KUMARAGURU COLLEGE OF TECHNOLOGY,
COIMBATORE – 641 049

(An Autonomous Institution Affiliated to Anna University, Chennai)

REGULATIONS – 2015
(CBCS)

SYLLABI FOR I -VIII SEMESTERS
From Academic year 2015-2016

KUMARAGURU COLLEGE OF TECHNOLOGY
COIMBATORE – 641 049
B. TECH. FASHION TECHNOLOGY
CURRICULUM
2015 Regulation

Semester I to Semester VIII

Total Credits – 185

SEMESTER – I

	Course Code	Course Title	Category	Contact periods	Hrs/Week & Credits			
					L	T	P	C
Theory								
1.	U15EN*T*101	Technical English	HS	4	3	0	0	3
2.	U15MA*T*101	Engineering Mathematics – I	BS	5	3	2	0	4
3.	U15PH*T*101	Engineering Physics	BS	4	3	0	0	3
4.	U15CH*T*101	Engineering Chemistry	BS	4	3	0	0	3
5.	U15FT*T*101	Fiber Science	PC	4	3	0	0	3
6.	U15CS*T*101	Structured Programming using'C'	ES	4	3	0	0	3
Practical								
7.	U15CH*P*101	Chemistry laboratory	BS	3	0	0	2	1
8.	U15FT*P*101	Fiber Analytical laboratory	PC	3	0	0	2	1
9	U15CS*P*101	Structured Programming Laboratory using 'C'	ES	3	0	0	2	1
10.	U15GH*P*101	Personal Values -1	HS	1	1	0	0	1
11	U15SI*P*101	Social Immersion Project	HS	2	0	0	2	2
TOTAL				37				25

SEMESTER – II

	Course Code	Course Title	Category	Contact periods	Hrs/Week & Credits			
					L	T	P	C
Theory								
1.	U15ENP201	Business Communication and Presentation Skills	HS	4	2	0	2	2
2.	U15MA*T*201	Engineering Mathematics – II	BS	5	3	2	0	4
3.	U15PH*T*204	Applied Physics	BS	4	3	0	0	3
4.	U15CH*T*204	Chemistry for Textiles	BS	4	3	0	0	3
5.	U15ME*T*201	Engineering Graphics	ES	5	2	2	0	3
6.	U15FT*T*201	Yarn Technology	PC	4	3	0	0	3
Practical								
7.	U15PH*P*201	Physics Laboratory	BS	3	0	0	2	1
8.	U15ME*P*201	Engineering Practices Laboratory	ES	3	0	0	2	1
9.	U15CS*P*203	Problem Solving Techniques Laboratory	ES	3	1	0	2	2
10.	U15GH*P*201	Personal Values -2	HS	1	1	0	0	1
TOTAL				36				23

SEMESTER III

Code No.	Course Title	Category	L	T	P	C
Theory						
U15MA*T*306	Probability and Applied Statistics	BS	3	2	0	4
U15EET313	Electrical Engineering	ES	3	0	0	3
U15FT*T*301	Concepts of Fashion and Design	PC	3	0	0	3
U15FT*T*302	Basic Pattern Making and Adaptation	PC	3	0	0	3
U15FT*T*303	Garment Components fabrication	PC	3	0	0	3
U15FT*T*304	Apparel Machinery and Equipment	PC	3	0	0	3
Practical						
U15FT*P*301	Fashion Design Laboratory	PC	0	0	2	1
U15FT*P*302	Apparel Components and Machinery Laboratory	PC	0	0	4	2
U15GHP301	Family Values	HS	1	0	0	1

TOTAL CREDITS: 23

SEMESTER IV

Code No.	Course Title	Category	L	T	P	C
Theory						
U15MA*T*401	Numerical Methods	BS	3	2	0	4
U15EST004	Environmental Science in Textile and Apparel Technology	HS	3	0	0	3
U15MET407	Basics of Mechanical Engineering	ES	3	0	0	3
U15FT*T*401	Weaving Technology	PC	3	0	0	3
U15FT*T*402	Fabric Structure and Design	PC	3	1	0	4
Core Elective	Elective I	PE	3	0	0	3
Practical						
U15FT*P*401	Fashion CAD and Fabric structure Analysis Laboratory	PC	0	0	4	2
U15ENP401	Communication Skill Laboratory	EEC	0	0	2	1
U15GHP401	Professional Values	HS	1	0	0	1

TOTAL CREDITS: 24

SEMESTER V

Code No.	Course Title	Category	L	T	P	C
Theory						
U15FT*T*501	Apparel Product Development Process	PC	3	0	0	3
U15FT*T*502	Knitting and Nonwoven Technology	PC	3	0	0	3
U15FT*T*503	Textile Chemical Processing	PC	3	0	0	3
U15FT*T*504	Apparel Production Technology	PC	3	0	0	3
U15CST904	Object Oriented Programming with C++	ES	2	0	2	3
Open Elective	Elective II	OE	3	0	0	3
Practical						
U15FT*P*501	Apparel Production Laboratory - I	PC	0	0	3	1
U15FT*P*502	Textile Chemical Processing Laboratory	PC	0	0	3	1
U15FT*P*503	Apparel CAD Laboratory	PC	0	0	3	1
U15FT*P*504	Industrial Training	EEC	0	0	-	1
U15GHP501	Social Values	HS	1	0	0	1

* - Industrial Training to be undertaken during the 4th semester summer vacation - Internal evaluation only

TOTAL CREDITS: 23

SEMESTER VI

Code No.	Course Title	Category	L	T	P	C
Theory						
U15GST006	Product Design and Development	ES	3	0	0	3
U15GST004	Operations Research	ES	3	0	0	3
U15FT*T*601	Apparel Merchandising	PC	3	0	0	3
U15FT*T*602	Apparel Production Planning and Control	PC	3	1	0	4
U15FT*T*603	Textile and Apparel Quality Evaluation	PC	3	0	0	3
Open Elective	Elective III	OE	3	0	0	3
Practical						
U15FT*P*601	Apparel Production Laboratory - II	PC	0	0	2	1
U15FT*P*602	Textile and Apparel Quality Evaluation Laboratory	PC	0	0	4	2
U15FT*P*604	Minor Project *	EEC	0	0	-	2
U15GHP601	National Values	HS	1	0	0	1

* - Minor Project to be undertaken during the 5th semester vacation - Internal evaluation only

TOTAL CREDITS: 25

SEMESTER VII

Code No.	Course Title	Category	L	T	P	C
Theory						
U15FT*T*701	Quality Assurance & Social Compliance for Apparel Industry	PC	3	0	0	3
U15FT*T*702	Costing in Apparel Industry	PC	3	1	0	4
Open Elective	Elective IV	OE	3	0	0	3
Core Elective	Elective V	PE	3	0	0	3
Core Elective E	Elective VI	PE	3	0	0	3
Optional	Optional Elective - Comprehension		3	0	0	3
Practical						
U15FT*P*701	Portfolio Presentation	PC	0	0	2	1
U15FT*P*702	Project Work - Phase I	EEC	0	0	4	2
U15GHP701	Global Values	HS	1	0	1	1

TOTAL CREDITS: 23

SEMESTER VIII

Code No.	Course Title Category	Category	L	T	P	C
Theory						
E7	Elective VII	PE	3	0	0	3
E8	Elective VIII	PE	3	0	0	3
E9	Elective IX	PE	3	0	0	3
U15FT*P*801	Project Work – Phase II	EEC	0	0	20	10

TOTAL CREDITS: 19

ELECTIVES FOR FOURTH SEMESTER					
Code No.	**Course Title**	**L**	**T**	**P**	**C**
Elective I					
U15FT*E*101	Fashion Photography	3	0	0	3
U15FT*E*102	Visual Merchandising	3	0	0	3
U15FT*E*103	Surface ornamentation and Accessories	3	0	0	3
U15FT*E*104	Home Furnishings	3	0	0	3
U15FT*E*105	Fashion Apparel Design and Development	3	0	0	3

ELECTIVES FOR SEVENTH SEMESTER					
Code No.	**Course Title**	**L**	**T**	**P**	**C**
Elective V					
U15FTE501	Fashion Communication and Marketing	3	0	0	3
U15FTE502	Application of Computers in Apparel Industry	3	0	0	3
U15FTE503	Apparel Finishing and Care	3	0	0	3
U15FTE504	Clothing Science for Apparel Engineering	3	0	0	3
U15FTE505	Automation in Apparel Manufacture	3	0	0	3
Elective VI					
U15FTE601	Intimate Apparels	3	0	0	3
U15FTE602	Fashion Retail Management	3	0	0	3
U15FTE603	Functional Clothing	3	0	0	3
U15FT*E*604	Industrial Engineering in Apparel Manufacturing	3	0	0	3
U15GST005	Engineering Economics and Financial Management	3	0	0	3

ELECTIVES FOR EIGHTH SEMESTER					
Elective VII					
U15FT*E*701	Logistics and Supply chain Management	3	0	0	3
U15FT*E*702	Garment Trims and Accessories	3	0	0	3
U15FT*E*703	Apparel Brand Management	3	0	0	3
U15FT*E*704	Knitwear Technology	3	0	0	3
U15GST002	Total Quality Management	3	0	0	3
Elective VIII					
U15FT*E*801	Leather Apparel Technology	3	0	0	3
U15FT*E*802	Global Marketing and Sourcing Strategies	3	0	0	3
U15FT*E*803	Technical Textiles	3	0	0	3
U15FT*E*804	Entrepreneurship for Apparel Technologists	3	0	0	3
U15GST003	Principles of Management	3	0	0	3
Elective IX					
U15FT*E*901	Theory of Textile Structures	3	0	0	3
U15FT*E*902	Applications of ERP and MIS in Apparel Industry	3	0	0	3
U15FT*E*903	Apparel Export Management	3	0	0	3
U15FT*E*904	Textile Composites	3	0	0	3

ONE CREDIT COURSES

Sl. No.	Course Title	Industry that will offer the course
U15FTIN01	Computer Aided textile and apparel designing	Apparel Industry/Consultants
U15FTIN02	Draping Techniques	Designers
U15FTIN03	Sewing machinery dynamics	Apparel Machinery Manufacturers/Suppliers
U15FTIN04	Developments in sewing machinery	Apparel Machinery Manufacturers/Suppliers
U15FTIN05	New trends in printing	Apparel Industry
U15FTIN06	Industrial Engineering Practices in Apparel Industry	Apparel Industry/Consultants
U15FTIN07	Application of six sigma in apparel manufacture	Apparel Industry
U15FTIN08	Waste elimination and value stream mapping in apparel industry	Apparel Industry
U15FTIN09	Certification procedures for product and process in apparel industry	Apparel Industry / Certification Agencies
U15FTIN10	Statistical analysis in the apparel industry	Research Institute/consultants
U15FTIN11	Export Market and Merchandising	Apparel Industry
U15FTIN12	Retail Analytics	Retail consultant
U15FTIN 13	Course I	
U15FTIN 14	Course II	
U15FTIN 15	Course III	

OPEN ELECTIVES

Code No.	Course Title	L	T	P	C	Sem	Semester offered for FT Students
U15FTOE01	Knitwear Technology	3	0	0	3	V	VIII
U15FTOE02	Automation in Apparel Manufacture	3	0	0	3	VI	VII
U15FTOE03	Industrial Engineering in Apparel Manufacturing	3	0	0	3	VII	VII
U15FTOE04	Fashion Photography	3	0	0	3	V	IV
U15FTOE05	Fashion Retail Management	3	0	0	3	VI	VII

SEMESTER – I

U15EN*T*101 - TECHNICAL ENGLISH (Common to all branches of Engineering and Technology)	L	T	P	C
	3	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students should be able to:

CO1: Use appropriate technical vocabulary when speaking and writing to express their understanding of technical concepts. (K2)

CO2: Write with greater felicity using the register suitable in the workplace.(K3)

CO3: Interpret the graphical data and convey the idea precisely.(K4)

CO4: Compose effective emails and write officials letters with greater clarity and precision.(K4)CO5: Make effective oral presentations on topics related to science and technology.(K3)

CO6: Exhibit sufficient language skills for the needs of the corporate sector.(K4)

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1				M					M	S		M		
CO2				M					M	S		M		
CO3				S					M	S		M		
CO4									M	S		M		
CO5									M	S		M		
CO6				M					M	S		M		

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment / Group Presentation 4. End Semester Examination	1. Course end survey

FOUNDATIONS OF TECHNICAL JARGON **9 Hours**

Parts of Speech – Word Formation – Affixing, Synonyms and Antonyms, Homonyms - Homophones and Homographs, One Word Substitutes, Nominal Compounds, Acronyms and Abbreviations, Definitions

TECHNICAL SYNTAX **9 Hours**

Tense, Voice, Kinds of Syntax, Gerund and Infinitives, Cause and effect expressions, Purposeand functional expressions, Conditional clauses, Reported speech

APPLICATIONS OF TECHNICAL SYNTAX **9 Hours**

Editing (Grammar – Concord, Articles, Parts of Speech, Modifiers – Dangling participles, Misplaced, Squinting and Punctuation), Instructions and Recommendations, Discourse markers – Process description, Writing a Paragraph – Descriptive, Narrative, Compare and Contrast, Argumentative, Evaluative, Persuasive, Sequencing of jumbled sentences

DRAFTING TECHNICAL DETAILS **9 Hours**

Note making – Linear, Report writing - Accident report, Project Proposals, Transcoding Graphics – Encoding and Decoding – Bar chart / Pie chart / Flow chart / Line graph / Tabulated data / Tree diagram or Organizational chart; Statement of Purpose

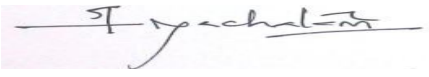
TECHNICAL CORRESPONDENCE **9 Hours**

Modules of a letter – Bank Loan applications, bona-fide Certificate Industrial Visit/ In-plant Training, Letter for Organizing functions, Letter of Application and Resume ,Notices and Circulars, Agenda, Basics of E-Mail writing and E-mail etiquette.

Total: 45 Hours.

Reference Books:

1. Rizvi Ashraf. M., Effective Technical Communciation, Tata McGraw Hill Publishing Co., Ltd., New Delhi, 2008.
2. Bhatnagar R.P. & Rahul Bhargava, “English for Competitive Examinations”, Macmillian Publishers, India, 1989, ISBN: 9780333925591
3. Aggarwal R.S., “A Modern Approach to Verbal & Non–Verbal Reasoning”, S.Chand Publishers, India, 2012, ISBN : 8121905516



U15MAT101- ENGINEERING MATHEMATICS I (Common to all branches of Engineering and Technology)	L	T	P	C
	3	2	0	4

COURSE OUTCOMES

After successful completion of this course, the students should be able to:

CO1: Identify eigen values and eigen vectors and its role in the system of equations.
(K3)CO2: Discover the radius, centre and circle of curvature of any curves. (K4)
CO3: Solve the first order ordinary differential equations of certain types and its applications. (K3)
CO4: Compile the solution of the higher order ordinary differential equations and its applications. (K6)
CO5: Identify the maximum and minimum values of surfaces. (K3)
CO6: Extend the functions as series and find the dependency between them using Jacobian. (K2)

Pre-requisite: Differentiation and Integration

CO/PO Mapping

S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M							M	M		
CO2	S	M							M	M		
CO3	S	M							M	M		
CO4	S	M							M	M		
CO5	S	M							M	M		
CO6	S	M							M	M		

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. End semester examination	Course end survey

MATRICES **9 Hours**

Rank of a matrix – Linearly dependent and independent vectors – Eigen values and eigenvectorsof a real matrix – Properties of eigen values and eigenvectors – Cayley Hamilton theorem (excluding proof) – Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation.

GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS 9 Hours

Curvature – Radius, Centre and Circle of curvature in Cartesian, Parametric and Polar form – Evolute – Envelope of family of curves with one and two parameters – Evolute as the envelopeof normals – properties of evolute and envelope.

FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS9 Hours

Leibnitz's equation – Bernoulli's equation – Equations of first order and higher degree - Clairauts form – Applications: Orthogonal trajectories and simple Electric circuit problems.

HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS 9 Hours

Linear equations of second and higher order with constant coefficients – Euler's and Legendre's linear equations – Method of variation of parameters – First order Simultaneous linear equations with constant coefficients - Application - Electrical circuit. (Differential equations and associated conditions need to be given).

FUNCTIONS OF SEVERAL VARIABLES 9 ours

Total derivative – Taylor's series expansion – Maxima and minima of functions of two variables – Constrained maxima and minima: Lagrange's multiplier method with single constraints – Jacobians.

L: 45Hr; T: 15Hr; TOTAL = 60 HOURS

REFERENCES

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 40th Edition.
2. Veerarajan T., Engineering Mathematics (for First Year), Tata McGraw Hill Pub. Co. Ltd., New Delhi, Revised Edition, 2007.
3. Kandasamy P., Thilagavathy K., and Gunavathy K., "Engineering Mathematics", S. Chand & Co., New Delhi, (Reprint) 2008.
4. Kreyzig E., "Advanced Engineering Mathematics", Eighth Edition, John Wiley and sons, 2010.
5. Arunachalam, T., Engineering Mathematics I, Sri Vignesh Publications, Coimbatore. (Revised) 2009.
6. Venkataraman M.K., "Engineering Mathematics", The National Pub. Co., Chennai,2003.
7. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, (2007).

U15PHT101/ ENGINEERING PHYSICS (Common to all branches of Engineering and Technology)	L	T	P	C
	3	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students should be able to:

CO1 Analyze and identify the crystal structure in materials
CO2 Imbibe the concept of optics, laser and their applications in engineering.
CO3 Categorize the optical fibre and apply it for various fields.
CO4 Acquire the basic knowledge in quantum mechanics
CO5 Apply the NDT techniques and modern engineering tools necessary for Engineering practice.
CO6 Emphasize the role of nuclear physics in energy production

CO-PO Mapping

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
Cos	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M										M
CO2	S	M			S							M
CO3	S	M			S							M
CO4	S	M			S							M
CO5	S	M			S							M
CO6	S	M					M					M

Course Assessment methods

Direct	Indirect
1. Internal test I 2.Internal test II 3.Assignment/ Seminar 4. End Semester Examination	1. Course end survey

CRYSTAL PHYSICS **9 Hours**

Space lattice – unit cell – lattice planes – Bravais space lattices – Miller indices – calculation of interplanar distances – Atomic radius – co- ordination number – Packing factor for SC, BCC, FCC and HCP structures – crystal imperfections – point defects – line defects – surface defects – volume defects – effect of crystal imperfections.

APPLIED OPTICS **9 Hours**

Interference – airwedge and its applications - Lasers – spontaneous and stimulated emissions – Einsteins coefficients – Nd: YAG, Co_2 and semiconductor laser – Homojunction and Hetrojunction (only qualitative description) – applications – CD-ROM and holography (qualitative only) – optical fibre – principle and propagation of light in optcal fibers – Numerical aperture and acceptance angle – types of optical fibres – applications – fibre optic communication system – medical endoscopy.

QUANTUM PHYSICS **9 Hours**

Plancks quantum theory of black body radiation (derivation) – Photo electric effect – Compton effect (derivation) and experimental verification of Compton effect – De-broglies concept - Schrodinger wave equation – time independent and time dependent equations (derivations) – physical significance of wave function – particle in a box (one dimensional case) – Electron microscope – Scanning electron microscope – Transmission electron microscope.

ULTRASONICS AND NDT **9 Hours**

Introduction – production – magnetostriction effect – magnetostriction generator – piezoelectric effect – piezo electric generator –properties –detection – cavitation –acoustic grating – velocity measurement – applications –Sonar –velosity of blood flow – NDT –Liquid Penetrant method – Ultrasonic flaw detector – A scan, B scan, C scan – X- ray radiography and fluoroscopy – Thermography.

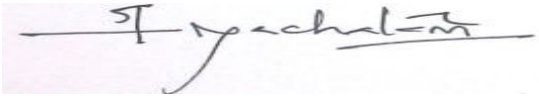
ATOMIC AND NUCLEAR PHYSICS **9 Hours**

Introduction – Atomic spectra – Molecular spectra – Applications – Raman effect – Stokes lines and anti stokes lines – Applications – Nuclear models – Liquid drop model –Nuclear fission – Theory – Energy released per fission – Chain reaction – Controlled chain reaction – Nuclear reactors – Condition for sustained chain reaction – Types of Nuclear reactors – Nuclear fusion – Thermo nuclear reactions – Differences between fission and fusion

TOTAL: 45 HOURS

REFERENCES

1. Rajendran V, Applied Physics, Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
2. Gopal S., Engineering Physics, Inder Publications, Coimbatore, 2006.
3. Palinisamy P.K., Engineering Physics I, Scitech Publications, Chennai, 2011.
4. Avadhanulu M.N. andKshirsagar P.G., A textbook of Engineering Physics, S.Chand & Company Ltd, New Delhi,2005.
5. Gaur R.K. and Gupta S.L., Engineering Physics, 8th edition, DhanpatRai Publications (P) Ltd., New Delhi, 2003.



U15CHT101 ENGINEERING CHEMISTRY (Common to all branches of Engineering and Technology)	L	T	P	C
	3	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students should be able to:

CO1: Assemble a battery and illustrate the phenomenon of production of electric current (K4)
CO2: Discuss the thermodynamic concepts and predict the feasibility of chemical reaction(K2)
CO3: Apply the theory of adsorption in real life situations (K3)
CO4: Outline the principles and instrumentation of spectroscopic techniques (K2)

CO/ PO MAPPING

CO/PO Mapping (S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	M				M							
CO2	M											
CO3	M	W				W						
CO4	M				M							

Course Assessment methods

Direct	Indirect
1. Internal test I 2.Internal test II 3.Assignment/ Seminar 4. End Semester Examination	1. Course end survey

ELECTROCHEMISTRY 9 Hours

Introduction - Electrode potential – Nernst equation and problems - Electrochemical series - Application of EMF measurements & problems - Kohlrausch law of independent migration of ions & its application - Conductometric titrations (acid - base & precipitation titration)

Electrodes : Standard and reference electrode (Hydrogen & Calomel) – Types of electrodes (Metal – Metal ion; Metal – Metal insoluble salt, Redox electrode) - Ion selective (glass electrode) – determination of pH using glass electrode
Cells : Galvanic cell – Types of concentration cells

ENERGY STORING DEVICES 9 Hours

Batteries : Primary Battery (Lechlanche & Alkaline battery) - Secondary Battery (Lead acid storage battery, Nickel - Cadmium battery & Lithium – Polymer battery) – Flow battery (Hydrogen and Oxygen Fuel Cell)

Solar Cells: Hybrid Solar cells
Nuclear Reactors: Light water nuclear power plant (nuclear fission) - ICF (nuclear fusion)

THERMODYNAMICS **9 Hours**

Introduction - Thermodynamic process (isothermic, isobaric, isochoric and adiabatic processes) - Internal energy – first law of thermodynamics (Mathematical derivation & limitation) - Enthalpy
- Second law of thermodynamics - Entropy - Entropy change of an ideal gas & problems - Free energy - work function - Gibbs Helmholtz equation (derivation, applications & problems) - Van't Hoff isotherm (derivation & problems) - Van't Hoff isochore - (derivation & problems) - Third law and zeroeth law (Only statements)

SURFACE CHEMISTRY **9 Hours**

Introduction of adsorption - Types of Adsorption - Adsorption isotherm (Freundlich isotherm, Langmuir adsorption isotherm, BET isotherm) - Applications of adsorption : Role of adsorption in catalytic reactions, Ion exchange adsorption, adsorption chromatography (Column chromatography)

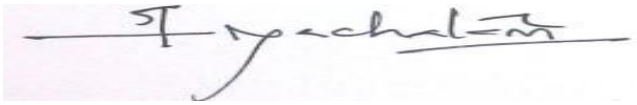
SPECTROSCOPY **9 Hours**

Introduction to spectroscopy - Beer Lambert's Law - Colorimetric analysis (principle, instrumentation (block diagram only) & application : Estimation of concentration of Ferrous and copper ions in solution) - UV – Visible spectroscopy (principle, instrumentation (block diagram only) & applications) - IR spectroscopy (principle, instrumentation (block diagram only) & applications) - Flame photometry (principle, instrumentation (block diagram only) & applications)

TOTAL: 45 HOURS

REFERENCES

1. Bahl B.S., Tuli G.D. and Arun Bahl., Essential of Physical Chemistry, S.Chand & Co. Ltd., New Delhi.
2. Somorjai G.A., Introduction to Surface Chemistry and Catalysis, John Wiley & Sons Inc., New York.
3. Shaw D.J., Introduction to Colloidal and Surface Chemistry, Butterworth – Heinemann Publishers
4. Syed Shabudeen, P.S. and Shoba U.S., Engineering Chemistry, Inder Publishers, Coimbatore.
5. Jain P.C. and Monika Jain, Engineering Chemistry, Dhanpatrai Pub. Co. (P) Ltd., New Delhi.
6. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, ShobanLal Nagin Chand & Co., New Delhi



U15FTT101 FIBRE SCIENCE *(For Fashion Technology)*	L	T	P	C
	3	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students should be able to

CO1	Recognize the essential and desirable propertiesof fibres	K2
CO2	Understand the cultivation of natural fibres	K_2
CO3	Understand the production of Man – made fibres	K_2
CO4	Understand the Properties of natural, man-made fibres	K_2
CO5	Understand the Properties and application of specialty fibres	K_3
CO6	Application of the properties to Identify different natural and man-made fibres	K_3

Pre-requisite: Nil

COs	**CO/PO mapping** (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													
	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO1
CO1	S												S	S
CO2	S												S	S
CO3	S												S	S
CO4	S												S	S
CO5	S												S	S
CO6		S											S	

Course Assessment methods

Direct	Indirect
Internal tests	Course Exit Survey
Assignment	
Group Presentation	
End Semester Exam	

INTRODUCTION TO TEXTILE FIBRES **12 Hours**

Definition of various forms of textile fibres - staple fibre, filament, bicomponent fibres. Classification of Natural and Man-made fibres, essential and desirable properties of Fibres- Introduction to fibre linear density and strength units of measurements. Production and cultivation of Natural Fibers: Cotton, Silk, Wool, Flax, Jute -Physical and chemical structureof the above fibres.

MANUFACTURED FIBRES **10 Hours**

Production Sequence of Regenerated Cellulosic fibres: Viscose Rayon, Acetate rayon – High wet modulus fibres: Modal and Lyocel -.Production Sequence of Synthetic Fibers: Polyester, Nylon and Acrylic. Introduction to spin finishes and texturisation.

BASIC FIBRE PROPERTIES **8 Hours**

Physical (Tensile, Moisture, Density), Chemical, Biological, Thermal and Optical Properties of the above Natural, and manufactured fibres

SPECIALITY FIBRES **8 Hours**

Properties and end uses of high tenacity and high modulus fibres, high temperature and flame retardant fibres, elastomeric fibres, PLA fibre, ultra-fine fibres, nano-fibres, metallic fibres – Gold and Silver coated; Super-absorbent fibres for medical and hygiene applications

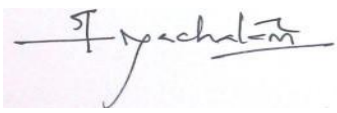
IDENTIFICATION OF TEXTILE FIBERS **7 Hours**

Appearance (Microscopic view, Colour), Solubility, density and Burning tests

TOTAL: 45 HOURS

REFERENCES

1. Mishra S.P., “Fibre Science & Technology”, New Age International Publishers, 2000.
2. Morton, W.E and Hearle, J.W.S., "Physical Properties of Textile Fibres", The Textile Institute, Manchester, U.K., 1993.
3. Muthopadhyay S.K., “Advances in Fibre Science”, The Textile Institute, UK 1992.
4. Collier. B and Tortora.P, “Understanding Textiles”, Edition 6, Prentice Hall, 2001.
5. Gupta V.B., “Textile Fibres: Developments and Innovations”, Vol. 2, Progress in Textiles: Science & Technology, Edited by V.K. Kothari, IAFL Publications, 2000.
6. Corbman B.P., “Textiles: Fibre to Fabric”, McGraw Hill International Edn,1983



U15CST101 STRUCTURED PROGRAMMING USING C (Common to all branches of Engineering and Technology)	L	T	P	C
	3	0	0	3

Course Outcomes (CO):

After Successful completion of this course, the students will be able to :

CO1	Explain the basics of programs and programming	K2
CO2	Select appropriate data types and control structures for solving a given problem.	K2
CO3	Illustrate the representation of arrays, strings and usage of string operations.	K3
CO4	Illustrate the importance of pointers, functions and dynamic memory allocation.	K3
CO5	Explain the fundamentals of structures and unions.	K2
CO6	Explain the basics of file handling mechanism.	K2

Pre-requisite : Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S														
CO2	S	M							W	W					
CO3	S	W							W	W					
CO4	M	W							W	W					
CO5	M	W							W	W					
CO6	M	W							W	W					

Course Assessment Methods:

Direct	Indirect
• Internal Tests • Assignments • Presentation • End Semester Exam	• Course End Survey

Course Content: **Hours**

INTRODUCTION **9**

Programs and Programming- Programming languages and Their Classification - Compiler, Linker, Loader and Interpreter – Structured Programming Concept –Algorithm – Pseudo Code – Flow Chart. Number System – Binary – Decimal – Conversion Problems.

C LANGUAGE BASICS **9**

Introduction to C Programming – Fundamentals – Structure of a C Program – Compilation And Linking Processes – Constants, Variables – Data Types – Expressions Using Operators In C – Managing Input And Output Operations – Decision Making And Branching – Looping Statements
– Solving Simple Scientific And Statistical Problems.

ARRAYS AND STRINGS **9**

Arrays – Initialization – Declaration – One Dimensional And Two Dimensional Arrays. String- String Operations – String Arrays. Simple Programs - Sorting- Searching – Matrix Operations

FUNCTIONS, STORAGE CLASSES AND POINTERS **9**

Functions: Definition of function – Declaration of function – Pass by value – Pass by reference – Recursion.
Storage classes – auto, static, extern, register- scope rules.
Pointers: Definition – Initialization – Pointers arithmetic – Pointers and arrays - Dynamic memory allocation - Example Problems

STRUCTURES, UNIONS AND FILES **9**

Structures and Unions: Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions.
Files: Introduction – Using files in C - Working with text files.

Total Hours: 45

References:

1. Pradip Dey and Manas Ghosh, “Programming in C”, Second Edition, Oxford University Press, 2011.
2. Rajasekaran S, “Numerical methods in Science and Engineering-A practical approach”, S.Chand and Company, New Delhi-55, 2012.
3. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006
4. Byron S Gottfried and Jitendar Kumar Chhabra, “Programming with C”, Tata McGraw Hill Publishing Company, Third Edition, New Delhi, 2011.
5. Ashok N. Kamthane, “Computer programming”, Pearson Education, 2007

U15CH*P*101/ U15CH*P*201 CHEMISTRY LABORATORY **(Common to all branches of Engineering and Technology except CSE)**	L	T	P	C
	0	0	2	1

COURSE OUTCOMES

After successful completion of this course, the students should be able to:

CO1: Prepare standard solutions (S1)

CO2: Analyse the properties of water by applying the chemical concepts (S2)

CO3: Analyse the solutions by electrochemical and spectroscopic techniques and apply it in real life situations like corrosion, soil, water testing etc (S3)

Pre-requisites : -

CO/ PO MAPPING

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	W								W			
CO2	W	M					M					
CO3		M			M				M			

Course Assessment methods

Direct	Indirect
1. Continuous Assessment of lab performance 2. Model Practical Examination 3. End Semester Practical Examination	1. Course end survey

PREPARATION OF SOLUTIONS (STANDARD)

1. Preparation of normal solutions of the following substances - oxalic acid, sodium carbonate, hydrochloric acid.
2. Preparation of phosphate buffer using Henderson equation.

WATER TESTING

3. Determination of total, temporary and permanent hardness by EDTA method.
4. Estimation of DO by Winkler's method.
5. Estimation of alkalinity by Indicator method.
6. Estimation of chloride by Argentometric method.

ELECTRO CHEMICAL ANALYSIS

7. Estimation of hydrochloric acid by pH metry.
8. Conductometric titration of mixture of acids and strong base

9. Conductometric precipitation titration using $BaCl_2$ and Na_2SO_4.
10. Estimation of Iron by Potentiometry

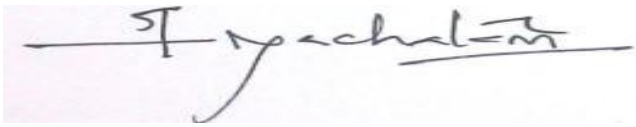
PHOTOMETRY

11. Estimation of the Ferrous ions (Thiocyanate method) by Spectrophotmetry.
12. Estimation of sodium and potassium by Flame photometry.

Total: 30 Hours

REFERENCES

1. Jeffery G.H., Bassett J., Mendham J. and Denny R.C., Vogel's Text Book of Quantitative Chemical Analysis, Oxford, ELBS, London, 2002.
2. Shoemaker D.P. and C.W. Garland., Experiments in Physical Chemistry, TataMcGraw-Hill Pub. Co., Ltd., London, 2003.
3. Shoba U.S., Sivahari R. and Mayildurai R., Practical Chemistry, Inder Publications, Coimbatore, 2011.



U15FT*P*101 Fiber Analytical laboratory	L	T	P	C
(For Fashion Technology)	0	0	2	1

COURSE OUTCOMES

CO1: Ability to identify the given fibre by microscopical examination(K_3)CO2: Ability to identify the given fibre by solubility Test(K_3)
CO3: Ability to identify the given fibre by Flammability Test(K_3)
CO4: Ability to identify cotton and viscose by alkali swelling Test(K_3)CO5: Acquire Skill to determine the blend proportion(K_3)
CO6: Acquire Skill to determine the fibre physical properties(K_3)

Pre-requisite:NIL

COs	**CO/PO Mapping** (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													
	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	S	S											S	S
CO2	S	S											S	S
CO3	S	S											S	S
CO4	S	S											S	S
CO5	S	S											S	S
CO6	S	S											S	S

Course Assessment methods:

Direct	Indirect
Lab Exercises	Course Exit Survey
Model Exam	
End Semester Exam	
Observation	

LIST OF EXPERIMENTS

1. Study of longitudinal view of natural and synthetic fibres
2. Study of cross-sectional view of natural and synthetic fibres
3. Identification of fibres through flammability tests
4. Identification of fibres through solubility tests
5. Determination of fibre density
6. Study of swelling behaviour of cotton and viscose in alkaline solution
7. Determination of blend proportion of blends
8. Determination of moisture regain of fibres
9. Determination of fineness of fibre
10. Estimation of Trash cotton in cotton fibre
11. Determination of fibre strength and elongation.
12. Determination of fibre length.

Total: 45 Hours

U15CS*P*101	STRUCTURED PROGRAMMING LABORATORY USING C (Common to all branches of Engineering and Technology)	L	T	P	C
		0	0	2	1

Course Outcomes (CO):

After Successful completion of this course, the students will be able to :

CO1	Apply and practice logical ability to solve simple problems	**S**
CO2	Demonstrate 'C' programs for statistical and scientific problem solving.	**S**
CO3	Implement pointers, memory allocation techniques in 'C' language.	**S**
CO4	Demonstrate code reusability using recursive and non-recursive functions.	**S**
CO5	Implement appropriate structures for the given scenario.	**S**
CO6	Implement the concept of basic file handling.	**S**

Pre-requisite: Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	**Programme Outcomes(POs)**												**PSO**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	S	M													
CO2	S	M													
CO3	M	M													
CO4	M	M													
CO5	M	M													
CO6	M	W													

Course Assessment Methods:

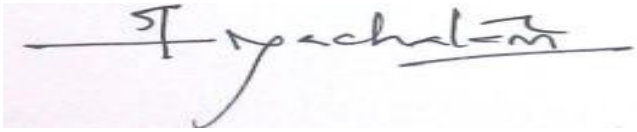
Direct	Indirect
1. Model Exam 2. Viva voce 3. End semester practical exam	Course End Survey

Course Content:

List of Experiments:

1. Simple programs
   - To find whether the given number is prime or not
   - Factorial of the given number
2. Programs involving Control and Looping Structures
   - Arithmetic Progression
   - Trigonometric series evaluation
3. Programs using Arrays
   - Sorting
   - Matrix addition and Multiplication
4. Calculation of median of a frequency distribution.
5. Evaluation of integrals
   - Trapezoidal Rule
6. String Processing
7. Program using Recursive function
8. Using pointers in C
9. Program using Functions, Structures and Files
   - Students Mark Analysis
10. Iterative method for finding Roots of the polynomials
    - Lagrange interpolation method

Total Hours: 24



U15GH*P*101 PERSONAL VALUES -1	L	T	P	C
(Common to all branches of Engineering and Technology)	**1**	**0**	**0**	**1**

Course outcomes:

After successful completion of the course, the student would be able to:

CO 1 : The student on taking the course shall broadly understand what is Human Excellenceand act accordingly

CO 2 : The student shall acquire the ability to introspect about the purpose of his/her life andcarry his/her life accordingly

CO 3 : The student shall understand the importance of nurturing the body, mind and soulCO 4: The student shall understand the impact of his/her thoughts on his/her life

CO 5 : The student shall learn basic contemplative practices so that he/she can practice at his/her leisure

Pre-requisite: NIL

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	Programme Outcomes(POs)													
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1						W	M		W			S		
CO2						M		W				M		
CO3						W	S					M		
CO4						M	M		M			S		
CO5												M		

Course Assessment methods:

Direct	Indirect
1. Individual Assignment 2. Group Assignment 3. Presentation 4. Surprise Test 5. Practical Assessment 6. End Semester Assessment	1. Attendance and Behavioural Assessment

Introduction to Human Excellence 2 Periods

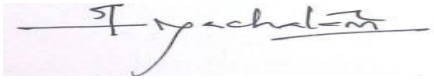
Body, Mind & Soul - Functional & Operational relationship 2 Periods

Analysis of Thought & Introspection	4 Periods
Learning Style Inventory & Neuro Linguistic Programming	2 Periods
Introduction to Contemplative Practices	6 Periods

Total Periods: 15

References Books:

1. Vethathiri's Maharishi's, ***"Yoga for Modern Age"***, The World Community Service Centre, Vedhathiri Publications 2009.
2. Swami Vivekananda, "***The Man Making Message"*** The Ramakrishna Tapovanam, Published 1972.
3. Vethathiri's Maharishi's, ***"Manavalakalai part 1,2&3"*** 1^{1th} edition, The World Community Service Centre, Vethathiri Publications,2005.
4. Laxmana Sharma, **". Who am I?"** Sri Ramanasramam Tiruvannamalai 606 603
5. Brian L Weiss, **"*Many Lives, Many Masters*"** 1st edition Published 1988 by Touchstone.
6. Sankar, **"Monk as a Man"** Penguin Books, Published 2011.
7. Norman Vincent Peale, **"Power of Positive Thinking"** Publisher Vermilion Books, 1993.



U15SIP101/ 201 – SOCIAL IMMERSION PROJECT

(Common to all branches of Engineering and Technology)

L	T	P	C
0	0	4	2

COURSE OUTCOMES

After successful completion of this course, the students should be able to:

CO1: Achieve the desirable awareness regarding significant social problems and identify the needs to provide a possible and innovative solution.

CO2: Acquire and demonstrate effective professional skills and qualities to deal with social issues through innovative leadership and sustainable services / approaches.

CO3: Provide students with a rich practical and socially oriented team work approach. CO4:Improve the quality of life of individuals and communities in proposed localities. CO5: Enhance technical knowledge in addressing the needs of a community problem.

CO6: Understand the social reality of a community and work for the essential changes to be made.

Pre-requisite: NIL

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1			S			S	S							
CO2			M			S	M	M						
CO3			S			S	S		S					
CO4			S			S	S							
CO5			M			S	M							
CO6			S			S	S							

Course Assessment methods:

Direct	Indirect
1. Impact study 2. Village Visit & Observation Skill 3. Workshop participation & 4. General report preparation 5. Assignment / Team Presentation 6. End Semester Examination	1. Course end survey

Class Room Activities	Social issues / Projects (Major Area) 30

• Developing social consciousness • Theoretical reading (Based on the project / general) • Inculcating Social immersion and Leadership • Social immersion and Engineering implementation • Formation of groups • Study on the society and identifying problems • Analysis of problems on issue based • Multiple approaches towards the problem&Selection for addressing. • Addressing a theoretical social problem. • Providing multiple solution for the problem • Knowledge on budgeting andfund raising. • Approaching agencies related to problems. Partnering with agencies • Presentation Skills and Movie Maker • Report preparation • Identification of causes and effects of the social issue	• Water / Sanitation • and Hygiene • Waste Management • Women Empowerment • Community health • Child health/ Poverty/Education/others • Energy management • Environment Management • Adult Education • Youth Empowerment • Green Industry Given above are the broad areas of projects recommended. Projects may varyto individuals/ groups/ class/ branch.

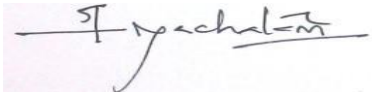
TOTAL:45Hours

Method of End Semester Practical Evaluation :Video: 40 marks Viva voce: 60 marks

References:

1. Nicholls Alex and Murdock Alex, Social Innovation Blurring Boundaries to reconfigure markets, Palgrave Macmillan., New York, 2012. :

2. Osburg Thomas and Schmidpeter Rene`, Social Innovation Solutions for sustainable Future. Springer, Germany 2013.



SEMESTER – II

U15ENP201 – BUSINESS COMMUNICATION AND PRESENTATION SKILLS (Common to all branches of Engineering and Technology)	L	T	P	C
	2	0	2	2

COURSE OUTCOMES

After successful completion of this course, the students should be able to

CO1: Gain cognizance of Effective Business Environment (K1)
CO2: Develop a milestone for leadership and group participation (K2)
CO3: Improve critical thinking and analytical skills to facilitate effective communication(K2)

CO4: Practice and perceive the full repertoire of listening strategies (K2)
CO5: Develop effective reading and writing skills and set goals for future growth (K2)
CO6: Inculcate Spoken Communication Skills required for presentations and discussions.(K2)

COs	CO/PO mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													
	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO1
CO1									S	S	M			
CO2									S	S				
CO3		S		M					S	S		S		
CO4				S					S	S				
CO5										S		S		
CO6									S	S				

Course Assessment methods

Direct	Indirect
1. Continuous assessment 2. Assignment 3. Model practical I 4. End Semester Exam	1. Course exit survey

Fundamentals of Business Communication **12 Hours**

Introduction to Business Communication - Greetings, Formal and Informal Introduction of Self and Others, Giving encouragement: Phrases for Positive Feedback, Agreeing and disagreeing – Expressions indicating frequency, Reading to Understand – Facts, Inference, Main Idea, Author's Opinion/ tone, Short prepared compositions on current affairs

Listening and Comprehending Business Communication **12 Hours**

Listening to monologues, Listening for general content- Listening to dialogues- Listening to a telephonic conversation- Listening for specific information, numbers, time, duration- Listening to conversations among three or more people - Listening to a group discussion and

providing factual information, Intensive listening

Oral Business Communication **12 Hours**

Establishing Business relationships and negotiating, Describe an object or event- Describing a working mechanism- Argumentative speech about a Public issue - Responding to situations and providing solutions, Seeking Permission, Introduction to Presentation Skills - Presenting information, Giving and Getting Product and Service Information, Perceiving Visual Information, Talking about People and Places

Reading and Comprehending Business Communication **12 Hours**

Reading techniques, News Paper Reading, Reading brochures, leaflets, instruction manual- Cloze test- Reading Comprehension, Book review, Article review, Reading a Technical Report, Critical Reading (Editorial): Creative and Critical thinking

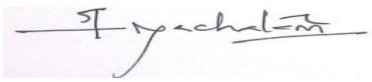
Written Business Communication **12 Hours**

Product Review, Writing a proposal for conducting science exhibition, E-mail etiquette and correspondence, Business Itinerary, Business Letters – Calling for a quotation – Placing Order – Letter of Complaint – Letter seeking Clarification – Acknowledging prompt / quality service, Letter requesting information, Letter explaining a situation, Letter of acceptance and declining, Encoding and decoding advertisements

Total: 60 Hours

Reference Books:

1. Spoken English: A foundation course for speakers of Tamil. Part I & II: Kamalesh Sadanand, Susheela Punitha. Orient Longman Publications, 2008.
2. Life Skills and Leadership for Engineers: David Goldsberg, University of Ilinois, Tata Mcgraw Hill.2007.



U15MA*T*201- ENGINEERING MATHEMATICS II (Common to all branches of Engineering and Technology)	L	T	P	C
	3	2	0	4

COURSE OUTCOMES

After successful completion of this course, the students should be able to:
On completion of the course, the students are expected

CO1: Evaluate double and triple integrations and enable them to find area and volume using multiple integrals. (K5)

CO2: Explain the basics of vector calculus comprising gradient, divergence and curl.

(K2)CO3: Identify the relationship between line, surface and volume integrals. (K3)

CO4: Construct analytic functions of complex variables and conformal mappings. (K6)

CO5: Summarize the basics of residues, complex integration and contour integration.

(K2)

CO6: Determine Laplace transform and it to represent system dynamic models andevaluate their time responses. (K5)

Pre- requisite: Differentiation and Integration

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M							M	M		
CO2	S	M							M	M		
CO3	S	M							M	M		
CO4	S	M							M	M		
CO5	S	M							M	M		
CO6	S	M							M	M		

Course Assessment methods:

Direct	Indirect
1. Internal Test I 2. Assignment 3. End semester examination	Course end survey

MULTIPLE INTEGRALS **9 Hours**

Double integration – Cartesian and polar coordinates – Change of order of integration –

Changeof variables between cartesian and polar coordinates - Triple integration in cartesian coordinates
– Application : Area as double integral – Volume as triple integral .

VECTOR CALCULUS **9 Hours**

Gradient, divergence and curl – Directional derivative – Irrotational and solenoidal vector fields - Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelopipeds.

ANALYTIC FUNCTION **9 Hours**

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy-Riemann equations in Cartesian coordinates and sufficient conditions (excluding proofs) – Properties of analytic function – Construction of analytic function by Milne Thomson method – Conformal mapping : $w = z + c$, cz , $1/z$ and bilinear transformation.

COMPLEX INTEGRATION **9 Hours**

Statement and applications of Cauchy's integral theorem and Cauchy's integral formula (excluding proofs) – Taylor's and Laurent's series expansions – Singularities – Residues – Cauchy's residue theorem (excluding proof) – Application of residue theorem to evaluate realintegrals - Unit circle and semi-circular contours (excluding poles on real axis).

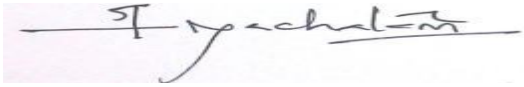
LAPLACE TRANSFORM **9 Hours**

Definition - Properties – Superposition - Shift in t - Shift in s - Time Derivatives - Time Integral – Initial and Final Value Theorems – Periodic functions: sine wave, saw-tooth, square and triangular waves - Inverse Laplace Transform – Simple system dynamic models – Transfer Functions – Poles and Zeroes - Response of First-Order Systems - Solution of RC Free, Step and Sinusoidal Responses; Response of Second-Order Systems - Free Response, step Response - Convolution theorem.

L: 45Hr; T: 15Hr; TOTAL = 60 HOURS

REFERENCES

1. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, Delhi, 42nd Edition, 2012.
2. Philip D. Cha, James J. Rosenberg, Clive L. Dym, Fundamentals of Modelling and Analyzing Engineering Systems, Cambridge University Press, United Kingdom, 2000.
3 Kreyzig E., Advanced Engineering Mathematics, John Wiley & Sons (Asia), Pvt, Ltd., Singapore, 10th Edition, 2010.
4 Veerarajan T., Engineering Mathematics (for First Year), Tata McGraw Hill, Pub. Co. Ltd., New Delhi, Revised Edition, 2007.
5 Venkataraman M.K., Engineering Mathematics, Volume - II, The National Pub. Co., Chennai, 2003.
6 Kandasamy P., Thilagavathy K. and Gunavathy K., Engineering Mathematics, S. Chand & Co., New Delhi, 2008.
7 Arunachalam T. and Sumathi K., Engineering Mathematics II, Sri Vignesh Publications, Coimbatore, Third Edition, 2011.



U15PHT204 / APPLIED PHYSICS *(Common to Textile Technology and Fashion Technology)*	L	T	P	C
	3	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students should be able to:

CO1 Acquire the knowledge of conducting and superconducting materials and its applications
CO2 Perceive the preambles of semiconductors and categorize its applications
CO3 Categorize the different types of magnetic materials and their applications.
CO4 Enumerate the different types of polarization in dielectric materials.
CO5 Confer the properties, preparation and applications of modern engineering materials
CO6 Identify methods for etching of fabrics

CO-PO Mapping

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
Cos	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M										M
CO2	S	M										M
CO3	S	M										M
CO4	S	M										M
CO5	S	M										M
CO6	S	M			M							M

Course Assessment methods

Direct	Indirect
1. Internal test I 2.Internal test II 3.Assignment/ Seminar 4. End Semester Examination	1. Course end survey

CONDUCTING AND SUPERCONDUCTING MATERIALS 9 Hours

Conducting Materials : Classical free electron theory of metals-Electrical conductivity – Thermal conductivity - expression – Wiedemann Franz law(derivation) – Lorentz number – drawbacks of classical theory – Fermi distribution function – density of energy states – effect of temperature on Fermi energy.

Superconducting Materials : Superconducting phenomena – properties of superconductors – Meissner effect, Isotope effect, Type I &Type II superconductors – High Tc superconductors - Applications – cryotron, magnetic levitation and squids.

SEMICONDUCTING MATERIALS 9 Hours

Origin of band gap in solids (Qualitative treatment only) - carrier concentration in an intrinsic semi conductor (derivation) – Fermi level – variation of Fermi level with temperature -

Electrical conductivity – band gap semiconductor – carrier concentration in n-type and p-type semi

conductors (derivation) – Variation of Fermi level with temperature and impurity concentration – Hall effect – Determination of Hall coefficient – experimental set up – Applications.

MAGNETIC & DIELECTRIC MATERIALS 9 Hours

Magnetic Materials : Properties of dia, para, ferro, anti ferro and ferri magnetic materials - Langevin's theory of paramagnetism – Weiss theory of Ferromagnetism – Domain theory of ferromagnetism - hysteresis – soft and hard magnetic materials – Ferrites – Applications - magnetic recording and readout - Storage of magnetic data, Tapes, floppy, magnetic disc drives
– Bubble memory.

Dielectric Materials : Electronic, ionic, orientation and space charge polarization - Frequency and temperature dependence of polarization – Dielectric loss – Dielectric breakdown – different types of break down mechanism - Ferro electric materials - properties and applications.

NEW ENGINEERING MATERIALS 9 Hours

Metallic glasses - preparation, properties and applications – shape memory alloys (SMA) –characteristics, properties of NiTi alloy applications advantages and disadvantages of SMA . **Ceramics:** Classification of ceramics- Fabrication, Properties and application.
Biomaterials: Biomechanisim - Classification of Biomaterials - Processing, Properties and applications.

NANO SCIENCE AND PLASMA TECHNOLOGY 9 Hours

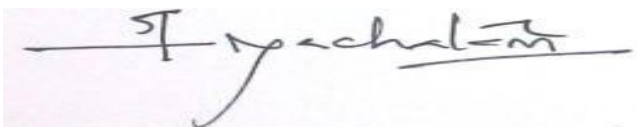
Nano Materials : synthesis - plasma arcing – Chemical vapour deposition – sol-gel - Electro deposition – ball milling – properties of nanoparicles and applications. – Carbon nano tubes – fabrication - arc method – pulsed laser deposition - Chemical vapour deposition - structure, properties & applications.

Plasma Technology: properties of plasma- types of plasma- thermal and non thermal plasma-Production of glow discharge plasma-Cold plasma- applications in textile and biomedical field.

TOTAL: 45 HOURS

REFERENCES

1. Gopal S., Materials Science, Inder Pub., Coimbatore, 2007.
2. Pillai S.O., Solid State Physics, 5th edition, New Age International Pub., New Delhi, 2003.
3. Avadhanalu M.N. and Kshirsagar P.G., A textbook of Engineering Physics, S. Chand & Company Ltd., New Delhi, 2005
4. Rajendran V. and Marikani A., Materials Science, Tata McGraw Hill Pub. Company Ltd., New Delhi, 2004
5. Goldston R.J. and Rutherford P.H., Introduction of Plasma Physics-I, CRC Pub., New York, America, 2000



U15CHT204 CHEMISTRY FOR TEXTILES *(Common to Textile Technology and Fashion Technology)*	L	T	P	C
	3	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students should be able to:

CO1: Design a water purifier (K3)
CO2: Discuss the mechanism of polymer formation (K2)
CO3: Classify dyes and describe its interaction with fibers using bonding (K3)
CO4: Analyse the usage of specialty chemicals in dyes (K3)

CO/PO MAPPING

CO/PO Mapping (S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak														
COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M		S											
CO2	M													
CO3	W	M												
CO4	M		M			M								

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar 4. End Semester Examination	1. Course end survey

WATER TECHNOLOGY **9 Hours**

Hard water: Disadvantages of hard water in textile industries - Formation of deposits in steam boilers and heat exchangers (scale and sludge) – priming – foaming - caustic embrittlement -boiler corrosion - wastage of Fuel - decrease in efficiency.

Prevention of scale formation: external treatment (Ion exchange method), internal treatment (colloidal, phosphate, calgon & carbonate methods) – desalination (reverse osmosis and electro- dialysis) – Common effluent treatment.

POLYMERS **9 Hours**

Introduction – Degree of polymerization – functionality – tacticity - classification based on source, application, thermal properties (thermosetting and thermoplastics) - effect of polymer

structure on properties – types of polymerization (addition, condensation, co-polymerization, Ring polymerisation) - mechanism of polymerization (free radical mechanism)

Preparation (mechanism not required) and applications of polythene, polypropylene, polystyrene, polyamides (nylon 6,6), polyesters (PET)

CHEMICAL BONDING **9 Hours**

Ionic, covalent and co-ordinate covalent bonds (overview only) -- hydrogen bonding and its consequences - VanderWaal's forces (dipole – dipole, dipole – induced dipole, induced dipole – induced dipole interactions) – Hybridsation (sp, sp^2, sp^3 in simple molecules) - Interaction of enzymes with fibres (basic concepts only) - Interaction between fibers and dyes (basic concepts only) - Dyes substrate affinity (dyes for cellulose fibres, silk)

DYES **9 Hours**

Introduction - Classification system of dyes - Chromophore and auxochromes – Important chemical chromophores of dyes classes (azo, anthraquinone, phthalocyanin, Indigoid, polymethine, phthalocyanine, metal complex, Fluorescien) - synthesis of azo dye (Congo red), triaryl methane dye (Malachite green), Anthraquinone dye (Alizarin - 1,2 dihydroxy anthraquinone), Indigoid dye (Indigo), phthalein dyes (Eosin)

ANTHOLOGY OF SPECIALITY CHEMICALS IN TEXTILES **9 Hours**

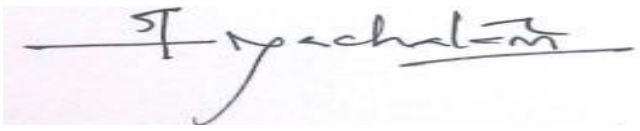
An introduction on chemistry of the following in textiles: Dispersing agents, Leveling agents, Retarding agents, Dye fixing agents.

Thermal analysis (TG, DTA, DSC): Principle, Instrumentation and application in Textiles

TOTAL: 45 HOURS

REFERENCES

1. Finar I.L, Organic chemistry, Pub. House, UK.
2. Hungar K., Industrial Dyes - Chemistry, properties and applications, Wiley VCH Verlag GmbH & Co., KGaA, Weinheim.
3. Sivaramakrishnan C.N., Anthology of speciality chemicals for textiles, Colour Pub. (P) Ltd., Mumbai, India.
4. Seymour R.B. and Carraher, Polymer chemistry, Plenum Pub. Corporation, New York.
5. Syed Shabudeen P.S. and Shoba U.S., Chemistry for textiles, Inder Pub., Coimbatore.
6. Amarika Singh, Vairam S. and Suba Ramesh., Chemistry for engineers., Wiley India Ltd., New Delhi
7. Bahl B.S. and Arun Bahl., A Textbook Of Organic Chemistry, S. Chand & Co., New Delhi
8. Hungar K., Industrial Dyes - Chemistry, properties and applications, John Wiley & Sons



U15ME*T*101/ U15ME*T*201 ENGINEERING GRAPHICS **(Common to all branches of Engineering and Technology)**	L	T	P	C
	2	2	0	3

COURSE OUTCOMES:

After successful completion of this course, the students should be able to:

CO1: Construct various plane curves
CO2: Solve problems in projection of points and lines.
CO3: Develop projection of surfaces and solids.
CO4: Solve problems in sections of solids and development of surfaces.CO5: Apply the concepts of isometric, and perspective projections CO6: Apply free hand sketching in engineering practice.

Pre-requisite: Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		M										
CO2	S	M								M		
CO3	S	M								M		
CO4	S	M								M		
CO5	S	M								M		
CO6	S	M										

Course Assessment methods:

Direct	Indirect
1. Internal Test I 2. Internal Test II 3. Assignment 4. Group presentation 5. Tutorial 6. End semester exam	Course end survey

PLANE CURVES, PROJECTION OF POINTS AND LINES 12 Hours

Importance of graphics in design process, visualization, communication, documentation and drafting tools, Construction of curves - ellipse, parabola, and hyperbola by eccentricity method only. Orthographic projection of points.

Projections of straight lines located in first quadrant - determination of true length and true inclinations.

PROJECTIONS OF SURFACES AND SOLIDS 12 Hours

Projections of plane surfaces - polygonal lamina and circular lamina, located in first quadrant and inclined to one reference plane., Projection of simple solids - prism, pyramid,

cylinder and cone. Drawing views when the axis of the solid is inclined to one reference plane.

SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES **12 Hours**

Sectioning of simple solids - prisms, pyramids, cylinder and cone. Obtaining sectional views andtrue shape when the axis of the solid is vertical and cutting plane inclined to one reference plane. Development of lateral surfaces of truncated prisms, pyramids, cylinders and cones.

PICTORIAL PROJECTIONS **12 Hours**

Isometric projection, Isometric scale, Isometric views of simple solids, truncated prisms, pyramids, cylinders and cones.

Perspective projection of prisms and pyramids when its base resting on the ground by vanishingpoint method.

FREE-HAND SKETCHING **12 Hours**

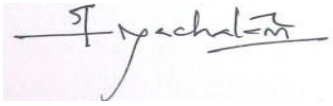
Free hand sketching techniques, sketching of orthographic views from given pictorial views ofobjects, including free-hand dimensioning.

Sketching pictorial views from given orthographic views.

L: 15Hrs; T: 45Hrs; TOTAL = 60 HOURS

REFERENCES

1. Basant Agrawal and CM Agrawal, Engineering Drawing, McGraw-Hill, New Delhi, First Edition, 2008.
2. Venugopal K. and Prabhu Raja V., Engineering Graphics, New Age International (P) Limited, New Delhi, 2008.
3. Nataraajan K.V., Engineering Drawing and Graphics, Dhanalakshmi Publisher, Chennai, 2005.
4. Warren J. Luzadder and Jon. M. Duff, Fundamentals of Engineering Drawing, Prentice Hall of India Pvt. Ltd., New Delhi, Eleventh Edition, 2005.
5. Gopalakirishna K.R., Engineering Drawing (Vol. I & II), Subhas Publications, 2001.



U15FTT201 YARN TECHNOLOGY *(For Fashion Technology)*	L	T	P	C
	3	0	0	3

After successful completion of this course, the students should be able to:

CO1	Describe the process flow in short staple spinning and also explain the different techniques in yarn manufacturing.	K2
CO2	Outline sequentially the processes involved in spinning long staple worsted yarns, and describe the working of various machines used	K2
CO3	Acquire knowledge on post spinning operations and machine used for the process	K1
CO4	Compare the quality characteristics of different yarns.	K4
CO5	Describe the various post spinning processes for spun yarns	K2
CO6	Acquire knowledge on sewing threads and various speciality yarn manufacturing techniques	K2

Pre Requisite:

1. U15FTT101 Fibre science
2. U15FTP101 Fibre analytical Laboratory

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S				M								S	
CO2	S				M								M	
CO3	S												M	
CO4	S													
CO5	S				M								M	
CO6	S												M	

Course Assessment methods

Direct	**Indirect**
Internal tests	**Course Exit Survey**
Assignment	
Group Presentation	
End Semester Exam	

SHORT STAPLE SPINNING SYSTEM (COTTON): **9 Hours**

Ginning- objectives, types, suitability and principle of working. Sequence of process in cotton spinning; Objectives and principles of working of Blow room, Carding, Drawing, Combing, Simplex and Ring spinning- Basic Principles of Rotor spinning, Air jet spinning and DREF spinning systems.

LONG STAPLE SPINNING SYSTEM (WORSTED): 9 Hours

Sequence of process; objectives and principles of working of Scouring, Drying, Oiling, Dyeing, Blending, Carding, Gilling and Combing, Drawing, Roving and Spinning. Solo and Compact spinning systems - objectives and principles of working.

YARN QUALITY AND CHARACTERISTICS: 9 Hours

Acceptable yarn Quality standards of cotton, polyester, polyester / cotton yarns. Yarn faults, imperfections and their identification. Comparison of characteristics of yarns from different spinning systems.

POST SPINNING: 9 Hours

Objectives and principles of working of Cone winding, Cheese winding, Reeling, Assembly winder, Ring doubler and Two for one twister (TFO) - Single yarn and ply yarn characteristics and their applications. Package faults (Cones and Hanks) and identification.

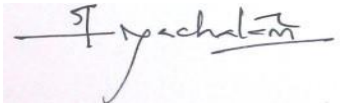
SEWING THREAD AND SPECIALITY YARNS: 9 Hours

Sewing Thread Manufacture**:** Fibres used and their characteristics. Essential quality requirements of sewing threads, Sequence of manufacturing process for sewing threads for cotton, polyester and polyester / cotton blends. Speciality Yarns: Fancy yarns, textured yarns and Melange yarns-Types and classifications. Core spun yarn production technique in ring frame.

TOTAL: 45 HOURS

REFERENCES

2. Klien,W.G,"TheTechnologyofShortStapleSpinning"TheTextileInstitute,, Manhester,1988 (five volumes)
3. Mahendra Gowda, R. V, "New Spinning Systems", NCUTE Publication, Second Edition, 2006
4. Joseph. M. L, "Essentials of Textiles", Hold Rienhart Winston Pub. Co., New York, 1990
5. Oxtoby E, "Spun Yarn Technology", Butterworth and Co., London, 1991.
6. Corbmann, B. P, "Textiles: Fibre to Fabric", McGraw Hill Inc., USA, 1996.
7. Chellamani, K. P, Chattopadhyay. D, "Yarns and Technical Textiles" SITRA publication, First Edition, 1999



U15PH*P*101/ U15PH*P*201 PHYSICS LABORATORY (Common to all branches of Engineering and Technology)	L	T	P	C
	0	0	2	1

COURSE OUTCOMES

CO1 Acquire practical knowledge about different physical properties of materialsCO2 Devlop skills in multidisciplinary project works and applications
CO3 Acquire skills in the experiments involving the physical phenomena like interference anddiffraction

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M										M
CO2	S	M										M
CO3	S	M										M

Course Assessment methods

Direct	Indirect
1. Continuous Assessment of lab performance 2. Model Practical Examination 3. End Semester Practical Examination	1. Course end survey

LIST OF EXPERIMENTS

Any Ten Experiments

1. Lee's disc - determination of thermal conductivity of a bad conductor
2. Air wedge - determination of thickness of a given specimen.
3. Spectrometer - determination of wavelength of mercury source using grating
4. Compound pendulum - determination of accelaration due to gravity.
5. Melde's String- Determination of frequency of an electrically maintained vibrator (tuning fork)
6. Viscosity - determination of co-efficient of viscosity of a liquid by poiseuille's flow method.
7. Non-uniform bending – determination of Young's modulus
8. Ultrasonic interferometer –determination of velocity of sound and compressibility of liquid.
9. Lux meter – Determination of efficiency of a Solar cell
10. Semiconductor laser:
    a. Determination of wavelength of laser using grating
    b. Particle size determination
    c. Acceptance angle of optical fibre
11. Carey foster bridge – determination of specific resistance of given coil of wire.
12. Field along the axis of a coil – Determination of magnetic moment.

TOTAL: 30 HOURS

U15ME*P*101 / U15ME*P*201 ENGINEERING PRACTICES LABORATORY	L	T	P	C
(Common to all branches of Engineering and Technology)	0	0	2	1

COURSE OUTCOMES

After successful completion of this course, the students should be able to:

CO1: Select the various tools and equipments used in the fabrication workshop.
CO2: Develop various joints in carpentry, fitting,
CO3: Make simple shapes using sheet metal tools.
CO4: Demonstrate the use of welding tools to make a butt joint
CO5: Demonstrate and evaluate the parameters of basic electronic components (wires, resistors,capacitors, diodes etc.) and test the components.
CO5: Estimate DC and AC Voltage and currents using appropriate measuring instruments.

Pre-requisite: Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M				M							
CO2	M				M							
CO3	M				M							
CO4	M				M							
CO5	M				M							
CO6	M				M							

Course Assessment methods:

Direct	Indirect
1. Lab Excercises 2. Model Exam 3. End semester exam 4. Observation	Course end survey

LIST OF EXPERIMENTS

GROUP – I **21 Hours**

A. CIVIL ENGINEERING

1. Carpentry

- Study of carpentry tools
- Preparation of T joint
- Preparation of dovetail joint

2. Plumbing

- Study of pipeline joints

B. MECHANICAL ENGINEERING

1. Fitting

- Study of fitting tools

- Preparation of L joint
- Preparation of square joint

2. Sheet Metal Working

- Study of sheet metal working tools
- Preparation of cone and tray

3. Welding

- Study of arc welding tools and equipment
- Preparation of butt joint

GROUP - II (ELECTRICAL & ELECTRONICS ENGINEERING)

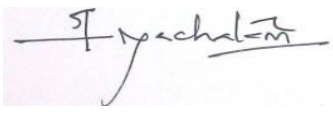
C. ELECTRICAL ENGINEERING PRACTICE **12 Hours**

- Basic household wiring using switches, fuse, indicator-lamp, etc.,
- Preparation of wiring diagrams.
- Stair case light wiring.
- Tube light wiring
- Study of iron-box, fan with regulator, emergency lamp and microwave oven.

D. ELECTRONIC ENGINEERING PRACTICE **12 Hours**

1. Assembling simple electronic component on a small PCB and Testing.
2. Soldering simple electronic circuits and checking continuity.
3. Measurements using digital multimeter.
   - DC and AC voltage measurement
   - DC and AC current measurements.
   - Resistance Measurement.
   - Continuity measurement.
4. Testing of Electronic components
   - Resistors
   - Inductors and capacitors
   - Diodes (resistance in forward bias and reverse bias)
   - Transistors
5. Study of CRO and Function generator
   - Study of Panel Controls
   - Measurement of Amplitude, Frequency, phase difference

TOTAL: 45 HOURS



U15CS*P*203 **PROBLEM SOLVING TECHNIQUES LABORATORY**

(Common to ECE, CSE, IT, FT)

Course Objectives:

To introduce students to the foundations of computing, programming and problem-solving.

To develop basic programming skills necessary for engineering education.

Course Outcomes (CO):

After Successful completion of this course, the students will be able to :

CO1	Write a pseudo code for the identified problem	S
CO2	Translate the pseudo code into an executable program	S
CO3	Validate the program for all the possible inputs.	S
CO4	Identify an appropriate approach to solve the problem	S
CO5	Use different data structures	S

Pre-requisite: Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	**PO**												**PSO**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	S	M		M					L						
CO2	S	M		M	S				L						
CO3	S	M		M					L						
CO4	S	M		M					L						
CO5	S	M		M					L						

Course Assessment Methods:

Direct	**Indirect**
• Model Lab Exam • End Semester Practical Exam	• Course Exit Survey

Course Content:

Problem solving

General problem solving concepts, approaches and challenges, problem solving with computers, data structures

Approaches

Solve by analogy, Decompose the task into smaller subtasks, Building block approach, merging solutions, Algorithmic thinking, Choice of appropriate data structures, Implementation of the Pseudo-code, implementing the code, testing the solution

Introduction to program structure

Variables and constants, local and global variables, expressions, control structures, selection structures, arithmetic, relational and logical operators, Conditional and looping statements, programming in manageable pieces: program modules, subprograms, functions and recursion

Problem to code approach

Problem statement, problem analysis, program design, program code, program test

Sorting (Numbers and Strings)

Bubble sort, Insertion sort, Selection Sort

Searching (Numbers and Strings)

Binary search, Random search, Search for Max-Min

References:

1. *R. J. Dromey, How to solve it by Computer, Prentice Hall International, New Jersey, 2007*
2. *Harold Abelson and Gerald Sussman, Structure and Interpretation of Computer Programs, MIT Press, 1996.*
3. *Subhasis Banerjee, S. Arun Kumar, D. Dubhashi, Introduction to Computer Science, McGraw Hill India.*

List of Experiments:

I Problems based on Numbers:

1) Write a program to compute the factorial of a given number.

Test Case	**1**	**2**	**3**	**4**
Input	8	1	0	-5
Output	40320	1	1	Invalid

2) Write a program to find all numbers between 2000 and 3000 (both inclusive) which are divisible by 7 but not a multiple of 5. All such numbers are to be printed in a comma separated sequence on a single line.
Output: 2002, 2009, 2016, … 3199

II Problems based on Data Processing:

1) Write a program that takes an IP address of the form P.Q.R.S as input, where P, Q, R and S are decimal numbers in the range 0 to 255, and prints the class of the address as indicated in the table below.

Value of P	**Class**
1 – 126	A
128 – 191	B
192 – 223	C
224 – 239	D
240 – 254	E

Test Case	**1**	**2**	**3**	**4**	**5**
Input	224.220.206.91	126.220.206.91	127.0.0.1	0.100.100.100	255.255.255.255
Output	Class D	Class A	Invalid	Invalid	Invalid

2) Write a program to check if a given number is a stepping number or not.
Note: A number is called a stepping number if every adjacent digit, except those separated by commas, differs by 1. A stepping number can't be a 1-digit number; it must be at least a 2-digit number. For example 45 and 43,545 are valid stepping numbers, but 890,098 is not a stepping number because the difference between numbers 9 and 0 cannot be considered as 1.

Test Case	**1**	**2**	**3**	**4**	**5**
Input	567	89,432	780,023	7	49
Output	Valid	Valid	Invalid	Invalid	Invalid

3) Write a program that takes a large English text file as input and counts the number of occurrences of each alphabet in the text.
(i) Display the alphabet with maximum and minimum number of occurrences.
(ii) Swap the alphabets with maximum and minimum occurrences to obtain a modified text file.
(iii) Take the output of (ii) as input and get back the original text file.

Test case:
Input: A text file with 3000 characters - in which 500 are e and 5 are z.
Output: (i) Maximum occurrence – e and Minimum occurrence – z
(ii) The characters e and z in the text file are swapped to get a modified text
(iii) The original text file

4) The property of Exclusive OR operation (i) Any X $\oplus$ X is 0 (ii) Any X $\oplus$ 0 is X.
An Encryption and Decryption scheme using this property is given below:
Encryption Algorithm: Cipher Text (C) = Plain Text (P) $\oplus$ Key (K)
Decryption Algorithm: Plaint Text (P) = Cipher Text (C) $\oplus$ Key (K)
Answer the following questions:
(i) For any given P and the corresponding C, find K [K = P $\oplus$ C]
(ii) For any given C and the corresponding key K, find P [P = C $\oplus$ K]

Test Case		**1**	**2**	**3**
Inpu	P	1 1 0 0 1 1 0 0	0 0 1 1 1 1 0 0	1 1 1 1 1 1 1 1
	C	0 0 1 1 0 0 1 1	1 0 1 0 1 0 1 1	1 1 1 1 1 1 1 1
Outp ut	Key	1 1 1 1 1 1 1 1	1 0 0 1 0 1 1 1	0 0 0 0 0 0 0 0
	New cipher text	0 0 0 0 0 0 0 0	1 1 0 0 1 1 1 1	11 11 1 1 1 1
	Plaintext (New cipher text $\oplus$Key)	1 1 1 1 1 1 1	0 1 0 1 1 0 0 0	1 1 1 1 1 1 1 1

5) Write a function num_atoms( ) that takes the weight of the element in grams and its atomic weight as parameters and calculates the number of atoms in n grams of an element.
Note: Atomic weight of gold (Au) 196.97 with units in grams/mole.
Atomic weight of carbon=12.001, Atomic weight of hydrogen=1.008
Avogadro's number is a constant, 6.022×10^{23}
Test Case 1:
Amount of gold =4.5grams, n = $0.45/197 = 2.28 \times 10^{-3}$, 1 mol = 6.022×10^{23} atoms
Total number of atoms = $6.022 \times 10^{23} \times 2.28 \times 10^{-3} = 13.756 \times 10^{20}$

6) Define a procedure histogram() that takes a list of integers and prints a histogram to the screen.

Test Case	**1**	**2**	**3**
Input	histogram([4])	histogram([-3, 6, 12])	histogram([2, 0, 3])

Output	****	****** **********	** ***

7) Write a program to solve this classic ancient Chinese puzzle: We count 35 heads and 94 legs among the chickens and rabbits in a farm. How many rabbits and how many chickens do we have?

8) In cryptography, a Caesar Cipher is a very simple encryption technique in which each letter in the plain text is replaced by a letter some fixed number of positions down the alphabet. For example, with a shift of 3, A would be replaced by D, B would become E, and so on. ROT-13 ("rotate by 13 places") is a widely used example of a Caesar cipher where the shift is 13. Write a program to implement an encoder/decoder of ROT-13.

Test Case	**1**	**2**
Input	Roy eats	Deer stays back
Output	Ebl rngf	Qrre fgnlf onpx

9) Newton's Second Law of motion is expressed as $F = m \times a$, where F is force, m is mass and a is acceleration. Write a program to calculate the acceleration if mass of an object and the force on that object are given as input. Display the result to the user.

Test Case	**1**	**2**
Input	Mass=5, Force =1050	Mass =3, Force=564
Output	210	188

III Problems based on Strings and Functions:

1) Write a program (using functions) that takes a long sentence with multiple words as input and rearranges the words in the sentence in the reverse order.

Test Case	**1**	**2**	**3**
Input	My name is python	Kumaraguru College of Technology	Problem based on Strings
Output	python is name My	Technology of College Kumaraguru	Strings on based Problem

2) Write a program that accepts a sequence of 4 digit binary numbers as its input, which are comma separated and prints as output, only the binary numbers that are divisible by 5 in the same format.

Test Case	**1**	**2**	**3**
Input	0100,0011,1010,1001,1100, 1001,0101	0010, 1111, 1100	1110, 1000, 1110
Output	1010, 0101	1111	Not divisible by 5

3) Write a program that accepts a sentence as input and calculates the number of letters, digits and special characters.

Test Case	**1**	**2**

Input sentence		hello world! @$ 123	There is a laptop with #CS123…
Output	Letters	10	20
	Digits	3	3
	Special Characters	3	4

4) Write a String tokenizer program that accepts a file as input and counts the number of lines and words and prints the same as output. (Note: You can use wc command also)

Test Case	**Input Sentences**	**No. of lines**	**No. of words**
1	Correctness and efficiency issues in programming, time and space measures Basics of imperative style programming Assertions and loop invariants	3	19
2	greedy algorithms are not always the optimal process, even after adjusting the order of their processing	2	16

5) Write a "space_correction()" function that takes a string (sentence) as input and examines it for space characters. If there are two or more continuous space characters in the sentence then they are deleted, so as to have only one space character between words. It also examines the end of sentences; if the period (full stop) is directly then followed by a letter it inserts a space after the period.

Test case I	Input	space_correction(“This is very funny and cool.Indeed!")
	Output	"This is very funny and cool. Indeed!"
Test case II	Input	space_correction(“A flow chart provides appropriate steps to be followed.it is a program design tool”)
	Output	A flow chart provides appropriate steps to be followed. it is a program design tool

6) Write a function printValue() that can accept two strings as input and prints the longer of the two. If two strings have the same length, then the function should print both the strings.

Test case	**1**	**2**	**3**
Input	printValue(“one”,”three”)	printValue(“laptop”,”laptop”)	printValue(“ten”,”so”)
Output	three	laptop laptop	ten

7) An anagram is a type of word play, the result of rearranging the letters of a word, using all the letters in the original word exactly once; e.g., uleb = blue. Write a program that accepts the jumbled characters from user and choose the correct word from the given list by rearranging the characters in the word. Display the word, if it is available in the given list of word. Assume that the list of words is set of colors like {brown, blue, green etc}

Test case	**1**	**2**	**3**
Input	onwbr	reegn	etihw
Output	brown	green	white

8) Assuming that we have some email address of the form "username@companyname.com". Write a program to print the user name of a given email address. Both user names and company names consists of letters only.

Test case	1	2
Input	inboxcse@gmail.com	csedeptgroups#yahoomail.com
Output	inboxcse	Invalid email address

9) Write a program that takes a string as input and prints the number of occurrences of each character in the string.

Test case	1	2
Input	abbaca	icici
No. of occurrences	a=3,b=2,c=1	i-3 , c-2

10) Write a recursive function and an iterative function to compute the Fibonacci sequence. Compare the performance of both functions.

11) Write a version of a palindrome recognizer that also accepts phrase palindromes such as "Go hang a salami I'm a lasagna hog.". (Note: punctuation, capitalization and spacing are ignored)

Test case	1	2
Input	i am tired	was it a rat i saw
Output	Not a palindrome	Palindrome

12) In English, a sentence using present continuous is formed by adding the suffix *-ing* to the verb.(example: go□ going).

A simple set of heuristic rules can be given as follows:

1. If the verb ends in *e*, drop the *e* and add *ing* (if not exception: be, see, knee, etc.)
2. If the verb ends in *ie*, change *ie* to *y* and add *ing*
3. For words consisting of consonant-vowel-consonant, double the final letter before adding *ing*
4. By default, just add *ing*

Write a function "make_ing_form()" which converts a given verb to present continuous form. Test your function with words such as lie, see, move and hug.

Test case	1	2	3	4
Input	believe	tie	sit	walk
Output	believing	tying	sitting	walking

13) A pangram is a sentence that contains all the letters of the English alphabet at least once. Write a function to check if a given sentence is a pangram or not. If the given sentence is not a pangram print the missing letters.

Test case	1	2
Input	*The quick brown fox jumps over the lazy dog*	*The quick brown rat jumps over the lazy cat*
Output	Pangram	Not a Pangram Missing letters*:f,x,d,g*

14) Write a function "calc_weight_ on_ planet()" that takes two arguments - weight on Earth and the surface gravity of the other planet and calculates the equivalent weight on the other planet. (Note: The surface gravity of Jupiter is 23.1 m/s^2 (approx) and that of Earth is 9.8 m/s^2(approx), Weight = Mass x Surface gravity)

Test case	1	2
Weight on Earth(lb)	*127.2*	*-100*
Weight on Jupiter	297.6	*Invalid*

15) Write a program to check the validity of passwords entered by users.

Following are the criteria for a valid password:

1. At least 1 letter between [a-z]
2. At least 1 letter between [A-Z]

3. At least 1 number between [0-9]
4. At least 1 character from [$#@]
5. Minimum length of password: 6
6. Maximum length of password: 12

Your program should accept a sequence of passwords that are comma separated and check them for validity based on the criteria given above and print the valid passwords only in the comma separated form.

Test case	**1**	**2**	**3**
Input	ABd1234@1, a F1#,2w3E*,2We3345	HFd1244@1, a F1#,2w3E*,2We334#5	ABd12342, a F1#,2w2B*,2We3345
Output	ABd1234@1	HFd1244@1, 2We334#5	Invalid

V Problems based on Data Structures:

1) Write a program that maps a list of words to a list of integers (representing the lengths of the corresponding words). Write it in three different ways: 1) using a for-loop, 2) using the higher order function map (), and 3) using list comprehensions
2) Write a program that prompts the user to enter the name of the fruit and its weight. The program should then display the information in the same form but in the alphabetical order.

Test case	**1**	**2**	**3**
Input	Kiwi, 4 kg, Apple, 6 kg, Banana, 11 kg	Gowva, 4 kg, Apple, 6 kg, Banana, 11 kg	Carrot, 4 kg, Kiwi, 6 kg, Banana, 11 kg
Output	Apple, 6 kg, Banana, 11 kg, Kiwi, 4 kg	Apple, 6 kg, Banana, 11 kg, Gowva, 4 kg	Banana, 11 kg, Carrot, 4 kg, Kiwi, 6 kg

3) Write a program that prompts the user to enter a list of words and stores them in a list. Create a new list that retrieves words from the first list such that first letter occurs again within the word. The program should display the resulting list.

Test case	**1**	**2**
Input	Baboon, List, Duplicate	Frog, Snake, Lizard
Output	Baboon	No Such word exist in list

4) List Overlap Solution:

Consider the following lists, A = [1,1,2,3,5,8,13,21,34,55,89] &
B = [1,2,3,4,5,6,7,8,9,10,11,12,13]

Write a program that returns a list that contains only the elements that are common between the lists (without duplicates). Make sure your program works on two lists of different sizes.

Hint: (A intersection B)

Test cases:

Input the following lists,

A = [1,1,2,3,5,8,13,21,34,55,89] B = [1,2,3,4,5,6,7,8,9,10,11,12,13]

Output: A ∩ B= [1,2,3,5,8,13]

VI Problems based on Sorting:

1) Write a program to sort the (name, age, score) tuples in ascending order where name is string, age and score are numbers. The tuples are input using the console. The sort criteria are:
    a. Sort based on name
    b. Then sort based on age;
    c. Then sort by score

d.

Test case	1	2
Input	Tom,19,80 John,20,90 Jony,17,91	Jony,17,91 Jony,17,93 Json,21,85
Output	[('John', '20', '90'), ('Jony', '17', '91'), ('Jony', '17', '93'),('Tom', '19', '80')]	[('Jony', '17', '91'), ('Jony', '17', '93'), ('Json', '21', '85')]

2) Write a program that accepts a sequence of words that are hyphen separated as input and prints the words in a hyphen-separated sequence after sorting them alphabetically.

Test case	1	2	3
Input	green-red-yellow-black-white	red-yellow-black	green-yellow-white
Output	black-green-red-white-yellow	black -red-yellow	green-white-yellow

VII Problems based on Divide and Conquer:

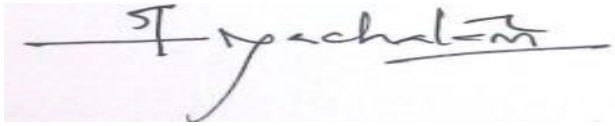
1) Write a program for binary search using arrays

Test case	1	2
Input	4, 7,8,11,21	4, 7,8,11,21
Enter the number to be search	11	18
Output	The number is present	The number is not present

VIII Problem Solving by Backtracking:

1) Write a program to solve the 4-Queen's Problem.

Total Hours:24



U15GH*P*201/ PERSONAL VALUES -2	L	T	P	C
(Common to all branches of Engineering and Technology)	**1**	**0**	**0**	**1**

Course outcomes:

After successful completion of the course, the student would be able to:

CO 1 : The student shall broadly understand how negative emotions affects his/her life andkeep away from them
CO 2 : The student shall be aware of the self and his/her responsibilities to himself and society at large
CO 3: The student shall understand the importance of conscious living
CO 4 : The student shall be able to better able to life by listening to inner voice
CO 5 : The student shall learn advanced contemplative practices so that he/she can practice athis/her leisure

Pre-requisite: NIL

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	Programme Outcomes(POs)													
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1						S	W	W				M		
CO2						M	M	M	W			S		
CO3						W	W	W				M		
CO4								W				M		
CO5						M	W					S		

Course Assessment methods:

Direct	Indirect
1.Individual Assignment 2.Group Assignment 3.Presentation 4.Surprise Test 5.Practical Assessment 6.End Semester Assessment	1.Attendance and Behavioural Assessment

Moralization of desire 1 Periods

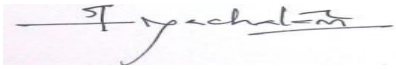
Neutralization of Anger 1 Periods

Heart Centered Living	3 Periods
Transactional Analysis	2 Periods
Self Awareness Methods	3 Periods
Advanced Contemplative Practices	5 Periods

Total Periods: 15

References Books:

1. Vethathiri's Maharishi's, ***"Yoga for Modern Age"***, The World Community Service Centre, Vedhathiri Publications 2009.
2. Swami Vivekananda, "***The Man Making Message"*** The Ramakrishna Tapovanam, Published 1972.
3. Vethathiri's Maharishi's, ***"Manavalakalai part 1,2&3"*** 1th edition, The World Community Service Centre, Vethathiri Publications,2005.
4. Devdas Medon, **"Stop Sleep Walking in Life"** Yogi Impressions Books, Published 2004.
5. Hermann Hesse, **"Siddhartha"** New Directions, Published 1922.



SEMESTER – III

U15MAT306 PROBABILITY AND APPLIED STATISTICS

L	T	P	C
3	2	0	4

Course Outcomes:

After successful completion of this course, the students should be able to

CO1: Compute measures of central tendencies, dispersions and correlate the variables.

CO2: Analyze random or unpredictable experiments and investigate salient features of random experiments.

CO3: Construct probabilistic models for observed phenomena through distributions which play an important role in many engineering applications.

CO4: Analyze sample data and interpret the same for population.

CO5: Analyze the variance for experimental designs.

CO6: Sketch the control charts and outline the process capability.

Pre-requisite courses: Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	S		M					M	M				
CO2	S	S		M					M	M			M	
CO3	S	S		M					M	M			M	
CO4	S	S		M					M	M			M	
CO5	S	S		M					M	M			M	
CO6	S	S		M					M	M			M	

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignment 3. Case Study	1. Course Exit Survey

Topics covered:

STATISTICAL MEASURES **9 Hours**

Measures of central tendency: Arithmetic Mean, Median and Mode **–** Measures of variation: Range, Mean deviation, standard deviation and coefficient of variation – Correlation (Discrete Data): Karl Pearson's Correlation coefficient – Spearman's Rank Correlation – Regression lines (Discrete Data).

9 Hours

PROBABILITY AND RANDOM VARIABLES

Axioms of probability - Conditional probability – Total probability – Baye's theorem - Random variable – Distribution function – properties – Probability mass function – Probability density function – moments.

9 Hours

STANDARD DISTRIBUTIONS

Binomial, Poisson and Normal distributions – Moments, Moment Generating functions and properties for the above distributions - Fitting of Binomial and Poisson distributions.

9 Hours

TESTING OF HYPOTHESIS

Testing of hypothesis for large samples (single mean, difference of means, single proportion, difference of proportions) – Small samples tests based on t and F distributions (single mean, difference of means, paired *t*- test and variance ratio test) – Chi-square test for independence of attributes and goodness of fit.

5 Hours

DESIGN OF EXPERIMENTS

Analysis of Variance: Completely Randomized Design – Randomized Block Design – Latin Square Design

STATISTICAL QUALITY CONTROL **4 Hours**

Concept of process control - Control charts for variables : $\overline{X}$ chart , R chart – Control charts for attributes : p chart, np chart, c chart – Tolerance limits.

Theory: 45 Hrs **Tutorial : 15 Hrs** **Total Hours: 60**

REFERENCES

1. Veerarajan T., "Probability, Statistics and Random Processes", Tata McGraw Hill,3rd edition, 2008.
2. Gupta S. P, "Statistical Methods", Sultan Chand & Sons Publishers, 2004.
3. Johnson R. A., Miller & Freund's "Probability and Statistics for Engineers", Sixth Edition, Pearson Education, Delhi, 2000.
4. Gupta.S.C. and Kapoor.V.K, "Fundamentals of Mathematical Statistics", 11th extensively revised edition, Sultan Chand & Sons, 2007.
5. Walpole R. E., Myers S.L. & Keying Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education Inc, 2002.
6. Gupta S.C. and Kapoor V.K., "Fundamentals of Applied Statistics", Sultan Chand, New Delhi, 4th Edition, 2014.
7. Charles Henry Brase and Corrinne Pellillo Brase "Understandable Statistics", D.C. Heath and Company, Toronto, 1987.

L	T	P	C
3	0	0	3

U15EET313 ELECTRICAL ENGINEERING

Course Objectives

1. To explain the various Electrical circuits and the different components and function of electrical machines.
2. To explain the principles of semiconductor devices and logic gates

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Understand the basic laws of electricity and apply them to electrical circuits.	K1
CO2	Calculate the power ratings of AC circuits	K2
CO3	Describe the operation of DC machines and Induction motors	K1
CO4	Understand the characteristics and applications of DC machines and Induction motors.	K1
CO5	Select suitable motor for desired applications	K2
CO6	Identify electronics components and use them to design circuits	K1

Pre-Requisite: Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M												S	
CO2	M	W											S	
CO3	M												S	
CO4	M	W											S	
CO5	M												S	
CO6	M												S	

Course Assessment Methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

ELECTRICAL CIRCUITS **9 Hours**

Ohm's Law – Kirchoff's Laws – series, parallel DC circuits – Introduction to AC Circuits – Waveforms and RMS Value – Single Phase series RLC circuits- Power and Power factor- solving simple AC circuits.

DC MOTORS **9 Hours**

Construction - Principle of Operation- types – back EMF– torque equation - speed torque characteristics – losses and efficiency – speed control of DC motor

INDUCTION MOTORS **9 Hours**

3 phase Induction Motor -construction– Principle of operation – types – torque equation - speed torque characteristics – 1 phase Induction Motor – Principle of operation- types. Electric braking of Induction Motor

INDUSTRIAL APPLICATIONS **9 Hours**

Types of Drives - Motor Selection – factors to be considered – power rating – types of Duty cycle –Heating and cooling curves - selection of motors for cranes, centrifugal pumps, and Textile Mills.

ELECTRONIC CIRCUITS **9 Hours**

Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation.

Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics.

Introduction to Binary Logic gates – AND, OR, NOT NAND, NOR, EX-OR & EX-NOR.

Theory:45 Hours **Total: 45 Hours**

TEXT BOOKS

1. Mehta V K and Rohit Mehta, "Principles of Electrical Engineering and Electronics", S.Chand & Co. Ltd., New Delhi, 2006.
2. Muthusubramanian R, Salivahanan S and Muraleedharan K A, "Basic Electrical, Electronics and Computer Engineering", 2nd Edition, Tata McGraw Hill Publishers, New Delhi, 2009.

REFERENCES

1. Pillai S K,"A first course on Electrical Drives", New Age International Publications Ltd,New Delhi, 2011.
2. Murugesh Kumar K, "Basic Electrical Science and Technology", Vikas Publishing Ltd, New Delhi, 2011.
3. Leach D P, Malvino A P and Goutam Saha, "Digital Principles and Applications", Tata Mc Graw- Hill, New Delhi, 2008.
4. Nagsarkar T K and Sukhija M S, "Basics of Electrical Engineering", Oxford press, 2005.

U15FT*T*301 CONCEPTS OF FASHION AND DESIGN

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Adapt elements & principles of design in context to Textiles and Apparels	K6
CO2	Choose suitable color dimensions and categories for textiles and apparels	K3
CO3	Summarize the dynamics of fashion and the role of fashion designers	K2
CO4	Explain the fashion forecasting process	K3
CO5	Determine the significance of a fashion portfolio	K3
CO6	Identify the traditional world costumes and textiles of India	K3

Pre Requisite: Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		S	S										S	S
CO2		S	S	M									S	S
CO3		S						M				M	M	
CO4		S	S	M									M	
CO5			M							M				
CO6		S												

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

DESIGN CONCEPTS **7 Hours**

Design – definition, Design types- natural, stylized, geometric, historic and abstract, garment design- structural, decorative and functional. Elements of Design –line, shape, form, size, colour, texture and pattern. Principles of Design – Harmony, Balance, Rhythm, Emphasis and Proportion. Introducing elements and principles of design in apparels.

COLOUR CONCEPTS **7 Hours**

Color – Definition, Dimensions of colour-Hue, Value and Intensity, Colour categories and psychology - Warm and Cool Colours, Advancing and Receding colours, Colour theories – Prang colour system and Munsell colour system - colour harmonies.

FASHION FUNDAMENTALS **11 Hours**

Fashion -Definition, Classification of fashion, tangibles and intangibles of fashion, Principles of fashion, Fashion life cycle, Fashion adoption theories. Fashion terminology -Street fashion, Recurring fashion, Mass fashion, Fashion trend, Fashion shows, Style, Chic, Boutique, Haute Couture, Fashion designers – definition, role and study of leading fashion designers - French, Italian, American, Indian and British.

FASHION DESIGNING PROCESS **9 Hours**

Fashion Forecasting – role of forecasting agencies, techniques and presentation of forecast. Design process – Innovation of practice, analyzing the brief, Research inspiration – Research direction, prototyping, planning a collection, designer boards and portfolio presentation

HISTORIC COSTUMES AND TEXTILES **11 Hours**

Origin and importance of clothing, Factors influencing costume changes. Costumes of ancient civilization – Egypt, Greece, Rome, British Medieval period and French empires during Renaissance period 1500 - 1600 AD, Traditional costumes of India, China and Japan. Traditional Textiles of India – Dacca Muslin, Jamdhani, Himrus and Amrus, Kashmir shawls, Kancheepuram and Baluchari saris, Paithani saris, Chanderi saris, Benaras Brocades, Bandhani, Patola, Ikkat, Block printed and Kalamkari.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Kathryn McKelvey and Janine Munslow, “Fashion Design: Process, Innovation and Practice”, Blackwell Publishing, USA, 2005.
2. Diane.T and Cassidy. T, “Colour forecasting” Blackwell Publishing, 2005
3. Dar, S.N., “Costumes of India and Pakistan”, D.B Tataporevala Sons and Co. Ltd., 1982.
4. Churye G.S, “Indian Costume”, Popular Prakashan Pvt. Ltd., Bombay, 1995.
5. Hatanaka Kokyo Collection –“Textile arts of India”, Chronide Books, 1996
6. Elaine Stone, Jean A. Samples, “ Fashion Merchandising” McGraw-Hill Book Company 1985.
7. Russel Gillow and Nicholas Barnard, “Traditional Indian Textiles”, Thames and Hudson Ltd.,London, 1991.
8. Douglas.A. Russel, “Costume History and Style”, Prentice Hall Inc., 1983
9. Elizabeth Rouse, “Understanding Fashion”, Blackwell Scientific Publication, Oxford, 1989.
10. Katherine Morris Lustre, “Historic Costume”, Chas A. Bennett Co., Publishers, Peoria, Illinois, 1956.

U15FT*T*302 BASIC PATTERN MAKING AND ADAPTATION

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Define and classify the patterns and memorize the steps involved in taking body measurement	K2
CO2	Prepare the basic block patterns for men, women and kids wear based on the principles and methodologies of drafting	K3
CO3	Prepare patterns for basic blocks using draping techniques	K3
CO4	Apply dart manipulation techniques to design, variation in garment components	K6
CO5	Evaluate the techniques involved in pattern alteration for various body measurements and fitting problems	K5
CO6	Develop knowledge on the techniques involved in grading for various sizes of body measurements	K3

Pre Requisite : Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		S											M	
CO2	S	S	M							M			S	M
CO3	S	S	M							M			S	M
CO4		S	S										S	
CO5	S	S	M	M								M	M	
CO6	S	S	M										M	

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

BASIC PATTERN MAKING 9 Hours

Patterns – definition and types- individual and commercial patterns. Pattern making – definition and types of pattern making- drafting, draping, flat pattern techniques, their advantages and disadvantages. Tools for pattern making. Body measurements – importance, principles, precautions. Definition and standardization of size chart (ASTM Standards)

DRAFTING **9 Hours**

Basic principles and methodologies used to draft standard basic block patterns for men, women and kids wear- top, skirt and bifurcated garment (pyjama) . Importance of pattern details – pattern name, cut number, on fold details, drill hole marks, darts, Seam allowances, notches, Balances marks and grain lines.

DRAPING **9 Hours**

Draping - Tools for Draping. Draping skills – preparation of basic blocks- bodice, skirt, sleeve and trouser.

FLAT PATTERN TECHNIQUES **9 Hours**

Dart Manipulation – basic techniques – pivot method, slash and spread, measurement method. Applications of dart manipulation on bodice with darts on shoulder, armhole, side seam and waistline – transferring darts, combining, dividing, converting into seams and fullness – drafting princess line cut.

PATTERN ALTERATION **5 Hours**

Pattern alteration - definition, principles, techniques – Lengthening, shortening, widening, narrowing patterns according to required body measurements by slash and spread or slash and overlap methods.

GRADING **4 Hours**

Grading – Definition, Principles and types –manual grading and computerized grading for bodice block, sleeve and skirt.

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. Helen Joseph Armstrong, "Pattern Making for Fashion Design" Pearson Education (Singapore)Pvt. Ltd.,2005
2. Winifred Aldrich, "Metric Pattern Cutting" Blackwell Science Ltd., 1994
3. Amaden-Crawford Connie, "The Art of Fashion Draping (3rd edition)" Om Books International Publications, 2005
4. Hollen Norma R; Kundel Carlyn, "Pattern making by the flat pattern method", 1998
5. Gillian Holman,"Pattern Cutting Made Easy", Blackwell Scientific Publications, 1997.
6. Natalie Bray "More Dress Pattern Designing" Blackwell Scientific Publications, 1986.
7. Gerry Cooklin, "Master Patterns and Grading for Women's Outsizes", Blackwell Scientific Publications, 1995.
8. Gerry Cooklin, "Master Patterns and Grading for Men's Outsize", Blackwell Scientific Publications, 1992.
9. Jeenne Price and Bernard Zamkoff, "Grading Techniques for Modern Design" Fairchild Publications, 1990.

U15FTT303 GARMENT COMPONENTS FABRICATION

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Define and Classify the types of stitches, seams, seam finishes, stitch and seam defects.	K2
CO2	Discuss the various methods for creating fullness in garments	K6
CO3	Develop simple patterns for different garment components	K3
CO4	Construct different types of garment components suiting requirements of the wearer	K3
CO5	Construct the different types of garment fasteners suiting requirements of the wearer	K3
CO6	Select and analyze garment components, seam /stitch types for different garment styles and purposes	K5

Pre Requisite: Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S									M			M	
CO2			S										M	
CO3	S		M										S	M
CO4		M	S			M							S	
CO5			S			M							M	
CO6		S	M	M		M						M	M	

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content **9 Hours**

SEAMS: Definition, Types of seams – Federal classifications, factors to be considered in the selection of seam, seam finishes and seam defects.

STITCHES: Definition, stitch classes - Federal classifications, stitch parameters, factors to be considered in the selection of stitches. Stitching defects.

9 Hours

FULLNESS: Definition, types- Darts – single, double pointed darts, Tucks - pin tucks, cross tucks, piped tucks, shell tucks. Pleats- knife pleats, box pleats, invertible box pleats, Kick pleats. Flare, godets, gathers, shirring, single, double frills and flounces.

HEMMING TECHNIQUES: Definition, types - machine stitched hem and hand-stitched hem.

NECKLINE FINISHES- preparation of bias strip, bias facing, bias binding, fitted facing and French binding.

9 Hours

SLEEVES: Types and construction of sleeves - plain, puffs, gathered, bell, bishop, circular, leg-o-mutton, Magyar sleeves, Raglan sleeves, kimono.

YOKES: Definition – Selection of yoke design, Types and construction of yoke - Simple yoke – yokes with or without fullness, midriff yokes, panel yokes, partial yokes.

9 Hours

COLLARS: Classification of collars, Types of collars– flat collars (peter pan collar, scalloped, flared, puritan collar, sailor collar) convertible collar, shirt collar with stand, Mandarin collar, shawl collar.

POCKETS: Types– patch pocket – creating variations, set in pocket- bound pocket, welt pocket, pocket in a seam- front hip pocket, Attaching flap to a patch pocket.

9 Hours

PLACKETS: Inconspicuous plackets - continuous bound placket, two-piece placket, zipper placket – slot seam & lapped seam. Conspicuous plackets - Tailored or Kurtha placket, fly opening – button and buttonhole method, Zipper method.

FASTENERS: Types - button and buttonholes, hooks and eye, snaps, Velcro, eyelets, cords and rivets

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. Mary Mathews, "Practical Clothing Construction Part I and II", Paprinpack, Madras, 2000.
2. Ruth E.Glock, Grace I. Kunz, "Apparel Manufacturing – Sewn Product Analysis", Pearson/Prentice Hall, 2005
3. Claire Shaeffer, "Sewing for the Apparel Industry", Prentice-Hall Inc, New Jersey, 2001
4. Gerry Cooklin, "Garment Technology for Fashion Designers", Blackwell Science Ltd., 2001.
5. Leila Aitken., "Step By Step Dress Making Course", BBC Books, 1992
6. Amaden. C. and Crawford, A guide to Fashion Sewing, Fairchild Publications, 2001.
7. Fan.J., Yu.W., and Hunter.L., "Clothing Appearance and Fit: Science and Technology", The Textile Institute, Manchester, 2004
8. Joseph. H andAmstrong, "Pattern Making for Fashion Design", Pearson Education Inc, 2005.
9. Sumathi,G.J, " Elements of Fashion and Apparel Design", New Age International (P) Ltd, 2005.
10. Federal standards, stitches and seams.

U15FTT304 APPAREL MACHINERY AND EQUIPMENT

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge in different methods of spreading of fabrics with respect to type of fabric and to Evaluate the marker efficiency.	K5
CO2	Describe the basic principles of working of different types of cutting machineries used in apparel production	K2
CO3	Test the settings and adjustment parts of sewing machines	K4
CO4	Develop skills for recognize various parts and their working principles in advanced garment sewing machines.	K3
CO5	Acquire knowledge on special machineries used in apparel production	K3
CO6	Express the importance and the audit of sewing machinery maintenance.	K2

Pre Requisite: NIL

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	S	M	M					W				M	S	M
CO2								W				M	S	M
CO3	S	S	S					W				M	S	M
CO4								W				M	S	M
CO5								W				M	S	M
CO6								W				M	S	M

Course Assessment methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

SPREADINGMACHINES 8 Hours

Types of Fabric Packages. Types of Fabrics – One Way– Two Way Fabrics – Their effect on spreading. Methods of Fabric spreading. Spreading equipments– Computerized spreaders. Marker planning, Marker efficiency, Factors affecting marker efficiency. Marker duplicating methods – Computer aided marker making.

CUTTINGMACHINES 8 Hours

Introduction to cutting machines. Types and functions of cutting machines –straight knife, round knife, band knife cutting machines. Notches, drills, die cutting machines. Computerized cutting

machines. Maintenance of cutting machines. Common defects in cutting and their remedies. Latest Developments.

SEWINGMACHINE- SNLS **10 Hours**

Basic parts of sewing machine – primary and auxiliary parts and their functions. Bobbincase/Bobbinhook, Throat plate – Takeup devices – Tensioners –Feed dog – Pressure foot. Types of needles – Parts of needles and their function. Needle finishes. Adjustments of Stand height – pedal – Needle Bar – Stitch length selection – Feed timing– Needle and Bobbin Thread Tension –Stitch cycle timing diagram. Common defects and remedies. Special attachments in sewing machines – guides, folders, stackers, trimmers, ziggers.

MULTI THREAD SEWING MACHINES **10 Hours**

Over lock machines - Types of Over lock machines. Parts and their functions. Threading diagram for over lock machines. Stitch Cycle Diagram for over lock machines– Adjustment of Needle height, Feed dog height, angle, Differential feed ratio, Position of upper and lower knives, loopers. Defects and Remedies.

Flat lock machines – Types. Parts and their functions. Threading diagram of flat lock machines– Stitch cycle diagram. Adjustment of parts – Needle height, feed dog height, differential feed ratio, loopers. Maintenance of flat lock machines. Defects and Remedies.

SPECIAL PURPOSE SEWING MACHINES **9 Hours**

Introduction to different special purpose sewing machines. Basic working of Feed of Arm, Button Hole sewing, button sewing, Bar tack, blind stitch machines. Embroidery sewing machines. Latest developments in sewing machines. Sewing machine maintenance - Maintenance schedule for various machines. Maintenance audit.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. HaroldCarrandBarbaraLatham,"TheTechnologyofClothingManufacture",OmBookService ,2002.
2. ShaefferClaire,"SewingfortheApparelIndustry",PrenticeHall,NewJersey, 2001.
3. Singer,"SewingLingerie",CyDeCosseIncorporated,1991.
4. Laing R.M. and Webster J, "Stitches and Seams", The Textile Institute,Manchester, 1999
5. Technical Advisory Committee of AAMA, " A New Look at Apparel Mechanization",1978.
6. JacobSolinger,"ApparelProductionHandbook",ReinholdPublications,1998

U15FT*P*301 FASHION DESIGN LABORATORY

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Design patterns and garments using various drawing techniques and drawing media	K6
CO2	Develop color swatches based on color theories.	K6
CO3	Illustrate various garment components, accessories & human anatomy	K3
CO4	Apply garment designs on croquis.	K3
CO5	Develop theme boards based on a theme	K6
CO6	Create patterns and garment designs deriving inspirations from a theme	K6

Pre Requisite : Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1			S							S		S		
CO2			S							S		S		
CO3			S							S		S		
CO4			S							S				
CO5		M	S							S				
CO6			S					M		S				

Course Assessment methods:

Direct	Indirect
1. Model Exams 2. Lab Exercises 3. End semester Exam	1. Course-exit survey

LIST OF EXPERIMENTS

1. Motif Development – Design Repeat and positioning
2. Object Drawing and Shading concepts
3. Drape of fabrics and shading with different mediums
4. Preparing swatches for dimensions of colour, different colour theories and harmonies
5. Rendering prints and textures with various fabric constructions (wovens, non-wovens and knit)
6. Drawing different Silhouettes and garment components - sleeves, collars, necklines, cuffs, skirts, pants

7. Human Anatomy- Figure basics, Constant proportions, Shapes and parts of human body. Study of different postures- Head- Face, Eyes, Lips, Nose, Hand - Fingers, Leg - Feet and Toes, Hand and Arms.
8. Normal Drawing - Eight head theory. Fashion Figure Drawing - Drawing croqui figures-stick, geometric, flesh - 8 ½ and 10 head figures.
9. Different postures of male and female figure - ¾ view, back view, side view. Different poses like – S-Pose, X-Pose, and T-pose.
10. Drawing croqui figures using template, model, imagination and photograph.
11. Create a mood board based on a selected theme.
12. Develop garments on croqui figures (Male and female) deriving inspirations from the developed mood board.

Experiments beyond the syllabus should be conducted

Total: 45 Hours

U15FTP302 APPAREL COMPONENTS AND MACHINERY LABORATORY

L	T	P	C
0	0	4	2

Course Outcomes
After successful completion of this course, the students should be able to

CO1	Explain the parts and functions of various sewing machines.	K2
CO2	Experiment with preparation and operation of various sewing machines.	K3
CO3	Develop patterns using measurements for various garment components.	K3
CO4	Construct garment components using suitable construction techniques.	K3
CO5	Choose the appropriate sewing parameters for any desired quality of stitching of apparel components.	K6
CO6	Apply skill to troubleshoot when faulty stitches occur	K3

Pre Requisite : Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S												M	
CO2	S	S	M										M	
CO3	S	S	S	S									S	M
CO4		S											S	M
CO5			S	S									S	M
CO6			S										S	

Course Assessment methods:

Direct	Indirect
1. Model Exams 2. Lab Exercises 3. End semester Exam	1. Course-exit survey

LIST OF EXPERIMENTS

Group - I

1. Preparing samples for basic Hand stitches.
2. Preparing samples for seams
3. Preparing samples for seam finish.
4. Preparing samples for Darts, pleats and tucks
5. Preparing samples for gathers, godets and frills
6. Preparing samples for Necklines – Bias facing, Bias Binding and Fitted facing.
7. Preparing samples for Sleeves – Plain, Puff, Raglan, Kimono, Cap Sleeve

8. Preparing samples for collars – Peter Pan collar, Full shirt collar, Shawl collar.
9. Preparing samples for pockets – Patch Pocket, Bound Pocket and Front Hip Pocket.
10. Preparing samples for plackets – continuous bound placket, 2 piece placket, tailors placket, Fly opening and Zipper

Group – II

1. Determination of Threading path and Stitches per inch in Single Needle Lock Stitch Machine.
2. Adjustment of needle height, feed dog height and feed dog angle in single needle lock stitch machine
3. Determination of Threading path and stitches per inch, looper thread tension and feed ratio in over lock stitch machine.
4. Determination of Threading path and various stitch alteration in Flat lock stitch machine.
5. Adjustments in button sewing machine for button hole type, size of button
6. Adjustments in Button Holing machine for type of button hole, stitches per inch
7. Adjustments in Feed off the arm Machine.
8. Adjustments in Flat lock elastic attaching machine
9. Adjustments in Electronic Zig – Zag Sewing machine.
10. Adjustment in bar tacking machine.

Experiments beyond the syllabus should be conducted.

Total: 60 Hours

L	T	P	C
1	0	0	1

U15GHP 301 FAMILY VALUES
(Common to all branches of Engineering and Technology)

Objectives

1. To understand the importance of family and to contribute to it
2. To lead spiritual development through good family life.
3. To respect womanhood
4. To lead a healthy and disease free life

Course outcomes:

After successful completion of the course, the student would be able to:

1. The students shall understand the importance of a family
2. The students shall acquire skills in simplified Kundalini yoga for sound health.
3. The students shall learn about greatness of womanhood
4. The students shall learn about the importance of Blessings and relationship
5. The students shall know about simplified Kundalini yoga, its methodology and its benefits

Pre-requisite: NIL

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1						M		M	S	W		M		
CO2						S	M		W			S		
CO3						W						M		
CO4						M			M			S		
CO5						M						M		

Course Assessment methods:

Direct	Indirect
1.Individual Assignment 2.Group Assignment 3.Presentation 4.Surprise Test 5.Practical Assessment 6.End Semester Assessment	1.Attendance and Behavioral Assessment

Introduction to Family Life – An Overall Perspective	1 Periods
Personal & Spiritual development through good Family life	1 Periods
Importance of Relationships & Blessings	3 Periods
Food as Medicine – Quantum Healing	3 Periods
Greatness of womanhood	2 Periods
Simplified Physical Exercises (Kundalini Exercises)	5 Periods

Total Periods: 15

References Books:

1. Vethathiri's Maharishi's, ***"Yoga for Modern Age"***, The World Community Service Centre, Vedhathiri Publications,2009.
2. Swami Vivekananda, "***The Man Making Message"*** The Ramakrishna Tapovanam, Published 1972.
3. Vethathiri's Maharishi's, ***"Manavalakalai part 1,2&3"*** 1[1th] edition, The World Community Service Centre, Vethathiri Publications,2005.
4. Brian L Weiss, **" *Only Love is Real* "** by Grand Central Publishing, Published 1997.

SEMESTER – IV

U15MAT401 NUMERICAL METHODS

L	T	P	C
3	2	0	4

Course outcomes

After successful completion of the course, the student will be able to:

CO 1: Solve a set of algebraic equations representing steady state models formed in engineering problems

CO 2: Fit smooth curves for the discrete data connected to each other or to use interpolation methods over these data tables

CO 3: Find the trend information from discrete data set through numerical differentiation.

CO 4: Estimate integrals from discrete data through numerical methods.

CO 5: Predict the system dynamic behaviour through solution of ODEs modeling the system

CO 6: Solve PDE models representing spatial and temporal variations in physical systems through numerical methods.

Pre-requisite:

Basic knowledge in differentiation, integration and numerical operations.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	S							M	M			M	
CO2	S	S							M	M			M	
CO3	S	S							M	M			M	
CO4	S	S							M	M			M	
CO5	S	S							M	M			M	
CO6	S	S							M	M			M	

Course Assessment methods:

Direct	Indirect
1. Internal Test I 2. Internal Test II 3. Assignment 4. Group presentation 5. Tutorial 6. End semester exam	Course end survey

NUMERICAL SOLUTION OF ALGEBRAIC EQUATIONS 9+3

Solution of nonlinear equations: False position method, Fixed point iteration method, Newton Raphson method for a single equation and a set of non- linear equations - Solution of linear system of equations: Gaussian elimination method, Gauss Jordan method and Gauss Seidel method - Matrix Inversion by Gauss Jordan method - Eigen values of a matrix by Power method.

CURVE FITTING AND INTERPOLATION 9+3

Curve fitting: Method of least squares – Interpolation: Newton's forward and backward difference formulae – Divided differences – Newton's divided difference formula - Lagrange's interpolation – Inverse interpolation.

NUMERICAL DIFFERENTIATION AND INTEGRATION 9+3

Numerical differentiation by using Newton's forward, backward and divided differences – Numerical integration by Trapezoidal and Simpson's 1/3 and 3/8 rules– Truncation error – Evaluation of double integrals.

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATION 9+3

Single step methods: Taylor's series method, Euler and Improved Euler methods, Fourth order Runge – Kutta method – Multistep method: Milne's predictor - corrector method.

NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS 9+3

Finite difference techniques for the solution of two dimensional Laplace's and Poisson's equations on rectangular domain– Solution of one dimensional heat equation using Bender Schmidt and Crank Nicholson difference schemes –Solution of one dimensional wave equation by explicit scheme.

Theory : 45 Hrs Tutorial : 15 Hrs Total: 60 Hrs

REFERENCES:

1. Kandasamy P., Thilagavathy K. and Gunavathy K., "Numerical Methods", S.Chand Co. Ltd., New Delhi, 2007.
2. Steven C.Chapra and Raymond P. Canale, "Numerical Methods for Engineers with Programming and Software Applications", McGraw-Hill, 2004.
3. Gerald C. F. and Wheatley P.O, "Applied Numerical Analysis", Pearson Education Asia, New Delhi, 2002.
4. Sastry S.S, "Introductory Methods of Numerical Analysis", Prentice Hall of India Pvt Ltd, New Delhi, 2003.

U15EST004 ENVIRONMENTAL SCIENCE IN TEXTILE AND APPAREL TECHNOLOGY
(Common to Textile and Fashion Technology)

L	T	P	C
3	0	0	3

Course Outcomes (COs)
After successful completion of this course, the students should be able to

CO1	Analyze the impact of engineering solutions in a global and societal context	**K4**
CO2	Discuss contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems	**K3**
CO3	Highlight the importance of ecosystem and biodiversity	**K2**
CO4	Ability to consider issues of environment and sustainable development in his personal and professional undertakings	**K3**
CO5	Paraphrase the importance of conservation of resources.	**K2**
CO6	Play a important role in transferring a healthy environment for future generations	**K3**

Pre Requisite : Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						S	S					
CO2						S	S					
CO3							M					
CO4						W	M	W				
CO5	M						M					
CO6						M	W					

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignment 3. Presentation 4. End semester exam	1.Course exit survey

Continuous Assessment Method

CO	Int 1	Int 2	End sem	Assignment	Presentation
CO1 - 20	50		20	20	20
CO2 - 15		40	15	15	15
CO3 -15	40		15	15	15
CO4 -20		50	20	20	20
CO5 -15	10		15	15	15
CO6 -15		10	15	15	15

OBJECTIVES

- At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and

useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity.

INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES **14 Hours**

Definition, scope and importance – Need for public awareness – Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people

Water resources: Use and overutilization of surface and ground water, conflicts over water, dams benefits and problems - Water conservation, rain water harvesting, watershed management

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies

Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, case studies

Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification, Wasteland reclamation – Role of an individual in conservation of natural resources

ECOSYSTEMS AND BIODIVERSITY **9 Hours**

ECOSYSTEM : Concept of an ecosystem – Structure and function of an ecosystem: Producers, consumers and decomposers, Food chain, Food web, Energy flow in the ecosystem and Ecological pyramids - Ecological succession – Introduction, types, characteristic features, structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

BIODIVERSITY : Introduction to Biodiversity – Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic values – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

ENVIRONMENTAL POLLUTION DUE TO TEXTILE AND APPAREL INDUSTRIES **10 Hours**

Pollutants associated with dyeing, printing and finishing, intermediates, auxiliaries

Causes – effects- preventive measures: Air pollution, Water pollution **(**from yarn, fabric, Wet processing and garment manufacturing processes), Noise pollution in various textile departments-Spinning, Weaving, Sewing line, Wet processing and finishing machineries.

Solid Waste Management**:** Fibre, lint, Trash, Yarn, Fabric waste, packaging waste, accessories wastages their disposals and reuse- waste minimization – Disaster management: floods, earthquake, cyclone and landslides.

SOCIAL ISSUES AND THE ENVIRONMENT **7 Hours**

From Unsustainable to Sustainable development – Urban problems related to energy – Resettlement and rehabilitation of people; its problems and concerns, case studies – Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Human Rights

HUMAN POPULATION AND THE ENVIRONMENT 5 Hours

Population growth, variation among nations – Population explosion – Environment and human health – communicable disease - Women and Child Welfare – Role of Information Technology in Environment and human health – Case studies.

Field Work

Visit to local area to document environmental assets- river / grassland / hill / mountain, visit to local polluted site- urban / rural / industrial / agricultural, study of common plants, insects, birds, study of simple ecosystems-pond, river, hill slopes etc.,

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co., 2013
2. Masters G.M., and Ela W.P., Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., Second Edition.
3. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmadabad India., 2002
4. Trivedi R.K and Goel P.K., "Introduction to Air pollution" Techno-science Publications. 2003
5. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media. 1996
6. Cunningham, W.P., Cooper, T.H.., &Gorhani E., Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001
7. Wager K.D., Environmental Management, W.B. Saunders Co., Philadelphia, USA, 1998
8. Townsend C., Harper J and Michael Begon, "Essentials of Ecology", Blackwell science Publishing Co., 2003
9. Syed Shabudeen, P.S. Environmental chemistry, Inder Publishers, Coimbatore. 2013
10. Harold R, Park Ridge. N.J, "Pollution Control in the Textile Industry", Jones Noyes Data Corp., 1973.
11. Bhatia S C "Handbook of Industrial Pollution and Control (Vol. 1 & 2), CBS edition, 2002.

U14MET407 BASICS OF MECHANICAL ENGINEERING

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Explain principles of thermodynamics, renewable energy and power plants
CO2	Explain the working principle and combustion characteristics of IC Engines.
CO3	Explain the working principle of VCR & VAR systems.
CO4	Understand and explain the various manufacturing processes and power transmission
CO5	Demonstrate basic manufacturing process
CO6	Explain various types of power transmission

Pre Requisite : Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S													
CO2		M												
CO3		M												
CO4	W													
CO5	M													
CO6	M													

Course Assessment Methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

LAWS OF THERMODYNAMICS 9 Hours

First law of thermodynamics – statement and application, steady flow of energy equation, Second law of thermodynamics. Heating and Expansion of Gases, Expression for work done, internal energy, hyperbolic and polytropic processes. Properties of Steam, Dryness fraction, latent heat, total heat of wet steam.

POWER PLANTS 9 Hours

Classification of Power Plants, Steam, Diesel, nuclear and Hydro Power Plants. Types of turbines, working of a single stage impulse and reaction turbine.

Alternate Sources of Energy: (Solar, Wind, Tidal, Geothermal, Ocean Thermal Energy Conversion (OTEC).Wind/ Solar grid fed power plant, Solar /Water air heaters – Techno-economics of power plants and energy sources.

INTERNAL COMBUSTION ENGINES **9 Hours**

Classification of IC engines, Main components of IC engines, working of a 4 stroke and 2 stroke petrol and diesel engine, differences between 4 stroke and 2 stroke engine.

Refrigeration and Air Conditioning: principle of vapour compression and vapour absorption refrigeration systems. Air conditioning, terminology and classifications. Humidification and Air conditioning.

MANUFACTURING PROCESSES **9 Hours**

Basic principles of Arc and Gas Welding, Soldering and Brazing, Extrusion, Forging, Rolling, and Drawing Processes. Milling – Types, Operations and Equipments.

POWER TRANSMISSION **9 Hours**

Types of drives, belt drives – flat and V belts, rope drives, chain drive, gear drives – spur, helical, bevel and worm gears (Descriptive treatment only) – gear trains, simple and compound.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Shanmugam G, Palanichamy M S, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Company, New Delhi, 2nd Edition, 2000.
2. Venugopal.K. and Prabu Raja, "Basic Mechanical Engineering", Anuradha Publications, Chennai, 2007.
3. Sarkar B. K.,"Thermal Engineering" Tata McGraw Hill Company, New Delhi. 2000
4. Rao N., "Manufacturing Technology: Foundry, Forming and Welding", Tata McGraw Hill Co., New Delhi, Paperback Edition. 1998 James Brown, "Advanced Machining Technology Handbook", McGraw Hill, New York,1998

U15FTT401 WEAVING TECHNOLOGY
COURSE OUTCOMES

L	T	P	C
3	0	0	3

After successful completion of this course, the students should be able to:

CO1	Acquire knowledge in the objectives and working principles of various machines used for yarn preparation for weaving	K2
CO2	Describe the working principle of beam preparatory machines for weaving.	K2
CO3	Develop knowledge in the selection of sizing ingredients for different fibres	K4
CO4	Discuss the objectives and working principles of various shuttle and shuttle less looms	K2
CO5	Develop knowledge in selection suitable preparatory processes for weaving	K4
CO6	Acquire knowledge on the process and quality control in the preparatory processes as well as in weaving.	K2

Pre Requisite:

1. U15FTT101 Fibre Science
2. U15FTT201 Yarn Technology
3. U15FTP101 Fibre Analytical Laboratory

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	S												
CO2	S	S												
CO3		S											M	W
CO4		S											W	M
CO5		S	S		S								M	M

YARN PREPARATION FOR WEAVING **9 Hours**

Process Flow – objectives of winding; principles of cheese and cone winding Machines; concepts in yarn clearing – mechanical, optical and electronic clearers; knotters and splicers; Yarn quality requirements for weaving.

BEAM PREPARATION FOR WEAVING **9 Hours**

Objectives of warping, material flow in beam warping and creels used in warping machines; sectional warping machines.

objectives of sizing; sizing materials and recipes used for different types of fibers; sizing machines; control systems used in sizing machine; sizing filament yarns; concept of single end sizing

SHUTTLE WEAVING **9 Hours**

Objectives and working principles – primary, secondary and auxiliary motions; Types of looms – Handloom, Non-automatic, Semi-automatic and Automatic looms; Drop box looms; Terry loom, mechanisms of Tappet, Dobby and Jacquard weaving.

SHUTTLELESS WEAVING **9 Hours**

Basic principles of various shuttleless weaving machines – Projectile, Rapier, Air-jet, Water-jet, Multi-phase; productivity and techno-economics of these machines.

PROCESS CONTROL IN WEAVING **9 Hours**

Process and quality control measures in pirn winding, cone winding, beam warping, sectional warping, sizing, and weaving. Computerised fabric inspection, Loom data system.

TOTAL: 45HOURS

REFERENCES

1. Allan Ormerod, Walter S. Sondhelm, Weaving-Technology and Operations, Textile Institute Pub., 1995.
2. Lord P.R. and Mohammed, Weaving: Conversion of yarn to fabric, M.H. Merrow Pub. Co Ltd., U.K., 1998.
3. Talukdar, Introduction to winding and warping, Mahajan Pub. (P) Ltd., 1998.
4. Talukdar, Wadekar and Ajgaonkar, Sizing–Materials, methods and machines, 2nd edition, Mahajan Pub. (P) Ltd., 1998.
5. Gokarneshan N., Weaving Preparation Technology, Abhishek Pub., 2009
6. Talukdar, Sriramulu and Ajgaonkar, Weaving–Machines, Mechanisms, Management, Mahajan Pub. (P) Ltd., 1998

U15FT*T*402 FABRIC STRUCTURE AND DESIGN

L	T	P	C
3	1	0	4

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Illustrate the elements of woven fabric design.	K3
CO2	Develop elementary fabric weave structures	K3
CO3	Explain colour theory and modifications of colour	K3
CO4	Develop creative weave designs using color and weave effects	K3
CO5	Develop structures for complex woven fabric.	K3
CO6	Explain the characteristics, properties and applications of woven fabric structures	K2

Pre Requisite

U15FTT101 Fiber Science
U15FTT201 Yarn Technology
U15FT*T*401 Weaving Technology

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S									M			M	
CO2		S	M							M			M	
CO3	S												M	
CO4			S							M			M	
CO5		S		M						S			M	
CO6		S											M	

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

BASIC WEAVES: 9+3 Hours

Elements of woven design, Construction of elementary weaves – plain – warp rib- weft rib – mat. Twills – modification of twills. Satin – sateen and their derivatives. Ordinary and Brighton honey comb– Huckaback. Crepe weaves.

BEDFORD CORDS AND MOCK LENO: **9+3 Hours**

Plain faced – twill faced. Wadded – modifications. Welt - piques: wadded piques – Loose back and fast back welts and piques. Mock leno – Distorted mock –leno.

DOBBY AND JACQUARD: Basic Dobby, Jacquard Design. Spot figuring – arrangement of figuring for dobby and jacquard.

COLOR THEORY: **9+3 Hours**

light and pigment theory – modification of color – color combination – application of colors – color and weave effects.

EXTRA FIGURED WEAVES: Extra warp and extra weft figuring. Extra warp and extra weft figuring with two colors.

BACKED FABRICS: **9+3 Hours**

Warp and weft back – reversible and non-reversible.

PILE FABRICS: warp pile – fast wire pile – terry weaves - terry stripe – terry check. Weft pile: plain back – twill back velveteen – Lashed pile corduroy – Weft plush – Length, density and fastness of pile.

DOUBLE CLOTH: **9+3 Hours**

Classification – self stitched – face to back – back to face – Combination face to back and back to face stitched double cloth. Wadded double cloth – weft and warp Wadded double cloth – Center warp & Weft Stitched double cloth.

Theory: 45 Hours **Tutorial: 15 Hours** **Total: 60 Hours**

REFERENCES

1. Gokarneshan.N., " Fabric Structure and Design", New Age International (P) Limited, 2011.
2. Grosicki Z., "Watson's Textile Design & Color: Elementary weaves & Figure", Blackwell Science, Commerce place, 1998.
3. H.Nisbet, "Grammar of textile Design", Tarporevala sons & Co. Pvt. Ltd., 1994.
4. W.S. Murphy, "Textile weaving & Design", Abhishek Publications, 2000

U15FT*P*401 FASHION CAD AND FABRIC STRUCTURE ANALYSIS LABORATORY

L	T	P	C
0	0	4	2

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Demonstrate skill on tools of fashion designing software to prepare digital apparel designs.	K3
CO2	Create textile designs in CAD software	K6
CO3	Appreciate significance of communicating informative graphics all through apparel production process	K2
CO4	Identify woven fabric designs and its commercial name by fabric feel	K2
CO5	Analyze and calculate the woven fabric parameters	K4
CO6	Analyze and calculate the knitted fabric parameters	K4

Pre Requisite

U15FT*T*301 Concepts of Fashion and Design
U15FT*P*301 Fashion Design Laboratory-I
U15FTT101 Fiber Science
U15FTT201 Yarn Technology
U15FT*T*401 Weaving Technology

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1					S									
CO 2			S										M	
CO 3									M	S		M		
CO 4		S												
CO 5		S		S						S			M	
CO 6		S		S						S			M	

Course Assessment methods:

Direct	Indirect
1. Model Exams 2. Lab Exercises 3. End semester Exams	1. Course Exit Survey

LIST OF EXPERIMENTS

GROUP I

1. Creating motives and croquis
2. Creating textures

3. Development of woven design
4. Development of knitted designs
5. Development of printed designs
6. Creating garments on croquis
7. Development of Specification sheet
8. Creating a mood board and a color board based on a theme
9. Preparation of digital designs for children's wear and accessories
10. Preparation of digital designs for women's wear and accessories
11. Preparation of digital designs for men's wear and accessories
12. Development of logo designs, tags and package design

GROUP II

1. Analysis of fabrics – Commercial name & fabric appreciation

Woven Fabric Analysis

2. Plain
3. Twill
4. Satin and Sateen
5. Huck a back
6. Honey comb
7. Extra figured weaves
8. Jacquard design
9. Double cloth
10. Pile fabric –Terry weave

Knitted fabric analysis

11. Single Jersey
12. Rib

Experiments beyond the syllabus should be conducted.

Total: 60 Hours

U15ENP401/ 501 - COMMUNICATION SKILLS LABORATORY (Common to all branches of Engineering and Technology)

L	T	P	C
0	0	2	1

Method of End Semester Evaluation : Practical : 60 marks, Online Exam : 40 marks

OBJECTIVE:

- To impart communicative ability to exhibit the individual's subject knowledge
- To achieve the desirable communicative competence by the students to meet the expectation of corporate
- To show the need for a comprehensive link language to share subject expertise
- To offer adequate exposure to soft skills needed for the corporate.
- To sensitize towards corporate culture.

Course Outcomes

After successful completion of this course, the students should be able to
CO1: Imparting the role of communicative ability as one of the softskills needed for placement
CO2: Developing communicative ability and softskills needed for placement
CO3: Making students Industry-Ready through inculcating team-playing capacity

Pre-requisites :

1. U15ENT101 / Technical English – I
2. U15ENT201 / Business Communication and Presentation skill

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1				M				M	S					
CO2				W				S	S	M				
CO3				S				S	S	W				

Course Assessment methods

Direct	Indirect
1. Presentation 2. Role Play 3. Mock interview 4. Group Discussion	1. Course end survey

GRAMMAR IN COMMUNICATION **9 Hours**

Grammar and Usage – Building Blocks, Homonyms, Subject and Verb Agreement, Error Correction – Grammar Application, Framing Questions – Question words, Verbal Questions, Tags, Giving Replies – Types of Sentences, Listening Comprehension – Listening and Ear training.

ASSERTIVE COMMUNICATION **9 Hours**

Listening Comprehension in Cross-Cultural Ambience, Telephonic Conversations/Etiquette, Role Play Activities, Dramatizing Situations – Extempore – Idioms and Phrases.

CORPORATE COMMUNICATION **9 Hours**

Video Sensitizing, Communicative Courtesy – Interactions – Situational Conversations, Time Management, Stress Management Techniques, Verbal Reasoning, Current Affairs – E-Mail Communication / Etiquette.

PUBLIC SPEAKING **9 Hours**

Giving Seminars and Presentations, Nuances of Addressing a Gathering – One to One/One to a Few/One to Many, Communication Process, Visual Aids and their Preparation, Accent Neutralization, Analyzing the Audience, Nonverbal Communication.

INTERVIEW AND GROUP DISCUSSION TECHNIQUES **9 Hours**

Importance of Body Language – Gestures and Postures and Proxemics, Extempore, Facing the Interview Panel, Interview FAQs, Psychometric Tests and Stress Interviews, Introduction to Group Discussion (GD), Mock GD Practices.

Practical: 45 Hours **Total: 45 Hours**

REFERENCES:

1. Bhatnagar R.P. & Rahul Bhargava, "English for Competitive Examinations", Macmillian Publishers, India, 1989, ISBN: 9780333925591
2. Devadoss K. & Malathy P., "Career Skills for Engineers", National Book Publishers, Chennai, 2013.
3. Aggarwal R.S., "A Modern Approach to Verbal & Non–Verbal Reasoning", S.Chand Publishers, India, 2012, ISBN : 8121905516

U15GHP401/ PROFESSIONAL VALUES (Common to all branches of Engineering and Technology)	L	T	P	C
	1	0	0	1

Objectives

1. To sensitize students about being professional
2. To sensitize about the importance of being ethical in one's profession
3. To understand various leadership theories
4. To understand the concept of karma yoga (Self less Work)
5. To be aware of the current strengths and weakness and how to develop on strengths

Course outcomes:

After successful completion of the course, the student would be able to:

1. The Students shall acquire knowledge on the Clarity, courage, confidence, commitment, compassion this required for a good professional
2. The Students shall understand the concept of Karma Yoga and lead his/her life accordingly
3. The Students shall understand the importance of ethics in ones profession and practice it
4. The Students shall get acquainted with leadership theories and use them in his/her profession appropriately
5. The Student shall learn how to be an empowered professional and how to empower colleagues

Pre-requisite: NIL

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO1		M	W			W	M	M	M			M		S
CO2		W				M	S	M	M			S		S
CO3					M		S	S	W	W		M		S
CO4		W				M	M	M	S	W		M		S
CO5		W				M	M	W	M			M		S

Course Assessment methods:

Direct	Indirect
1.Individual Assignment 2.Group Assignment 3.Presentation 4.Surprise Test 5.Practical Assessment 6.End Semester Assessment	1.Attendance and Behavioural Assessment

Introduction to Professional Values	1 Period
Concept of Integral Karma Yoga	3 Periods
Professional Ethics	3 Periods
Eastern and Western Leadership Theories	2 Periods

Empowerment of a Professional	4 Periods
Advanced Contemplative Practices with Demonstrations	2 Periods
	Total Periods: 15

References Books:

1. Rishabhchand, *"Integral Yoga of Sri Aurobindo*", Sri Aurobindo Ashram Publication Department, Pondicherry, Published 2001.
2. Charles E Harris, "*Engineering Ethics: Concepts and Cases*", 4th edition, Western Michigan University, Published 2009.
3. Devdas Menon, "*Spirituality at Work*", professor of structural engineering at IIT Madras.
4. Ameeta Mehra, "*Karma Yoga: Perfection in Work*", The Gnostic Centre, New Delhi, Published 2000.
5. Winthrop Sargeant,"*The Bhagavad Gita",* State University of New York, Published 1994.
6. D.R Kiran, *"Professional Ethics& Human Values",* The Mc Graw Hill/BSP Books, Published 2013.
7. S. Bhaskar, *"Professional Ethics& Human Values",* The Aunradha Agencies, Chennai, Published 2005.
8. Keith Ward & Cliff Bowman, *"Extraordinary performance from ordinary people",* Routledge, Published 2007.
9. Stephen Robbins, "Organization Behavior", The Prentice Hall; 15 editions, 2012.

SEMESTER – V

U15FTT501 APPAREL PRODUCT DEVELOPMENT PROCESS

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Apply knowledge on the various segments of fashion industry	K3
CO2	Identify consumer, influences on costume changes.	K4
CO3	Analyze feasibilities in adopting fashion concept and developing prototypes	K4
CO4	Outline the process of apparel line development and presentation.	K2
CO5	Developing skills in designing, pattern development and construction methods for children's and men's apparels	K5
CO6	Acquire skills in designing, pattern development and construction methods for women's apparels.	K3

Pre Requisite

U15FTT301 Concepts of Fashion and Design
U15FTT302 Basic Pattern making and Adaptation
U15FTT303 Garment Components Fabrication
U15FTP302 Apparel Component and Machinery laboratory

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO-1	PSO-2
CO1		S	S	S									M	
CO2		S	S	S		M								S
CO3	M	S	S	S	M									S
CO4		S	S							S				
CO5		S	S			M							M	M
CO6		S	S			M								

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

FASHION INDUSTRY OVERVIEW **8 Hours**

Segments of the fashion industry. Classification of apparel products. Background to the world of fashion- influence of the customer; different generations and motivations behind the changes. Design logic of apparel products, concept generation, concept screening.

DEVELOPING FASHION CONCEPT

8Hours

Line concept – Synthesize current issues, establish line direction, describe materials, identify group concepts and analyze current line. Principles of creative fashion ideas. Manipulation of Design Elements. Creative design - Develop designs, prototype.

LINE DEVELOPMENT AND PRESENTATION **8 Hours**

Line adoption – Determining styles and balancing assortments. Technical design – perfect styling

and fit, engineer production patterns, samples, costing and grade patterns. Presentation: Review for adoption, line review, line / style release. Product Positioning Strategy – Sizing and fit in material selection. Fabric Sourcing and Selection.

CHILDREN'S APPAREL **6 Hours**

Designing and patterning – measurements - standard size charts- Step-by-step garment drafting procedure and construction flow process – baby set- jabla, bib, panty and bonnet, romper, sun suit

MEN'S APPAREL **6 Hours**

Designing and patterning – measurements - standard size charts- Step-by-step garment drafting procedure and construction flow process –formal shirt, formal trouser and t-shirt.

WOMEN'S APPAREL **9 Hours**

Designing and patterning – measurements - standard size charts- Step-by-step garment drafting procedure and construction flow process – ladies top, ladies skirt, salwar kameez, choli blouse, brassier and panties.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Maurice J. Johnson and Evelyn C.Moore, "Apparel Product Development", Second Edition, Prentice Hall Upper saddle river, New Jersey, 2001.
2. Ruth E Glock and Grace I Kunz, "Apparel Manufacturing - Sewn Product Analysis", Prentice Hall, New Jersey, Fourth Edition, 2005.
3. Kathryn McKelvey and Janine Munslow, "Fashion Design: Process, Innovation and Practice", Blackwell Publishing, USA, 2005.
4. Helen Joseph and Armstrong, "Pattern Making for Fashion Design", Pearson Education, 2005.
5. Winifred Aldrich, "Metric Pattern Cutting for Men's Wear", Blackwell Science, 2000.
6. Winifred Aldrich, "Metric Pattern Cutting for Children's Wear and Baby Wear", 3rd Edition, Black well Science, 2001.
7. Gerry Cooklin, "Garment Technology For Fashion Designers", Black well Science, 2000.
8. Zarapkar.K.R," Zarapkar system of cutting" Navneet publications ltd, Mumbai, 2010

U15FT*T*502 KNITTING AND NONWOVEN TECHNOLOGY

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Generalize the weft knitted fabric production processes	K3
CO2	Outline the structure and properties of various weft knitted fabrics	K2
CO3	Acquire know ledge on the structure and properties of various advanced weft knitted fabrics	K4
CO4	Recognize the structure, properties, applications and latest developments in warp knitting	K4
CO5	Acquire knowledge on the application of knitted structures textiles	K4
CO6	Acquire knowledge on nonwovens manufacturing techniques and its applications.	K4

Pre Requisite

U15FTT101 Fiber Science

U15FTT201 Yarn Technology

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	M												
CO2	S	M												
CO3	S	M	W											M
CO4	S	M	W											M
CO5	S	M												M
CO6	S	M												

Course Assessment methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

PRINCIPLEOFWEFTKNITTING 9 Hours

Comparison of Weaving and Knitting - Terms and definitions in weft knitting. Knitting Elements - Needles and its types, sinker, cam. Knitting action of latch, bearded and compound needles. Working principle and passage of yarn in circular and flat knitting machine - Classifications of knitting machines. Comparison of plain, circular rib, and interlock fabrics and machines. - Yarn quality requirements for knitting.

WEFTKNITSTRUCTURES 9 Hours

Classification of weft knit structures - Symbolic and diagrammatic representation of weft knit structures. Comparisons of single jersey, rib, interlock and purl structures. Comparison of knit, tuck, float Stitches. Single jersey derivatives - accordion, check and stripe effect. Rib derivatives - derby rib, swiss rib, royal rib- polka rib, Milano rib, double pique and pique poplin. Knitted fabric defects.

ADVANCEDWEFT KNIT STRUCTURES **9 Hours**

Eight lock structure, Interlock gated structures Single pique, Ponte-di-Roma and Ottoman rib. Derivatives of purl structure - cross purland basket purl. Blister fabrics. Introduction to Jacquard structures. Socks knitting. Weft knitting calculations for GSM and production. Latest developments in weft knitting machines. Principles of seamless garment manufacture in circular and flat knitting.

WARPKNITTING **9 Hours**

Comparison of warp and weft knitting. Basic warp knitting elements. Knitting cycle -tricot, raschel machines. Comparison of tricot and raschel. Basic stitches -pillar, blind lap, tricot, inlay, satin and atlas stitches. Basic tricot warp knit structures – full tricot, lock knit and loop raised fabrics. Basic raschel warp knit structures - power nets, curtainsand laces. Latest developments in warp knitting machines. Warp knitting calculations for GSM and production.

NONWOVENS **9 Hours**

Definition. Raw materials for nonwovens – natural and man-made fibers, binders; classification of nonwovens, manufacturing methods - Needle punching, chemical bonding, spun bonding, thermal bonding, melt-blown process, hydro-entangling. Applications of non-wovens.

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. David Spencer., "Knitting Technology", Pergamon Press, Oxford 2005 ISBN**(13):** 9781855733336.

2.Anbumani N, "Knitting – Fundamentals, Machines, Structures and Developments", New Age International Publishers, 2010 . **ISBN(13):** 978-81-224-1954-2.

3. Ajgaonkar D B, "Principles of Knitting", Universal Publishing Corporation, Mumbai, 1998, **ISBN**: 81-85027-34-X.

4. Chandrasekhar Iyer, Bernd Mammel and Wolfgang Schach., "Circular knitting", Meisenbach GmbH, Bamberg, 1995, **ISBN**: 3-87525-066-4.

5.Albrecht. W, Fuchs. H, Kittelmann and Walter, "Nonwoven Fabrics- Raw Materials, Manufacture, Applications, Characteristics, Testing Processes", Wiley-VLH, 2002, Weinheim. ISBN- 3-527-30286-7

U15FTT503 TEXTILE CHEMICAL PROCESSING

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge and explain the chemical processing of cotton and blended materials.	K3
CO2	Summarise the suitable process to process the fibre, yarn and fabrics through preparatory and dyeing processes.	K3
CO3	Analyse the parameters and Deciding the recipes for chemical processing of different materials.	K4
CO4	Aquire Knowledge and Analyse the parameters for Printing techniques	K3
CO5	Testing and evaluation on the eco-friendly processes and the effluent treatments.	K5
CO6	Summarise the pollutants, banned and toxic chemicals and amines.	K2

Pre Requisite:

U15CH*T*204 Chemistry for Textiles

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	W					S	S						M	M
CO2	W					S	S						M	M
CO3			M			S	S						M	M
CO4						S	S						M	M
CO5						S	S						M	M
CO6						S	S						M	M

Course Assessment methods:

Direct	Indirect
5. Internal tests 6. Assignment 7. Group Presentation 8. End Semester Exam	2. Course Exit Survey

Course Content

PRETREATMENTS **9 Hours**

Introduction to wet processing. Process sequence in wet processing for wovens and knits.Singeing–electric and gas singeing. Desizing–chemical and enzymatic.Scouring–alkaline and enzymatic. Bleaching – hypo chlorite and peroxide bleaching, optical whitening. Mercerizing–tension, tensionless and tubular mercerization.

DYEING **12 Hours**

Introduction-Dyeing equipments – jigger, winch, soft flow, jet dyeing machine, J-box, padding mangles, package dyeing machine and garment dyeing machine. RFT dyeing. Classification of

dyes. Dyeing of cotton fabrics using direct, reactive, vat and sulphur dyes. Dyeing of polyester(carrier, HTHP and thermosol) and cellulosic blends(one bath and two bath process). Fastness properties of dyes.

PRINTING **7 Hours**

Print paste - ingredients and preparation. Styles of printing- direct style of printing on cotton using pigments and reactive dyes, dis-charge style of printing cotton using pigments on reactive ground, resist style of printing cotton on reactive ground, Tie and dye, batik. After treatments of printed goods.

METHODSOFPRINTING **7 Hours**

Block, Stencil, Roller, Rotary, Flatbed, Transfer and Chest printing. Screen Making. Special prints–kadi, rubber, foam, glitter, leather, foil, flock and pearl. Latest developments in printing.

QUALITY ASSURANCEAND ECO – FRIENDLY WET PROCESSING 10 Hours

Need for Quality control areas of Quality control in wet processing (Water, PH, Temperature, MLR, Time) – computer color matching. Importance of Eco –friendly wet processing, List of banned dyes and chemicals, German ban, Eco-Labels, Eco-Testing. Textile effluent treatment.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. V A Shenai Technology of Textile Processing- Vol. III, , 1975, Sevak Publications
2. V.A. Shenai, "Technology of Dyeing –Volume VI", Sevak Publications, Bombay, 2000.
3. "Chemical Processing of Textiles-I" Nodal Centre for Upgradation of Textile Education (NCUTE), 2000.
4. JohnShore,"CellulosicsDyeing",SocietyofDyersandColourists,Mumbai,2005
5. Lesile W.C. Miles, "Textile printing", Society of Dyers and Colourists,Mumbai,2003
6. "Chemical technology In the pre-treatment Processes of textiles" , S.R. Karmakar, ISBN: 0-444 50060-1 Nov,1999
7. Datye K.V. and Vaidya A. A., "Chemical Processing of Synthetic Fibres and Blends", John Wiley and Sons, Newyork,1984.
8. "Chemical Preparatory processing in Textiles" NCUTE Programmes series, march 13-14,2000.
9. "Dyes and pigments": New research, Arnold r. Lang Editor , Nova Science Publishers, Inc. New York January 8, 2013
10. "Eco–Friendly Textiles-The German Ban", NITRA Publishing Ltd., 1996.
11. "Eco-Friendly Textiles Challenges to the Textile Industry", Textile Committee. March 10 1995.

L	T	P	C
3	0	0	3

U15FT*T*504 APPAREL PRODUCTION TECHNOLOGY

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge on the processes involved in apparel production and preparation of spec sheet	K2
CO2	Recognize the properties and characteristics of raw material for apparel manufacture	K2
CO3	Gain knowledge in pattern layout planning and preparation of construction flow for apparel production	K3
CO4	Identify the problems of fit and indicate remedies	K6
CO5	Acquire knowledge on apparel finishing processes	K3
CO6	Acquire knowledge on packaging processes	K3

Pre Requisite

U15FT*T*303 Garment Components Fabrication

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO-1	PSO-2
CO1	S	S	M							S			S	
CO2		S												M
CO3	M	S	S							S			M	
CO4	M	M								S			M	
CO5	S	M												M
CO6	S	M												

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

PROTO SAMPLES & SPEC SHEETS 9 Hours

Apparel production process- flow process. Analyzing specification sheet- sample preparation and approval. Preparation of specification sheet for children's frock, ladies top, and men's trousers- working diagrams, seam and stitch specification and size chart. Preparation of proto pattern and developing production pattern.

RAW MATERIAL SELECTION 9 Hours

Factors affecting selection of fabric- precautions while handling different fabrics while laying,

marking, cutting and sewing. Sewing Thread properties and seam performance –seam strength, seam elasticity, sewing problems. Components- label, linings, Interlining, Elastic, shoulder pads, Seam binding and tape – performance properties of the above components.

PATTERN LAYOUT PLANNING **9 Hours**

Importance of grain in garments, principles and types of layout, transferring patterns on fabrics. Listing garment components and planning the construction process flow for children's frock, ladies top, and men's trousers

FITTING **9 Hours**

Standards of good fit - ease, line, grain, set, balance. Steps in assembling a blouse and checking fit. Solving fitting problems in Top, skirt, trouser by pattern alteration.

APPAREL FINISHING PROCESS **9 Hours**

Fusing and pressing- definition, process, requirements, equipments and methods. Packing - Function, types of package forms, Types of packaging materials, packaging methods, packing shipping equipments.

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. Harold Carr and Barbara Latham, "The Technology of Clothing Manufacture", Om Book Service, 2002.
2. Jacob Solinger, "Apparel Production Handbook", Reinhold Publications, 1998.
3. Laing R.M., Webster J, "Stitches and Seams", The Textile Institute, Manchester, 2004.
4. Gerry Cooklin, "Garment Technology for Fashion Designers", Blackwell Science Ltd., 2001.
5. Claire Shaeffer, "Sewing for Apparel Industry", Prentice Hall, 2000
6. Mary Mathews, "Practical Clothing Construction, Part I and II", Paperback Ed., Madras, 2000
7. Joseph. H and Amstrong, "Pattern Making for Fashion Design", Pearson Education Inc, 2005
8. Fan.J., Yu.W., and Hunter.L., "Clothing Appearance and Fit: Science and Technology", The Textile Institute, Manchester 2004.
9. Leila Aitken.,"Step By Step Dress Making Course", BBC Books,2004.
10. Ruth E Glock and Grace I Kunz, "Apparel Manufacturing - Sewn Product Analysis", Prentice Hall, New Jersey, Fourth Edition, 2005

U15CST904

OBJECT ORIENTED PROGRAMMING USING C++

L	T	P	C
2	0	2	3

Course Objectives:

To understand the difference between object oriented programming and procedural programming.

To explain the principles of object oriented concepts.

To apply the object oriented concepts to solve problems in C++.

Course Outcomes (CO):
After Successful completion of this course, the students will be able to :

CO1	Explain the features of object-oriented programming	K2
CO2	Describe the use of basic programming constructs of C++.	K2
CO3	Apply the concepts of constructors and destructors to develop simple C++ programs.	K3
CO4	Demonstrate the use of operator overloading	K3
CO5	Apply the concepts of inheritance to develop C++ programs	K3
CO6	Explain the concepts of friend functions and static data members.	K2

Pre-requisite: Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	S								W	W				
CO2	S								W	W				
CO3		M	M						W	W				
CO4			M						W	W				
CO5		S	M						W	W				
CO6			M						W	W				

Course Assessment Methods:

Direct	Indirect
• Internal Tests • Assignment • Presentation • End Semester Exam	• Course end survey

Course content: **Hours**

PRINCIPLES OF OBJECT ORIENTED PROGRAMMING **8**

Features of procedure oriented programming – Object oriented programming paradigm – Basic concepts of object oriented programming – Benefits of OOP – Object oriented languages – Applications of OOP – A simple C++ program – Structure of C+ + program – Creating the source file.

C++ PROGRAMMING BASICS 10

Data Types, Operators and Expressions, Control Flow- Arrays and Strings, Modular Programming with Functions- Call by reference- Return by reference- Default arguments- Inline functions- Function overloading.

CLASSES AND OBJECTS 9

Class Specification- Accessing class members – Defining member functions -Passing object as arguments- Returning Objects from functions- Friend functions and friend classes- Constant parameters and member functions- Structures and classes- Static Data and member functions- Object initialization- Constructor- Parameterized constructor- Destructor- Constructor Overloading- Copy constructor.

OPERATOR OVERLOADING 10

Introduction- Overloadable operators- Unary operator overloading- Binary operator overloading- Arithmetic operators- Concatenation of strings- Comparison operators- Arithmetic assignment operators- Overloading of new and delete operators- Data conversion- conversion between basic data types- Overloading with friend functions- Assignment operator overloading.

INHERITANCE 8

Derived class declaration- Forms of inheritance- Inheritance and member accessibility- Constructors in derived classes- Destructors in derived classes- Constructor invocation and data member initialization- Overloaded member function- Abstract classes- Multilevel inheritance- Multiple inheritance- Hierarchical inheritance- Multipath inheritance and virtual base class- Hybrid inheritance- Virtual functions.

Theory: 45 Hours **Tutorials: 0 Hours** **Total Hours: 45 Hours**

References:

1. K.R. Venugopal, Rajkumar, T. Ravishankar, "Mastering C++" Tata Mc Graw Hill Publishing Company Ltd, 2013.

2. E. Balagurusamy, "Object Oriented Programming with C++", TMH, 2013.

3. Robert Lafore, "Object Oriented Programming in C++", Galgotia publications pvt Ltd, Fourth edition, 2002

4. Herbert Schildt, "C + +: The Complete Reference", Fourth Edition, Tata McGraw Hill Publishing Company Ltd, 2003.

U15FT*P*501 APPAREL PRODUCTION LABORATORY- I

L	T	P	C
0	0	3	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Develop skills in fashion illustration and designing for children's & ladies wear.	K6
CO2	Prepare basic blocks for different measurements and apply the grading techniques.	K3
CO3	Apply the construction techniques for developing children garments	K3
CO4	Apply the construction techniques for developing ladies garments	K3
CO5	Prepare the operation flow chart for the garments.	K4
CO6	Estimate the cost particulars for the children and ladies garments	K4

Pre Requisite :

U15FT*T*301 Concepts of fashion & design
U15FT*P*301 Fashion Design Laboratory
U15FT*T*302 Basic pattern making and adaptation
U15FT*T*303 Garment components fabrication

		CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs			Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	M											M	
CO2	S	S	M										M	
CO3		S	S	S									M	
CO4		S	S	S									M	
CO5			M	S					S	W	M	M	S	
CO6			M	S					S	W	M	M	S	

Course Assessment methods

Direct	Indirect
1. Model Exams 2. Lab Exercises 3. End semester Exams	1. Course Exit Survey

LIST OF EXPERIMENTS

1. Development of basic block patterns–top, skirt and bifurcated garments
2. Grading of any one garment.
3. Designing and developing pattern for Baby set- Jabla, panty, bib and bonnet.

4. Construction of Baby set- Jabla, panty, bib and bonnet
5. Designing and developing pattern for Rompers
6. Construction of Rompers
7. Designing and Developing Pattern for Ladies Skirt and Top
8. Construction of Ladies Skirt and Top
9. Designing and Developing Pattern for Ladies Salwar
10. Construction of Ladies Salwar
11. Designing and Developing Pattern for Ladies Kameez
12. Construction of Ladies Kameez

Total: 45 Hours

Experiments beyond the syllabus should be conducted..

L	T	P	C
0	0	3	1

U15FTP502 TEXTILE CHEMICAL PROCESSING LABORATORY

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquiring knowledge on bleaching, dyeing and printing process	K2
CO2	Estimation and application of chemicals and dyes for processing the textile materials	K4
CO3	Demonstrate ability to formulate appropriate shade and process parameters of chemical process.	K3
CO4	Apply the different types of machines for the chemical processing	K3
CO5	Evaluate on fastness properties of dyed materials.	K5
CO6	Ability to reprocess to formulate the appropriate shade if problems occur in the process.	K6

Pre Requisite

U15CH*T*204 Chemistry for Textiles

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1												M	M	M
CO2	S											M	M	M
CO3	M											M	M	M
CO4					M							M	M	M
CO5		M										M	M	M
CO6	S											M	M	M

Course Assessment methods

Direct	Indirect
1. Model Exams 2. Lab Exercises 3. End semester Exams	1. Course Exit Survey

LISTOFEXPERIMENTS:

1. Bleaching of cotton using Hydrogen per oxide.
2. Dyeing ofcotton with direct dyes on woven/knitted fabric.
3. Dyeing of cotton with Reactive dyes on woven/knitted fabric.
4. Dyeing of cotton with Vat dyes on woven/knitted fabric.
5. Dyeing of protein fibreswith Acid dyes.
6. Stripping and re-dyeing of cotton fabric.
7. Dyeing of Polyester using carrier.
8. Identification of dyes.
9. Direct style of printing on cotton fabrics.
10. Discharge style-printing on cotton.
11. Resist style-printing on cotton.

12. Determination of colour fastness of dyed fabrics using launderometer and crock meter.

Experiments beyond the syllabus should be conducted

Total: 45 Hours

U15 FTP503 APPAREL CAD LABORATORY

Co	T	P	C
0	0	3	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Develop Computer aided pattern drafting for different apparels	K3
CO2	Develop the skill of grading various apparel patterns using CAD	K3
CO3	Create and manipulate efficient marker plans	K4
CO4	Construct specification sheets for garments as per requirements	K3
CO5	Estimate the fabric consumption	K3
CO6	Develop cut order plan	K4

Pre Requisite

U15FT*T*302 Basic Pattern Making and Adaptation

U15FTP501Apparel Production Laboratory-I

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

CO	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
1		S			S				S	M			S	S
CO 2		S			S				S	M			S	S
CO 3		S			S				S	M			M	M
CO 4		M			S								M	M
CO 5					M								M	M
CO 6					M				S	M			M	M

Course Assessment methods

Direct	Indirect
1. Lab Model Exams 2. Lab Exercises 3. End semester Exams	1. Course Exit Survey

	Acquiring knowledge on bl
CO2	Estimation and application materials
CO3	Demonstra e ability to form chemical process.
CO4	Apply the d fferent types of
CO5	Evaluate on fastness proper
CO6	Ability to reprocess to for process.

LIST OF EXPERIMENTS:

1. Develop pattern, grading for children's wear – Baby frock using a one way fabric of 38" and 42" width.
2. Develop pattern, grading for children's wear – Rompers using a two-way fabric of 38" and 42" width.
3. Develop a specification sheet for a children's wear – Rompers

4. Develop pattern, grading and marker plan for a Ladies top with fabric of 44" and 52" width. Calculate the fabric consumption. Develop a specification sheet for the Ladies top.
5. Develop pattern and marker plan for a Men's Basic T shirt of 48" fabric width. Calculate the fabric consumption. Develop a specification sheet for a Men's Basic T shirt. Develop a cut order plan
6. Develop pattern and grading and marker plan for Men's Formal Trouser using fabric of 60" and 72" width. Calculate the fabric consumption. Develop a specification sheet for Men's Formal Trouser.
7. Develop pattern and grading and marker plan for Ladies Full Gown using fabric of 48" width. Calculate the fabric consumption. Develop a specification sheet for Ladies Full Gown.
8. Develop pattern, grading and marker plan for a Ladies Skirt using plaid fabric of 38" and 60 " width. Calculate the fabric consumption. Develop a specification sheet for Ladies Skirt. Develop a cut order plan
9. Develop pattern, grading and marker plan for a Men's Full arm shirt using fabric of 60" and 72" width. Calculate the fabric consumption. Develop a specification sheet for Men's Full arm shirt.
10. Develop pattern, grading and marker plan for Salwar Kameez using fabric of 60" and 72" width. Calculate the fabric consumption.
11. Develop pattern and grading for a blazer using fabric of 60" and 72" width. Calculate the fabric consumption.
12. Develop pattern, grading and marker plan for a Men's vest and brief using fabric of 38" and 42" width. Calculate the marker efficiency and fabric consumption. Develop a specification sheet for vest and brief. Develop a cut order plan.

Experiments beyond the syllabus should be conducted

Total: 45 Hours

U15GHP501/ SOCIAL VALUES (Common to all branches of Engineering and Technology)	L	T	P	C
	1	0	0	1

Objectives

1. To understand the genesis of society and social values
2. To understand the various sources of disparity among human beings
3. To empathize social issues and offer solutions wherever possible
4. To learn about social welfare organizations

Course outcomes:

After successful completion of the course, the student would be able to:

1. The students shall acquire knowledge about how societies are formed and social values are created
2. The students shall understand and empathize various social issues and contribute towards finding a solution
3. To understand the causes of disparity among human beings
4. To know about social welfare organizations and to use social media effectively
5. To understand various social parameters that influences individual and society at large

Pre-requisite: Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		W				M	W	M	W			M		
CO2		W	W			W	M	M		W		M		
CO3		W				M	W	S				M		S
CO4		W				S		M	W	M		S		S
CO5			W		W	M	W			W		M		S

Course Assessment methods:

Direct	Indirect
1.Individual Assignment 2.Group Assignment 3.Presentation 4.Surprise Test 5.Practical Assessment 6.End Semester Assessment	1.Attendance and Behavioural Assessment

Introduction to Social Values – Society	2 Periods
Development of Science, Education, Politics & Economics	3 Periods
Disparity among human beings	3 Periods

Social Issues & Welfare	3 Periods
Social Welfare Organizations	2 Periods
Yogasanas & Meditation	*2 Periods*

Total Periods: 15

References Books:

1. Swami Vivekananda, "***Prosperous India"*** 1st edition, The Ramakirshna Mission Institute of Culture, 1937.
2. Fritz Schumacher, ***"Small is Beautiful",*** The Blond & Briggs, Published 1973.
3. Vethathiri Maharishi***, "Logical Solutions for the Problems of Humanity",*** The World Community Service Centre, Vethathiri Publications, 1999.
4. Sarvepalli Radhakrishnan, ***"The Source Book on Indian Philosophy"***, Princeton, N.J. : Princeton University Press, 1957.
5. Sarvepalli Radhakrishnan, ***"Religion, Science and Culture",*** The Orient Paperbacks, India, Published 1994.
6. Vethathiri's Maharishi's, ***"Vethathirian Principles of Life"*** The World Community Service Centre, Vethathiri Publications, 2003.

SEMESTER – VI

U15GST006 **PRODUCT DESIGN AND DEVELOPMENT**
(Common to all branches)

L	T	P	C
3	0	0	3

Course Objectives

- Understand the basic concepts of product design and development.
- Know the implications in product architecture and the importance of industrial design.
- Understand prototyping basics and influence of diverse factors on project success.

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Apply concepts of product development and outline product planning process	K3
CO2	Apply relative importance of customer needs in establishing product specifications	K3
CO3	Identify concept generation activities and summarize the methodology involved in concept selection and testing	K2
CO4	Outline supply chain considerations in product architecture and understand the industrial design process	K2
CO5	Apply design for manufacturing concepts in estimating manufacturing costs	K3
CO6	Apply principles of prototyping in product development economics and highlight importance of managing projects	K3

Pre-requisite: Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M		M		M					W			S	
CO2			M										M	
CO3	M		M											
CO4			S			W				M	M			M
CO5			S		M	M							S	
CO6					M				M		S		S	

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

INTRODUCTION - DEVELOPMENT PROCESSES AND ORGANIZATIONS – PRODUCT PLANNING

9 Hours

Characteristics of successful product development to Design and develop products, duration and cost of product development, the challenges of product development.

A generic development process, concept development: the front-end process, adapting the generic product development process, the AMF development process, product development organizations, the AMF organization. The product planning process, identify opportunities.

Evaluate and prioritize projects, allocate resources and plan timing, complete pre project planning, reflect all the results and the process.

IDENTIFYING CUSTOMER NEEDS - PRODUCT SPECIFICATIONS 9 Hours

Gathering raw data from customers, interpreting raw data in terms of customer needs, organizing the needs into a hierarchy, establishing the relative importance of the needs and reflecting on the results and the process. Specifications, establish specifications, establishing target specifications setting the final specifications.

CONCEPT GENERATION - CONCEPT SELECTION - CONCEPT TESTING

9 Hours

The activity of concept generation clarify the problem search externally, search internally, explore systematically, reflect on the results and the process, Overview of methodology, concept screening, concept scoring, caveats. Purpose of concept test, choosing a survey population and a survey format, communicate the concept, measuring customer response, interpreting the result, reflecting on the results and the process.

PRODUCT ARCHITECTURE - INDUSTRIAL DESIGN - DESIGN FOR MANUFACTURING 9 Hours

Meaning of product architecture, implications of the architecture, establishing the architecture, variety and supply chain considerations, platform planning, related system level design issues. Assessing the need for industrial design, the impact of industrial design, industrial design process, managing the industrial design process, is assessing the quality of industrial design. Definition, estimation of manufacturing cost, reducing the cost of components, assembly, supporting production, impact of DFM on other factors.

PROTOTYPING - PRODUCT DEVELOPMENT ECONOMICS - MANAGING PROJECTS

9 Hours

Prototyping basics, principles of prototyping, technologies, planning for prototypes, Elements of economic analysis, base case financial mode,. Sensitive analysis, project trade-offs, influence of qualitative factors on project success, qualitative analysis. Understanding and representing task, baseline project planning, accelerating projects, project execution, postmortem project evaluation.

Theory: 45 Hours **Total : 45 Hours**

REFERENCES

1. Karl Ulrich,T, Steven Eppinger, D, "Product Design and Development", McGrawHill, 2015.
2. Chitale, AK, Gupta, RC, "Product Design and Manufacturing" PHI, 2013.
3. Timjones, "New Product Development:An Introduction to a multifunctional process", Butterworth-Heinemann, 1997.
4. Geoffery Boothroyd, Peter Dewhurst and Winston Knight,A, "Product Design for Manufacture and Assembly", CRC Press, 2011.

U15GST004 OPERATIONS RESEARCH

L	T	P	C
3	0	0	3

Course Outcomes
After successful completion of this course, the students should be able to

CO1	Apply linear programming model and assignment model to domain specific situations
CO2	Analyze the various methods under transportation model and apply the model for testing the closeness of their results to optimal results
CO3	Apply the concepts of PERT and CPM for decision making and optimally managing projects
CO4	Analyze the various replacement and sequencing models and apply them for arriving at optimal decisions
CO5	Analyze and apply appropriate inventory techniques in domain specific situations.
CO6	Analyze and apply appropriate queuing theories in domain specific situations

Pre-requisite: Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	S	S		S									M	
CO 2	S	S		S									M	
CO 3	S	S		S							S		M	
CO 4	S	S		S									M	
CO 5	S	S		S									M	
CO 6	S	S		S									M	

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

LINEAR MODEL **9 Hours**

The phases of OR study – formation of an L.P model – graphical solution – simplex algorithm – artificial variables technique (Big M method, two phase method), duality in simplex

TRANSPORTATION AND ASSIGNMENT PROBLEM **9 Hours**

Transportation model – Initial solution by North West corner method – least Cost method – VAM. Optimality test – MODI method and stepping stone method. Assignment model – formulation – balanced and unbalanced assignment problems

PROJECT MANAGEMENT BY PERT & CPM **9 Hours**

Basic terminologies – Constructing a project network – Scheduling computations – PERT - CPM – Resource smoothening, Resource leveling, PERT Cost

REPLACEMENT AND SEQUENCING MODELS **9 Hours**

Replacement policies - Replacement of items that deteriorate with time (value of money not changing with time) – Replacement of items that deteriorate with time (Value of money changing with time) – Replacement of items that fail suddenly (individual and group replacement policies). Sequencing models- n job on 2 machines – n jobs on 3 machines – n jobs on m machines, Traveling salesman problem

INVENTORY AND QUEUING THEORY **9 Hours**

Variables in inventory problems, EOQ, deterministic inventory models, order quantity with price break, techniques in inventory management.

Queuing system and its structure – Kendall's notation – Common queuing models - M/M/1: FCFS/∞/∞ - M/M/1: FCFS/n/∞ - M/M/C: FCFS/∞/∞ - M/M/1: FCFS/n/m

Theory :45 Hours **Total: 45 Hours**

REFERENCES

1. Taha H.A., "Operation Research", Pearson Education
2. Hira and Gupta "Introduction to Operations Research", S.Chand and Co.2002
3. Hira and Gupta "Problems in Operations Research", S.Chand and Co.2008
4. Wagner, "Operations Research", Prentice Hall of India, 2000
5. S.Bhaskar, "Operations Research", Anuradha Agencies, Second Edition, 2004

U15FT*T*601 APPAREL MERCHANDISING

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge on apparels industry and business concepts adopted.	K2
CO2	Collection of data of apparel markets, marketing research and strategies.	K3
CO3	Develop knowledge on sourcing, supply chain management, and resource planning	K3
CO4	Acquire knowledge on role and responsibilities of merchandiser and Applying it with stake holders, product development, line planning and presentations	K3
CO5	Developing knowledge on merchandise management and operating merchandise.	K3
CO6	Application of branding and the brand licensing and development process	K3

Pre Requisite :

U15FTT501 Apparel Product Development Process

U15FT*T*504 Apparel Production Technology

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1									S	S	S	M	M	
CO2			M	M					S	S	S	M	M	W
CO3			M	W					S	S	S	M	M	M
CO4		M	M						S	S	S	M	M	M
CO5									S	S	S	M	M	M
CO6									S	S	S	M	M	M

Course Assessment methods

Direct	**Indirect**
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

APPAREL INDUSTRY OVERVIEW **10 Hours**

Organization of the Apparel Business: Introduction to apparel industry. Types of apparel exporters.Business concepts applied to the apparel industry.

MARKETING **9 Hours**

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

SOURCING **8 Hours**

Need for sourcing- sourcing materials- Manufacturing Resources Planning-Material Resource Planning. Vendor Management- Sourcing strategies- Overseas sourcing. Supply chain and

demand chain analysis- Materials management for quick response.

MERCHANDISING **10 Hours**

Definition of merchandising, Functions of merchandising division - Role and responsibilities of a export merchandiser-different types of buyers. Communications with the buyers - awareness of current market trends – product development – Tech pack analysis - Order confirmation process. Export Merchandising -. Classification of exporters- Manufacturer exporter, Merchant exporter, Job worker(CM/CMT). Introduction to buying house.Retail Merchandising- Merchandising strategies, Roles and Responsibilities of retail merchandisers.

MERCHANDISE MANAGEMENT **8 Hours**

Product management - model stock plan, constraining factors, types of suppliers and selection criteria, category management, merchandise management planning in retail and export segments. Brand Management - Brand documentation- Brands and brand awareness. Documentation on brands. Brand formulation. Brand Licencing.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Philip Kotler, Kelvin Lane Keller, Abraham Koshy and Mithileshwar Jha, "Marketing Management a South Asian Perspective", Pearson Education India, 2006.
2. Evelyn C Moore, "Math for Merchandising", Wiley Eastern Inc.,2002.
3. John Donnellan "Merchandise Buying and Management", Farichild Publications, inc., NewYork, 2002
4. Ruth E Glock and Grace I Kunz, "Apparel Manufacturing", Prentice Hall, New Jersey, Fourth Edition,2005.
5. "The Textile Industry: Winning strategies for the New Millennium", Volume II, Textile Institute.,1999

U15FTT602 APPAREL PRODUCTION PLANNING AND CONTROL

L	T	P	C
3	1	0	4

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Explain the basic techniques of production planning & control in garment industry	K3
CO2	Choose the suitable plant site location, layout and production system for apparel industry based on style and quantity of merchandise	K5
CO3	Prepare and analyze the flow process grids, control forms and scheduling charts for production control in apparel industry	K4
CO4	Decide the suitable cut production analysis for various garment quantities	K5
CO5	Explain the material management system for apparel industry	K3
CO6	Determine the capacity planning and line balancing techniques to achieve balanced production	K5

Pre Requisite

U15FT*T*504 Apparel Production Technology
U15FT*T*304 Apparel Machinery and Equipment

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	S								M				S	
CO 2		S	M						M		S		M	
CO 3		S		S	S				M	S	M		S	
CO 4		S		S	S				M				S	
CO 5		S			S				M	M	S		S	
CO 6	S	S		S	M				M	M	S		S	

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

PRODUCTION PLANNING AND CONTROL **9 Hours**

Definition, Objectives of production control, relationship of production control to the

functional areas of a manufacturing organization.

Pre planning: Pre-production functions, Importance of Preproduction function. Lead Time, Product development - steps from prototype to production sample. Product data management.

PLANT LAYOUT **8 Hours**

Plant site location. Plant Layout - definition – types of production layout, criteria for evaluation of a plant layout. Basic production line layout. Determining minimum space requirement, Government regulations for plant layouts.

APPAREL MANUFACTURING SYSTEMS **8+5 Hours**

Section Production systems - whole garment production system, Progressive bundle system, Unit production system, Multiple flow system, modular manufacturing systems – their advantages and disadvantages. Guide lines for choosing suitable production system.

FLOW PROCESS GRIDS AND CHARTS

Flow process grid construction, flow process grids for production control.

CUT PRODUCTION ANALYSIS

Cut order planning – types of spreads, spreading methods, marker utilization, economic cut quantities**.**

MATERIAL MANAGEMENT **10+5 Hours**

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 **10+5 Hours**

Determination of machine requirements for a new factory -calculation of labor 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 – balance control.

Theory: 45 Hours **Tutorial: 15 Hours** **Total: 60 Hours**

REFERENCES

1. Garg R.K, and Sharma V., "Production Planning and Control Management", Dhanpat Rai Publishing, 2003.
2. Jacob Solinger, "Apparel Production Handbook", Reinhold Publications, 1998.
3. Telsang (Martand) "Industrial Engineering and Production Management" S. Chand & Company Limited, 2008
4. Rajesh Bheda " Managing Productivity of Apparel Industry" CBI publishers and distributors, New Delhi 2002.
5. David J Tyler, " Material Management in Clothing Production", Prentice Hall, New jersey, 1991.
6. Carr Harold, Latham Barbara, "The Technology of Clothing Manufacture", Om Book Service, 2004.
7. Bracken Bury, "Knitted Clothing Technology", Om Books Service, 1999.
8. Gerry Cooklin, "Introduction to Clothing Manufacture", Blackwell Science Ltd.,2005.
9. Gerry Cooklin, "Garment Technology for Fashion Designers", Om Books service, 1997.

Churter, A.J., "Introduction to Clothing Production Management", Oseney Mead, 2001

U15FTT603 TEXTILE AND APPAREL QUALITY EVALUATION

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge in sampling techniques of fibers, yarns and fabrics and also in various method of measuring yarn number	K5
CO2	Apply knowledge in principles of working of yarn testing instruments	K3
CO3	Apply knowledge in principles of working of fabric testing instruments	K3
CO4	Correlate knowledge in evaluation of fabric handle properties	K4
CO5	Acquire knowledge on testing instruments used for accessories	K4
CO6	Analyze knowledge in the measurement of fastness properties of fabrics	K4

Pre Requisite:

U15FT*T*504 Apparel Production Technology

U15FT*T*402 Fabric Structure and Design

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S													
CO2		M												M
CO3		S												M
CO4	M	M												M
CO5	M		S				S							M
CO6			M				M							

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

SAMPLING TECHNIQUES AND YARN NUMBERING SYSTEM 9 Hours

Definition– random, biased sampling. Terms used in sampling. Sampling techniques for fibre, yarn and fabric. Moisture Regain and Moisture Content. Standard conditions for testing samples. Yarn count – Definition. Yarn Numbering System– Direct, indirect. Simple calculations.

YARN TESTING 9 Hours

Determination of yarn count, yarn twist- single and folded yarns. Measurement of yarn hairiness- optical, singeing and hairiness tester- Causes for yarn hairiness. Classification of variation. Methods of measuring evenness –Blackboard, ASTM standards, Cutting and weighing methods. Electronic capacitance – evenness tester – Uster standards.

Yarn faults – classification – Classimat. Measurement of yarn strength – Single yarn strength tester –Tensorapid, Tensojet - lea strength tester. Count Strength Product (CSP), its significance.

FABRIC TESTING- MECHANICAL PROPERTIES 9 Hours

Fabric tensile strength tester– Raveled strip method, Cut strip, Grab methods. Fabric tear strength tester. Ballistic strength tester – Hydraulic bursting strength tester. Fabric Abrasion Resistance

– Martindale abrasion tester. Fabric Pilling - I.C.I Pillbox tester. Crimp–Influence of crimp on fabric properties–Shirley crimp tester

FABRICTESTING– AESTHETICS AND COMFORT PROPERTIES 9 Hours

Fabric Drape – Drape meter. Fabric Stiffness – Shirley Stiffness tester, Fabric crease resistance and crease recovery measurements. Fabric Permeability- Fabric airpermeability tester and water permeabilitytester.

APPAREL AND ACCESSORY TESTING 9 Hours

Seam strength and seam slippage testing. Peel bond strength testing-Button, Zipper strength testing. Colour fastness testing – Washing, Rubbing, Light, Perspiration fastness. Apparel dimensional stability – spirality, skewing and its measurement.

Theory: 45 Hours Total: 45 Hours

REFERENCES

1. Arindam Basu, "Textile Testing – Fibre, Yarn and Fabric", The South India Textile Research Association, Coimbatore, 2001.
2. B.P. Saville, "Physical Testing of Textiles", Wood head Publishing Limited, 1999.
3. Grover E G and Hamby D.S, "Hand Book of Textile Testing and Quality Control", Wiley Eastern Pvt. Ltd., New Delhi, 2000.
4. Sundaram V, "Handbook of Textile Testing", CTRL Publication, Bombay, 2003.
5. Booth,J.E.,"PrinciplesofTextileTesting",CBSPublishersandDistributors, 2002.
6. BSI, "BSI Hand books", British Standard Institution, Manchester,2007
7. BIS, "BIS Hand Books" ,Bureau of Indian standards, Delhi, 2007.

U15FTP601 APPAREL PRODUCTION LABORATORY- II

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Develop apparel designs and fashion illustration for ladies & men's wear	K6
CO2	Prepare basic blocks for ladies wear	K3
CO3	Develop patterns as per the required styles for ladies garments	K4
CO4	Develop patterns as per the required styles for men's garments and practice grading for different sizes	K4
CO5	Practice construction of apparel, outline construction flow process for various ladies & men's garments	K4
CO6	Estimate fabric consumption by marker making and costing of apparels	K4

Pre Requisite

U15FT*T*301 Concepts of fashion & design
U15FT*P*301 Fashion Design Laboratory - 1
U15FT*T*302 Basic pattern Making and Adaptation
U15FT*T*303 Garment Components Fabrication
U15FT*P*501 Apparel Production Laboratory - I

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	M											S	W
CO2	S	S	M										S	
CO3		S	S	S									S	
CO4		S	S	S									S	
CO5			M	S					S	W	M	M	S	
CO6			M	S					S	W	M	M	M	

Course Assessment methods

Direct	Indirect
1. Model Exams 2. Lab Exercises 3. End semester Exams	1. Course Exit Survey

LIST OF EXPERIMENTS:

1. Development of basic block patterns–top, skirt and bifurcated garments and grading of any one (men's or ladies garment)
2. Designing and Developing Pattern for Brassier and Panties
3. Construction of Brassier and Panties
4. Designing and Developing Pattern for Choli
5. Construction of Choli
6. Designing and Developing Pattern for Men's Formal Shirt
7. Construction of Men's Formal Shirt
8. Designing and Developing Pattern for Men's Formal Trousers
9. Construction of Men's Formal Trousers
10. Designing and Developing Pattern for Knitted Basic T-shirt
11. Construction of Knitted Basic T-shirt
12. Marker Planning for any one garment

Experiments beyond the syllabus should be conducted

Total: 45 Hours

U15FT*P*602 TEXTILE AND APPAREL QUALITY EVALUATION LABORATORY

L	T	P	C
0	0	4	2

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge in basic working principles of testing instruments	K1
CO2	Develop skills in preparing samples for various types of experiments as per standards	K1
CO3	Acquire knowledge in the method of operating the equipments and to conduct experiments	K1
CO4	Analyze and interpret the data obtained from the testing instruments	K4
CO5	Conclude based on the standards and present the results	K4
CO6	Acquire knowledge in computerized colour matching instrument	K1

Pre Requisite: Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S													
CO2		S		S										
CO3				S										
CO4		S		S							S		S	
CO5				S						M			S	
CO6					M									

Course Assessment methods

Direct	Indirect
1. Model Exams 2. Lab Exercises 3. End semester Exams	1. Course Exit Survey

LIST OF EXPERIMENTS

1. Determination of Yarn Count and Lea Strength
2. Determination of Single / Ply Yarn Twist
3. Determination of Yarn Appearance Grade
4. Determination of Fabric Abrasion Resistance
5. Determination of Fabric Tensile Strength
6. Determination of Color Fastness to Rubbing - Crock meter
7. Determination of Fabric Stiffness and Crease Recovery Angle
8. Determination of Fabric bursting strength and fabric Drape.
9. Determination of fabric pilling.

10. Determination of fabric tear strength.
11. Determination of colorfastness to perspiration.
12. Determination of shrinkage of woven and knitted fabrics.
13. Determination of Seam Strength and Seam Slippage
14. Determination of Zipper strength
15. Determination of Button Pull Strength
16. Determination of Peel bond strength of fusible interlinings
17. Determination of Wickability of fabric
18. Determination of Spirality and Course length of Knitted fabrics
19. Classification of Fabric defects and evaluation using 4 point system.
20. Determination of Wettability of fabrics.
21. Determination of sublimation fastness and stretch & recovery of fabric.
22. Analysis of Seam puckers.
23. Determination of garment dimensional stability.
24. Color measurement of fabrics with computerized colour matching.

Experiments beyond the syllabus should be conducted.

Total: 60 Hours

U15GH*P*601/ NATIONAL VALUES (Common to all branches of Engineering and Technology)	L	T	P	C
	1	0	0	1

Objectives

1. To enlighten students about responsible citizenship and polity
2. To sensitize the greatness of India and Indian Culture and to encourage students to uphold them
3. To be aware of the India's messages to world and propagate them as when possible
4. To understand about the uniqueness of India
5. To know about famous Indian personalities and their characteristics and to know about their contributions

Course outcomes:

After successful completion of the course, the student would be able to:

1. The Students shall acquire knowledge on the Enlightened Citizenship.
2. The Students shall know skills the greatness of India and Indian Culture.
3. The students shall be aware of the messages of India to the world
4. The Students shall be aware of the uniqueness of India
5. The students shall know about the inspiring Indian personalities and emulate them

Pre-requisite: Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO1		W				M		M				M		
CO2		W				S	W	S	M	M		M		
CO3		W	W		W	M	W	M	M	M		M		
CO4		W				M	W	M	W	W		M		
CO5						W	M	W	W	W		S		

Course Assessment methods:

Direct	Indirect
1.Individual Assignment 2.Group Assignment 3.Presentation 4.Surprise Test 5.Practical Assessment 6.End Semester Assessment	1.Attendance and Behavioural Assessment

Enlightened Citizenship	2 Periods
Greatness of India & Indian Culture	2 Periods
Uniqueness of India	2 Periods
Famous Indian Personalities	2 Periods
India's messages to the world	3 Periods
Meditation & Yogasanas	4 Periods

Total Periods: 15

References Books:

1. Gurcharan Das, "***India Grows at Night***", Penguin **Books** India, Published September 2012.
2. Swami Vivekananda, "***Prosperous India"*** 1st edition, The Ramakirshna Mission Institute of Culture, 1937.
3. Sarvepalli Radhakrishnan, ***"The Source Book on Indian Philosophy"***, Princeton, N.J. : Princeton University Press, 1957.
4. Amartya Sen, ***"The Argumentative Indian",*** Allen Lane, Published 2005.

SEMESTER – VII

U15GST005 ENGINEERING ECONOMICS AND FINANCIAL MANAGEMENT

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Evaluate the economic theories, Cost concepts and pricing policies	K_5
CO2	Analyze the market structures and integration concepts	K_4
CO3	Apply the concepts of national income and understand the functions of banks and concepts of globalization	K_3
CO4	Apply the concepts of financial management for project appraisal and working capital management	K_3
CO5	Understand accounting systems	K_2
CO6	Analyze financial statements using ratio analysis	K_3

Pre Requisite : Nil

COs	**CO/PO Mapping** (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													
	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1		M				M					M		S	
CO2				M		M					M			
CO3						M					M			
CO4				M							S			
CO5											S			
CO6		M		M							S			

Course Assessment methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

ECONOMICS, COST AND PRICING CONCEPTS 9 Hours

Economic theories – Demand analysis – Determinants of demand – Demand forecasting – Supply – Actual Cost and opportunity Cost – Incremental Cost and sunk Cost – Fixed and variable Cost – Marginal Costing – Total Cost – Elements of Cost – Cost curves – Breakeven point and breakeven chart – Limitations of break even chart – Interpretation of break even chart – Contribution – P/V-ratio, profit-volume ratio or relationship – Price fixation – Pricing policies – Pricing methods.

CONCEPTS ON FIRMS AND MANUFACTURING PRACTICES 9 Hours

Firm – Industry – Market – Market structure – Diversification – Vertical integration – Merger – Horizontal integration

NATIONAL INCOME, MONEY AND BANKING, ECONOMIC ENVIRONMENT 9 Hours

National income concepts – GNP – NNP – Methods of measuring national income – Inflation – Deflation – Kinds of money – Value of money – Functions of bank – Types of bank – Economic liberalization – Privatization – Globalization

CONCEPTS OF FINANCIAL MANAGEMENT 9 Hours

Financial management – Scope – Objectives – Time value of money – Methods of appraising project profitability – Sources of finance – Working capital and management of working capital

ACCOUNTING SYSTEM, STATEMENT AND FINANCIAL ANALYSIS 9 Hours

Accounting system – Systems of book-keeping – Journal – Ledger – Trail balance – Financial statements – Ratio analysis – Types of ratios – Significance – Limitations

Theory :45 Hours **Total: 45 Hours**

REFERENCES

1. Prasanna Chandra, " Financial Management (Theory & Practice) ,"TMH
2. Weston & Brigham, " Essentials of Managerial Finance"
3. Pandey, I. M., "Financial Management"
4. Fundamentals of Financial Management- James C. Van Horne.
5. Bhaskar S. "Engineering Economics and Financial Accounting", (2003) Anuradha Agencies, Chennai
6. Financial Management & Policy -*J*ames C. Van Horne
7. Management Accounting & Financial Management- M. Y. Khan & P. K. Jain
8. Management Accounting Principles & Practice -P. Saravanavel
9. RamachandraAryasri.A., and Ramana Murthy V.V.,"Engineering Economics &Financial Accounting"-Tata McGraw Hill, New Delhi, 2006
10. Varshney R.L., and MaheswariK.L.,"Managerial Economics" – Sultan Chand & Sons, New Delhi, 2001
11. Samvelson and Nordhaus,"Economics"-Tata McGraw Hill, New Delhi, 2002

U15FTT701 QUALITY ASSURANCE AND SOCIAL COMPLIANCE FOR APPAREL INDUSTRY

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge on the concepts of quality assurance, its importance in manufacturing process, and realizing the same through sampling-based inspection.	K1
CO2	Acquire knowledge on quality control of material and processes in apparel manufacturing	K1
CO3	Understand and execute quality requirements of different standard organization and Buyer's requirements	K2
CO4	Acquire knowledge on the concepts of social compliance and its importance in the apparel industry	K2
CO5	Interpret compliance norms for apparel manufacture and industry	K4
CO6	Relate and practice concepts of ethical trading and international compliance for apparel Business	K5

Pre Requisite

U15FT*T*504 Apparel Production Technology
U15FT*T*602 Apparel production planning and control
U15FTT503 Textile Chemical Processing

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		S									M	M	M	
CO2		S	S	S							M	M	S	
CO3		S	S	S		S		M			M	M	S	
CO4		S									S	S	M	S
CO5						S	S	S	S	S	S	S	S	S
CO6						S	S	S	S	S	S	S	S	S

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

INTRODUCTION **9 Hours**

Quality definition – Quality control and its necessity. Quality assurance - difference between quality assurance and quality inspection. Inspection and importance - Functions of inspection – Difference between Testing and Inspection. Types of inspection - 100% inspection, spot checking. Sampling

arbitrary sampling and statistical sampling. Comparison of 100% inspection and sample inspection. Stages of inspection – raw material inspection, in process inspection and final inspection – AQL standards.

QUALITY CONTROL FOR FABRICS 3 Hours

Quality control for fabrics – different types of defects in fabrics – classification into major and minor faults – fabric inspection systems – 4 point, 10 point systems. Fabric inspection machine.

QUALITY CONTROL IN APPAREL PRODUCTION 9 Hours

Quality control in pattern making, marker planning, cutting, sewing and packing. Classification of defects – product defect, process defect. Grading visual defects. Defect zones in apparels. Quality control of labels, buttons, zippers, fasteners.

QUALITY STANDARDS 6 Hours

Standard test methods- ISO, ASTM, BS, ANSI, ASA, BIS, ASQ, AATCC.
Standard performance specifications for women's, men's, children's wear – woven and knitted.
Tolerances and quality standard for finished garments. Different Buyer's requirements, Quality manuals, Quality Management systems- ISO 9000

SCOPE AND NEED OF SOCIAL COMPLIANCE 6 hours

Social Compliance - concept, need, benefits for industry, workers, society. Social accountability and Corporate Social responsibility - scope and need. Social Compliance in supply chain management.

GENERAL NORMS FOR SOCIAL COMPLIANCE IN APPAREL INDUSTRY 6 hours

ILO conventions on discrimination, forced labor and c hi l d labor, Minimum age Convention, freedom of association, collective bargaining, environment and climate, health and safety – norms applicable, effect and risk in the supply chain

ORGANIZATIONS FOR INTERNATIONAL SOCIAL COMPLIANCE 6 hours

Organization for Economic Co- operation of Development (OECD), Ethical Trading Initiative (ETI), Worldwide Responsible Apparel Production (WRAP), Social Accountability International SA8000 : objectives, principles and certification process

Theory : 45 Hours Total: 45 Hours

REFERENCES

1. Rajesh Chhabara, "Social Accountability", Ava softech Pvt. Ltd., 2005
2. Rebocak Leifziger, "SA 8000: The first decade", Greech Leaf Publishers, May 2009.
3. Jacob Solinger, "Apparel Manufacturing Handbook", Prentice Hall, 1998
4. PradipV.Mehta, P.E, Satish K.Bharadwaj, "Managing Quality in Apparel Industry", Newage International (P) Ltd, Publishers, 2006
5. SammelEliou, "Production Planning and Control", Wiley Eastern Pvt. Ltd.2007
6. Billie J. Collier, Helen H. Epps, "Textile Testing and Analysis", Prentice Hall, New Jersey,1999
7. http://www.ilo.org.in.
8. http://www.endchildlabor.com
9. http://www.labour.nic.in
10. http://www.unicef.org
11. http://www.indianchild.com

U15FTT702 COSTING IN APPAREL INDUSTRY

L	T	P	C
3	1	0	4

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge in basic principles of cost accounting	K2
CO2	Describe the factors that determine the cost of apparel products	K2
CO3	Discuss the factors that determine the cost of apparel products	K2
CO4	Calculate the CMT cost for different types of garments	K4
CO5	Evaluate the cost of apparel products based on various specifications of garments	K5
CO6	Acquire knowledge on various pricing techniques, budgeting and cost volume profit analysis	K2

Pre Requisite :

U15FTT101 Fiber Science
U15FTT201 Yarn Technology
U15FT*T*401 Weaving Technology
U15FTT502 Knitting and Nonwoven Technology
U15FT*T*303 Garment Components Fabrication
U15FT*T*504 Apparel Production Technology
U15FT*T*503 Textile Chemical Processing
U15FT*E*503 Apparel Finishing and Care

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO 9	PO1 0	PO1 1	PO12	PSO 1	PS O2
CO1	S	S								S	S			
CO2		S					S				S			
CO3	S	S		S							S	S		
CO4		S									S		S	
CO5		S									S	S	S	
CO6		S							S		S			

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. Tutorial 5. End Semester Exam	1.Course Exit Survey

Course Content

COST ACCOUNTING 10 Hours

Objectives- responsibility of accounting, uses of cost accounting.Elements of cost. Direct material, Directlabour, Factory overheads. Cost behavior patterns in apparel industry. Fixed variable, semi variable. Estimating and costing- importance- difference betweenestimating andcosting.

RAW MATERIAL AND CMT COST: 10+5 Hours

Factorsthatdeterminethecostofgarments– materialcost– costofyarn,costoffabricproduction,costofprocessing.Width,designandlotsizeoffabricaffecting cost. Different types of accessories used in garments and their cost -Thread,Button,Zippers, Interlining etc. Packing and labeling cost– differenttypesoflabelsandpackingmaterials.

Costofcomponents –cutting cost – making and trim cost (CMT cost) – CMT cost for different types of garments. Shipmentcost.

GARMENT PRICING: 9+8 Hours

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.

COST VOLUME PROFIT ANALYSIS: 8 +2 Hours

Break even analysis. Profit and loss statement, Balance sheet.Ratio analysis. Sales mix by garment style. Effect of volume change.Price / volume analysis. Depreciation- Calculation of depreciation.

BUDGETING FOR APPAREL INDUSTRY: 8 Hours

Budgeting principles for the apparel industry, fixed vs. flexible budget, master budget, limitations of budgets.

Theory: 45 Hours Tutorial: 15 Hours Total: 60 Hours

REFERENCES

1. MauriceJohnsonandE.Moore,"ApparelProductDevelopment",Om Book Service,2001.
2. B.M.LallNigamandI.C.Jain"CostAccountingPrinciplesandPractice",Prentice HallofIndia,2007.
3. M.Y.KhanandP.K.Jain"CostAccounting",HillpublishingLtd.,New Delhi, 2007.
4. Ruth E.Glockand Grace I. Kunz,"Apparel Manufacturing Sewn Product Analysis",DorlingKindersley(India)Pvt.Ltd.,2005.
5. Chakraborty S K, "Cost Accounting and Financial Management", New age International, 2004.
6. Pandey I M, "Management Accounting", Vikas Publishing House, New Delhi, 1999.

U15FTP701 PORTFOLIO PRESENTATION

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

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Interpret and relate the published fashion forecasts to design apparels based on a concept	K5
CO2	Create apparel designs based on requirements	K6
CO3	Develop documents and design sheets to enable effective communication in the apparel industry	K6
CO4	Select the suitable raw materials, garment trims & accessories and other garment details based on the garment requirements and develop garments	K6
CO5	Estimate the Garment costing based on the sample developed	K5
CO6	Develop an apparel line based on market requirements	K6

Pre Requisite:

All Apparel relevant courses from Semester I to Semester VIII

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		S		S									M	
CO2			S		S	S	M	S				S	S	S
CO3					S					S			M	
CO4		S				S	S	S			S		S	S
CO5											M		S	
CO6		S	S							S		S	S	S

Course Assessment methods:

Direct	Indirect
1. Model Exams 2. Lab Exercises 3. End semester Exams	1. Course Exit Survey

GUIDELINES:

The following have to be prepared:

1. Design Research
2. Conceptualization
3. Client profile.
4. Theme board
5. Color board
6. Forecast board
7. Sourcing Board – Fabrics
8. Sourcing Board – Trims
9. Pattern (doodle) development board
10. Fashion design presentation board – 5 nos.
11. Product development - One men's wear,
12. Product development - one women's wear

Experiments beyond the syllabus should be conducted.

Total: 45 Hours

U15GH*P*701/ GLOBAL VALUES (Common to all branches of Engineering and Technology)	L	T	P	C
	1	0	0	1

Objectives

1. To facilitate Students to think holistically
2. To empathize ecology and its benefits and thereby conserve it
3. To be aware of Issues related to Globalisation and how to mitigate it
4. To understand global economy and to know how economy driven world impacts happiness

Course outcomes:

After successful completion of the course, the student would be able to:

1. The Students shall understand importance of ecology and its preservations
2. The Students shall understand the various global issues and their causes and solutions
3. The Students shall approach any problem holistically as against giving a reductionist solution
4. The Students shall learn impact of globalization on various factors such as environment, local population etc
5. The Students shall learn to integrate and understand how an Individual peace impacts world peace

Pre-requisite: Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO1		W					M	M	M	M		M		S
CO2		W				M	S	S	M	M		M		S
CO3		W	W		W	M	M	M	W	W		M		S
CO4		W				S	M	M	W	W		M		S
CO5						W	W	W				S		S

Course Assessment methods:

Direct	Indirect
1.Individual Assignment 2.Group Assignment 3.Presentation 4.Surprise Test 5.Practical Assessment 6.End Semester Assessment	1.Attendance and Behavioural Assessment

Introduction to Global Values 1 Period

Introduction to Systems Thinking 1 Period

Ecology, ecological imbalances and its solution 3 Periods
Globalisation Vs Localisation – an economic and Spiritual Perspective 3 Periods
Global Issues & Solutions 3 Periods

Advanced Contemplative Practices 4 Periods

Total Periods: 15

References Books:

1. Vethathiri's Maharishi's, ***"World peace"*** The World Community Service Centre, Vethathiri Publications,1957.
2. Fritz Schumacher, ***"Small is Beautiful",*** The Blond & Briggs, Published 1973.
3. Noam Chomsky, ***"Profit over People",*** Seven Stories Press, Published 1999.
4. Vethathiri's Maharishi's, ***"Atomic Poison"*** The World Community Service Centre, Vethathiri Publications, 1983.

ELECTIVE I

U15FT*E*101 FASHION PHOTOGRAPHY

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Summarize knowledge on types of camera, working principles of camera and their various accessories.	K2
CO2	Apply basic techniques, equipment techniques, and subject techniques of various camera in photography	K3
CO3	Identify the importance of lighting, types of lighting, film types, film speed, and film format.	K4
CO4	Summarize skills on fashion photography in different fields	K6
CO5	Apply knowledge on developing and printing, image mixing and printing.	K3
CO6	Explain the applications of computer in photography and video photography	K3

Pre Requisite: Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1		S	S		S								M	
CO 2		S	S										S	
CO 3		M	M										S	
CO 4		S	S		S		S						S	S
CO 5		S	S		M								M	S
CO 6			M	S	S		S						S	M

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

INTRODUCTION: 9 Hours

Camera types – 35mm, SLR, Digital camera. Working principle of camera. Accessories: general accessories - lenses, lens filters, film types, flashlights- lighting accessories - power accessories, system accessories. Care and maintenance of camera.

TECHNIQUES: 12 Hours

Camera techniques: Basic techniques – fundamentals of composition, depth of field, shutter speed, focusing, using exposures. Equipment techniques – filter techniques, lens techniques, flash techniques, studio flash techniques, lighting techniques**.** Subject techniques – landscape, night photography, portrait, action photography and special effects. Outdoor and Indoor Photography – equipments.

LIGHTING AND FILM: 9 Hours

Lighting – concept and importance – Types of lighting – front light, side light, back light, revealing

light, controlling light, flash and studio lighting. Film types – Black and White, Colour. Film speed- Film format.

SUBJECT PHOTOGRAPHY: 6 Hours

Fashion Photography in different media – modeling, newspaper, magazines and fashion shows. Concept/theme based photography along with its application and acceptability in marketing and commercialization/branding.

DEVELOPING AND PRINTING: 9 Hours

Basics of developing and printing – image mixing and printing – Latest developments in printing – Computer application in photography. Video photography

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. Nirmal Pasricha, "A Professional's Basic Photography", Black Rose Publications, Delhi, 2002.
2. Daniel Lezano, "The Photography Bible", A David and Charles Book., United Kingdom, 2004.
3. Simon Joinson, "Get the most from your Digital Camera", A David and Charles Book., United Kingdom, 2004.
4. Miller, W.R. "Basic Industrial Arts, Plastics, Graphic Arts, Photography", McKnight Publishing company, Illinois, 1978.
5. John Hedge, "Photography Course", John Hedge Co, 1992.
6. Steve Bavister, "35 mm Photography -The Complete Guide", A David and Charles Book., United Kingdom, 2004.
7. Peter Cattrell, "Photography", Octopus Publishing Group Ltd, London 2005.
8. Sue Hillyard, "The Photography Handbook - A Step by Step Guide", New Holland Publishers, London, 2003.

U15FT*E*102 VISUAL MERCHANDISING

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Define and appreciate the significance and role of visual merchandising in a retail environment, in order to effectively present the merchandise to the consumers	K2
CO2	Classify the various elements of Visual presentation and understand their significance in visually presenting a display	K2
CO3	Analyze and identify the best suitable environment for merchandise including interior, exterior and point of displays	K4
CO4	Appraise on various techniques used in presenting merchandise	K5
CO5	Plan on optimizing the merchandise and retail space to customers	K6
CO6	Summarize the various features available in a computer controlled visual merchandising	K2

Pre Requisite :

U15FT*T*301 Concepts of Fashion and Design

U15FT*P*401 Fashion CAD and Fabric structure Analysis Laboratory

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1										S		M		
CO2										S		M		
CO3		S	M			M	S			S				M
CO4		S	S			M	M			S				M
CO5				M	M	M	S	M			M		S	M
CO6					M									

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

FUNDAMENTALS OF VISUAL MERCHANDISING 9 Hours

Visual Merchandising-definition,objectivesandscope.Types ofdisplay and display settings. Retail stores and approaches of visual merchandising -Types of retail stores, store atmospherics, ApproachesinVisualMerchandising in various stores-Inhousestaffing,DepartmentStore Approach, Small Store Approach. Role of Visual Merchandising in changing faceofretailing.

ELEMENTS OF VISUAL PRESENTATION 5 Hours

Overview of the various elements – Color, lighting, line and composition, graphics and signage, store exteriors and interiors, sensory stimulants like scent, sound etc. Application of colorschemes andcolorpsychology tocreatemoodin garmentdisplay.

MANNEQUINS AND FIXTURES **6 Hours**

Mannequinsandotherhumanforms,alternatives tomannequins.Criteria for selection of fixtures, dressing fixtures, modular fixtures.Store exterior – Signs, Marquees, Outdoor Lighting, Banners, Planters, Awnings, Windows in Storefront Design, store fronts.

STORE INTERIORS AND POINTS OF DISPLAY **5 Hours**

Focal points, island displays, risers and platforms, the runway the catwalk, counters and display cases, museum cases, demonstration cubes, ledges, shadow boxes, enclosed displays, fascia, t-walls. Point of purchase display, industrial display, fashion shows, trade organizations and sources.

DISPLAY TECHNIQUES **5 Hours**

Attention getting devices, familiar symbols, masking and proscenia – purpose and techniques used

STORE PLANNING AND EXECUTION OF A VISUAL PRESENTATION 10 Hours

Storelayoutplanning-grid,racetrack,freeformand their directionofflow. Floor plans and reading of floor plans – P lan-o-gram- definition, purpose and planning - theme,ensemble,racks, shelves,bins,etc. Assortment planning- Assortment planning, OptimizeapparelassortmentsDisplay calendar and planning a display, scheduling the promotion, budgetingandsafety factorsinvisualmerchandising.

COMPUTER AIDEDVISUAL MERCHANDISING **5 Hours**

CAD in store design,Information technologyinassortment planningandinventorymanagement.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Pegler M.M., “Visual Merchandising and Display”, IV Edition, Fair child Publications,NewYork,2001.
2. Diamond.J,Diamond,E.,“ContemporaryVisualMerchandising”, Prentice HallInc.NewJersey2003.
3. Diamond.E,FashionRetailing–AMultichannelApproach,IIEdition,Prentice HallInc.NewJersey2006.
4. RathP.M., Peterson J., Greensley.P, Gill.P, Introduction to Fashion Merchandising,Delmar PublishersInc.,NewYork1994.
5. PhillipsP.M.,FashionSalesPromotion,IIEdition,PrenticeHallInc, NewJersey,1996.
6. CurtisE,FashionRetail,JohnWileyandSonsLtd,England,2004

U15FT*E*103 SURFACE ORNAMENTATION AND ACCESSORIES

Course Outcomes (COs):
After successful completion of this course, the students should be able to

L	T	P	C
3	0	0	3

CO1	Develop knowledge in classification and gain skill to select parameters for raw materials and tools for surface ornamentation	K4
CO2	Classify and identify different hand embroidery stitches	K2
CO3	Classify and identify different traditional embroidery stitches	K2
CO4	Recognize and identify the machine embroidery types and processes	K2
CO5	Relate the embroidery production processes and quality parameters in computerized embroidery	K3
CO6	Acquire knowledge on types of accessories and its production processes	K2

Pre Requisite
U15FT*T*301 Concepts of Fashion and Design
U15FT*P*301 Fashion Design Laboratory

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M	S											S	
CO2	M	S	M										S	
CO3	M	S	M										S	
CO4	S	S											S	
CO5	S	M											S	
CO6	M	M											S	M

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

INTRODUCTION: 7 Hours

Embroidery – meaning and importance- Types and Classification. Study and compatibility of needles, thread, frames, backing materials and fabrics for embroidery. Attachments to sewing machines for embroidery.

HAND EMBROIDERY: 10 Hours

Hand embroidery stitches - classification - running, couching, button hole, satin, long and short, wheat, chain, stem, herringbone, cross stitch, knotted stitches, fish bone. Indian traditional embroideries – Phulkari, Kasuti, Kashida, Kutch work, Chikkankari, Kantha, Tribal embroidery stitches, designs, colors and materials used.

MACHINE EMBROIDERIES AND SURFACE ORNAMENTATION: 10 Hours

Machine Embroideries and Surface ornamentation – types - eyelet work, cutwork, lace work, drawn thread work, drawn fabric work, patch work, mirror work, applique, shaded embroidery, shadow work, badala work, bead and sequins work and bobbin thread embroidery.

COMPUTERIZED EMBROIDERY: 10 Hours

Computerized Embroidery Machine – Multi Head Embroidery Machine - Functions and Features. Embroidery Production Process, Selection of thread, color and stitches for computer controlled embroidery machines. Study of frames. Special attachments. Quality control aspects.

FASHION ACCESSORIES: 8 Hours

Fashion Accessories – footwear, handbags, belts, gloves, hats, scarves, Jewellery - designing, selection of materials and production processes.

Theory : 45 Hours Total: 45 Hours

REFERENCES

1. Parul Bhatnagar, "Traditional Indian Costumes and Textiles", Abhishek Publications, Chandigarh, 2004.
2. Jay Diamond and Ellen Diamond, "Fashion, Apparel, Accessories, Home Furnishings" Pearson Prentice Hall, New Jersey, 2007.
3. Usha Srikant, "Designs for a lifetime", Samata Enterprises, Mumbai, 2002.
4. Shailaja D. Naik, "Traditional Embroideries of India", A.P.H Publishing Corporation, New Delhi, 1996.
5. Gini Stephens Frings, "Fashion - From Concept to Consumer", Prentice Hall, New Jersey,1999.
6. Sheila Paine, "Embroidered Textiles", Thames and Hudson Ltd., 1990.
7. Gail Lawther, "Inspirational Ideas for Embroidery on Clothes and Accessories", Search Press Ltd., 1993.
8. Training Manual for Embroidery Machine Operators, TAJIMA, UIET, Tirupur, 2003.
   Training Manual for Embroidery Machines, Barudan, Tirupur, 2002.

U15FTE104 **HOME FURNISHINGS**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Generalize knowledge about the varieties of home furnishing materials and finishing methods	K3
CO2	Developing skills in the selection of different varieties of home furnishing materials in terms of sizes, shapes and patterns and construction methods	K4
CO3	Analyze the knowledge on suitability of furnishings and coverings for living room.	K4
CO4	Analyze the knowledge on suitability of various types of linens and its end uses	K4
CO5	Analyze the knowledge on suitable care & maintenance of home furnishing materials.	K4
CO6	Assess the varieties of home furnishing products and its end uses	K4

Pre Requisite : Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M												S	M
CO2		S	M											
CO3	M	M											M	M
CO4		M	M										M	
CO5			M											
CO6			M										M	M

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

INTRODUCTION **9 Hours**

Definition & introduction to textile furnishings. Different type of furnishing materials –woven and nonwoven. Factors affecting selection of home furnishing – fiber, yarn, fabric & finishes. Finishes for home furnishings – soil repellency, mosquito repellency, flame proofing, dust repellency, anti microbial finish.

WINDOW TREATMENT **9 Hours**

Doors and Windows - types. Window treatment –exterior, interior - hard and soft. Curtains and Draperies – types, parts, factors for selection and construction, accessories used.

LIVING ROOM FURNISHING **4 Hours**

Living Room furnishings - sofa cover, cushion, cushion cover, bolster, bolster cover, teapoy cover. Wall coverings – types.

FLOOR COVERING **5 Hours**

Floor covering – types – Hard floor covering, resilient floor coverings, and soft floor coverings - carpet, rugs, mats.

BED AND BATH LINEN **9 Hours**

Bed linens– types– bed sheets, blankets, blanket covers, comforters, comforter covers, bed spreads, mattress and mattress covers, pads, pillows and pillow covers. Care and maintenance of bedlinen. Bathlinen & its types- towel, mats. Care and maintenance of bathlinen.

KITCHEN LINEN **4 Hours**

Kitchen linens – types - dish cloth, towels, fridge cover, fridge handle cover, mixie cover, and grinder

cover, napkin, apron.

TABLE LINEN **5 Hours**

Table Linen – Types - tablemats, table cloth, hand towel, doilies, runners. Cleaning materials – wipes andmops. Care and maintenance of kitchen and table linen.

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. Jay Diamond and Ellen Diamond, "Fashion Apparel, Accessories, Home Furnishings",PearsonPrenticeHall,NewJersey,2007.
2. Hamlym, "Bed and Table linen", Octopus Publishing Group Ltd, Newyork 2001.
3. David Holloway, "The Essential Book of Home Improvement Techniques", Marshals Publications, London, 2000.
4. Emma Callery, "The Home Decorator's Colour Source Book", Apple Press Ltd, London, 2006.
5. Heather Luke, "Design and Make Cushions", Silverdale Books Ltd, Leicester, 2001.
6. Hamlym, "Curtains and Blinds", Octopus Publishing Group Ltd, Newyork, 2001.
7. Susie Johns, "A Cornucopia of Cushions", Apple Press Ltd, London, 1997.
8. James Merrell, "Living with Decorative Textiles, "Thames andHudson ltd, London,1995.
9. Caroline Lebea, "Fabrics the Decorative Art of Textiles", Thames and Hudson Ltd, London,1994

U15FTE105 FASHION APPAREL DESIGN AND DEVELOPMENT

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge on basic principles in designing and developing garment patterns.	K2
CO2	Developing designing skills in preparation of garments by implementing the various measurementsfor children's, women's and men's garments.	K3
CO3	Developing skills in pattern development and construction methods for children's, women's and men's garments.	K6
CO4	Trace the knowledge on the different varieties of woven and knitted garments.	K3
CO5	Assess the suitability of garment patterns, fabrics, seams to fit the individuals	K5
CO6	Assess the comfort ability parameters on woven and knitted garments	K3

Pre Requisite

U15FT*T*301 Concepts of Fashion and Design

U15FT*T*302 Basic Pattern Making and Adaptation

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

Cos	Programme Outcomes(Pos)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO -1	PSO -2
CO 1	S													
CO 2		S	M						M					M
CO 3		S	M						M				S	M
CO 4	M			M										
CO 5	M												M	M
CO 6									M					

Course Assessment methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

CHILDREN'S WEAR **10 Hours**

Designing and pattern development- measurements-standard size charts for children's wear. Quality requirements for selecting suitable fabric, seams and stitches for children wear. Step-by-step garment drafting process and construction sequence – Frocks- A-line, summer, yoke, baba suit

WOMEN'S WOVEN WEAR **10 Hours**

Designing and pattern development – measurements - standard size charts for women's wear. Quality requirements for selecting suitable fabric, seams and stitches for women's wear. Step-by-step garment drafting procedure and construction sequence – ladies kurti, churidar, skirts - plain, gored, pleated and blouses – plain blouse, raglan blouse, katori blouse.

WOMEN'S KNIT WEAR **9 Hours**

Designing and pattern development- measurements – standard size charts for women's knitwear.

Step-by-step garment drafting procedure and construction sequence-corsets, camisole, nighty and dresses - princess line, empire line, tent dress and maternity wear.

MEN'S WOVEN WEAR **9 Hours**

Designing and pattern development – measurements – standard size charts formen's wear. Quality requirements for selecting suitable fabric, seams and stitches for men's wear. Step-by-step garment drafting procedure and construction sequence –Trousers-pleated, jeans, cargos, half sleeve shirt and single breasted coat.

MEN'S KNIT WEAR **7 Hours**

Designing and pattern development – measurements – standard size charts for men's knitwear. Step-by-step garment drafting procedure and construction sequence – elastic shorts, briefs and vests.

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. Helen Joseph and Armstrong, "Pattern Making for Fashion Design", Pearson Education, 2005.
2. Winifred Aldrich, "Metric Pattern Cutting for Men's Wear", Blackwell Science, 2000.
3. Winifred Aldrich, "Metric Pattern Cutting for Children's Wear and Baby Wear", 3rd Edition, Black well Science, 2001.
4. Singer, "Sewing Pants That Fit", Cowles Creative Publishing Inc., 1989.
5. McKelvey Kathryn, "Fashion Source Book", Black well Science, 1994
6. Gerry Cooklin, "Garment Technology For Fashion Designers", Black well Science, 2000.

Claire Shaeffer, "Fabric Sewing Guide", Chilton Book Company - Radnor, Pennsylvenia,

ELECTIVE V

U15FTE501 FASHION COMMUNICATION AND MARKETING

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Appreciate the significance of fashion communication, theories of clothes and their functions	K2
CO2	Understand the various dimensions of fashion and its impact on society	K2
CO3	Perceive a market according to its size, structure and market environment	K3
CO4	Analyze and interpret required data from the market through appropriate marketing research and data collection	K4
CO5	Choose suitable process of fashion forecasting	K3
CO6	Identify the significance and classification of fashion products and choose new product development and marketing communication strategy	K5

Pre Requisite :

U15FTT502 Apparel Product Development Process

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		M								S				
CO2		M				M				M		M		M
CO3		S		M			M							M
CO4			S	M	M				S	S			M	
CO5		S		M	M								M	
CO6		M	M							S		M	M	

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

FASHION COMMUNICATION **9 Hours**

Fashion and Anti fashion, Function of Fashion Clothing-Material function–protection, modesty and concealment, immodesty and attraction. Cultural functions – individuality expressions, social status, social role, economic status, political status, religious status.

FASHIONAND SOCIETY **9 Hours**

Fashion and modernity, fashion and post modernity, masquerade fashion and allegory, fashion and pastiche, fashion and bricolage, fashion and ambivalence.

INTRODUCTION TO FASHION MARKETING **5 Hours**

Definition of Fashion- Fashion marketing – Development of Fashion market – Size, Structure – marketing environment - micro marketing, macro marketing environment.

FASHIONMARKETINGRESEARCH **6 Hours**

Purpose of research-research design and data sources– Sampling methods– probability sampling, non probability sampling. Data sources, Primary data collection methods. Market Segmentation- Fashion marketing mix.

FASHION FORECASTING: **7 Hours**

Definition of fashion forecasting, Types of forecasting – long term and short term, Process of fashion forecasting, Role of fashion forecasters, fashion forecasting packages – hard copy and soft copy packages – Trend stop, Trend union, WGSN. Forecasting Services/Agencies and its role in forecasting.

FASHION PRODUCT DEVELOPMENT **9 Hours**

Fashion Products and its importance– Fashion Industry and new Product Development

FASHION MARKETING COMMUNICATION: Fashion advertising, Sales promotion, Public relations, celebrity endorsement and sponsorship, personal selling, visual merchandising to visual marketing.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Malcolm Barnard "Fashion as communication", Routledge Taylor & Francis Group, 2002
2. Mike Easey, "FashionMarketing",BlackwellScience,2000.
3. MauriceJ .Johnson and Evelyn C.moore, "Apparel Product Development", Prentice HallInc.,2001.
4. Smith, P. R. and Taylor, J., "Marketing Communications: An Integrated Approach", KozanPage, London, U.K.2005.
5. Agins, T. "The end of Fashion; How Marketing Changed the Clothing Business Forever", Perennial,2000.
6. Hines, T and Bruce, M."Fashion Marketing-Contemporary Issues",CIM,2001
7. George Belch, Michael A Belch, "Advertising Promotion: An Integrated Marketing Communication Perspective", Tata McGraw Hill, 2001.
8. John M Penrose, Robert W Rasberry, Robert J. Myers, "Advanced Business Communication",SouthWesternPublicationCompany,2001

U15FTE502 APPLICATION OF COMPUTERS IN APPAREL INDUSTRY

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Outline the knowledge on basics of computer	K2
CO2	Summarize the existing CAD / CAM applications in apparel design and manufacturing.	K3
CO3	Analyze and identify options for integrating CAD / CAM processes in apparel designing and manufacturing.	K4
CO4	Make use of software knowledge to design textile and garment designs	K3
CO5	Appraise various computer aided garment production systems according to the requirements of the apparel industry	K5
CO6	Appraise a suitable computer aided management system according to the requirements of the apparel industry	K5

Pre Requisite:

U15FT*T*301 Concepts of Fashion and Design
U15FT*T*302 Basic Pattern Making and Adaptation
U15FT*T*402 Fabric Structure and Design
U15FT*P*401 Fashion CAD and Fabric structure Analysis Laboratory
U15FTT502 Knitting and Nonwoven Technology
U15FTT504 Apparel Production Technology

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PS O 1	PS O 2
CO 1	S													
CO 2		S											M	M
CO 3		S			S								S	
CO 4	S		S		S								S	M
CO 5		S			M								S	
CO 6		S			M								S	

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

COMPUTER BASICS **7 Hours**

Introduction to Computer fundamentals –computer specifications, Input, output, and storage technologies. Computer Software – Application software, system software, commercial software, graphics software – vector and raster graphics. Computer network: LAN/WAN, Web and email.

COMPUTER AIDED TEXTILE DESIGN SYSTEMS- TEXTILE CAD 11 Hours

Warp and Weft design, Simulation of colour and weave effect - Plain and stripe effect, automatic peg plan and draft generation; Weave construction library – Knitting Design CAD – features and process in knit designing. Print design CAD: Touch up and production of mask films; automatic repeats and half drop generation, colour separation. Embroidery Design CAD: features and process of punching software.

COMPUTER AIDED FASHION AND PATTERN DESIGN SYSTEMS 9 Hours

Illustration, garment designing and texture mapping, story board and cataloguing, Virtual Garmenting. 3D Body Measurement System –Digitizer -Pattern Drafting system- Grading – grade rule table - Marker planning.

COMPUTER AIDED GARMENT PRODUCTION SYSTEMS 11 Hours

Computer application in fabric defect checking, computerized fabric laying and cutting. Principle of Radio frequency tagging- Application in material handling, cutting and ware house storage. Application of Automation and pneumatics in production and finishing machines - sewing, fusing, pressing, work aids, stackers, folding and finishing. UPS system- Robotics.

COMPUTER AIDED MANAGEMENT SYSTEMS 7 Hours

E-prototyping in garments – Electronic catalogues – E-commerce and M- commerce in apparel industry – Enterprise Resource Planning (ERP), Electronic Data Interchange (EDI), Management Information System (MIS).

Theory : 45 Hours Total: 45 Hours

REFERENCES

1. Rence weiss chase, CAD for fashion Design", Prentice Hall Inc., 1997.
2. Winfred Aidrich,"CAD in Clothing and Textiles", Blackwell Science Ltd., 1994.
3. Patric Taylor,"Computer in the Fashion Technology", Om Book Service,1997.
4. Sigmon, D.M., Grady P.L. and Winchester S.C, "Computer Integrated Manufacturing and total quality management", Textile Progress, Vol. 27, No.4, 1998, ISBN: 1870372166.

U15FTE503 APPAREL FINISHING AND CARE

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge on types of finishes on fabrics and garments.	K2
CO2	Analyse and classify the different conditions and chemicals need for finishing of materials	K3
CO3	Acquire knowledge on Denim Finishes and advanced finishes.	K3
CO4	Discuss on un-conventional finishes and their applications	K2
CO5	Classify and apply skill to identify stains and removal technique in apparel.	K3
CO6	Acquire knowledge on sustainable and green finishing methods	K2

Pre Requisite :

U15FT*T*503 Textile Chemical Processing

U15FT*P*502 Textile Chemical Processing Laboratory

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	M		S			S						M	M	S
CO2	M	W	S			S						M	M	S
CO3		W	S			S						M	M	S
CO4			S			S	S					M	M	S
CO5		M	S	S		S						M	M	S
CO6						S	S	M			S	M	M	S

Course Assessment methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

INTRODUCTION **6 Hours**

Reason for finishing, Classification of finishing, Mechanical and chemical finishing routes. Aesthetic finishes-Stiffening, Softening, Different types of Calendered effect, Brushing, Sueding, Burn out finishes

FUNCTIONAL FINISHING **9 Hours**

Shrinkage control -Sanforizing, Compacting & Stentering, Water repellent/proof, flame retardant, heat resistant, mildew proof, moth proof, anti-static, soil release, UV protection, anti microbial and elastomeric finish (without compaction). Resin finishing – durable press, wash-n-wear, wrinkle free

SPECIAL FINISHES **9 Hours**

Denim processing-general method, Process conditions, machineries, chemicals used for various special effects-stone wash, acid wash, enzyme wash, bio- polishing, sand blasting, ozone and laser fading, tinted denim, over dyed denim, reverse denim, pseudo denim, stretch denim, peach skin effect, quick wash denim, vintage wash, enzyme- soda wash, dextrose- caustic wash, sueding

wash, golf ball wash, tie ‘n’ wash, marble wash and crush finish.

UNCONVENTIONAL FINISHING METHODS **9 Hours**

Plasma treatment, finishing using micro capsules, nano and electro chemical treatment of textile materials, self cleaning and phase changing materials. Sustainable and green processing.

GARMENT FINISHING **3 Hours**

Garment Dyeing Machines for Finishing, Selection of sewing thread, accessories w.r.t garment dyeing and finishing. Preparation of fabrics for garment dyeing and finishing.

APPAREL CARE **9 Hours**

Types and characteristics of stains, Identification of stains, selection of stain removers, Stain removal methods - Oil, colour matter, Garment laundering equipments and procedures, Use of care labels and standards / norms for care labels.

Evaluation and Standards for finished garments and accessories.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Nomeia D, souza., "Fabric Care", New Age International (P) Ltd, Chennai, 1998.
2. Shenai V A, "Technology of Textile Finishing", Sevak Publications, Mumbai,1995.
3. Dr.G.Nalankilli, Dr.S.Jayaprakasam, "Textile Finishing" SSMIIT Staff's and Student's Co-op society. 1997
4. "Garment Wet Processing Technical Manual", AATCC/SDC, 1994. Whittall N S, "Laundering and Dry Cleaning", vol.8, Textile Progress, 1996.
5. Pradip V Mehta, "An Introduction to Quality Control for the Apparel Industry", ASQC Quality Press, 1992.
6. Goldman R F and Lyle D S, "Performance of Textiles" John Wiley and Sons, New York 1987.
7. Hall A J, "Textile Finishing", Elsevier Publishing Co. Ltd, 1986.
8. Richard A Scott, "Textiles for Protection", The Textile Institute, Wood head Publishing Limited, CRC Press. 2005.

   W.D. Schiendler and P.J. Hauser, "Chemical Finishing of Textiles", The Textile Institute, Wood Head, 2004.

U15FTE504 CLOTHING SCIENCE FOR APPAREL ENGINEERING

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire Knowledge on the basic requirements in the design of apparel engineering	K2
CO2	Recognize and associate the objective and subjective evaluation of clothing fit	K4
CO3	Recognize and associate the Effect of fiber properties, yarn structure and fabric construction on the fabric aesthetic & appearance	K4
CO4	Recognize and associate the Effect of fiber properties, yarn structure and fabric construction on the fabric dimensional stability.	K4
CO5	Acquire Knowledge and associate the Effect of fiber properties, yarn structure and fabric construction on the fabric Serviceability.	K4
CO6	Enhance knowledge and associate the effect of fiber properties, yarn structure and fabric construction on the fabric handle & clothing comfort	K4

Pre Requisite:

U15FTT101 Fibre science
U15FTT201 Yarn technology
U15FT*T*402 Fabric structure and design
U15FT*T*603 TextileandApparel QualityEvaluation

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	S												
CO2	S	S												
CO3	S	S											S	
CO4	S	S											S	
CO5	S	S											S	
CO6	S	M											S	

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course content

REQUIREMENTS FOR APPAREL ENGINEERING 5 Hours

Introduction to apparel design & its types – aesthetic, functional, exploratory, incremental. Requirements for clothing design - physiological, biomechanical, ergonomic, psychological requirements. Process, steps involved in clothing design.

SIZING SYSTEMS AND EVALUATION OF CLOTHING FIT 10 Hours

Development of sizing system. Principles of sizing system. Definition, Importance, Standards, influence of clothing fit. Testing methods - objective and subjective evaluation of fit.

AESTHETICS AND APPEARANCE 9 Hours

Selection of fibre, yarn structure and fabric construction; their effect on pilling, fastness, lusture and Shade variation. Fabric properties related to appearance.

DIMENSIONAL STABILITY: Study of factors that affect hygral expansion, relaxation shrinkage, swelling shrinkage, felting shrinkage. Dimensional stability to dry cleaning and dry heat with respect to fibre properties.

SERVICEABILITY **9 Hours**

Study of Factors affecting properties such as snagging, abrasion resistance, tearing strength, tensile strength, bursting strength, fusing, Seam strength and slippage with respect to fiber properties, yarn structure and fabric design.

FABRIC HANDLE **3 Hours**

Objective evaluation of fabric hand by KES and FAST.

CLOTHING COMFORT **9 Hours**

Effect of fibre properties, yarn structure, fabric design, fabric construction and treatments on the fabric properties such as air permeability, breathability, moisture transport – wetting and wicking; clothing comfort – thermal comfort, heat and moisture transfer, moisture sensations; tactile comfort – pressure sensations.

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. Engineering Apparel Fabrics and Garments, Woodhead Publishing Textiles, by J Fan, L. Hunter, 2009
2. Saville B.P, "Physical Testing of Textiles", The Textile Institute, Wood head Publishing Ltd, Cambridge, 1999
3. Fan J., Yu. W and Hunter L., Clothing Appearance and fit, Textile Institute, Woodhead Publishing Limited, England, 2004
4. Ed.Postle R., Kawabata.S and Niwa M., "Objective Evaluation of Fabrics", Textile Machinery Society, Japan, Osaka, 1983.
5. Sandra Betzina, Fast Fit-Easy Pattern Alterations for Every Figure, The Taunton press inc., Singapore, 2003
6. Biomechanical engineering of textile and clothing,editedbyY. Li and X-Q. Dai, Woodhead Publishing Limited, England, 2006
7. Design of apparel fabrics: role of fibre, yarn and fabric parameters on its functional attributes, Journal of Textile Engineering, Vol.54, No.6, 179-190, 2008
8. Design and engineering of functional clothing, Indian Journal of fiber & Textile Journal, Vol.36, pp. 327-335, December 2011

U15FTE505 AUTOMATION IN APPAREL MANUFACTURE

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge in automation in fabric inspection	K1
CO2	Analyze the requirements of spreading and cutting	K4
CO3	Discuss the developments in spreading and cutting	K2
CO4	Understand the developments in sewing and finishing machines used in apparel industries	K2
CO5	Acquire knowledge in the developments in material handling	K1
CO6	Acquire knowledge on robotics and its application in apparel industry	K1

Pre Requisite:

U15FT*T*304 Apparel Machinery and Equipment

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S													
CO2					S								S	
CO3					S									
CO4					S									
CO5					S									
CO6					S									

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

AUTOMATION IN FABRIC INSPECTION **9 Hours**

Definition – importance and role of automation in apparel industry. Principles of automatic fabric inspection and defect checking. Machine vision system – image acquisition, feature enhancement; Image segmentation – feature extraction, image understanding.

AUTOMATION IN SPREADING AND CUTTING **6 Hours**

Spreading- types, requirements of spreading. Automated elements in spreading machines. Cutting – types, requirements of cutting. Automated elements in cutting of textile materials – water jet, laser and plasma and computerized cutting machine.

AUTOMATION IN SEWING AND FINISHING **10 Hours**

Advanced sewing – Automatic placket feeder – Automatic pocket maker – Auto button sewer – Electronic sewing machines – Automation in special sewing machines- bar tack, button holing and button fixing. Advanced garment finishing, folding and packing machines – CNC pressing machines.

AUTOMATION IN MATERIAL HANDLING **10 Hours**

Types of equipment- Automated storage and retrieval systems- Overview of conceptions of "Work Robots" and "Manipulators". Conveyor systems – Unit production systems. Ply separation; Transportation - position and orientation, pick and place – clamping grippers and pinch grippers.

ROBOTICS IN APPAREL INDUSTRY **10 Hours**

Robotics in spreading and cutting; Robotics in sewing – double lock stitching, one side stitching, Tufting; Robotics for material handling; Robots as 2D and 3D folding machines; Robot control and simulation. Return on investment on automation.

Theory: 45 Hours **Total :45 Hours**

REFERENCES

1. Berkstresser, G.A. & Buchanan, E.M., Automation and Robotics in the Textile and Apparel Industries, Noyes Publications, 1986.
2. M.G.Mahadevan, "Textile Robotics and Automation", Abhishek Publications, Chandigarh, 2001.
3. A.Gordan, et al., "Automation and Robotics in the Textile and Apparel Industries (Textile series)", Noyes Publication, UK, 1986.
4. G.A.Berkstresser, "Automation in the Textile Industry: From Fibers to Apparel", 1st Edition, Technomic Publishing Co., Inc, UK, 1995.
5. M.Acar, "Mechatronic Design in Textile Engineering", NATO Science Series, 1st edition, Springer, USA, 1994.
6. Carr, H. and Latham, B., 'The Technology of Clothing Manufacture', Wiley-Blackwell, 2009.
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9. Solinger, J, 'Apparel Manufacturing Handbook', 2nd Ed., Van Nostrand Reinhold, New York, 1995
10. Crum, R.J, 'Methods of Joining Fabrics', Shirley Institute, 1983.
11. V.Jayakumar, " Applied Hydraulics & Pneumatics", Lakshmi Publications, Chennai, June 2010.
12. Tain kok Kiong, Andi Sudjana Putra " Drives and Control for Industrial Automation", Springer – Verlag London Limited 2011.
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14. P. Khanna, "Industrial Engineering and Management", Dhanpat. Rai Publications, New Delhi, 1999.

ELECTIVE VI

U15FTE601 INTIMATE APPARELS

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Categorize intimate apparel and choose suitable fabrics	K5
CO2	Appraise on basic principles in designing and construction of various types of inner wear for men and women	K3
CO3	Develop skills in designing intimate men's garments	K6
CO4	Develop skills in designing intimate women's garments.	K6
CO5	Relate the suitability of accessories and other construction methods of producing intimate Apparels	K5
CO6	Evaluate the performance of Intimate apparel	K4

Pre Requisite :

U15FT*T*302 Basic Pattern Making and Adaptation
U15FT*T*501 Apparel Product Development Process
U15FT*E*105 Fashion Apparel Design and Development

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S												S	
CO2		S											S	M
CO3		S	M										M	
CO4	M		W										M	
CO5		S	S										M	M
CO6			S	S	M								S	

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

INTIMATE APPAREL **9 Hours**

Definition-Types- Night Wear, Under Wear, Classification of Kid's, Women's and Men's Intimates. Quality requirements for selecting suitable fibers, fabrics, designs for intimate apparels. Physical and physiological health effect of Intimate apparel. Latest finishes for intimate apparels

MEN'S INTIMATE APPARELS **9 Hours**

Introduction, Design and development- measurements - Step by step drafting procedure and construction sequence - vests, briefs, trunk, pyjama and bathrobe.

WOMEN'S INTIMATE APPAREL **9 Hours**

Introduction, Design and development - measurements - Step by step drafting procedure and construction sequence - waist petticoat, bra, panty, camisole, night dress, negligee

INTIMATE APPAREL ACCESSORIES **4 Hours**

Accessories - bra wire, hook and eye tape, ring and slider, buckle, plastic bone, Elastics, Threads etc. used for intimate apparel.

INTIMATE APPAREL PRODUCTION TECHNOLOGY **5 Hours**

Principles, methods, technical aspects and controls of lamination, moulding and seamless knitting technology for production of intimate apparels.

PERFORMANCE EVALUATION OF INTIMATE APPAREL **9 Hours**

Functional Requirements – comfort – sewability – appearance retention – durability - after care

Performance Evaluation – thermal properties – moisture permeability – liquid transport properties – low stress mechanical properties – dimensional stability & skewness stability – colour fastness – wearer trials

Requirements for engineering intimate apparels – Fibre & yarn characteristics Fabric composition, thickness structure

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. W. Yu, J. Fan, S.C. Harlock, S.P. Ng "Innovation and Technology of Women's Intimate Apparel", Woodhead Publishing Limited, England, 2006.
2. Ann Haggar, " Pattern Cutting For Lingerie, Beach Wear And Leisure Wear", Black Well Science Limited, France, 2001.
3. Lynn Nottage, "Intimate Apparel / Fabulation", Theatre Communications Group, USA, 2006.
4. Stokes Terry, "Intimate Apparel", Brooklyn: Release Press, USA, 1980.
5. Singer, "Sewing Lingerie", Cy Decosse Incorporated, Mexico, 1991.

U15FTE602 FASHION RETAIL MANAGEMENT

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Gain knowledge on the fundamentals of retailing	K2
CO2	Relate the aspects of customer behavior and retailing	K4
CO3	Acquire Knowledge on management of merchandise	K3
CO4	Understand the importance of effective location for retailing	K2
CO5	Understand the importance of atmospherics and space management of retail outlets	K2
CO6	Develop skills in retail pricing and strategies in promotional activities	K2

Pre Requisite :

U15FT*T*501 Apparel Product Development Process

U15FT*T*601 Apparel Merchandising

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													
COs	Programme Outcomes(POs)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	W					M	M						M	
CO2	W	W							M	M	M	M	S	
CO3	W	M	M						M	M	M	M	S	S
CO4	W	M	S			M	M		M	M	M	M	S	S
CO5	W	M	S			M	M		M	M	M	M	S	S
CO6	W	M	S			M	M		M	M	M	M	S	S

Course Assessment methods:

Direct	**Indirect**
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

RETAILING AND RETAILING ORGANIZATION 9 Hours

Definition, characteristics and functions of retailing, retailers, retailing channels, retail strategy. Structure of retail organization, retail units, merchandise mix, customer interaction, organized retailing, retail formats, geographical markets, retailing in rural India, vertical marketing system, challenges in retail business.

RETAIL CUSTOMER BEHAVIOUR 4 Hours

Consumer behaviour, factors affecting consumer decision making, consumer decision process, influence of situational variables on shopping behaviour, customer profile and analysis.

RETAIL MARKET SEGMENTATION AND TARGET MARKETING 5 Hours

Segmentation- definition and benefits: Segmenting, targeting and positioning. Criteria for segmentation, types of markets, dimensions for segmentation, types of segmentation. Market targeting, customer profile, survey of buyers intentions.

MERCHANDISE MANAGEMENT **7 Hours**

Product management, brand management and retailing, merchandise management, model stock plan, constraining factors, types of suppliers and selection criteria, category management, merchandise management planning in retail segments.

RETAIL LOCATION AND SPACE MANAGEMENT **9 Hours**

Location decision - importance, levels and determining factors. Types of location, types of consumer goods and location decision. Site selection analysis.

Atmospherics, store space management, walls as retail selling tools, colour planning, physical materials in store designing, atmospherics in the context of internet retailing.

RETAIL PRICING & PROMOTION STRATEGY: **11 Hours**

Influences on retail pricing strategy, development in retail prices, retail pricing objectives, retail pricing approaches and strategies, consumer responsiveness to prices, role of price elasticity and sensitivity.

Promotion mix selection, advertising, media selection, sales promotion, personal selling and publicity.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Mike Easey , “Fashion Marketing “, Blackwell Scientific Publications, 2002
2. Gibson G. Vedamani, “Retail Management Functional Principles and Practices”, Jaico Publishing House, Second Edition, 2002
3. Nair Suja. R, "Retail Management", Himalaya Publishing House, 2008.
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5. Fleming Peter, "A Guide to Retail Management": Advice on retail operation, customer service and sales team, Jaico Publishing House , Mumbai, 2007.
6. Gopal, "Retail Management: An Introduction", ICFAI University press, 2006.

L	T	P	C
3	0	0	3

U15FTE603 FUNCTIONAL CLOTHING

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Summarize the classification and design requirements of various classifications of functional clothing	K2
CO2	Choose the requirements of functional clothing as per the end use of the consumer	K3
CO3	Appraise technical specifications for functional clothes	K5
CO4	Choose suitable textile raw materials suitable for developing functional clothes	K6
CO5	Apply the knowledge on textiles processes in designing functional clothing	K3
CO6	Acquire knowledge on the evaluation methods and standards available to evaluate the various functional clothing	K2

Pre Requisite :

U15FT*T*501 Apparel Product Development Process
U15FTE105 Fashion Apparel Design and Development
U15FT*T*504 Clothing Science for Apparel Engineering

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1		S	S			S							S	
CO 2	S	S											S	
CO 3	S	S	S									M	S	S
CO 4	S	S	S									M	S	S
CO 5				S			M						S	
CO 6			S	S								S	S	

Course Assessment methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

INTRODUCTION **8 Hours**

Functional clothing - Classification, requirements, design and engineering- steps in designing, pattern engineering, functional fit. Performance analysis of functional clothing.

MEDICAL WEAR **7 Hours**

Classification of medical textiles and their functions – Textile materials used for implants and non-implants, extracorporeal devices, Healthcare and hygiene products. Therapeutic and bio sensing garments – Design and applications.

PROTECTIVE WEAR **9 Hours**

Materials used, requirements and functions of flame resistant protective clothing, chemical

protective clothing, mechanical protective clothing – cut, slash, ballistic and blunt impact protection, electrical protective clothing and radiation protection.

SPORTS WEAR **8 Hours**

Materials used, requirements and functions of sportswear in fatigue reducing, performance monitoring and enhancing- Materials used, requirements and functions of sports footwear - Design, fit, materials, components and their functions.

VANITY CLOTHING **4 Hours**

Materials used, requirements and functions of vanity clothing- Body shaping, support and contouring for enhanced appearance

CLOTHING FOR PEOPLE WITH SPECIAL NEEDS **3 Hours**

Materials used, requirements and functions of clothing for people with special needs- enabling clothing for elderly, infants and disabled.

CROSS FUNCTIONAL CLOTHING **6 Hours**

Materials used, requirements and functions of cross functional clothing- Space suits, combat clothing and wearable electronics

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Horrocks A. R. and Anand S. C, "Handbook of Technical Textiles", The Textile Institute, Woodhead Publications, Cambridge, UK, 2000
2. Adanur S., Wellington Sears "Handbook of Industrial Textiles", Technomic Publishing Co. Lanchester, USA, 1995
3. Vigo T. L., Intelligent Fibres, Journal of Textile Institute , 90, Part 3, Textile Institute, 1999
4. Anand S., "Medical Textiles", Textile Institute, UK, 1996
5. Sanjay Gupta, "Smart Textiles – Their Production and Marketing Strategies", Bhumica Printers, New Delhi, 2000
6. Tao X., "Smart Fibres, Fabric and Clothing", Textile Institute, Woodhead Publishing Limited, Cambridge, 2001

L	T	P	C
3	0	0	3

U15FT*E*604 INDUSTRIAL ENGINEERING IN APPAREL MANUFACTURING

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire broad knowledge of the various industrial engineering methods and tools associated with manufacturing systems and human factors	K3
CO2	Demonstrate modern industrial engineering methods and scientific solutions to apparel manufacturing towards economic, environmental, and societal context	K4
CO3	Perform as industry leaders in the global marketplace, capable of successfully planning, controlling, and implementing large-scale projects	K4
CO4	Understand and apply the principles of science, technology, engineering, and math involving industry-relevant problems	K4
CO5	Acquire skills to investigate, experiment and solve problem in context with productivity improvement and material handling	K5
CO6	Acquire skills to implement IE techniques in sewing floor of any apparel manufacturing firm	K4

Pre Requisite :

U15FT*T*303 Garment components fabrication

U15FT*T*504 Apparel Production Technology

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO 1	S									S			S	M
CO 2					S	S				S		M	M	
CO 3				M						S	S		M	
CO 4	M			M										
CO 5		M		M									M	M
CO 6				S	S				M		M		M	M

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

INTRODUCTION **9 Hours**

Scope of industrial engineering in apparel Industry, role of industrial engineers.

Productivity: Definition - Productivity, Productivity measures .Reduction of work content due to the product and process, Reduction of ineffective time due to the management, due to the worker. Causes for low productivity in apparel industry and measures for improvement.

WORK STUDY **9 Hours**

Definition, Purpose, Basic procedure and techniques of work-study.

Work environment – Lighting, Ventilation, Climatic condition on productivity. Temperature control, humidity control, noise control measures. Safety and ergonomics on work station and work environment

Material Handling – Objectives, Classification and characteristics of material handling equipments, Specialized material handling equipments.

METHOD STUDY **9 Hours**

Definition, Objectives, Procedure, Process charts and symbols. Various charts – Charts indicating process sequence: Outline process chart, flow process chart (man type, material type and equipment type); Charts using time scale – multiple activity chart. Diagrams indicating movement – flow diagram, string diagram, cycle graph, chrono cycle graph, travel chart

MOTION STUDY: Principle of motion economy, Two handed process chart, micro motion analysis – therbligs, SIMO chart.

WORK MEASUREMENT **9 Hours**

Definition, purpose, procedure, equipments, techniques. Time study - Definition, basics of time study- equipments. Time study forms, Stop watch procedure. Predetermined motion time standards (PMTS). Time Study rating, calculation of standard time, Performance rating – relaxation and other allowances. Calculation of SAM for different garments, GSD.

WORK STUDY APPLICATION **9 Hours**

Application of work study techniques in cutting, stitching and packing in garment industry. Workaids in sewing, Pitch diagram, Line balancing, Capacity planning, scientific method of training.

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. Johnson Maurice "Introduction of Work Study", International Labour Organization, Geneva, 2005.
2. V.Ramesh Babu "Industrial Engineering in Apparel Production" Woodhead publishing India PVT ltd, 2012
3. Kiell B.Zandin, " Mayanard's " Industrial Engineering Hand Book", Fifth edition, Mc Graw Hill, NewYork, 2001.
4. Sharma (S K) ;Sharma (Savita "Work Study And Ergonomics **"**S. K. Kataria & Sons (publishers) ISBN: 818845834, 2010
5. Khanna.O.P., "Industrial Engineering and Management", Danpat Rai and Sons,1987.
6. Ralph M. Barnes, "Motion and Time Study Design and Measurement of Work", 7th Edition, John Wiley and Sons, New York, 1980.
7. Khan.M.I., "Industrial Ergonomics", PHI LTD. Eastern Economy Edition, 2010.
8. Kantilla Ila, "Apparel Industry In India", Prentice Hall, 1990.
9. Rajesh Bheda, "Managing Productivity in Apparel Industry "CBS Publishers & Distributors, 2008

ELECTIVE VII

U15FT*E*701 LOGISTICS AND SUPPLY CHAIN MANAGEMENT

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Discuss the importance of logistics and supply chain management and its value for competitive advantage of the firm.	K2
CO2	Analyze and interpret the supply chain, the role of its actors and its logistics flows and function	K4
CO3	Apply the ability to develop and manage Supply Chain	K3
CO4	Assess logistics and supply chain management required by garment industry	K5
CO5	Understand the concept of distribution network planning	K2
CO6	Identify new emerging trends SCM and apply suitably in Apparel Industry	K3

Pre-Requisites:

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1	M									M			M	
CO2	M	M								M	S		M	
CO3	M	S								M	S		M	
CO4	S													
CO5	M					M					M			
CO6					M	M	M		S		M	M		M

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

OVERVIEW OF SCM AND LOGISTICS **9 Hours**

Definition of logistics and supplychain management, Evolution of logistics, logistics and competitive performance, physicaldistributionmanagement.Principlesof supplychainmanagement–functionsofsupplychainmanagement,Customerfocusinsupplychainmanagement–customerservice,EfficientConsumerResponse(ECR).

DESIGNANDMANAGEMENTOFSUPPLYCHAIN **9 Hours**

Phasesofsupply chainmanagement,inboundandoutboundlogistics–supplierstomanufacturers,manufacturerstoconsumers.Logistics management-designandmanagement,integratedsupply chain,pullandpushstrategy.Demandmanagement-demand forecastingandshaping.Bullwickeffect-Influencingfactors, controlmeasures.

GLOBALSUPPLYCHAINMANAGEMENT **9 Hours**

Organizingforglobal markets– World Class Supply Chain Management (WCSCM).Stages in globalSCM.Internationallogistics.WorldclassLogisticsManagement(WCLM)

ITENABLEDSUPPLYCHAINMANAGEMENT **9 Hours**

Informationtechnology intheintegratedsupplychain,

importance,informationrequirementsandapplications.Intelligence information system – material resource planning,manufacturingresourceplanning,enterpriseresourceplanning.ITpack-ages–SAPR/3ERP, BAANERPsolutions,i2Rhythm,selectionofsuitable package.

Cost and Performance Measurement InSupply ChainManagement: Costdrivers,activitybasedcosting,logisticscost, customerprofitabilityanalysis.Benchmarking–importance,roleandmethodology,challengesin implementation. Performance measurementsystems.

DISTRIBUTION NETWORK PLANNING **9 Hours**

Transportationmix–ware housing,transportationcost,transportationdecisionandfuturisticdirectionintrans-portation.Locationstrategy–plantlocation, distributionproblem,warehouselocation,retailfacilitylocation.

EMERGINGTRENDSINSUPPLYCHAINMANAGEMENT: Collaboration strategies,VendorManagedInventory(VMI),thirdandfourthpartylogistics,greensupplychain,reverselogisti cs..

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. DouglasM.Lambert,JamesR.StockandLisa.M.Ellram,"Fundamentals of LogisticsManagement",ColumbiaBoblinMediaCorp.,1998.
2. Donald J.Bowersoxand Davis J.Closs, "Logistics Management – The IntegratedSupplyChainProcess",ColumbiaBoblinMedia Corp.,2006.
3. Sunil Chopraand Peter Meindal, "Supply Chain Management: Strategy,Planningand Operations",Prentice HallInc.,2001.
4. BenjaminS. Blanchard,"LogisticsEngineeringandManagement",McGraw Hill,Inc.NewYork, 2002.
5. MartinChristopher,"Chap.7ofLogisticsandSupplyChain Management– Strategiesforreducing cost and improving service", Second Edition. McGraw Hill.Inc.,NewYork1992.

U15FT*E*702 GARMENT TRIMS AND ACCESSORIES

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Apply knowledge on fundamentals of garment trims and accessories	K3
CO2	Outline the types and characteristics of primary and secondary trims	K4
CO3	Explain the package forms and shipping equipments	K3
CO4	Analyze the suitability of the packaging material	K4
CO5	Explain the testing Standards and certification process for garment trims and accessories	K3
CO6	Analyze the Performance properties of garment components and trims	K4

Pre Requisite:

U15FT*T*501 Apparel Product Development Process
U15FT*T*504 Apparel Production Technology
U15FT*E*105 Fashion Apparel Design and Development

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	S					S	S							S
CO 2		S				S	S							M
CO 3		S	M			S	S						M	
CO 4	M					S	S						M	S
CO 5	S	S				S	S						S	S
CO 6			S			S	S	M					S	S

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

INTRODUCTION **9 Hours**

Meaning, importance, classification, Factors affecting selection of raw materials, types of finishes for trims and accessories, importance of certification of trims and accessories in exports

PRIMARY TRIMS **9 Hours**

Linings-fibre types and properties- factors affecting selection of linings- making up and testing of linings – lining component patterns;

Interlinings- fusible and non fusible – woven and non woven – types - chemical bonded, thermal bonded, needle bonded, spun bonded, embroidery backing, water soluble fabrics, Tricot lining, Coat lining, Mobilone tape, Felts. Wadding or batting – types and characteristics

SECONDARY TRIMS **9 Hours**

Closures (buttons, hooks and eyes, hooks and bars, press studs, rivets, zips, ,velcro), shoulder pads, tapes; Ornamental Trims- laces, braids , elastic, fringes, tassels, appliqués, transfer prints, tie cords, labels and motifs

PACKING AND FINISHING ACCESSORIES **9 Hours**

Types of package forms – merchandise packaging and shipping packaging, Types of packaging materials – raw materials - Poly bags, collar accessories and backing boards, Quality specification for packaging materials – fitness certification for end use and bursting strength (ASTM Standards), Packing and shipping equipment – folding equipment, container packing equipment and conveyors.

PERFORMANCE AND TESTING **9 Hours**

Performance properties of components and trims – Standards and certification for trims and accessories- Buttons (BS 4162 and ASTM D5171), Snap Fasteners(ASTM D4846) Zipper (BS3084, ASTM D2061, AS 2332), Elastics (ASTM D4964 and EN 14704 Part 3), Safety tests (BS 7907, EN 71-1, 16 CFR 1501 (16 CFR.1500.51,52and53), Attached components / trims / Motifs / prints -Durability to washing – ISO 6330, Tests for nickel free and lead free trims and accessories.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Harold Carr and Barbara Latham- Technology of Clothing Manufacture– Blackwell Science Inc. USA., 2002
2. Jacob Solinger, "Apparel Production Handbook", Reinhold Publications, 1998.
3. Gerry Cooklin – Garment Technology for Fashion Designers, Black well science Ltd. USA., 2011
4. Jarnow.J.A. and Judelle. B – Inside the fashion business, 2nd edition, 2002.
5. ASTM Standards - en.wikipedia.org/wiki/ASTM International
6. ISO Standards- www.iso.org/iso/iso_catalogue.htm

U15FT*E*703 APPAREL BRAND MANAGEMENT

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge on branding strategy and positioning	K2
CO2	Apply the brand building and extension strategies	K3
CO3	Analyze the brand management and global branding techniques	K4
CO4	Acquire knowledge on Advertising types and advertisement business	K3
CO5	Demonstrate ability to create advertisement message, select media, and work out budget.	K5
CO6	Analyze the process of budgeting in advertisement business	K5

Pre-requisites: NIL

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1		M	M	M	S								M	
CO2		M	M	M	S		M		S	M		M	M	M
CO3		M	M	M	S	S	M		S	M	M	M	M	M
CO4		M	M	M	S	S	M	M	M	M			M	M
CO5		M	M	M	S	S	M	M	S	M		M	M	M
CO4		M	M	M	M		M		M	M	M		M	M

Course Assessment methods

Direct	Indirect
9. Internal tests 10. Assignment 11. Group Presentation 12. End Semester Exam	3. Course Exit Survey

Course Content

BASICS OF BRANDING **9 Hours**

Concept, image, identity, loyalty.Brand name – types. Branding strategy - Brand positioning - competitive positioning, product positioning. Brand equity. Intellectual property rights – Trademark and brand registration.

BRAND BUILDING **9 Hours**

Consumer branding, technology branding, corporate branding, retail branding. Brand extension: Concept, evaluation of opportunities, factors influencing extension, extension guidelines.

GLOBAL BRANDING **9 Hours**

Rationale, advantages / disadvantages.International branding strategy - planning system, leadership, cross-country relationship.Brand Management Systems: Role of Product managers / brand managers. Trends in brand management - brand cult.Brand alliances – co branding, licensing.

ADVERTISING **9 Hours**

Definition, advertising objectives, benefits, economic aspects and ethics in advertising. Advertising and marketing mix. Advertising Appeal: Message – reach, frequency, impact and effectiveness

Media Overview: Types of media, media selection, media plan, media cost and availability. Matching media and market. Media strategy - media mix, media scheduling. Comparative evaluation.

ADVERTISING BUSINESS **9 Hours**

Organization, advertising manager, advertising agency, advertising plan, basic principles, agency compensation. Public relations.Advertising Budget: Allocation of budget for various components of advertising. Methods of determining budget for advertisement. Administering the advertisement budget

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Harsh.V.Verma, “Brand Management- Text and Cases”, Excel Books, New Delhi, 2005
2. Moorthi Y L R, “Brand Management”, Vikas Publications House Pvt. Ltd., Mumbai, 2004.
3. Kevin Lane Keller, “Strategic Brand Management”, Prentice Hall, 2nd Edition, 2006
4. Sengupta S, “Brand Positioning”, Tata McGraw Hill, New Delhi, 2006.
5. K.S.Chandrasekhar, “Product Management - Text and Cases”, Himalaya Publishing House, 1st Edition, 2002.
6. S.A.Chunnawala, “Product Management”, Himalaya Publishing Home, First Edition, 1998.

U15FTE704 KNITWEAR TECHNOLOGY

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Illustrate the elements of Knitwear machinery	K3
CO2	Explain types of stitches and seams	K3
CO3	Explain production technology of Foundation garments	K2
CO4	Know production technology of outerwear garments	K3
CO5	Develop fully fashioned sweaters and integral garments.	K2
CO6	Understand the concepts and methods of production of various garments by using knitwear technology	K3

Pre Requisite

U15FTT101 Fiber Science

U15FTT201 Yarn Technology

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S				M	S				S		S	S	
CO2								M					W	
CO3		S	S				S		S			S		S
CO4		S	S				S		S					S
CO5	S				S			M		M				S
CO6	S			S		S					M		M	

Course Assessment methods

Direct	Indirect
5. Internal tests 6. Assignment 7. Group Presentation 8. End Semester Exam	2.Course Exit Survey

INTRODUCTION TO KNITWEAR MACHINERY **10 Hours**

Classification of knitwear manufacturing machines-fully cut, stitch shaped, fully fashioned, and integral garment machines. Socks knitting- glove knitting. Automatic V-bed flat knitting machine. Seamless garment knitting machine.

TECHNOLOGY OF SEAMS AND STITCHES **7 Hours**

Classification of stitches and seams- mechanical properties of stitches and seams- thread consumption. Application of stitches and seams in knitted inner and outerwear garments. Selection of sewing machines for knitted fabrics -Flat lock, over lock and linking machine.

PRODUCTION TECHNOLOGY OF FOUNDATION GARMENTS **8 Hours**

Fabric and sewing thread quality requirements for foundation garments. Operation sequence production techniques- machinery used and special attachments for foundation garments - slips, braziers, vest and brief.

PRODUCTION TECHNOLOGY OF OUTER WEAR GARMENTS **10 Hours**

Fabric and sewing thread quality requirements for outwear garments. Operation sequence production techniques- machinery used and special attachments for knitted- T- shirts, combo wears, swimwear, arm warmer, sports garments and bifurcated garments.

PRODUCTION TECHNOLOGY OF FULLY FASHIONED SWEATERS AND INTEGRAL GARMENTS **10 Hours**

Shape generation in fully fashioned garments- production of slipovers and cardigans. Basic techniques in integral garments manufacture - integral garment production - socks, upper and lower body garments.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Terry Brackenbury, "Knitted Clothing Technology", Blackwell science, 2005.
2. Gerry Cooklin, "Garment Technology for Fashion Designers", Blackwell Science, 2000.
3. David Spencer., "Knitting Technology", Pergamon Press, Oxford 2005.
4. Pradip V Mehta, "Introduction to Quality Control for the Apparel Industry", ASQC Quality Press, 1992.
5. Charles Richman, "Guide to manufacture of Sweater, Knit shirts and Swim wear", National Knitted Outer Wear Association, New York, 1992.

L	T	P	C
3	0	0	3

U15GST002 TOTAL QUALITY MANAGEMENT

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Apply & analyze quality concepts and philosophies of TQM	K4
CO2	Apply concepts of continuous improvement	K3
CO3	Apply TQM concepts to enhance customer satisfaction and deal with customer related aspects.	K3
CO4	Apply and analyze the quality tools, management tools and statistical fundamentals to improve quality	K4
CO5	Apply and analyze the TQM tools as a means to improve quality	K4
CO6	Understand quality systems, procedures for its implementation, documentation and auditing	K2

Pre Requisite :

U15MA*T* 306 Probability and Applied Statistics

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		M		M							M			M
CO2		M		M							M			
CO3		M		M							M			M
CO4					S						M			
CO5		M			S						M			
CO6					W						M		M	M

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

INTRODUCTION **9 Hours**

Definition of Quality, Dimensions of Quality, Quality costs, Top Management Commitment, Quality Council, Quality Statements, Barriers to TQM Implementation, Contributions of Deming, Juran and Crosby, Team Balancing

TQM PRINCIPLES **9 Hours**

Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Continuous Process Improvement,5S, Kaizen, Just-In-Time and TPS

STATISTICAL PROCESS CONTROL **9 Hours**

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

TQM TOOLS **9 Hours**

Quality Policy Deployment (QPD), Quality Function Deployment (QFD), Benchmarking, Taguchi Quality Loss Function, Total Productive Maintenance (TPM), FMEA

QUALITY SYSTEMS **9 Hours**

Need for ISO 9000 and Other Quality Systems, ISO 9001:2008 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO 14001:2004

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Dale H.Besterfiled, "Total Quality Management", Pearson Education, 2011.
2. James R.Evans & William M.Lidsay, "The Management and Control of Quality", South-Western (Thomson Learning), 2008.
3. Feigenbaum.A.V. "Total Quality Management", McGraw Hill,1991.
4. Oakland.J.S. "Total Quality Management", Butterworth – Hcinemann Ltd., Oxford,1989.
5. Bhaskar S. "Total Quality Management", (2007-revised edition) Anuradha Agencies, Chennai
6. Narayana V. and Sreenivasan, N.S. "Quality Management – Concepts and Tasks", New Age International, 2007.
7. Zeiri, "Total Quality Management for Engineers", Wood Head Publishers, 1991.

ELECTIVE VIII

L	T	P	C
3	0	0	3

U15FT*E*801 LEATHER APPAREL TECHNOLOGY

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Understand the classification of leather materials and process of preparing leather for manufacture leather apparels	K3
CO2	Understand the process of preparing leather for manufacture leather apparels	K3
CO3	Gain knowledge on designing leather apparels	K4
CO4	Gain knowledge on properties and characteristics of leather garments	K3
CO5	Gain knowledge on types of machineries and equipments used in manufacture of leather apparel	K3
CO6	Acquire knowledge on quality control in leather garments	K4

Pre-requisites: Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSI 2
CO1						M	M							
CO2		M					M						M	M
CO3		M	M		M			M					M	M
CO4			M											
CO5		M				M							M	M
CO6		M	M		M		M		M				M	M

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

LEATHER TANNAGES 9 Hours

Principles and practices, preservation techniques: Soaking, Liming, deliming, bating, and pickling. Different methods of pertaining processes: light, heavy and Industrial leathers. Types of Tannages: Vegetable, synthetic. Tannage mechanism. Post tanning operations: Neutralisation, bleaching processes and dyeing. Types of leathers: E.I.,tanning of kips , buffcalf, calf and goat and sheep skins, sole leather, chrome sole leather, picking band leathers and pickers.

LEATHER PROCESSING 12 Hours

Processes and principles involved in manufacture of following types of leather - Wetblue leathers - Full Chrome Upper leathers - Upholstery leathers lining leathers - Harness, Belting and Saddlery leathers. - Football, hockey ball, cricket ball and other sports goods leathers - Chamois leather Fashion garment leathers - Utility glove leathers. Principle methods and mechanism of drying of leathers.

CLASSIFICATION AND TYPES OF LEATHER GARMENTS

Classification of leather garments**,** based on material design, uses and fashion, anatomy of human body. Types of figures and age group. Principles of Tailoring. Emphasis of sizes, measurements and fitting. Different types of leather garments, Grain garments, Suedes, Fur leather from sheep, goat, cow, calf, chrome, semi - chrome. Combination tanned leather.

PROPERTIES AND CHARACTERISTICS OF LEATHER GARMENTS

General properties of leather such as feel, texture, resistance, rub resistance, uniformity of shades, lining and padding materials, fasteners, grinderies, thread and decorated fitting.

TOOLS, EQUIPMENT, AND MACHINERY **7 Hours**

Machines used in garment manufacturing such as Industrial sewing machine – Single & Double, Cloth cutting machine, Button hole & button stitching machine and Ironing process. Tools used for garment manufacturing such as gimping scissors, wooden & iron hammer, stone slabs, measuring tapes, measuring instruments (L square), Shaper, Crayons, Special furniture required for garment unit and dummy for checking fitting.

APPAREL DESIGNING **9 Hours**

Preparation of sectional patterns, Arrangements of patterns to minimize the wastage of leathers. Recovery of wastage and its utilization. Designing and fabrication of garments, gloves, cap coat, pant etc. Shoe: Selection of leather, upper closing lasting and conditioning. Designing and fabrication of shoes.

SEQUENCE OF OPERATION **8 Hours**

Principle of cutting components, colour matching, texture feel, type of stitching, and attachment, Sequence of operation for assembly of components for garment manufacturing.

QUALITY CONTROL IN LEATHER GARMENTS

In process checking and final checking of measurements, get up and overall quality of free hand sketching and drafting and preparation of pattern.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Grace I, Kunz and Ruth E. Glock, "Apparel Manufacturing: Sewn Product Analysis", Prentice Hall, Fourth Edition, 2004.
2. Dutta.S S, "An Introduction to the Principles of Leather Manufacture", Fourth Edition, Indian Leather Technologists Association, Calcutta, 2002.
3. Sandy Scrivano,"Sewing with Leather & Suede", Lark Books, 2002.
4. Thomas C,Thorstensen,"Practical Leather Technology", Krieger Publishing Company, 2001.
5. Mary Maguire, "Leather Work", Lawrence Publication House, 2000.

U15FT*E*802 GLOBAL MARKETING AND SOURCING STRATEGIES

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge on drivers and factors influencing global marketing	K3
CO2	Analyze the process of global market management	K4
CO3	Analyze the sourcing strategies**.**	K4
CO4	Evaluate the elements of sourcing design**.**	K5
CO5	Evaluate the trends in growth of global markets	K5
CO6	Understand the role of developed and under developed countries in world trade	K2

Pre Requisite : Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2
CO1		S	S	S		S	S	S		S		M	S	S
CO2		S	S		S					S	M	M	S	
CO3		S		S	S		S	S		S	M	M	S	S
CO4		S			S		S				M		S	S
CO5		M		S	S	S						M	S	
CO6		M		S					M	M			S	

Course Assessment methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

GLOBAL MARKETING **9 Hours**

Introduction to Global Marketing – Drivers towards Globalization - Factors influencing global marketing – economic, social and cultural.Limitations to Global Marketing.Global Competitive analysis - competitive environment, country specific advantages, firm specific advantages.

GLOBAL MARKET MANAGEMENT **9 Hours**

Global customers - Global segmentation and positioning- market segments, global product positioning, positioning a new brand, positioning a global brand. Global Product and Services - Global product lines, services, service quality, globalization of services.Distribution strategies, advertising, promotion.Organizing for Global Marketing - Organizational structure, management systems, people and organizational culture.

SOURCING STRATEGIES **9 Hours**

Principles of sourcing strategy - out sourcing.Sourcing goals and objectives.Source selection - contracts and incentives, supplier strategies.Sourcing data and reports.

SOURCING DESIGN **9 Hours**

Sourcing design elements.Risks and rewards of multiple sourcing. Capacity constraints and pricing in sourcing markets. LIC selection and incentives for innovation - Yard stick contracts. Case studies in sourcing.

FUTURE OF GLOBAL MARKETING **9 Hours**

Growth of markets – developed and under developed countries. Issue of Trade cycles. Rise of under developed and developing countries. Global marketing case studies.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Warren.J.Keegan, "Global Marketing Management", 7th Edition, Prentice Hall of India, New Delhi, 2008.
2. Johany. K.Johansson, "Global Marketing", Second Edition, Irwin McGraw Hill, 1995.
3. Subash C, Jain, "International Marketing", Sixth Asian books (P) Ltd, South Western Thomson learning, 1993.
4. Cateora, "Organisations Structures", Tenth Edition, McGraw Hill, 1997.

SudhiSheshadri "Sourcing Strategy", Principles, Policy and Design , Springer, 2005.

L	T	P	C
3	0	0	3

U15FT*E*803 TECHNICAL TEXTILES

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge on the principles of engineering applied in the manufacture of technical textiles.	K1
CO2	To analyze and identify required parameters vital to design and manufacture products with technical application suiting the needs of the customer	K4
CO3	Acquire knowledge on different special fibres and composites used for technical applications	K1
CO4	Acquire skill to contribute significantly through the Apparel supply chain.	K3
CO5	To be able to explain the principle of different technical applications	K2
CO6	To be able to use and create textiles for new technical applications	K6

Pre Requisite :

U15FTT101 Fibre science

U15FTT201 Yarn Technology

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	S											S	
CO2		S	M	S										
CO3	M	S	S		M	S								
CO4		M	M						S					
CO5	S	S	S		M									
CO6		M			S	M	M					M		S

Course Assessment methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

8 Hours

TECHNICAL TEXTILES: Definition and scope of technical textiles, Classification. **TECHNICAL FIBRES:** High strength and modulus organic fibres – High chemical and thermal resistance organic fibres. High performance inorganic fibres – Ultra fine and Novelty fibres.

9 Hours

AGRO TEXTILES: Textiles for crop covers, bird netting, soil mats and silos. Shade fabrics and textiles for green houses.

GEO TEXTILES: Types and application of geo synthetics. Functions and application areas of geo textiles. Mechanics of filtration , separation, drainage and reinforcement by geo textiles.

9 Hours

AUTOMATIVE TEXTILES: Application of textiles in automobiles. Requirement and design for pneumatic tyres, airbags and belts. Textiles in passenger cars, other road vehicles, Rail applications, Air crafts , Marine application. Application of composites in automotives.

10 Hours

PROTECTIVE TEXTILES: Materials, Principle and application of Waterproof fabrics – breathable fabrics – Fire protection – Heat and cold protection – Ballistic protective clothing – Camouflage textiles – NBC protection

9 Hours

TEXTILES IN FILTRATION: Dust collection, Solid-liquid separation, liquid – liquid filtration, liquid-gas separation, Mechanism of filtration, Fabric construction, Finishing treatments.

PACKAGE TEXTILES: Textiles in food packaging. Fabrics for bags and luggage. Flexible Intermediate Bulk Packing.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Sabit Adanur and Wellington Sears, "Handbook of Industrial Textiles", Technomic Publishing company Inc., USA, 1995.
2. A. R. Horrocks and S. C. Anand, "Handbook of Technical Textiles", Woodhead Publishing Limited and the Textile Institute, 2000.
3. S.K. Mukhopadhyay & J.F. Partridge, "Automotive Textiles", Textile Progress, Vol.29, No.1/2, the Textile Inst. Publication, 1999.
4. Dr. V K Kothari, "Progress in Textiles : Science and Technology", Vol 3, Technical Textiles Technology, Development & Applications , IAFL Publications, New Delhi, 2008.
5. Fung & Warner, "Textiles in Automobile Engineering" Woodhead Publishing, ISBN: 978-1-85573-493-7, 2000.
6. K.L. Floyd, "Industrial Application of Textiles", Textile Progress Vol.6 No.2 the Textile Institute Publication, 2009.

   Medical Textile – International Conference, Bolton UK, 2007

U15FTE804 ENTREPRENEURSHIP FOR APPAREL TECHNOLOGISTS

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Recognize the factors affecting Entrepreneurship growth and their problems	K_2
CO2	Outline the importance of Entrepreneurial Development programmes.	K_2
CO3	Describe the projects identification, selection and formulation procedure	K_2
CO4	Indicate the role of government in entrepreneurial development	K_2
CO5	Underline the basis of intellectual property rights in India.	K_2
CO6	Recognize the factors in the management of new enterprises	K_2

Pre Requisite : All Apparel relevant courses from Semester I to Semester VII

COs	**CO/PO Mapping** (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													
	Programme Outcomes(POs)													
	PO 1	PO 2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO 10	PO1 1	PO1 2	PS O1	PSO 2
CO1	S	S	M							S			S	
CO2		S											S	
CO3	M	S	S							S			S	
CO4	M	M								S			S	
CO5	S	M											S	
CO6	M	S	S							S			S	S

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

ENTREPRENEUR **9 Hours**

Entrepreneurship andeconomicdevelopment–itsimportance–EntrepreneurQualities,nature,types,traitsofentrepreneurSimilaritiesanddifferencesbetweenentrepreneurandmanager–factorsaffectingentrepreneurship growth- Problemsofentrepreneurs-women entrepreneurs.

ENTREPRENEURIAL PROMOTION **9 Hours**

Motivation: Theories and factors of entrepreneurial motivation – Entrepreneurial development programmes– need, objectives, phasesandevaluation-Traininganddeveloping-occupationalmobility-factorsin mobility- Role of consultancy organizations in promoting entrepreneurs.

PROJECT MANAGEMENT **9 Hours**

Project identification and selection – projectformulation–Reportpreparation–evaluation:marketing-technicalandfinancial- Steps and formalities to be followed in starting a new small scale enterprise

MANAGEMENT OF NEW ENTERPRISES

Financing of enterprise-various forms ownership of business- knowledge on various forms of taxation by government .Income tax Excise duty, TIN, GST Sales Tax, Customs duty, Surcharge, registration and licensing fees- growth strategies- Corporate social responsibility- causes and prevention of sickness in industry

INSTITUTIONAL SUPPORT **9 Hours**

Role of government in entrepreneurial development- MSME act2006 –startup India-stand up India-

make in India- District Industry Centreanditsrole–Governmentincentives–financialandnon-financial

for startups and MSME- role of Industry associations and trade promotion councils

INTELLECTUAL PROPERTY RIGHTS **9 Hours**

Intellectualproperty rights laws in India -patent-tradem arks–industrialdesign-copy rights-need and benefits of registration IP-WIPOanditsactivities-TRIPS Agreement-Government support to MSME for registration of IP

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1Khanka S.S., "Entrepreneurial Development" SChandandCompany Private Limited., 2012ISBN: 81-219-1801-4,

2. VasanthDesai"DynamicsofEntrepreneurialDevelopmentandManagement"HimalayaPublishingHouse 2010ISBN: 9788183184113

3. SatishTaneja,EntrepreneursDevelopment; Himalaya Publishing House, 2010. ISBN: 9788184886832

4. www.indiainbusiness.nic.in

U15GST003 PRINCIPLES OF MANAGEMENT

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Apply the concepts of management and administration and analyze the evolution ofmanagement thoughts	K_3
CO2	Apply the concepts of planning, forecasting and decision making	K_3
CO3	Analyze organizational structures and apply staffing concepts	K_4
CO4	Analyze the motivational and leadership theories	K_4
CO5	Apply & analyze the communication and controlling processes.	K_4
CO6	Analyze the various international approaches to management	K_4

Pre Requisite : NIL

COs	**CO/PO Mapping** (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													
	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO12	PSO 1	PSO 2
CO1											M			
CO2											M		S	S
CO3											M			
CO4									M		M			S
CO5										M	M			
CO6											M		S	S

Course Assessment methods

Direct	**Indirect**
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

MANAGEMENT CONTEXT **9 Hours**

Management – Definition – Importance – Functions – Skills required for managers - Roles and functions of managers – Science and Art of Management –Management and Administration. Evolution of Classical, Behavioral and Contemporary management thoughts.

PLANNING **9 Hours**

Nature & Purpose – Steps involved in Planning – Forms of Planning – Types of plans – Plans at Individual, Department and Organization level - Managing by Objectives. Forecasting – Purpose – Steps and techniques. Decision-making – Steps in decision making.

ORGANISING **9 Hours**

Nature and Purpose of Organizing - Types of Business Organization - Formal and informal organization – Organization Chart – Structure and Process – Strategies of Departmentation– Line and Staff authority – Benefits and Limitations. Centralization Vs De-Centralization and Delegation of Authority.Staffing – Manpower Planning – Recruitment – Selection – Placement – Induction.

DIRECTING & CONTROLLING **9 Hours**

Nature & Purpose – Manager Vs. Leader - Motivation - Theories and Techniques of Motivation. Leadership – Styles and theories of Leadership.

Communication – Process – Types – Barriers – Improving effectiveness in Communication.

Controlling – Nature – Significance – Tools and Techniques.

CONTEMPORARY ISSUES IN MANAGEMENT **9 Hours**

Corporate Governance Social responsibilities – Ethics in business – Recent issues.
American approach to Management, Japanese approach to Management, Chinese approach to Management and Indian approach to Management.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Tripathy PC And Reddy PN, "Principles of Management", Tata McGraw-Hill, 4th Edition, 2008.
2. DinkarPagare, "Principles of Management", Sultan Chand & Sons, 2000.
3. Kanagasapapathi. P, Indian Models of Economy, Business and Management, Prentice Hall of India, New Delhi, ISBN: 978-81-203-3423-6, 2008
4. G.K.Vijayaraghavan and M.Sivakumar, "Principles of Management", Lakshmi Publications, 5th Edition, 2009.
5. Bhaskar S. "Principles Of Management", (2011) Anuradha Agencies, Chennai
6. Harold Koontz & Heinz Weihrich, "Essentials of Management – An International perspective", 8th edition. Tata McGraw-Hill, 2009.
7. Charles W.L. Hill and Steven L McShane – Principles of Management, Tata McGraw-Hill, 2009.

ELECTIVE IX

U15FT*E*901 THEORY OF TEXTILE STRUCTURES

L	T	P	C
3	0	0	3

Course Outcomes:

After successful completion of this course, the students should be able to

CO1	Analyze the geometry and construction of various fabrics and relate the geometry with fabric properties	K_4
CO2	Formulate equations for prediction of tensile properties of various fabrics and explain the reasons for such behavior	K_2
CO3	Explain the theories of mechanical properties of fibres	K_2
CO4	Apply the knowledge of Dimensional properties and Relaxation – shrinkage in designing knitted garments.	K_3
CO5	Explain the theories of fibre structure and properties of fibres.	K_2
CO6	Analyze the geometry and construction of yarns	K_4

Pre-requisite:

U15MA*T*201 Engineering Mathematics – II

	CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													
COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S											S	
CO2	S	S											S	
CO3	S	S											S	
CO4	S	S											S	
CO5	S	S											S	
CO6	S	S											S	

Course Assessment Methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

THE STRUCTURE AND PROPERTIES OF FIBRES **9 Hours**

Structure of fibres, morphology and order in fibre structure Theories of fine structures of fibres. Frictional properties: Theory of friction and lubrication and its application to fibres Measurement of friction Thermal and optical behavior of fibres Swelling and theories of moisture sorption, .Di-electric properties. Effects of frequency and temperature on dielectric constant and static electricity

THE MECHANICAL PROPERTIES OF FIBRES **9 Hours**

Theories of elasticity Thermodynamic analysis of deformation Rubber elasticity of long chain molecules and molecular network Application to fibres Theory of viscoelasticity Stress relaxation, creep, stress-strain relations, viscoelasticity of natural fibres.

YARN AND FABRIC MECHANICS **9 Hours**

Basic Yarn Geometry - Packing of fibres in yarn; Fibre arrangement in twisted yarn; Fabric Mechanics: Fabric Specifications and cover factor. Plain cloth geometry - crimp ratio and thread spacing - setting theory and maximum set. Pierce's flexible and elastic thread model - Oloffson's

general model Crimp interchange in woven fabrics - crimp balance -geometrical structure of twill and mat weaves.

TENSILE PROPERTIES OF WOVEN FABRICS 9 Hours

Tensile properties of woven fabrics: stress-strain curve .Modeling of tensile behavior, anisotropy of woven fabric. Geometrical changes during the extension of cloth - load extension modulus, Application of force, energy and finite element methods in fabric tensile behavior analysis.

KNITTING DYNAMICS 9 Hours

Knitting Dynamics: Yarn tension and knitting forces - effect of cam shape, increase in number of feeders and increase in linear speed. Single jersey knitted fabric Geometry and Properties: Tightness factor - Dimensional properties – Spirality - Relaxation – shrinkage

Theory: 45 hours Total: 45 hours

REFERENCES

1. Manufactured Fibre Technology VB Gupta & VK Kothari ISBN: 978-94-010-6473-6
2. Physical properties of Textile Fibres WE Morton & JWS Hearle ISBN-9781845694425
3. Seyam A M, "Structural Design of Woven fabrics", Textile progress Vol.31, No: 3. Textile Institute Publication .ISBN: 978 1 85573 696 2, 2003.
4. Progress in Textiles: Science & Technology Vol. 1, Testing and Quality Management, V.K. Kothari, IAFL Publications, New Delhi, ISBN: 81- 901033-0-X, 1999.
5. J Hu, "Structure and mechanics of Woven fabrics", Hong Kong Polytechnic University, Wood Head Publishing Ltd, 2004. ISBN: 978 1 85573 484 ***5***
6. Hearle JWS, Grosberg P and Backer S, "Structural mechanics of fibres, yarn and fabrics" Wiley Interscience Publishing limited, 1969.

U15FT*E*902 APPLICATIONS OF ERP AND MIS IN APPAREL INDUSTRY

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge on basics of ERP and MIS	K2
CO2	Acquire knowledge on the application and modules of ERP in apparel Industry.	K3
CO3	Acquire Application strategy of Information Systems in apparel industry	K4
CO4	Develop knowledge on internet and electronic commerce and their day to day importance	K3
CO5	Describing and developing knowledge on transforming Information systems to the business operations	K3
CO6	Developing skills on supporting technically on ERP system developers for apparel industries.	K4

Pre Requisite : NIL

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO 1	S				M				M				M	M
CO 2	S				M				M				M	M
CO 3	S				M					M				
CO 4		S			M				M	M			M	M
CO 5		S			M					M				
CO 6		S			M				M	M			M	M

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

INTRODUCTION **9 Hours**

An overview and features of ERP, MIS integration, ERPdrivers, Trends in ERP, ERP in India. ERP system perspective – Management Information System, Operations Support System,TransactionProcessingSystem,NetworkStructureofERPsystem,ERPworkflow,Process modeling for ERP systems, Communication in ERP systems, OLTP, (On Line Transaction Processing), OLAP (On Line Analytical Processing), Enterprise Integration application tools for ERP.

RESOURCE MANAGEMENT PERSPECTIVE **9 Hours**

Business modules in ERP packages, Finance, Production, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution, Resource Management, Business ProcessReengineering,RelationshipbetweenERPandBPR,ERPImplementationLifecycle,Implementation methodology,ERPProjectManagementandMonitoring.ERPandE-

Commerce,ERPCulture,ERPandCRM,ERPandSCM, ERP selection issues, ERP in Public Sector Enterprises, Pre- and Post-implementation issues, ERP Vendors, Key ERP consultants in India, Future directions in ERP.

BASICSOFINFORMATIONSYSTEM **9 Hours**

Introduction to Information system in business, Need for Information Technology, System concept, Components of an information system, Information system resources, Information system activities, recognizing information system. Expanding role of information systems, Operating support system, Management support systems.

INTERNET AND ELECTRONIC COMMERCE **9 Hours**

Introduction, Business use of internet, Interactive marketing, Business value of the internet, Customer value and the internet. Fundamentals of Electronic Commerce(EC), EC applications, Business-to-Consumer commerce, Business to Business commerce, Electronic payments and security.

INFORMATION SYSTEMS FOR BUSINESS OPERATION: **9 Hours**

Applications of intranets, intranet technology resources, the business value of intranets, the role of Extranets, enterprise collaboration systems. Information systems for marketing, manufacturing, human resources, accounting, financial, transaction processing, managerial and decision support, Information systems for strategic advantages, Strategic application and issues in IT, ethical and societal challenges of information technology.

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. V.K.Garg, Venkat and N.K.Krishna, “ERP Concepts and Practices”, 1st edition, PHI Publications, 1997.
2. James A.O’Brien, “Introduction to Information Systems”, Tata Mc Graw Hill, New Delhi, 2005.
3. AlexisLeon,“ERPDemystified”,1stedition,Tata Mc Graw Hill, New Delhi, 2000.
4. S.Sadagopan, “ERP: A Managerial Perspective”,1stedition,Tata McGraw Hill,NewDelhi,1999.
5. Langenalter,A.Gary,“Enterprise Resources Planning and Beyond”,1stedition, St.Lucie Press, USA, 2000.
6. Diwan, Parag and Sharma, Sunil, “Enterprise Resource Planning: A Manager’s Guide”,1st edition,1999.
7. E.Turban, E.McLean and J.Wetherbe, “Information Technology for Management: Making Connections for Strategic Advantage”, John Wiley and Sons, New Jersey, 2001.
8. W.S.Jawadekar, “Management Information Systems”,Tata Mc Graw Hill, New Delhi,2004.

U15FT*E*903 APPAREL EXPORT MANAGEMENT

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Demonstrate knowledge on need for exports and export trade statistics.	K3
CO2	Illustrate the steps involved in setting up export business and export correspondence and negotiation	K4
CO3	Examine the EXIM policy and export promotion schemes	K4
CO4	Research the sources for export finance and analyze the export payment terms	K4
CO5	Demonstrate knowledge in export documentation and procedures	K3
CO6	Evaluate the requirements of export negotiation and different incentive options on exports.	K5

Pre Requisite : NIL

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1		M			S					S		M	S	
CO2		M			S			M	M	S	S		S	M
CO3					S					S			S	
CO4		M			S					S	S		S	
CO5		M			S				M	S	S	M	S	M
CO6					S			M	M	S	S	M	S	M

Course Assessment methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

INTRODUCTION **9 Hours**

Basics of international trade and its significance.Role of WTO and regional economic groups in international trade.International trade statistics of textiles and apparel. Prospects for Indian apparel exports and SWOT analysis.

EXPORT BUSINESS **9 Hours**

Setting upof export business - export marketing organisation, product planning for export markets, export pricing and costing, International Commercial(Inco) Terms. Export correspondence -negotiations for export business.

EXIMPOLICY **9 Hours**

Highlights of Exim Policy 2008–2013.Various schemes for export promotion-duty drawback, duty exemption, duty remission. EOU, free trade zones, special economic zones, market access initiative, market development assistance, brand promotion, trading house, export houses, ware housing zones

EXPORTFINANCE: **9 Hours**

Basic concepts of foreign exchange – foreign exchange risk management - Forfeiting and Factoring. Methods of International Payment Settlement - International Commercial Terms - Letter of Credit - Exchange Control Regulations for imports and exports - Export Financing - Pre-Shipment finance - Post Shipment Finance - EXIM Bank of India - ECGC - Demand Guarantees and Standby Letter of Credit

EXPORT PROCEDURE AND DOCUMENTATION 9 Hours

Export Procedure, Inspection and Customs Clearance procedures. Shipping formalities. Export Documentation - types - transport documents, commercial documents, and regulatory documents. Marine Insurance General Information on Shipping - Types of Containers - Containerization - Air Transportation. Export Packaging - Introduction - Mechanical tests - Climatic tests - International Care labeling.

Negotiation of documents and realization of export proceeds, procedure for obtaining various export incentives.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. BalagopalTAS,"ExportMarketing", Himalayan Publishing House, 2005.
2. Francis Cherunilam, 'International Trade and Export Management' HPH, 2004
3. Govt.ofIndia's,"ForeignTradePolicy",2007.
4. D.C. Kapoor, Export Management, Vikas Publications, 2009
5. PalleKrishna Rao,"WTO–TextandCases–ExcelSeries",ExcelBooks2005.
6. Hearle JWS, Hines TandSuhM, "Global Marketing of Textiles", Journal of The Textile Institute (Special Issue) 1997.
7. "Globalization: Technological, Economic and Environmental Imperatives", The Textile Institute,1995.
8. P.K.Khurana,"Export Management",GalgotiaPublishsing Company, 2003.

U15FT*E*904 TEXTILE COMPOSITES

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge in different types of composites and application of composites	K2
CO2	Describe the prepreg and perform manufacturing techniques	K2
CO3	Discuss the properties of different fibres and matrix materials used in composite manufacture	K2
CO4	Describe the manufacturing techniques of composites	K2
CO5	Develop knowledge in various properties of composites	K4
CO6	Acquire knowledge in nano composites and composite design	K2

Pre-requisite:

U15FT*T*502 Knitting and Nonwoven Technology

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S													
CO2	S													
CO3	S													M
CO4					S								W	
CO5	S													W
CO6			S											

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

Course Content

INTRODUCTION **9 Hours**

Composite – definition, classification, constituents – reinforcement, matrix, interface, critical fibre length. Types and properties of reinforcements, matrix materials. Application of composites.

PREPREGS AND PREFORMS **6 Hours**

Introduction - manufacturing techniques - property requirements - Textile preforms - weaving, knitting and braiding.

COMPOSITE MANUFACTURING TECHNOLOGY **9 Hours**

Hand layup, Vacuum bag moulding, compression molding, filament winding, resin transfer moulding, pultrusion, injection moulding, Manufacturing with thermosets and thermoplastics.

PROPERTIES OF COMPOSITES **9 Hours**

Geometrical properties of composites - Fibre volume fraction – Density and void content, Laminar tensile – shear – compression – flexural properties. Interlaminar fracture Failure and Fracture mode in fibre composites. Inplane shear characteristics of textile reinforcements.

NANO COMPOSITES **6 Hours**

Introduction to Nanocomposites, Composite material, Mechanical properties of Nano composite material: stress - strain relationship, toughness, strength, plasticity.

COMPOSITE DESIGN **6 Hours**

Design – failure predictions, laminate design considerations, joint design, design examples, application examples.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. Horrocks A. R., Anand S.C., "Handbook of Technical Textiles", Woodhead Publishing, Cambridge, 2000
2. Adanur S., "Handbook of Industrial Textiles", Technomic Publication, Lancaster, 2001
3. Kanna M.C., Hearle, O Hear., Design and Manufacture of Textile Composites, Textile process, Textile Institute, Manchester, April 2004.
4. Mathews F L and Rawlings R D, "Composite Materials: Engineering and Science", CRC Press and Woodhead Publishing Limited, 2002.
5. Derek Hull, "An introduction to Composite Materials", Cambridge University Press, 1988.
6. Bhagwan D. Agarwal, Lawrence J. Broutman, and K. Chandrashekhara, 'Analysis and Performance of Fiber Composites', John Wiley & Sons, 2006.
7. Long C. A., 'Design and Manufacture of Textile Composites', Woodhead Publishing, 2005.

ONE CREDIT COURSES

U15FTIN01 COMPUTER AIDED TEXTILE AND APPAREL DESIGNING

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Practice creativity and innovation	K6
CO2	Develop designs as per market needs and current trends	K6
CO3	Develop catalogues to market the developed products	K6

Pre Requisite : Fashion Designing Laboratory I & II

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1			S											
CO 2			S							S			S	
CO 3		S	S		S					S			S	

Course Assessment methods:

Direct	Indirect
	1. Course end Survey

EXPERIMENTS:

1.	Design mood boards and color boards for specific markets based on fashion forecasts
2.	Develop print fabric simulations
3.	Develop woven fabric simulations
4.	Develop knitted fabric simulations
5.	Develop surface ornamentation simulations
6.	Develop a collection of garments
7.	Develop an E-catalogue of the collections.

Total: 15 Hours

REFERENCES

1. Fashion Designing Laboratory – I Lab Manual
2. Fashion Designing Laboratory – II Lab Manual
3. Lectra Manual

U15FTIN02 DRAPING TECHNIQUES

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Appraise and select suitable fabric for the required design aspects	K4
CO2	Evaluate and select suitable fabric for the required silhouettes	K4
CO3	Explore the different draping techniques for the development of skirts and blouses	K5
CO4	Develop skills in different draping techniques for the development of bifurcated garments	K5
CO5	Create methods for the development of new designs for advanced draping	K6
CO6	Design and develop three dimensional garments by draping techniques for designers and industry	K6

Pre Requisite :

U15FT*T*301 Concepts of Fashion and Design
U15FT*T*302 Basic Pattern Making & Adaptation
U15FT*T*303 Garment Component Fabrication
U15FT*P*302 Garment Component Fabrication Lab

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		S	S	M		M				M			S	M
CO2		S	S	M		M				M			S	M
CO3		S	S		M			M	S				S	
CO4		S	S		M			M	S				S	
CO5		S	S	M					S	S	S	S	S	M
CO6		S	S	M					S	S	S	S	S	W

Course Assessment methods:

Direct	Indirect

EXPERIMENTS

1.	**Effect of fabric on forms for skirts** Type of fabric :Wovens, knits; nonwovens, non textile (Leather, paper, fusion of materials etc.) Weight of fabric :light weight, medium weight and heavy weight
2.	**Effect of fabric on forms for skirts** Types of Silhouettes : bell & balloon, circle & triangle
3.	Intermediate Draping : Skirts- kilt, pegged, dirndl, yoke with flare & flounces

4.	Intermediate Draping : Blouses – Bustiers, Peasant, Gibson Girl with incorporation of collar and sleeve by draping technique

5.	Intermediate Draping : Pants -Harem, Hakama, wide leg pants
6.	Advanced Draping : Asymmetrical and Biased drapes, and
7.	Advanced Draping: Gowns -Shift & Empire

Practical : 15 Hours **Total: 15 Hours**

REFERENCES

1. Aldrich W., Fabric, Form and Flat Pattern Cutting, Blackwell Science Limited, London, 1996.
2. Crawford A.A., The Art of Fashion Draping, Om Books International, New Delhi, 2005.
3. Kiisel K., Draping -the complete Course, Laurence King Publishers, 2013

U15FTIN03 SEWING MACHINERY DYNAMICS

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Recall various process parameters in garment sewing	K1
CO2	Apply knowledge to determine the impact of process parameters on garment sewing	K3
CO3	Acquire knowledge on sewing dynamics	K1
CO4	Acquire knowledge in measurement of needle heat	K1
CO5	Analyze the impact of needle heating on sewing performance	K4
CO6	Acquire knowledge on measuring sewing machine forces	K1

Pre Requisite:

U15FT*T*304 Apparel Machinery and Equipment

U15FT*P*302 Apparel Components and Machinery Laboratory

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S													
CO2		S											S	
CO3			S											
CO4														
CO5													S	
CO6														

Course Assessment methods:

Direct	Indirect

PROCESS PARAMETERS IN GARMENT SEWING **7 Hours**

The impact of operation type and technological equipment on process parameters of garment sewing- determining total time on the basis of process parameter measuring- determining total time using video cameras- measuring system and equipment

SEWING DYNAMICS **8 Hours**

Influence of machine and material parameters on the stitch length - effect of thread structure on tension peaks during lock stitch sewing- needle penetration force – impact of needle heat on sewing performance. Measurement of needle heat- Measuring sewing machine forces at high speeds

Total: 15 hours

REFERENCES

1. Harold Carr and Barbara Latham, "The Technology of Clothing Manufacture", Om Book Service, 2002.
2. Shaeffer Claire, "Sewing for the Apparel Industry", Prentice Hall, New Jersey, 2001.
3. Singer, "Sewing Lingerie", Cy De Cosse Incorporated, 1991.
4. Laing R.M. and Webster J, "Stitches and Seams", The Textile Institute, Manchester, 1999

5. Technical Advisory Committee of AAMA, " A New Look at Apparel Mechanization",

1978.
6. Jacob Solinger, “Apparel Production Handbook”, Reinhold Publications, 1998

U15FTIN04 DEVELOPMENTS IN SEWING MACHINERY

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge in developments in basic sewing machines	K1
CO2	Discuss the developments in sewing machine work aids and attachments	K2
CO3	List different types of special sewing machines required for making different garments	K1
CO4	Acquire knowledge in advancements in sewing machines used for knitted garments	K1
CO5	Acquire knowledge in advancements in sewing machines used for woven garments	K1
CO6	Describe the developments in CNC sewing machines	K2

Pre Requisite:

U15FT*T*304 Apparel Machinery and Equipment

U15FT*P*302 Apparel Components and Machinery Laboratory

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PEOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PEO1	PEO2
CO1	S													
CO2	S													
CO3		S												
CO4				S										
CO5				S										
CO6					S									

Course Assessment methods:

Direct	Indirect
1. Internal test	Course exit survey

BASIC SEWING MACHINES: **5 Hours**

Developments in basic sewing machines- single needle lock stitch machine – bobbin winding- work aids and attachments- automatic trimming

SPECIAL SEWING MACHINES: **10 Hours**

Developments in special sewing machines – over lock machine- flat lock machine – feed off the arm- button sewing machine, button hole making machine, bar tack machine, safety stitching, blind stitching, double needle , zig zag machines, CNC sewing machines.

Theory : 15 Hours **Total: 15 Hours**

REFERENCES

1. Harold Carr and Barbara Latham, “The Technology of Clothing Manufacture”, Om Book Service, 2002.

2. Shaeffer Claire, “Sewing for the Apparel Industry”, Prentice Hall, New Jersey, 2001.

3. Singer, “Sewing Lingerie”, Cy DeCosse Incorporated, 1991.
4. Laing R.M. and Webster J, “Stitches and Seams”, The Textile Institute, Manchester, 1999
5. Technical Advisory Committee of AAMA, “ A New Look at Apparel Mechanization”, 1978.
6. Jacob Solinger, “Apparel Production Handbook”, Reinhold Publications, 1998.

U15FTIN05 NEW TRENDS IN PRINTING

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge on new printing techniques	K1
CO2	Acquire knowledge on different printing substrate and materials used commercially	K1
CO3	Acquire knowledge on carpet and home textile printing techniques	K1
CO4	Ability to explain various printing methods, machines and styles for fabric and garment	K2
CO5	Create innovations in the field of printing	K6

Pre Requisite :

U15FT*T*503 Textile Chemical Processing

U15FT*P*502 Textile Chemical processing laboratory

		CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs			Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		S												
CO2		M			S								S	
CO3		M			S									
CO4		M		S										
CO5			S		S									S

Course Assessment methods:

Direct	Indirect
Mini projects End semester	Course end survey

DIGITAL PRINTING **3 Hours**

Different types, Substrate preparation, Ink Formulation, Digital colour management, Industrial production printers.

TRENDS IN PRINTING **9 Hours**

Ajrak, Akola, Brushprint, Bagru, Balaotra, 3D print, Dewdrop, Dabu print Flock, Foil, Fluorescent printing, Gold, Jawata, Khari, Pigment, Pearl, Puff, Rubber, Rapid print, Neptoal, Modern abstract prints

NEW TRENDS **3 Hours**

Trends in Garment printing, Carpet and Home textile printing

Total: 15 Hours

REFERENCES

1. Edited by H.Ujiie "Digital printing of Textiles", Wood head Publishing Limited 2006

2. L.W.C.Miles "Textile Printing" Society of Dyers & Colorists; 2nd revised edition, January 2003

3. R. S. Prayag, Technology Textile Printing – Noyes Data Corporation, 1989

U15FTIN06 INDUSTRIAL ENGINEERING PRACTICES IN APPAREL INDUSTRY

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge of the various industrial engineering methods and tools associated with apparel manufacturing	K2
CO2	Apply modern industrial engineering methods and scientific solutions to apparel manufacturing t o wa r d s economic, environmental, and societal context	K3
CO3	Practice work measurement, work place engineering and lean manufacturing in the apparel manufacturing industry	K3

Pre Requisite:

U15FT*T*602 Apparel Production planning and control

U15FT*T*504 Apparel Production Technology

		CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak											
COs	Programme Outcomes(POs)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S			S	S									
CO2					S	S	S						S	M
CO3			S				M				M		S	

Course Assessment methods:

Direct	Indirect
Miniprojects End Semester exam	COURSE END SURVEY

5 **Hours**

WORK MEASUREMENT- Operation break down, Preparation of OB (Operation bulletin), SAM Calculation, Time study, GSD.

METHOD STUDY -Motion analysis of the operations, Ergonomics

5 **Hours**

WORK PLACE ENGINEERING - M/C Layout and Work station layout, Equipment Technology. Operation Management - Line Set up, Production estimation of a line, WIP Control, Line Balancing, Developing and Maintaining Skill Matrix, Calculating Thread Consumption,

5 **Hours**

Capacity planning, Cost estimation of a garment. Performance Rating, Incentives schemes. Lean Manufacturing - Value stream mapping, Sixsigma, Zero defects. Pneumatic Controls and Robotics

Theory : 15 Hours **Total: 15 Hours**

REFERENCES:

1.V.Ramesh Babu Industrial Engineering in Apparel Production Wood head Publishing Limited 2011

2. www.onlineclothingstudy.com

3. Guidelines for Industrial Engineering, KSA Technopak

4. Improving Working Conditions and Productivity in the Garment Industry: An Action Manual International Labour Org

5. Hobbs (Dennis P) LEAN Manufacturing Implementation: A Complete Execution Manual for any Size Manufacturer , Cengage Learning India Private Ltd, NewDelhi

U15FTIN07 APPLICATION OF SIX SIGMA IN APPAREL MANUFACTURE

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Apply the concept of Six Sigma and its application to evaluate and control a process	K3
CO2	Analyze various metrics used in designing, implementing and evaluating Six Sigma process	K4
CO3	Assess implementation of six sigma concept in apparel industry	K5

Pre Requisite :

U15MA*T*306 Probability and Applied statistics

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO 1	S		M	M	M				M	M			M	
CO 2	S	S	M	M	M				M	M	M		M	
CO 3			M		M				M	M	M		M	M

Course Assessment methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

DESIGN FOR SIX SIGMA (DFSS): 6 Hours

Six Sigma Basics: Overview and Implementation. Process measurement, Process analysis, Process improvement (Six Sigma and Lean concept) and Process control.

DESIGN FOR SIX SIGMA AND IMPLEMENTATION: 9 Hours

Design for Six Sigma, Six Sigma implementation. Six Sigma Metrics: DPU, DPO, DPMO, Sigma levels, Yield, First Time Yield, Overall Yield, Throughput Yield, Rolled Throughput Yield, Normalized Yield Process Capability Indices: Cp, Cpk, Cpm, Cpkm. Dealing with non-normality through transformations.

Total: 15 Hours

REFERENCES

1. Chowdhury, Subir, “Design for Six Sigma”, Dearborn Trade, 2002.
2. Chowdhury, Subir, ”The Power of Six Sigma”, Pearson Education (Singapore) Pvt. Ltd., 2001.
3. Creveling C M; Sluisky J L; Antis, Jr. D, “Design for Six Sigma Technology and Product Development”, Pearson Education (Singapore) Pvt. Ltd., 2004.
4. Truscott William T, “Six Sigma Continual Improvement for Business: A Practical Guide”, Elsevier, 2009.

U15FTIN08 WASTE ELIMINATION AND VALUE STREAM MAPPING IN APPAREL INDUSTRY

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Understand Lean concept in manufacturing perspective	K2
CO2	Apply concept of Lean Wastes and understand its impact on cost of poor quality in the context of apparel manufacturing industry	K4
CO3	Apply the Value Stream Mapping tool in elimination of Lean Wastes	K4

Pre-requisite:

U15FT*T*603 Textile and Apparel Quality Evaluation

U15FT*T*701 Quality Assurance and Social Compliance for Apparel Industry

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO 1						M	M			M			M	
CO 2		M				M	M			M			S	
CO 3		M			M	M	M			M	M	M	S	M

Course Assessment methods:

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

INTRODUCTION 3 Hours

Introduction to Lean concept – Comparison of Lean practice and traditional business practices - Lean practices as distinguished from TQM, Management Systems of QMS, EMS, OSHAS and TPM.

LEAN WASTES 8 Hours

8 Wastages - over production, higher inventory, waiting time, unnecessary conveyance and motion of materials, over processing, rework- repairs - rejections, customer returns, wastage of people talents. profit leakages due to wastages

Cost of Poor Quality – Cost of Quality – calculation of Cost of Poor Quality. 5 S – Seiri, Seiton, Seisō, Seiketsu, Shitsuke – house keeping practices for cleaner production.

VALUE STREAM MAPPING 4 Hours

Identifying non – value activities in apparel manufacture – analysis and eliminating non – value activities through Value Stream Mapping (VSM)

Total: 15 Hours

REFERENCES

1. Gopalakrishnan N, Simplified Lean Manufacture: Elements, Rules, Tools and Implementation, Prentice Hall of India Learning Pvt. Ltd., 2010
2. Hobbs Dennis P,"Lean Manufacturing Implementation: A Complete Execution Manual for Any Size Manufacturer", Cengage Learning India Private Ltd, NewDelhi, 2009.
3. Rajmanohar T P, "Lean Product Development: Concept and Models", ICFAI Press, 2009.

4. Desai, Aruna, “Lean manufacturing: Perspectives and Applications”, ICFAI Press, 2008.
Rajmanohar T P, “Cost of Poor Quality: Concept and Applications”, ICFAI Press, 2008.

U15FTIN09 CERTIFICATION PROCEDURES FOR PRODUCT AND PROCESS IN APPAREL INDUSTRY

Course Outcomes

After successful completion of this course, the students should be able

CO1	Understand the different requirements of various product certification processes in Apparel Industry.	K2
CO2	Understand the different requirements of various process certification processes in Apparel Industry.	K2
CO3	Apply and follow certification procedures for health, safety and environment protection.	K3

Pre-Requisites: NIL

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO 1					M								S	
CO 2		S			M					M			S	
CO 3				S	M			S		M	S	M		S

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

PROCESS CERTIFICATION: 7 Hours

Cleaner Technology Production (CTP) - Occupational Health and Safety Assessment Specifications (OHSAS) –Worldwide Responsible For Apparel Production (WRAP) - Code of Vendor Conduct. Global Sourcing and Operating Guidelines - Country Assessment Guidelines - Health and Safety Conditions , Human Rights Environment, Legal System, Political, Economic and Social Environment. Business Partner Terms of Engagement (TOE) - Ethical Standards, Legal Requirements, Environmental Requirements, Environmental Philosophy and Guiding Principles. Community Involvement, Employment Standards - Evaluation and Compliance.

PRODUCT CERTIFICATION: 8 Hours

ECO-Labeling - Oeko-Tex 100, EU Eco-Label for Textiles. Care Labelling - Sun protective labelling - Fibre content labeling - Country of origin labeling - Product Safety Standards (Children's Nightwear and Limited Daywear Having Reduced Fire Hazard) Regulations, Accessories on infants apparel. UPF Rated certificate, certification for Fabrics, accessories and trims for children's nightwear and other daywear. Mandatory fabric test certification - Fibre Analysis - (Composition / Fibre Content) Construction, Yarn Count, Dimensional Stability Shrinkage, Spirality - Tensile Strength - Tear Strength - Colour Fastness, Seam Slippage, Pilling, Stretch & Recovery for fabric with elastane - Water Repellancy, Flammability, Water Absorbency/Wicking. Product Safety Certification - Drawcords / ties, Elastic, Zippers, Broken Needle Policy, Pins Policy, Shipment certification.

Total: 15 Hours

REFERENCES

1. 'Guidebook for Export to Japan' Japan External Trade Organization (JETRO). 2011

2. New CPSC Testing and Certification Requirements, 2012 - www.intertek.com
3. WRAP – Production facility handbook- www.wrapcompliance.org
4. Code of Vendor Conduct, Gap Inc

U15FTIN10 STATISTICAL ANALYSIS IN THE APPAREL INDUSTRY

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Develop knowledge on basic principles of statistical design of experiments	K4
CO2	Apply knowledge in collecting experimental data and entry of data in software according to given procedure	K3
CO3	Experiment the datas using the appropriate statistical tool and develop relevant models for analysis and interpretation	K4

Pre Requisite : Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S			S										
CO2				S						S			S	
CO3		S		S	S								S	

Course Assessment methods:

Direct	Indirect

EXPERIMENTS:

1.	Data Collection and Processing of Data
2.	Frequency Distribution-Graphical Representation
3.	Calculation of mean, variance, Standard deviation and CV
4.	Probability distributions
5.	Testing of hypothesis-t-test, F-test
6.	Control Charts
7.	ANOVA
8.	Correlation
9.	Regression
10.	Chi-square test

Total: 15 Hours

REFERENCES

1. Montgomery D C Design and Analysis of Experiments, John Wiley & Sons,2004
2. Kothari C P Research Methodology-Methods and Techniques, Mishra Prakeshan 2000
3. Minitab-Software manual
4. SPSS software manual

U15FTIN11 EXPORT MARKET AND MERCHANDISING

L	T	P	C
1	0	0	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Demonstrate knowledge on opportunities in international market, Starting Export & Import Business.	K3
CO2	Examine the process of Foreign Exchange Management Act and currency risk management in international trade	K4
CO3	Apply knowledge on overseas market research and product development and planning strategies for exports	K3
CO4	Identify the elements of merchandising services and analyze role of merchandiser and merchandise planning	K3

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1			M	M					M	S			S	
CO2		M		M						S			S	
CO3				S									S	S
CO4		M		S						S			S	S

Course Assessment methods:

Direct	Indirect

Export Market

Marketing Opportunities in International market, Starting Export & Import Business- Licenses & Approvals, Methods of Realizing Payments & Payments Transaction under Letter of Credit, Concept of Digital Signature and e-filing, Foreign Exchange Management Act and regulation covering export transaction - Currency Risk Management in International Trade

Overseas market research-Identifying foreign markets- factors for selecting foreign markets- Product planning strategies for exports.

New product development Process- International Product Life cycle-Methods of entry in foreign markets- Channels of Distribution in export markets- Warehousing.

Export Merchandising

Features of merchandising services - Current market information - Central merchandising - Group purchases - Order placement and follow – up

Role of merchandiser, qualities of a merchandiser - Fashion calendar - The planning cycle - Merchandise planner. Buying calendar - Buying strategy.

References:

1. P K Vasudeva, 'International Marketing', Excel Books, New Delhi. 2010.
2. R. L. Varshney& B. Bhattacharya, 'International Marketing Management- An Indian Perspective',

Sultan Chand & Sons, New Delhi.25th Ed. 2015.

3. Bennett Roger, Blythe Jim, ‘International Marketing: Strategy Planning, Market Entry & Implementation’, Kogan Page Ltd. 2013.
4. Albaum.G, Duerr. E, Strandskov.J, ‘International Marketing and Export Management’, Dorling Kindersley.2011
5. Moore Evelyn. C, ‘Math For Merchandising: A Step-By-Step Approach’, Prentice Hall. 2012
6. Mathew Robin, ‘Apparel Merchandising’, Book Enclave. 2009.

U15FTIN12 RETAIL ANALYTICS

Course Outcomes

After successful completion of this course, the students should be

CO1	Understand the salient features of retail analytics	K2
CO2	Acquire knowledge on the emerging analytical trends in retailing	K4
CO3	Relate the use of analytics in forecasting and product development	K4
CO4	Interpret the use of analytics in marketing, pricing and supply chain	K4
CO5	Express the use of analytics in organizational trends in retailing	K3
CO6	Relate the use of analytics in strategic initiatives of retailing	K4

Pre Requisite :

U15FT*T*501 Apparel Product Development Process
U15FT*T*601 Apparel Merchandising
U15FTE602 Fashion Retail Management

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO1	PSO2
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		
CO1	W					M	M						M	
CO2	W	W							M	M	M	M	S	S
CO3	W	M	M						M	M	M	M	S	S
CO4	W	M	S			M	M		M	M	M	M	S	S
CO5	W	M	S			M	M		M	M	M	M	S	S
CO6	W	M	S			M	M		M	M	M	M	S	S

Course Assessment methods:

Direct	Indirect

Theory : 15 Hours **Total: 15 Hours**

REFERENCES

1. http://www.hcltech.com/technology-qa/what-is-retail-analytics
2. http://www.popai.com/uploads/downloads/Research-Retail-Analytics-2009.pdf
3. https://cdn2.hubspot.net/hubfs/215445/docs/The_Definitive_Guide_to_Retail_Analytics

OPEN ELECTIVE COURSES OFFERED TO OTHER DEPARTMENTS

U15FTE704 / U15FTOE01 KNITWEAR TECHNOLOGY

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Illustrate the elements of Knitwear machinery	K3
CO2	Explain types of stitches and seams	K3
CO3	Explain production technology of Foundation garments	K2
CO4	Know production technology of outerwear garments	K3
CO5	Develop fully fashioned sweaters and integral garments.	K2
CO6	Understand the concepts and methods of production of various garments by using knitwear technology	K3

Pre Requisite

U15FTT101 Fiber Science

U15FTT201 Yarn Technology

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S				M	S				S		S	S	
CO2								M					W	
CO3		S	S				S		S			S		S
CO4		S	S				S		S					S
CO5	S				S			M		M				S
CO6	S			S		S					M		M	

Course Assessment methods

Direct	Indirect
9. Internal tests 10. Assignment 11. Group Presentation 12. End Semester Exam	3.Course Exit Survey

INTRODUCTION TO KNITWEAR MACHINERY **10 Hours**

Classification of knitwear manufacturing machines-fully cut, stitch shaped, fully fashioned, and integral garment machines. Socks knitting- glove knitting. Automatic V-bed flat knitting machine. Seamless garment knitting machine.

TECHNOLOGY OF SEAMS AND STITCHES **7 Hours**

Classification of stitches and seams- mechanical properties of stitches and seams- thread consumption. Application of stitches and seams in knitted inner and outerwear garments. Selection of sewing machines for knitted fabrics -Flat lock, over lock and linking machine.

PRODUCTION TECHNOLOGY OF FOUNDATION GARMENTS **8 Hours**

Fabric and sewing thread quality requirements for foundation garments. Operation sequence production techniques- machinery used and special attachments for foundation garments - slips, braziers, vest and brief.

PRODUCTION TECHNOLOGY OF OUTER WEAR GARMENTS **10 Hours**

Fabric and sewing thread quality requirements for outwear garments. Operation sequence production techniques- machinery used and special attachments for knitted- T- shirts, combo wears, swimwear, arm warmer, sports garments and bifurcated garments.

PRODUCTION TECHNOLOGY OF FULLY FASHIONED SWEATERS AND INTEGRAL GARMENTS **10 Hours**

Shape generation in fully fashioned garments- production of slipovers and cardigans. Basic techniques in integral garments manufacture - integral garment production - socks, upper and lower body garments.

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

6. Terry Brackenbury, "Knitted Clothing Technology", Blackwell science, 2005.
7. Gerry Cooklin, "Garment Technology for Fashion Designers", Blackwell Science, 2000.
8. David Spencer., "Knitting Technology", Pergamon Press, Oxford 2005.
9. Pradip V Mehta, "Introduction to Quality Control for the Apparel Industry", ASQC Quality Press, 1992.
10. Charles Richman, "Guide to manufacture of Sweater, Knit shirts and Swim wear", National Knitted Outer Wear Association, New York, 1992.

U15FTE505 / U15FTOE02 AUTOMATION IN APPAREL MANUFACTURE

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire knowledge in automation in fabric inspection	K1
CO2	Analyze the requirements of spreading and cutting	K4
CO3	Discuss the developments in spreading and cutting	K2
CO4	Understand the developments in sewing and finishing machines used in apparel industries	K2
CO5	Acquire knowledge in the developments in material handling	K1
CO6	Acquire knowledge on robotics and its application in apparel industry	K1

Pre Requisite:

U15FT*T*304 Apparel Machinery and Equipment

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S													
CO2					S								S	
CO3					S									
CO4					S									
CO5					S									
CO6					S									

Course Assessment methods

Direct	Indirect
5. Internal tests 6. Assignment 7. Group Presentation 8. End Semester Exam	2.Course Exit Survey

Course Content

AUTOMATION IN FABRIC INSPECTION 9 Hours

Definition – importance and role of automation in apparel industry. Principles of automatic fabric inspection and defect checking. Machine vision system – image acquisition, feature enhancement; Image segmentation – feature extraction, image understanding.

AUTOMATION IN SPREADING AND CUTTING 6 Hours

Spreading- types, requirements of spreading. Automated elements in spreading machines. Cutting – types, requirements of cutting. Automated elements in cutting of textile materials – water jet, laser and plasma and computerized cutting machine.

AUTOMATION IN SEWING AND FINISHING 10 Hours

Advanced sewing – Automatic placket feeder – Automatic pocket maker – Auto button sewer – Electronic sewing machines – Automation in special sewing machines- bar tack, button holing and button fixing. Advanced garment finishing, folding and packing machines – CNC pressing machines.

AUTOMATION IN MATERIAL HANDLING 10 Hours

Types of equipment- Automated storage and retrieval systems- Overview of conceptions of "Work Robots" and "Manipulators". Conveyor systems – Unit production systems. Ply separation; Transportation - position and orientation, pick and place – clamping grippers and pinch grippers.

ROBOTICS IN APPAREL INDUSTRY **10 Hours**

Robotics in spreading and cutting; Robotics in sewing – double lock stitching, one side stitching, Tufting; Robotics for material handling; Robots as 2D and 3D folding machines; Robot control and simulation. Return on investment on automation.

Theory: 45 Hours **Total :45 Hours**

REFERENCES

15. Berkstresser, G.A. & Buchanan, E.M., Automation and Robotics in the Textile and Apparel Industries, Noyes Publications, 1986.
16. M.G.Mahadevan, "Textile Robotics and Automation", Abhishek Publications, Chandigarh, 2001.
17. A.Gordan, et al., "Automation and Robotics in the Textile and Apparel Industries (Textile series)", Noyes Publication, UK, 1986.
18. G.A.Berkstresser, "Automation in the Textile Industry: From Fibers to Apparel", 1st Edition, Technomic Publishing Co., Inc, UK, 1995.
19. M.Acar, "Mechatronic Design in Textile Engineering", NATO Science Series, 1st edition, Springer, USA, 1994.
20. Carr, H. and Latham, B., 'The Technology of Clothing Manufacture', Wiley-Blackwell, 2009.
21. Relis, N. & Strauss, G, 'Sewing for Fashion Design', Upper Saddle River, NJ: Prentice Hall, 1997.
22. Stylios G, 'Textile Objective Measurement and Automation in Garment Manufacture' Ellis Horwood Ltd., U.K., 1991
23. Solinger, J, 'Apparel Manufacturing Handbook', 2nd Ed., Van Nostrand Reinhold, New York, 1995
24. Crum, R.J, 'Methods of Joining Fabrics', Shirley Institute, 1983.
25. V.Jayakumar, " Applied Hydraulics & Pneumatics", Lakshmi Publications, Chennai, June 2010.
26. Tain kok Kiong, Andi Sudjana Putra " Drives and Control for Industrial Automation", Springer – Verlag London Limited 2011.
27. Dave Polka, "Motors and Drives – A Practical Technology Guide", ISA – The Instrumentation Systems and Automation Society, 2003
28. P. Khanna, "Industrial Engineering and Management", Dhanpat. Rai Publications, New Delhi, 1999.

L	T	P	C
3	0	0	3

U15FT*E*604 / U15FTOE03 INDUSTRIAL ENGINEERING IN APPAREL MANUFACTURING

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Acquire broad knowledge of the various industrial engineering methods and tools associated with manufacturing systems and human factors	K3
CO2	Demonstrate modern industrial engineering methods and scientific solutions to apparel manufacturing towards economic, environmental, and societal context	K4
CO3	Perform as industry leaders in the global marketplace, capable of successfully planning, controlling, and implementing large-scale projects	K4
CO4	Understand and apply the principles of science, technology, engineering, and math involving industry-relevant problems	K4
CO5	Acquire skills to investigate, experiment and solve problem in context with productivity improvement and material handling	K5
CO6	Acquire skills to implement IE techniques in sewing floor of any apparel manufacturing firm	K4

Pre Requisite :

U15FT*T*303 Garment components fabrication

U15FT*T*504 Apparel Production Technology

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO 1	S									S			S	M
CO 2					S	S				S		M	M	
CO 3				M						S	S		M	
CO 4	M			M										
CO 5		M		M									M	M
CO 6				S	S				M		M		M	M

Course Assessment methods

Direct	Indirect
5. Internal tests 6. Assignment 7. Group Presentation 8. End Semester Exam	2. Course Exit Survey

Course Content

INTRODUCTION **9 Hours**

Scope of industrial engineering in apparel Industry, role of industrial engineers.

Productivity: Definition - Productivity, Productivity measures .Reduction of work content due to the product and process, Reduction of ineffective time due to the management, due to the worker. Causes for low productivity in apparel industry and measures for improvement.

WORK STUDY **9 Hours**

Definition, Purpose, Basic procedure and techniques of work-study.

Work environment – Lighting, Ventilation, Climatic condition on productivity. Temperature control, humidity control, noise control measures. Safety and ergonomics on work station and work environment

Material Handling – Objectives, Classification and characteristics of material handling equipments, Specialized material handling equipments.

METHOD STUDY **9 Hours**

Definition, Objectives, Procedure, Process charts and symbols. Various charts – Charts indicating process sequence: Outline process chart, flow process chart (man type, material type and equipment type); Charts using time scale – multiple activity chart. Diagrams indicating movement – flow diagram, string diagram, cycle graph, chrono cycle graph, travel chart

MOTION STUDY: Principle of motion economy, Two handed process chart, micro motion analysis – therbligs, SIMO chart.

WORK MEASUREMENT **9 Hours**

Definition, purpose, procedure, equipments, techniques. Time study - Definition, basics of time study- equipments. Time study forms, Stop watch procedure. Predetermined motion time standards (PMTS). Time Study rating, calculation of standard time, Performance rating – relaxation and other allowances. Calculation of SAM for different garments, GSD.

WORK STUDY APPLICATION **9 Hours**

Application of work study techniques in cutting, stitching and packing in garment industry. Workaids in sewing, Pitch diagram, Line balancing, Capacity planning, scientific method of training.

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

10. Johnson Maurice "Introduction of Work Study", International Labour Organization, Geneva, 2005.
11. V.Ramesh Babu "Industrial Engineering in Apparel Production" Woodhead publishing India PVT ltd, 2012
12. Kiell B.Zandin, " Mayanard's " Industrial Engineering Hand Book", Fifth edition, Mc Graw Hill, NewYork, 2001.
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U15FT*E*101 / U15FTOE04 FASHION PHOTOGRAPHY

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Summarize knowledge on types of camera, working principles of camera and their various accessories.	K2
CO2	Apply basic techniques, equipment techniques, and subject techniques of various camera in photography	K3
CO3	Identify the importance of lighting, types of lighting, film types, film speed, and film format.	K4
CO4	Summarize skills on fashion photography in different fields	K6
CO5	Apply knowledge on developing and printing, image mixing and printing.	K3
CO6	Explain the applications of computer in photography and video photography	K3

Pre Requisite: Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1		S	S		S								M	
CO 2		S	S										S	
CO 3		M	M										S	
CO 4		S	S		S		S						S	S
CO 5		S	S		M								M	S
CO 6			M	S	S		S						S	M

Course Assessment methods

Direct	Indirect
5. Internal tests 6. Assignment 7. Group Presentation 8. End Semester Exam	2.Course Exit Survey

Course Content

INTRODUCTION: 9 Hours

Camera types – 35mm, SLR, Digital camera. Working principle of camera. Accessories: general accessories - lenses, lens filters, film types, flashlights- lighting accessories - power accessories, system accessories. Care and maintenance of camera.

TECHNIQUES: 12 Hours

Camera techniques: Basic techniques – fundamentals of composition, depth of field, shutter speed, focusing, using exposures. Equipment techniques – filter techniques, lens techniques, flash techniques, studio flash techniques, lighting techniques**.** Subject techniques – landscape, night photography, portrait, action photography and special effects. Outdoor and Indoor Photography – equipments.

LIGHTING AND FILM: 9 Hours

Lighting – concept and importance – Types of lighting – front light, side light, back light, revealing

light, controlling light, flash and studio lighting. Film types – Black and White, Colour. Film speed- Film format.

SUBJECT PHOTOGRAPHY: 6 Hours

Fashion Photography in different media – modeling, newspaper, magazines and fashion shows. Concept/theme based photography along with its application and acceptability in marketing and commercialization/branding.

DEVELOPING AND PRINTING: 9 Hours

Basics of developing and printing – image mixing and printing – Latest developments in printing – Computer application in photography. Video photography

Theory: 45 Hours **Total: 45 Hours**

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U15FTE602 / U15FTOE05 FASHION RETAIL MANAGEMENT

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Gain knowledge on the fundamentals of retailing	K2
CO2	Relate the aspects of customer behavior and retailing	K4
CO3	Acquire Knowledge on management of merchandise	K3
CO4	Understand the importance of effective location for retailing	K2
CO5	Understand the importance of atmospherics and space management of retail outlets	K2
CO6	Develop skills in retail pricing and strategies in promotional activities	K2

Pre Requisite :

U15FT*T*501 Apparel Product Development Process

U15FT*T*601 Apparel Merchandising

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													
COs	Programme Outcomes(POs)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	W					M	M						M	
CO2	W	W							M	M	M	M	S	
CO3	W	M	M						M	M	M	M	S	S
CO4	W	M	S			M	M		M	M	M	M	S	S
CO5	W	M	S			M	M		M	M	M	M	S	S
CO6	W	M	S			M	M		M	M	M	M	S	S

Course Assessment methods:

Direct	Indirect
5. Internal tests 6. Assignment 7. Group Presentation 8. End Semester Exam	2. Course Exit Survey

Course Content

RETAILING AND RETAILING ORGANIZATION 9 Hours

Definition, characteristics and functions of retailing, retailers, retailing channels, retail strategy. Structure of retail organization, retail units, merchandise mix, customer interaction, organized retailing, retail formats, geographical markets, retailing in rural India, vertical marketing system, challenges in retail business.

RETAIL CUSTOMER BEHAVIOUR 4 Hours

Consumer behaviour, factors affecting consumer decision making, consumer decision process, influence of situational variables on shopping behaviour, customer profile and analysis.

RETAIL MARKET SEGMENTATION AND TARGET MARKETING 5 Hours

Segmentation- definition and benefits: Segmenting, targeting and positioning. Criteria for segmentation, types of markets, dimensions for segmentation, types of segmentation. Market targeting, customer profile, survey of buyers intentions.

MERCHANDISE MANAGEMENT **7 Hours**

Product management, brand management and retailing, merchandise management, model stock plan, constraining factors, types of suppliers and selection criteria, category management, merchandise management planning in retail segments.

RETAIL LOCATION AND SPACE MANAGEMENT **9 Hours**

Location decision - importance, levels and determining factors. Types of location, types of consumer goods and location decision. Site selection analysis.

Atmospherics, store space management, walls as retail selling tools, colour planning, physical materials in store designing, atmospherics in the context of internet retailing.

RETAIL PRICING & PROMOTION STRATEGY: **11 Hours**

Influences on retail pricing strategy, development in retail prices, retail pricing objectives, retail pricing approaches and strategies, consumer responsiveness to prices, role of price elasticity and sensitivity.

Promotion mix selection, advertising, media selection, sales promotion, personal selling and publicity.

Theory : 45 Hours **Total: 45 Hours**

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