8Hrs)**

Pre-cleaning, Mending, Stamping, stitching , Shearing and Cropping, Objective, mechanisms, process parameters involved in singeing, desizing, scouring, bleaching etc. assessment of desizing, scouring and bleaching efficiency. Machineries used in the pre coloration process. Brief idea on hot and cold mercerization, optical brighteners.

##### Module-II

**Textile Coloration Techniques: (10Hrs)**

Different dyes, their classification and application, Machineries used for loose fibre dyeing, yarn, hank and fabric dyeing. Brief idea on different dyeing machineries like, Winch, Jet, Beam, Jigger, J-Box system. Principles of application of direct, vat, sulphur dyes on cellulosic fibers, Dyeing of protein materials: acid, metal complex, chrome and basic dyes. Dyeing of synthetic materials: Nylon, Polyester and Acrylic. Printing: Styles of printing– Direct, resist, discharge and transfer, Printing methods - Block, screen, Transfer and Digital printing, after treatments for dyed and printed goods ,washing, steaming and drying.

##### Module-III

**Fabric and Garment Finishing: (12Hrs)**

Finishes- definition, types- Temporary and permanent Finishes, Basic/routine—Tentering, Decatising, sanforising, calendaring, Functional/ special-waterproof and water repellent, Wrinkle free, antimicrobial, Flame retardant and other special finishes. Classify drying machines, Discuss Working principle of Hydroextractor , multi cylinder drying, IR/ RFdryer.

Apparel Finishing: Flock printing, foam printing, transfer printing, wet transfer, film release, sublimation transfer printing. Preparations of logo and motifs for fixing on garments. , wash and wear, acid wash, stone wash, bio-stoning, crinkled, denim and blast finishing, bio polishing and controlling factors. Brushing of garments. washing, , pressing. Identification of stains, characteristics and history, selection of spotting chemicals, factors for spotting, dry cleaning. Basic concept of pressing, folding, bar tacking, stickering, packaging etc.

**Learning Resources**:

1. Textile Chemistry, Part-I & II : R.H. Peters, Elsevier.
2. Dyeing & Chemical Technology of Textile Fibres : E. R.Trotman.
3. Bhagwat R.S ―Handbook of Textile Processing, ColourPublication.
4. Shenai, V.A. ―Technology of Bleaching and Mercerizing - Vol. III, SevakPublications.
5. Fundamentalandpracticesincolourationoftextiles,JNChakravorty,WoodheadPublishingIndiaPvtLtd, 2008
6. ShenaiVA,―TechnologyofPrinting‖,SevakPublications,Mumbai,1990

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1. JT Marsh, An Introduction to Textile Finishing, Chapman and Hall,2
2. Whittall NS., "Laundering and dry cleaning", vol.8, TextileProgress

Ed, London, 1966

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SUBJECT NAME: **CLOTHING SCIENCE ANDTECHNOLOGY(3) UPEFT502**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + To enable the students to understand specific characteristics of humanclothing.
	+ To gain knowledge about the fabric handle and aesthetic properties offabric required for humanclothing.
	+ To understand the comfort characteristics of fabric for clothingpurposes.
	+ To understand the physiological and field testing of clothing.

##### Module-I Introduction :(08Hrs)

Concept of selection of fabrics for clothing purpose – Types of fabric, required for apparel use for different age group, occasions, purpose – Fabric properties and performance for apparel use. Serviceability of Fabrics: Abrasion resistance - flat abrasion, flex abrasion, edge abrasion, Pilling - mechanism of pilling formation, anti-pilling techniques, Snagging, Strength - Tearing strength - Tensile strength - Bursting strength , seam strength and seam slippage.

##### Module-II

**Aesthetic properties: (10Hrs)**

Drape, Crease and Wrinkle recovery - Lustre. Yarn unevenness: neps, thick place, thin place, periodic fault, Scroopiness, Colour- Colour fastness: to light, washing, perspiration, rubbing, dry cleaning. Dimensional Stability of Fabrics**:** Hygral expansion, Relaxation shrinkage, Swelling, shrinkage, Felting shrinkage. Mechanism of fabric shrinkage- Relationship between Hygral Expansion, Relaxation shrinkage and extensibility - Knitting Process Parameters and fabric stability. Methods of measuring dimensional stability to dry cleaning and dry heat. Fabric Hand : smoothness, fullness and stiffness, subjective hand judgment, objective, evaluation of fabric hand and its applications.

##### Module-III

**Clothing Comfort: (12Hrs)**

Definition of comfort - Human clothing system - Physical, Physiological, and psychological aspects of comfort – Tactile and pressuresensationaspects.Applications,ofclothingcomfortresearch.ThermalComfort:Introduction.Thermaltransferprocesses

– Dry heat transfer and, Rapid heat transfer. Function of Textiles in enhancing thermal comfort. Comparison of thermal comfort properties for different textile structures. Functional Properties **:** Elasticity: elastic recovery, residual strain; Thermal insulation ; Water repellence, water resistance and water proof; Wicking: vertical and horizontal,transportation of liquid; Water absorbency; UV protection; Soil release Safety : Toxicity - residual dye stuff and other finishing agent ; Flammability

##### Learning Resources:

1. Kothari,V K,―TestingandQualityManagement―,CBSBookPublishers,NewDelhi, 2000.
2. Li.Y,―TheScienceofClothingComfort‖,TextileProgress,Volume:31,No.1/2, Textile Institute, ISBN: 1870372247,2001.
3. Saville BP,―PhysicalTesting of Textiles,‖TheTextileInstitute, Woodhead publication limited, Cambridge, ISBN: 1855733676,1999.
4. BillieJCollierandHelenHEpps,‖TextileTestingandAnalysis,‖Prentice-HallInc., New Jersey , ISBN 0134882148,1999.
5. LymanFourt&NormanR.S.Hollies,―Clothing:Comfort&Functions‖,Marcel Dekker, Inc, Newyork, ISBN:0-8247-1214-5.
6. G.Song,―ImprovingComfortinClothing‖,WoodheadPublicationLtd,ISBN:1- 84569-539-9.
7. A.Das,R.Alagirusamy,IITDelhi,―ScienceinClothingComfort‖,Woodhead Publication Ltd, ISBN:1-84569-789-8.

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## Detailed Syllabus (6th Semester)

SUBJECT NAME: **GARMENT MANUFACTURINGTECHNOLOGY-II(3) UPCFT601**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Explain the parts and functions of various sewingmachines.
	+ Acquire knowledge of working principles in advanced and special garmentmachineries.
	+ Various Sewing accessories and trims used in garment.
	+ Different fusing and pressing elements in garment manufacturing with packingstyles.
	+ Fabric selection using differentparameters.
	+ The knowledge of different sewingdynamics.

##### Module- I

**Sewing Machines and Attachments: (10Hrs)**

Sewing Machine: Feeding mechanism and Sewing machine beds. Detailed Knowledge on different kind of Stitching machines– Chain, lock, blind, zigzag, buttonhole, multi needle 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. Defects and remedies, Care and maintenance of sewing machines.

##### Module-II

**Sewing Accessories and Trims with Fusing and Pressing: (10Hrs)**

Sewing Needles: Type, Characteristic and Use. Sewing Threads**:** Fibre types, Thread composition, Thread Finishes, Thread Properties and Their Relationship with Needles. Trims and use of Other Components-Labels and motif, Wadding, Lace, Braid, Elastic, Hook and Loop Fastening, Zip Fasteners, Buttons, Shoulder Pad, Tuck Button, snap fastener etc.

Lining and Interlining, Need for pressing, Types of pressing, Pressing equipment and methods; Pleating, Classification of pressing. Garment finishing machines. Fusing Technology: Requirement of fusing, method of fusing, fusing process. Packing:different types of packing, packing materials, labels and tags.

##### Module-III

**Selection of Fabric and Sewing Dynamics: (10Hrs)**

Face Fabric, Fabric Specifications for various end use applications, Fabric Grading based on Point System, Fabric Selection based on Formability. Concept of Snake Chart (FAST) for Selection of Fabric.

Control of Sewing Thread Tension, Needle Penetration Force: (Different Models), Difference between Sewability and Tailorability, Determination of Sewability: Factors Affecting Sewability; Seam Strength and Seam Efficiency, Seam Slippage, Seam Pucker and Needle Cutting Index (NCI)/Yarn Severance.

##### Learning Resources:

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

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SUBJECT NAME:**GARMENT MANUFACTURING TECHNOLOGY-II (PRACTICAL)** CODE:**ULCFT601**

### Study of the Sewing machineries, different parts andfunctions.

* 1. Study of Feed-of-the-armmachine.
	2. Preparation of sample of different types ofpockets
	3. Preparation of sample of different types ofPlackets
	4. Preparation of sample of different necklines using facing andpiping.
	5. Sewing and finishing formal men‘s top & bottomwear.
	6. Sewing and finishing basic women‘s top & bottomwear.
	7. Sewing and finishing of kid‘swear.
	8. A traditional IndianGarment.
	9. A traditional Sambalpuri garmentconstruction.

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SUBJECT NAME: **FABRIC STRUCTURE AND DESIGNANALYSIS (3)** CODE: **UPCFT602**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + - To produce the basic designs in the graphpaper.
		- To produce decorative textile designs.
		- To produce complex textiledesigns.
		- To produce innovative designs using CADsoftware.

##### Module: I

**Basic Weaves: (10Hrs)**

Woven design fundamentals; Classification of woven structures, methods of weave representation, Basic elements of a woven design; Design, Drafting plan, Peg plan and Denting. Basic concept of Plain woven structure and derivatives like plain, warp rib, weft rib and matt etc. with end uses, Twill Weaves and its derivatives like balanced and balanced twill, pointed twill ,combined twill, broken twill, Construct Diamond, Construct satin & Sateen with end uses.

##### Module-II

**Compound Weaves: (10Hrs)**

Construction of ordinary honey comb, Brighton, Huck-a-Back, Mock leno and their Application.

Construct Bedford cords(Plain & twill faced with wadding effect) & welts design; Describe colour and weave combination, like continuous line, hairline, birds eye ,step pattern. Concept of Pile fabric, Manufacturing of : Terry pile, velvet structure, velveteen , Brief idea on construction for Back and double cloth, gauge and leno weaves and their representation in design paper.

##### Module-IV

**Decorative Weaves: (10Hrs)**

Construct Extra warp and extra weft designs with drafting & lifting; and their applications, State different factors affecting Jacquard design, construct jacquard design like Damask, tapestry, tissue & Brocade Designs. Different software for textile woven design with windows platform.

##### Learning Resources:

1. Groscicki ZJ,―WatsonTextile DesignandColour‖,WoodheadPublishing,NewDelhi, 1975.
2. Gokarneshan N., Fabric structure and design, New Age Publishers, New Delhi,2008
3. Grammar of Textile Design, Nisbeth H, D B Tarapore Wala sons and Co. Bombay,2010.
4. Elementary Textile Design and Fabric Structure, John Read , Hildreth Press,2011.
5. The Primary Structures of Fabrics, Irene Emery, Thames & Hudson Ltd., London,2009

SUBJECT NAME: **FABRIC STRUCTURE AND DESIGN ANALYSIS (PRACTICAL)** CODE:**ULCFT602**

1. Analysis of cloth (plain & it‘sderivatives)
2. Analysis of cloth(Twill, Sateen/Satin, Honey comb, Mock-leno,Huck-A-Back)
3. Analysis of cloth (Terry pile, velvet, Back, Double,leno).
4. Transfer of a design on pointpaper.
5. Apply Computer aideddesign.

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Subject Name: **Apparel Production, Planning andControl(3)** Code:**UPEFT601**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* Concept of production and itsplanning.
* Concept of data management and prototypedevelopment.
* Idea on apparel manufacturingtechniques.
* Concept about plantlayout.
* Idea about schedulingmethods.

##### Module-I

**Production planning and control: (08Hrs)**

Concept of Production - Definition, Objectives of production control, relationship of production control to the functional areas of a manufacturing organization, Productivity. Pre planning: Pre-production functions, Importance of Preproduction function. Lead Time, Product development - steps from prototype to production sample. Product data management.

##### Module-II

**Plant layout: (12Hrs)**

Apparel manufacturing systems: Different Production systems: Progressive bundle system, Unit production system, multiple flow system, modular manufacturing systems, mass customization – their advantages and disadvantages. Guide lines for choosing suitable production system.

Plant Layout – definition, criteria for evaluation, types of production layout. Minimum space requirement, Flow Process Grids and Charts **–** Flow process grid construction, flow process grids for production control. Cut production analysis: Cut order planning – spreading, marker planning, types of marker, marker utilization, economic cut quantities**,** Planning of sewing room**.**

##### Module-III

**Material management: (10Hrs)**

Just in Time Production system (JIT), Optimized Production Technology (OPT), Inventory Modeling – Economic order quantity (EOQ). Control Forms: Functions of cutting order, cutting ticket, bundle control sheet. Principles of Scheduling: scheduling charts

– GANTT chart, backlog graph. Scheduling techniques Network representation – CPM and PERT. Plant loading and capacity planning: Determination of machine requirements for a new factory -calculation of labour requirements. Line balancing: determination and allocation of man power and machines for balanced production in existing plant for a given target, application of line balancing techniques – Balancecontrol.

##### Learning Resources:

1. GargR.K,andSharmaV.,―ProductionPlanningandControlManagement‖,DhanpatRai Publishing, 2003.
2. Plant layout & materials handling- Apple J M- RonaldPress
3. Motion and time study- Barnes Ralph- John Wiley & Sons1999.
4. Jacob Solinger, ―Apparel Production Handbook‖, Reinhold Publications,1998.
5. Telsang(Martand)―IndustrialEngineeringandProductionManagement‖S.Chand&Company Limited, 2008
6. RajeshBheda―ManagingProductivityof Apparel Industry‖CBI publishersand distributors, New Delhi2002.

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Subject Name: **SUSTAINABLE APPARELPRODUCTION(3)** Code: **UPEFT602**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Understand the environmental impact of clothingindustry.
	+ Understand importance of designing forsustainability.
	+ Learn and implement sustainable fashionpractices.

##### Module I

**Sustainable Design:(10Hrs)**

Ecological Sensitivity and Design Sustainability and Sustainable designs – Introduction to sustainability – Sustainable fashion, Forms of Sustainable Fashion, Sustainable Fashion Cycle, Sustainable Fashion Practice, Sourcing and direct applications – Sustainable interior designs, Sustainable marketing

##### Module II (12Hrs)

**Environmental Ethics of Fashion: (12Hrs)**

Environmental issues in Fashion Waste Couture: The Environmental Price of Fashion- Environmental Impact of the clothing industry – Potential environmental and occupational hazards in fashion industry - Legacy of Waste Couture. Fashion, Humanism and Environment - Environmental ethics of fashion Fashion Forward - Eco-fashion – green fashion – natural as well as recycled fibres in cloth industry –concept of trash ion. Fashion Design: Combining Aesthetics with the Environment Philosophic Contentions of aesthetic appreciation – Art and Imagination - human aesthetics - art and knowledge – art and action Historical roots of environmental aesthetics – Cognitive views – Non cognitive views – Aesthetics of human environment and everydaylife

* Environmental aesthetics and environmentalism.

##### Module III (08Hrs)

**Eco - friendly Fashion Industry: (08Hrs)**

Effects Of Technological Growth: Rapid Technological Growth And Depletion Of Resources, Sustainable Development Energy Crisis; Renewable Energy Resources Environmental Degradation And Pollution. Eco-Friendly Technologies. Environmental Regulations.

##### Learning Resources:

1. Subramanian SenthilkannanMuthu, ―Handbook of Sustainable Apparel Production‖, CRC PressTaylor &Francis Group, 1st Edition2015
2. DrRichard S. Blackburn, ―Sustainable Apparel: Production, Processing And Recycling‖, Woodhead Publishing; 1stedition (2015)
3. Kate Fletcher and Lynda Grose, ―Fashion and Sustainability: Design for Change‖, Laurence King; Reprint edition (2012)
4. Joanne Finkelstein, "Chic Theory," Australian Humanities Review(1995).
5. Sustainable Fashion and Textiles: Design Journeys. Kate Fletcher.2008
6. Dr. David C. Innes, "What Do Your Clothes Say About You?"(1993).

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Subject Name: **FASHION PHOTOGRAPHY AND VISUALMERCHANDISING (3)** Code: **UPEFT603**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Entire medium of visual image from technical as well as from an art point ofview.
	+ Understanding of the importance of visualization and observation in fashionphotography.
	+ Utilization of photography as a medium of effectivecommunication.
	+ Understanding of fashion and visualmerchandising.

##### Module-I

**Introduction to Photography: (10Hrs)**

History and origin**,** Various parts of still Camera, Use of lens, Exposure , Depth of Field, Use of light and its effect, contrast and its use, Photographing using natural light, Close-up photography, Sensor, Format, Pixel, Quality of image, Resolution, Factors affecting picture quality, Understanding White Balance in Digital Photography , Color Temperature, How does the Light Affect the Color? Compression (lossy and lossless), Storing**,** Composition: Rule of third, golden points, Color Vision, Digital camera and human Eye comparison, Primary and Secondary colour, Mixture of colours, use of colour to create mood, Role of light in quality photography, Use of natural light, Use of artificial light to create natural effect.

##### Module-II

**Fashion Photography: (10Hrs)**

Human Photography, Product Photography, Emotion, style, posture, self promotion, visual aesthetics of photography, Role of light in quality photography, Use of natural light, Use of artificial light to create natural effect. Selection of photography, assistants,stylist, make- up artist and hair stylist, selection of the model. Quality of photograph : JPEG, TIFF and RAW,RAW Vs JPEG, Sensitivity, Sensor size, crop factor, Normal lens for various format, pixel type, Bit depth, Byer Arrey, Display, Printing, DPI and PPI, storage device, Digital Camera Interface. Post production: Choosing format size while giving order for printing and selecting printing papers.

##### Module-III

**Visual Merchandising: (10Hrs)**

Meaning & definitions, Concept, Principles and functions of VM, VM as an Art or Science, Definitions, Functions, Display basics. Store Personality & Image, Importance of the need to understand the Store Personality and Image in the context of the target market. Cross Merchandising, Impulse buying. Displays, Importance of display, Types of display and display settings. Store Window, Detailed study of display for store windows – closed back, open back, construction, glare, Mannequins Space Planning Fixtures, Props Lighting Mannequins and alternatives to mannequins, Space Planning & Fixtures Types of Props & 3D Forms Systems & In store furniture and lighting. VM Planning Implementation & Control, Calendar Planning, Importance of festivals in the Indian context. Sales Tracking, QA & SOPs, Exhibit and trade show design. Principles for New Store Launch/Existing Stores/ClearanceSales.

##### Learning Resources:

1. Fashion Photography: A Complete Guide to the Tools and Techniques of the Trade. Author: [Bruce Smith.](http://www.flipkart.com/author/bruce-smith) Publisher: Crown Publishing Group.2008.
2. The New Art of Photographing Nature. Author: [ART WOLFE.](http://www.flipkart.com/author/art-wolfe) Publisher: RANDOM HOUSE INDIA.2013
3. Fashion Buying & Merchandising, SidneyPackard.
4. Fashion Marketing & Merchandising: Student Workbook. Author: [Mary Wolfe.](http://www.flipkart.com/author/mary-wolfe) Publisher: Goodheart-Wilcox Publisher, 2008.
5. Silent Selling, Judy Bell and Kate Ternus, Blooms Bury,Publication.

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Subject Name: **FASHION STYLING ANDPROMOTION(3)** Code: **UPEFT604**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Different styles of fashion like, personal, corporateetc.
	+ Promotion and advertisement of fashion business.
	+ Importance of media in fashionpromotion.
	+ Effective communication media for fashion forecasting and trend analysis.

**Module I**

**Fashion Styling: (10Hrs)**

Introduction to fashion styling, disciplines of styling – fashion image construction, garment and prop sourcing, re- modification, recycling and customization. Fashion stylist, Types of fashion stylists – editorial, catalogue, wardrobe, event/live performance, celebrity, commercial, runway, corporate, personal shopping, merchandise styling. Skills required for successful fashion styling, Fashion styling Vs Imageconsulting.

**Module II**

**Fashion Promotion: (10Hrs)**

Introduction to fashion promotion, objectives of promotion, traditional approach to promotion, promotion tools – consumer, trade and business, Fashion advertising, PR, celebrity endorsement and sponsorship, personal selling, visual merchandising and marketing, Concept of fashion forecasting, trend analysis.

**Module III**

**Communication Media: (10Hrs)**

Importance of media, media planning, media types and techniques– social media, print media, television, radio, direct mail, outdoor, Internet, Communication design, effectiveness of marketing communications, copy writing, catalogue design, advertising campaigns, editorials, brand image design

**Learning Resources:**

1. The little dictionary of fashion by ChristianDior
2. Advanced style: Older & Wiser by Ari SethCohen
3. Secrets of Stylists by SashaCharninMorroison
4. What to Wear, Where: The How-to Handbook for any style situation by HillaryKerr
5. Fashion Marketing by MikeEasey
6. Principles of Marketing by Phillip Kotler and GaryArmstrong

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Subject Name: **FASHION CADD(Practical)(2)** Code:**ULCFT603 Course Outcomes:**

#### After successful completion of this course, the students will be able to develop knowledge and skills of :

* + - Hardware, Software & basic tools used for development of textile & apparel design throughCAD.
		- Utilization of graphic package: Corel draw, Adobe photo shop,CAD.
		- Colour selection & application throughCAD.
		- Pattern making using CAD software.

**Experiments or Practical to be conducted.**

1. Motif generation oncomputer.
2. Study of Photoshop tools in detail, enhancing images & pixels, types of file formats,edit

tools: transform, fill, brush tool, Layers & filters.

1. Learning basic tools of Coral Draw. Working with Text, Lines, Shapes & Objects, Outlines & fills,Applying fill, outlines, special effects, shapingobjects.
2. Development of basic weave design & their derivation throughCAD.
3. Developing Croqui figures for men, women and children using Photoshop/ CorelDraw/CAD.
4. Design flat sketches Men‘s wear/ Ladies wear/ kids wear usingCAD.
5. Draping of garments on men‗s, women‗s &children casual, party, night, sports, office/formal wears using Fashion Studio software / Photoshop / CorelDraw.
6. Creating spec sheets, cost sheets for each garment using Fashion Studio software / Photoshop / CorelDraw.
7. Study of principles of pattern making using CAD andpreparing
8. Grading of the abovepattern.
9. Marker planning for women‗s wear like: Top/Skirt/ Men‗s Shirt/Trouser/Kurtha.
10. Study of principles of computerized cutting &sewing.

**Learning Resources:**

1. CAD/CAM byGroover&zimmer
2. Inside Fashion Design -KittyG.Dikerson
3. Inside Fashion Business -Kitty G.Dikerson
4. Elements of color& design –SumathiG.J.

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## Detailed Syllabus (7th Semester)

Subject Name: **HOME FURNISHING AND INTERIORDESIGN(3)** Code: **UPEFT701**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Different fibers, fabrics used for hometextiles.
	+ Varieties of home decorativeitems.
	+ Concepts of interior design in modern lifestyle.
	+ Selection of fabrics fordraperies.

##### Module-I

**Classification of Home Textiles: (12Hrs)**

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**-**Different Types of Bed Linen-Bed covers, pillow covers, mattress and blanket covers, duvet covers, cushions, throw pillows, shams, bolster, 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

**Home Decorative: (8Hrs)**

Floor coverings - carpets, rugs/durries, wooden and metal tiles, bamboos Wall covering – lighting, wall art, wall hanging and decorative frames, Home decorative**–** Furniture, Draperies, Curtains, Decorating Accessories(flower vases, sculptures, decorative plants, aquarium, etc.).

##### Module – III

**Home Furnishings: (10Hrs)**

Requirements in terms of decoration according to different rooms,( Living room, Bedroom room, dining room, kitchen room, store room, guest room, bath room, use of acoustic fabric inside the room).Curtains and draperies: Advances in Home decoration - Draperies–Choice of Fabrics–Curtains–Types of Developments in Finishing of Draperies – Developments in tucks and Pleats and uses of Drapery Rods, Hooks, Tape Rings and Pins. Arrangement: **-** flower arrangement, furniture arrangement

##### Learning Resources:

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

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Subject Name: **BRAND DESIGN ANDMANAGEMENT(3)** Code:**UPEFT702**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* Brandingconcepts.
* Designing and establishment ofbrands.
* Management of differentbrands.
* Competing with new and existingbrands.
* Global Brandingtechniques.
* Strategic management of foreign brands.

**Module-I Introduction: (10Hrs)**

Basic understanding of brands, definition, branding concepts, brand name and logos, criteria for choosing brand elements, Significance of brands, different types of brands- core brands, store brands etc.

#### Module-II

**Brand Management: (10Hrs)**

Strategic management of brands, brand management process, brand building, strong brands, brand positioning, establishment of new brand, brand values, brand vision, brand elements, branding for global markets, competing with existing and new brand, foreign branding techniques, brand layout programmes, brand promotion method, brand ambassadors, their role, online brand promotion, methods of online brand promotions.

**Module-III**

**Brand Adoption Practices:(10Hrs)**

Brand adoption techniques, definition, different types, of brand extension, factors influencing decision for extension, rebranding and re-launching of old and new brand. Measuring brand performance, brand equity management, store brand strategy, benefits for the customers and retailers, brand managers, their role, branding challenges and opportunities.

**Learning Resources:**

1. Brand Management- Text and cases, Mathew, Macmillian2008.
2. Building Brand Value, Five steps of Builiding Powerful Brands, M.G. Parmeswaran,2006,NewDelhi,Tata McGrawHill,
3. Brand Management, H.V.Verma,2004, NewDelhi, ExcelBooks.
4. Strategic Management, Kelvin Lane Keller, M.G.Rameswaram, Third Edition.

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Subject Name: **FUNCTIONAL AND SMARTAPPARELS(3)** Code:**UPEFT703**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Concept of smart textiles andclothing.
	+ Various sectors of functional textiles/clothing.
	+ Manufacturing of functional textiles and apparels with theirproperties.
	+ Product development of smart and functionalapparels.

**Module –I**

**Concept of Smart Textiles**: **(10Hrs)**

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**

**Protective Clothing: (08Hrs)**

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 clothing.

**Module –III**

**High performance Apparels: (12Hrs)**

Sports wear. Radiation Protective clothing from UV , x-ray, alpha ray, beta ray , gamma ray. Bullet proof and ballistic protective clothing. Defence clothing,

Space suit. Garment for medical & hospital use, Antimicrobial textile wear, Pathogen resistant surgical gown **,**

Clothing for protection against chemicals &nuclear

**Learning Resources:**

1. Industrial Textile by SabitAdnoor.
2. Pushpa, B., and Sengupta, A.K., "Industrial Application of Textiles for Filteration and Coated fabrics",Textile Progress Vol.14,1992

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Subject Name: **TECHNICALTEXTILES (3)** Code:**UPEFT704**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Classification of technicaltextiles.
	+ Manufacturing of technical textiles and theirproperties.
	+ Functions and property requirements of technical textiles and their applications in differentfields.
	+ Demonstration in the product development of technicaltextiles.

##### Module-I Introduction: (10Hrs)

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. 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. Agro textiles**:** Fibres, Fabric Construction details – Properties and applications.

##### Module-II

**Protective Clothing**: **(08Hrs)**

Brief idea about different type of protective clothing, functional requirement of textiles in defense including ballistic protection materials and parachute cloth, temperature and flame retardant clothing, chemical protective clothing, water proof breathable fabrics. Sports and recreation textiles: Functional requirement of different types of product and their construction.

##### Module-III

**Medical, Geo, Automotive Textiles**: **(12Hrs)**

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

Automotive textiles: Brief idea about the important properties and requirements in automotive textiles,

textiles components in tyre, tyre structure and design.Textiles in agriculture, electronics, power transmission belting, hoses, canvas covers and tarpaulins.

**Learning Resources:**

1. ―HandbookofTechnicalTextiles‖,Ed.AR HorrocksandSC Anand,WoodheadPublicationLtd., Cambridge(2000).
2. ―EngineeringwithGeosynthetics‖,Ed.GVRaoandGVSRaju,Tata McGrawHillPublishing Co.Ltd.,New Delhi (1990).
3. ―IndustrialTextile‖,Ed.,JSvedova,Elsevier, NewYork(1990).
4. ―ModernTextile CharacterizationMethods‖,Ed.MRaheel,MarcelDekker, Inc.(1996).
5. MukhopadhyaySKandPartridgeJF,―AutomotiveTextiles‖,Vol.29,No..,TheTextile Institute (1999).
6. SabitAdanur,―WellingtonSearsHandbookofIndustrialTextiles‖,Technomic publishing companyInc., USA, 1995
7. Pushpa,B.,andSengupta,A.K.,"IndustrialApplicationofTextilesforFilterationandCoatedfabrics", Textile Progress Vol.14,1992

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**Entrepreneurship Development (3-0-0)**

## Prerequisites:

### Organizational Behaviour.

1. English.

**Module 1: (06 Hours)**

Entrepreneurship: Concept of Entrepreneurship and Intrapreneurship, Types of Entrepreneur, Nature and Importance, Entrepreneurial Motivation and Achievement, Entrepreneurial Personality & Traits and Entrepreneurial Skills.

**Module 2: (08 Hours)**

Entrepreneurial Environment, Identification of Opportunities, Converting Business, Opportunities into reality. Start-ups and business incubation, Skill Development. Setting up a Small Enterprise. Issues relating to location, Environmental Problems and Industrial Policies and Regulations.

**Module 3: (08 Hours)**

Basics of Accounting, Terms: Assets, Liabilities, Equity, Revenue, Expense, Working capital, Marketing Mix and STP.

HRM: Concepts and Function, Labour Laws- Factories Act, Organizational sup- port services - Central and State Government, Incentives and Subsidies.

**Module 4: (08 Hours)**

Sickness of Small-Scale Industries, Causes and symptoms of sickness, cures of sickness, Role of Banks and Government in reviving sick industries.

**Text Books:**

1. Entrepreneurship Development and Management, Vasant Desai,HPH.
2. Entrepreneurship Management, Bholanath Dutta, ExcelBooks.
3. Entrepreneurial Development, Sangeeta Sharma, PHI.
4. Entrepreneurship, Rajeev Roy, Oxford UniversityPress.

**Detailed Syllabus (8th Semester)**

Subject Name: **APPAREL MERCHANDISING ANDRETAILING(3)** Code:**UPEFT801**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Concepts of Fashion marketing, national and internationallevel..
	+ Status of global fashion market.
	+ Concepts of fashion retailing and merchandising.
	+ Concepts of fashion business mix, pricing, retail storemanagement**.**

##### Module-I

**Fashion Marketing: (08 Hrs)**

Introduction to apparel marketing, objectives of marketing; Market segmentation; Fashion marketing mix; PLC and New product development; Scope ; potential of apparel product in domestic ; international market; Exploration of fashion industry; Fashion Promotion; Present scenario of apparel industry in India – challenges &amp; prospects of these industries.

##### Module – II

**Fashion Retailing: (10Hrs)**

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.

##### Module-III

**Fashion Merchandising: (12Hrs)**

Introduction to Merchandising; Types of merchandising; Merchandising mix; Merchandising Planning; Elements of merchandising; Assortment planning; Costing& pricing; Pricing; Concept of fashion forecasting; Range development process; General &amp; Specific range development. Visual Merchandising: Importance of Visual Display. Fashion communication – Visual Merchandising – advantages – 3D visual merchandising system – optimizing techniques in retail space.

##### Learning Resources:

1. Fashion Marketing – MikeEasy
2. Principle of Marketing - Philip Kotler andArmstrong
3. Marketing Management - Philip Kotler and Kevin Keller
4. Mastering Fashion Marketing - Tim Jackson and DavidShaw
5. Fashion Buying & Merchandising, SidneyPackard
6. Apparel Manufacturing, Ruth E. Glock& Grace I. Kunz

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Subject Name: **COSTING AND FINANCIAL MANAGEMENT IN APPAREL INDUSTRY(3)** Code: **UPEFT801**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Understanding the basics of cost and financial accounting, garment costing, understanding costcomponents and, marginal cost variance andbudgets.
	+ Various sources of long termfinancing.
	+ Understanding the needs of financial terminologies and their implications used in theindustry.

##### Module - I

**Introduction to Cost Accounting: (06 Hrs)**

Responsibility accounting, uses of cost accounting, elements ofcost,Direct material,Direct labour, Factory overhead;cost of goods manufactured statements, cost behavior patterns in the apparel industry-fixed variable, semi variable,job order for process costing

##### Module - II

**Accounting for factory overhead: (08Hrs)**

Capacity level concepts, production and service departments direct and indirect costs over and under applied overhead, cost volume profit analysis; Breakeven analysis: Contribution margin, Variable Cost, Marginal income, sales mix by garment style, effect of volume change, Price/column analysis, CVP Analysis

##### Module - III

**Apparel Marketing cost Analysis: (16 Hrs)**

Marketing cost accounting, marketing cost standards, variance analysis for marketing cost, effective variance ,price variance; Determining Pricing of apparel products: Price elasticity of demand and supply, sample costing-marginal revenue and marginal cost, cost plus pricing methods; Full cost pricing, conversion cost pricing differential cost pricing, variable cost pricing, direct cost pricing derivation of cost of apparel products-woven/knits; The budgeting process: Budgeting principles for the apparel industry, fixed vs. variable budget, master budget. Introduction to Financial Management: Objectives, Scope and meaning of Financial Management, Financial Statement Analysis, Basic concepts of Fund flow and Cash Flow

##### Learning Resources:

1. RichordD.IrwinIcn,‖Principles of cost Accounting:Managerial Applications‖Revised by GayleRayburn,1983
2. SultanChand&sons,‖ManagementAccounting‖NewDelhi,2ndedition1998
3. Dr.S.N. Maheshwari, Principles of Management Accounting, SixteenthEdition
4. KhanM.YandP.K.Jain,―ManagementAccounting‖,2012,6thEdition

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**OPEN ELECTIVES**

Subject Name: **FUNDAMENTAL TECHNIQUES OF APPARELDESIGN(3)** Code:**UOEFT501**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + - Understanding of basic principle ofdesign.
		- Different fashion terminology.
		- Playing with differentcolors.
		- Understanding of concept of fashionillustration.

##### Module-I

**Introduction to Fashion: (10Hrs)**

Fashion origin, evolution with examples from different eras till French revolution, Fashion cycles, Fashion theories. Fashion terminology: fashion, style, fad, classic, boutique, trends, designer, silhouette, Hi fashion,

Fashion/selling seasons and knock-offs. Types of fashion: haute couture, Prêt-a-porter and Mass Fashion. Levels of Fashion Acceptance-Fashion leader, fashion role model, fashion follower, Fashion victims.

##### Module-II

**Sketching Techniques: (08Hrs)**

Basic sketching techniques and sketching from life, Perspective and its uses, Grid technique of rendering. Introduction to Anatomy, study of bone and muscular structure, proportions of males, females and children. Study of face, torso, legs and arms Introduction to Fashion Art, Proportion and the Fashion Figure - 8 head, 10 head, 12 head theory of fashion drawing.

##### Module-III

**Fashion Illustrations: (12Hrs)**

Elements of Fashion illustration: Introduction to Fashion illustration - History, importance, artists and illustrators of national and international repute. Elements of Design (point, line, form, shape, space, size, texture and colour), Principles of Design ( harmony, proportion, balance, rhythm and emphasis), Colour Theory (Prang, Munsellcolour system, Pantone Colours, colour wheel, colour value scale, grey scale, colour schemes, colour psychology, colour and emotions, Indian approach to colour), Modification of colour as a formation of tints, shades &colour greys .Change in Hue, Change in value, Neutralized Colour or coloured grey. Achromatic Harmony,MonochromaticHarmony,AnaloguesHarmony,ComplementaryHarmony,PolychromaticHarmony.

**Learning Resources**:

1. Inside Fashion Design, Sharon LeeTats
2. Colour Harmony, Bride N. Whelan, RockportPublishers.
3. The Costumes and Textiles of India,JamilaBrijBhusan
4. Soamn, Jullian, „Professional Fashion illustration‟ B.T. Batslord, London 1995.

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Subject Name: **VISUAL ART AND ILLUSTRATIONTECHNIQUES(3)** Code:**UOEFT601**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

Understandingofbasicprinciplesofdesign and color,concepts,mediaand formats,andtheabilityto applythemto a specific aestheticintent.

Traditions, conventions, and evolutions of the discipline as related to issues of representation, illusion, and meaning. Development of solutions to aesthetic and design problems should continue throughout the degree program.

The ability to synthesize the use of drawing, two-dimensional design, and color, beginning with basic studies and continuing throughout the degree program toward the development of advanced capabilities.

Using of basic tools, techniques, and processes sufficient to work fromconcept to finished product, including knowledge of paints and surfaces.

##### Module- I

**Pencil Shading**: **(08 hours)**

Fashion sketching-origin, important and creative use. Pencil shading-values or gradation, pressure on pencil effect, three different ways of get gradation: stocks\ hatching \cross hatching, stippling smudging; Colorings & Rendering Techniques: Tools and Materials: Pencil, Inks, Brushes, Crayons, Pastels, Pencil, Water soluble pencils, Poster, Water Color, Felt Pens, Stedler Color, Good Quality Paper, Swatches. Fabric rendering**:** Textures and Patterns**:** Illustration in Textural Techniques Different Varieties of Fabric: Soft Fabrics, denim, Jersey, Chiffon, Satin, and Transparent Fabric

##### Module-II

**Working Drawing & Sketching: (08 hours)**

Composition of female postures: S-posture, X-posture, T- posture, A- posture, straight, Z- posture Working Drawing & Sketching:-Composition of female postures: S-posture, X-posture, T- posture, A- posture, straight, Z- posture. Drawing Female Figures:-Drawing female figure free hand; Creating the profile figure; Profile pose; Achieving balance and movement; The fuller figure; Drawing legs: Form and shape; Drawing Arms: Form and Shape; Drawing hands; Posing hands for a fashion sketch; Drawing feet; Drawing the Head; Sketching women‘s jackets; Sketching women‘s tops and blouses; Sketching women‘s lounge wear; Sketching women‘s coats

##### Module-III

**Illustration & Development of costume: (14Hrs)**

Developing & Draping of Female Garments of Fashion Poses in Different Styles. Draping Figure with Surface Ornamentation, Illustration of Casual Wear, Formal Wear. Stylization figure. Different types of Garment for Female. Stylized rendering**:** Rendering Effects, Rendering Lace. Draping of Different Garment: Gathers, Folds, Pleats Showing Fullness in Garment Sketching Children Figures**:-**Children age groups; Drawing children figure proportions; Drawing children‘s arms and legs; Drawing children‘s hands; Drawing children‘s legs and feet; Posing children figures; Dressing children; Drawing children‘s head; Hair styles for children. Illustration& Sketching Accessories:-Sketching Jewellery; necklace,ears ring,nosering,

Sketching sun glasses; Sketching hats;purse,bags,belts,shoes, Detailing for other fashion accessories.

Fashion Accessories:-Necklace, Ears Ring, Nose Ring, Purse, Bags, Belts, Hats, Shoes, Spectacles, Foot Wear

##### Learning Resources:

* 1. Fashion Illustration byManmeets Sodhia KalyaniPublisher
	2. Design Studies byManmeets Sodhia KalyaniPublisher
	3. Fashion Illustration for Designers by Kathryn Hagen PearsonPublisher

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Subject Name: **FASHIONPHOTOGRAPHY(3)** Code:**UOEFT701**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + - Entire medium of visual image from technical as well as from an art point ofview.
		- Understanding of the importance of visualization and observation in fashionphotography.
		- Utilization of photography as a medium of effectivecommunication.

##### Module-I

**Introduction to Photography: (12Hrs)**

History and origin**,** Various parts of still Camera, Use of lens, Exposure , Depth of Field, Use of light and its effect, contrast and its use, Photographing using natural light, Close-up photography, Sensor, Format, Pixel, Quality of image, Resolution, Factors affecting picture quality, Understanding White Balance in Digital Photography , Color Temperature, How does the Light Affect the Color? Compression (lossy and lossless), Storing**,** Composition: Rule of third, golden points, Color Vision, Digital camera and human Eye comparison, Primary and Secondary colour, Mixture of colours, use of colour to create mood, Role of light in quality photography, Use of natural light, Use of artificial light to create natural effect.

##### Module-II

**Fashion Photography: (10Hrs)**

Human Photography, Product Photography, Emotion, style, posture, self promotion, visual aesthetics of photography, Role of light in quality photography, Use of natural light, Use of artificial light to create natural effect. Selection of photography, assistants,stylist, make- up artist and hair stylist, selection of the model.

##### Module-III

**Quality of photograph : (08Hrs)**

JPEG, TIFF and RAW,RAW Vs JPEG, Sensitivity, Sensor size, crop factor, Normal lens for various format, pixel type, Bit depth, Byer Arrey, Display, Printing, DPI and PPI, storage device, Digital Camera Interface. Post production: Choosing format size while giving order for printing and selecting printing papers.

##### Learning Resources:

1. Fashion Photography: A Complete Guide to the Tools and Techniques of the Trade. Author: [Bruce Smith.](http://www.flipkart.com/author/bruce-smith) Publisher: Crown Publishing Group.2008.
2. The New Art of Photographing Nature. Author: [ART WOLFE.](http://www.flipkart.com/author/art-wolfe) Publisher: RANDOM HOUSE INDIA.2013

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Subject Name: **FASHION BUSINESS ANDFORECASTING(3)** Code:**UOEFT702**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* Understanding the nature of fashion business, elements and challenges associated with FashionIndustry.
* Understanding the five areas of FashionBusiness.
* Understandingonprinciplesofmarketing,factorsaffectingdomesticandinternationalmarket,fashion trends and consumer behavior.
* Understanding the principles of fashion forecasting with allaspects.

**Module-I**

**Fashion Business: (10Hrs)**

Definition of Fashion, Evolution of Fashion,- Terminology of Fashion, Principles of Fashion movement, Economic importance of Fashion Business, Four levels of Fashion (Primary level, Secondary level, the Retail level & Auxiliary level),Theory of Clothing Origin, Fashion cycle, Theories of fashion adoption, International Fashion centers.

**Module-II**

**Fashion Environment: (05Hrs)**

Environment of Fashion, Market segmentation (Demographics, Geographic, Psychographics &Behavioral),

Economic Environment, Social Environment, Fashion Categories, Men‘s wear, Women‘s Wear and Kid‘s wear.

**Module-III**

**Fashion Forecasting: (15Hrs)**

Meaning of Fashion Forecasting , The role of a forecaster, The precision of the forecast, The fashion, industry‘s components, structure of the fashion industry, fashion timetable, Information Network , selling strategy. Process in Forecasting - Primary sources, Secondary sources, Tertiary sources , Tracking sales, Competition, Demographics, Value & life style, Publication, Forecasting services , Plethora influences, Observation posts, Fashion of involvement, New uses of products, Old neighborhood. Fashion marketing research – Purpose of research - research design & data sources Sampling methods – data Collection – Forecasting Fashion – Market Segmentation - marketing mix.

**Learning Resources:**

1. Elaine Stone,‖ Fashion Merchandising‖, Blackwell Science Ltd.,2000.
2. BrannonEvelynL―FashionForecasting‖FairchildBooks,NewYork3rd,2010
3. PernaRita ―FashionForecasting‖FairchildBooks,NewYork1992.
4. ―TheDynamicsofFashion‖ ElaineStoneFairchildPublication, 2008

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Subject Name: **VISUALMERCHANDSING(3)** Code:**UOEFT801**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of:**

Principle and Functions of Visual merchandiser. Techniques of virtual business.

Managing space in a retail store. Displaying techniques.

Store/Mall management.

**Module-I**

**VM Concepts: (10Hrs)**

Meaning & definitions, Concept, Principles and functions of VM, VM as an Art or Science, Definitions, Functions, Display basics. Store Personality & Image, Importance of the need to understand the Store Personality and Image in the context of the target market.

**Module-II**

**VM Designing: (10Hrs)**

Elements of Exterior Design, Signage, Façade, Entrance, Banners, Awnings/Marquee. Window Display, Elements of Interior Design, Atmospherics, Merchandise Grouping, Department location, Layout/Circulation Plan Planogram & Wall elevations. Role in effective merchandising Principles of Merchandise Presentation Categories, Dominance Factor, Cross Merchandising, Impulse buying. Displays, Importance of display, Types of display and display settings. Store Window, Detailed study of display for store windows – closed back, open back, construction, glare, effective use of elements and principles ofdesign.

**Module-III**

**VM Planning: (10Hrs)**

Mannequins Space Planning Fixtures, Props Lighting Mannequins and alternatives to mannequins, Space Planning & Fixtures Types of Props & 3D Forms Systems & In store furniture and lighting. VM Planning Implementation & Control, Calendar Planning, Importance of festivals in the Indian context. Sales Tracking, QA & SOPs, Exhibit and trade show design. Principles for New Store Launch/Existing Stores/Clearance Sales.

**Learning Resources:**

1. Fashion Buying & Merchandising, SidneyPackard.
2. Fashion Marketing & Merchandising: Student Workbook. Author: [Mary Wolfe.](http://www.flipkart.com/author/mary-wolfe) Publisher: Goodheart-Wilcox Publisher, 2008
3. Silent Selling, Judy Bell and Kate Ternus, Blooms Bury,Publication.

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Subject Name: **SMART AND FUNCTIONALAPPARELS(3)** Code:**UOEFT802**

#### Course Outcomes:

**After successful completion of this course, the students will be able to develop knowledge and skills of :**

* + Concept of smart textiles andclothing.
	+ Various sectors of functional textiles/clothing.
	+ Manufacturing of functional textiles and apparels with theirproperties.
	+ Product development of smart and functionalapparels.

**Module –I**

**Concept of Smart Textiles**: **(10Hrs)**

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**

**Protective Clothing: (08Hrs)**

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 clothing.

**Module –III**

**High performance Apparels: (12Hrs)**

Sports wear. Radiation Protective clothing from UV, x-ray, alpha ray, beta ray , gamma ray. Bullet proof and ballistic protective clothing. Defence clothing, Space suit. Garment for medical & hospital use, Antimicrobial textile wear, Pathogen resistant surgical gown **,** Clothing for protection against chemicals&nuclear

**Learning Resources:**

1. Industrial Textile by SabitAdnoor.
2. Pushpa, B., and Sengupta, A.K., "Industrial Application of Textiles for Filteration and Coated fabrics",Textile Progress Vol.14,1992

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