B.Tech. (Fashion Technology)

Revised 2018 Regulations, Curriculum & Syllabi

(Candidates admitted during Academic Year 2021-2022)

BANNARI AMMAN INSTITUTE OF TECHNOLOGY

An Autonomous Institution Affiliated to Anna University – Chennai • Approved by AICTE • Accredited by NAAC with "A+" Grade

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CONTENTS

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

I. Graduates will be having successful careers in industry, academics and research in the fields of apparel technology and fashion design with a fundamental knowledge and skill in basics of science, technology, arts, mathematics, computers and apparel manufacturing processes.

II. Graduates will be globally competent in fashion industry project management and entrepreneurship through effective communication, design and technology skills and also be able to appraise social and environmental issues.

III. Graduates will demonstrate spirit of ethics, leadership and engage in professional practice throughout their career.

PROGRAMME OUTCOMES (POs)

a. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

d. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

e. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

f. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

g. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

h. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. Communicate effectively on complex engineering activities with the engineering community

and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
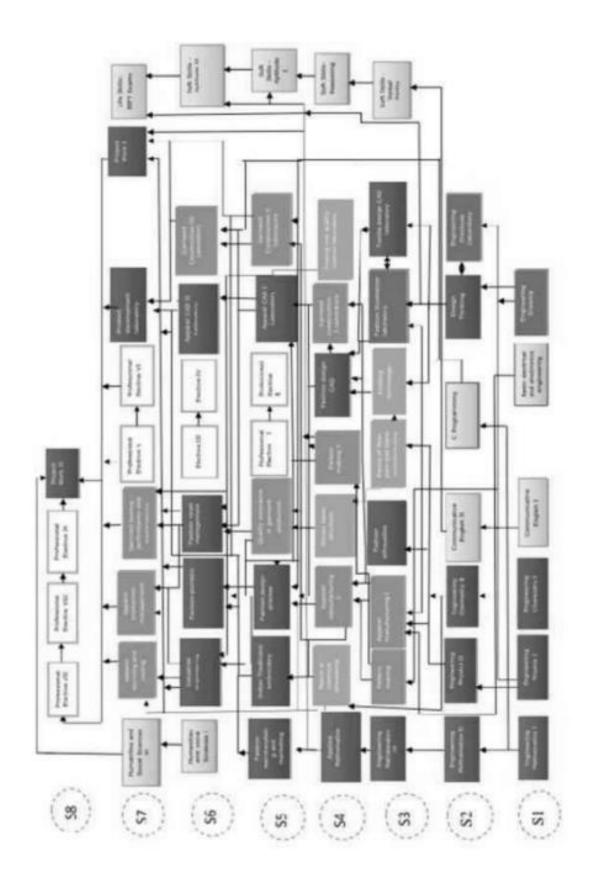
k. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

l. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

1. Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

2. Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

MAPPING OF PEOs AND POs

PEO(s)	Programme Outcomes(s)											
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
I	x	x	x	x	x		x				x	x
II			x			x	x	x	x	x		x
III			x	x		x	x	x	x	x	x	x

DEPARTMENT OF FASHION TECHNOLOGY Minimum Credits to be Earned: 163									
I SEMESTER									
Code No.	**Course**	**L**	**T**	**P**	**C**	**Hours/ Week**	**Maximum Marks**			**Category**
							CA	**ES**	**Total**	
18FT101	ENGINEERING MATHEMATICS I	3	1	0	4	4	40	60	100	BS
18FT102	ENGINEERING PHYSICS I	2	0	2	3	4	50	50	100	BS
18FT103	ENGINEERING CHEMISTRY I	2	0	2	3	4	50	50	100	BS
18FT104	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	2	0	2	3	4	50	50	100	ES
18HS101	COMMUNICATIVE ENGLISH I	1	0	2	2	3	100	0	100	HS
18FT106	ENGINEERING DRAWING	1	0	4	3	5	100	0	100	ES
Total		**11**	**1**	**12**	**18**	**24**	**-**	**-**	**-**	**-**
II SEMESTER										
Code No.	**Course**	**L**	**T**	**P**	**C**	**Hours/ Week**	**Maximum Marks**			**Category**
							CA	**ES**	**Total**	
18FT201	ENGINEERING MATHEMATICS II	3	1	0	4	4	40	60	100	BS
18FT202	ENGINEERING PHYSICS II	2	0	2	3	4	50	50	100	BS
18FT203	ENGINEERING CHEMISTRY II	2	0	2	3	4	50	50	100	BS
18FT204	COMPUTER PROGRAMMING	2	0	2	3	4	50	50	100	ES
	LANGUAGE ELECTIVE	1	0	2	2	3	100	0	100	HS
18FT206	DESIGN THINKING	2	0	2	3	4	50	50	100	ES
18FT207	ENGINEERING PRACTICES LABORATORY	0	0	4	2	4	100	0	100	ES
Total		**12**	**1**	**14**	**20**	**27**	**-**	**-**	**-**	**-**

	III SEMESTER									
Code No.	**Course**	**L**	**T**	**P**	**C**	**Hours/ Week**	**Maximum Marks**			**Category**
							CA	**ES**	**Total**	
18FT301	ENGINEERING MATHEMATICS III	3	1	0	4	4	40	60	100	BS
18FT302	PATTERN MAKING	2	0	2	3	4	50	50	100	PC
18FT303	APPAREL MANUFACTURING I	2	0	2	3	4	50	50	100	PC
18FT304	FASHION SILHOUETTES	2	0	2	3	4	50	50	100	PC
18FT305	BASICS OF FIBER,YARN AND FABRIC MANUFACTURING	3	0	0	3	3	40	60	100	PC
18FT306	KNITTING TECHNOLOGY	3	0	0	3	3	40	60	100	PC
18FT307	FASHION ILLUSTRATION LABORATORY	0	0	4	2	4	100	0	100	PC
18FT308	TEXTILE DESIGN CAD LABORATORY	0	0	4	2	4	100	0	100	PC
18GE301	SOFT SKILLS-VERBAL ABILITY	0	0	2	0	2	100	0	100	EEC
	Total	**15**	**1**	**16**	**23**	**32**	**-**	**-**	**-**	**-**
	IV SEMESTER									
Code No.	**Course**	**L**	**T**	**P**	**C**	**Hours/ Week**	**Maximum Marks**			**Category**
							CA	**ES**	**Total**	
18FT401	APPLIED MATHEMATICS	2	1	0	3	3	40	60	100	ES
18FT402	BASICS OF CHEMICAL PROCESSING	3	0	2	4	5	50	50	100	PC
18FT403	APPAREL MANUFACTURING II	2	0	2	3	4	50	50	100	PC
18FT404	WOVEN FABRIC STRUCTURE	2	0	2	3	4	50	50	100	PC
18FT405	PATTERN MAKING II	3	0	2	4	5	50	50	100	PC
18FT406	FASHION DESIGN CAD	2	0	2	3	4	50	50	100	PC
18FT407	GARMENT CONSTRUCTION I LABORATORY	0	0	4	2	4	100	0	100	PC
18FT408	TESTING AND QUALITY CONTROL LABORATORY	0	0	4	2	4	100	0	100	PC
18HS001	ENVIRONMENTAL SCIENCE	2	0	0	0	2	100	0	100	HS
18GE401	SOFT SKILLS – BUSINESS ENGLISH	0	0	2	0	2	100	0	100	EEC
	Total	**16**	**1**	**20**	**24**	**37**	**-**	**-**	**-**	**-**

Code No.	Course	L	T	P	C	Hours/Week	Maximum Marks			Category
							CA	ES	Total	
V SEMESTER										
21FT501	FASHION MERCHANDISING AND MARKETING	3	0	0	3	3	40	60	100	PC
21FT502	INDIAN TRADITIONAL EMBROIDERY	3	0	2	4	5	50	50	100	PC
21FT503	FASHION DESIGN PROCESS	3	0	2	4	5	50	50	100	PC
21FT504	QUALITY ASSURANCE IN GARMENT PRODUCTION	3	0	0	3	3	40	60	100	PC
	PROFESSIONAL ELECTIVE I	3	0	0	3	3	40	60	100	PE
	PROFESSIONAL ELECTIVE II	3	0	0	3	3	40	60	100	PE
21FT507	APPAREL CAD I LABORATORY	0	0	4	2	4	100	0	100	PC
21FT508	GARMENT CONSTRUCTION II LABORATORY	0	0	4	2	4	100	0	100	PC
18GE501	SOFT SKILLS – APTITUDE I	0	0	2	0	2	100	0	100	EEC
Total		**18**	**0**	**14**	**24**	**32**	**-**	**-**	**-**	**-**

Code No.	Course	L	T	P	C	Hours/Week	Maximum Marks			Category
							CA	ES	Total	
VI SEMESTER										
21HS002	HUMAN VALUES AND ETHICS	2	0	0	2	2	40	60	100	HS
21FT602	INDUSTRIAL ENGINEERING	3	0	2	4	5	50	50	100	PC
21FT603	FASHION PORTFOLIO	2	0	2	3	4	50	50	100	PC
	PROFESSIONAL ELECTIVE III	3	0	0	3	3	40	60	100	PE
	PROFESSIONAL ELECTIVE IV	3	0	0	3	3	40	60	100	PE
	PROFESSIONAL ELECTIVE V	3	0	0	3	3	40	60	100	PE
21FT607	APPAREL CAD II LABORATORY	0	0	4	2	4	100	0	100	PC
21FT608	GARMENT CONSTRUCTION III LABORATORY	0	0	4	2	4	100	0	100	PC
18GE601	SOFT SKILLS – APTITUDE II	0	0	2	0	2	100	0	100	PC
Total		**16**	**0**	**14**	**22**	**30**	**-**	**-**	**-**	**-**

							Maximum Marks			
	VII SEMESTER									
Code No.	Course	L	T	P	C	Hours/Week	CA	ES	Total	Category
21FT701	APPAREL SOURCING AND COSTING	3	0	0	3	3	40	60	100	PC
21FT702	GARMENT TESTING - PERFORMANCE AND SUSTAINABILITY	3	0	0	3	3	40	60	100	PC
	PROFESSIONAL ELECTIVE VI	3	0	0	3	3	40	60	100	PE
	PROFESSIONAL ELECTIVE VII	3	0	0	3	3	40	60	100	PE
	PROFESSIONAL ELECTIVE VIII	3	0	0	3	3	40	60	100	PE
	PROFESSIONAL ELECTIVE IX	3	0	0	3	3	40	60	100	PE
21FT707	PRODUCT DEVELOPMENT LABORATORY	0	0	4	2	4	100	0	100	PC
21FT708	PROJECT WORK I	0	0	6	3	6	50	50	100	EEC
	Total	**18**	**0**	**10**	**23**	**28**	-	-	-	-
	VIII SEMESTER									
Code No.	Course	L	T	P	C	Hours/Week	CA	ES	Total	Category
21FT801	PROJECT WORK II	0	0	18	9	18	50	50	100	EEC
	Total	**0**	**0**	**18**	**9**	**18**	-	-	-	-

ELECTIVES

LANGUAGE ELECTIVES

Code No.	Course	L	T	P	C	Hours/ Week	Maximum Marks			Category
							CA	ES	Total	
18HS201	COMMUNICATIVE ENGLISH II	1	0	2	2	3	100	0	100	HSS
18HSH01	HINDI	1	0	2	2	3	100	0	100	HSS
18HSG01	GERMAN	1	0	2	2	3	100	0	100	HSS
18HSJ01	JAPANESE	1	0	2	2	3	100	0	100	HSS
18HSC01	CHINESE	1	0	2	2	3	100	0	100	HSS
18HSF01	FRENCH	1	0	2	2	3	100	0	100	HSS

OPEN ELECTIVES

Code No.	Course	L	T	P	C	Hours/ Week	CA	ES	Total	Category
21OFT01	FASHION CRAFTSMANSHIP	3	0	0	3	3	50	50	100	BS
21OFT02	INTERIOR DESIGN IN FASHION	3	0	0	3	3	50	50	100	BS
21OFT03	SURFACE ORNAMENTATION	3	0	0	3	3	50	50	100	BS

ONE CREDIT COURSES

Code No.	Course	L	T	P	C	Hours/ Week	CA	ES	Total	Category
18FT0XA	LEAN MANUFACTURING	1	0	0	1	16	100	0	100	OC
18FT0XB	INTELLECTUAL PROPERTY RIGHTS	1	0	0	1	16	100	0	100	OC
18FT0XC	BUYERS MANUAL	1	0	0	1	16	100	0	100	OC
18FT0XD	BIO-MIMICRY IN FASHION	1	0	0	1	16	100	0	100	OC
18FT0XE	DRAPING AND FITTING	1	0	0	1	16	100	0	100	OC
18FT0XF	PRODUCT CERTIFICATION IN GARMENT INDUSTRY	1	0	0	1	16	100	0	100	OC
18FT0XG	DENIM FABRICS AND GARMENTS	1	0	0	1	16	100	0	100	OC
18FT0XH	FABRIC DEVELOPMENT AND SOURCING	1	0	0	1	16	100	0	100	OC
18FT0XI	SKILL DEVELOPMENTON APPAREL PRODUCTION PLANNING PACKAGE	1	0	0	1	16	100	0	100	OC
18FT0XJ	VISUAL MERCHANDISING	1	0	0	1	16	100	0	100	OC
18FT0XK	ESSENTIALS OF PHOTOGRAPHY	1	0	0	1	16	100	0	100	OC
18FT0XL	FASHION PRODUCT TESTINGFOR SUSTAINABILITY	1	0	0	1	16	100	0	100	OC
18FT0XM	PHOTOSHOP FOR FASHION DESIGN	1	0	0	1	16	100	0	100	OC
18FT0XN	ILLUSTRATOR FOR FASHION DESIGN	1	0	0	1	16	100	0	100	OC
18FT0XO	MICROPROCESSORS APPLICATIONS	1	0	0	1	16	100	0	100	OC
18FT0XP	ENERGY AUDITS IN GARMENT INDUSTRY	1	0	0	1	16	100	0	100	OC

Code	Course									
18FT0XQ	ESSENTIALS OF MICROSOFT EXCEL IN THE APPAREL INDUSTRY	1	0	0	1	16	100	0	100	OC
18FT0XR	SIX SIGMA	1	0	0	1	16	100	0	100	OC
18FT0XS	SOCIAL COMPLIANCE, STANDARDS AND SPECIFICATIONS	1	0	0	1	16	100	0	100	OC
18FT0XT	FASHION DIGITAL ILLUSTRATION	1	0	0	1	16	100	0	100	OC
18FT0XU	QUALITY ASSURANCE AND TESTING PROCEDURE	1	0	0	1	16	100	0	100	OC
18FT0XV	CHARACTERISTICS AND APPLICATION OF MEDICAL GARMENTS	1	0	0	1	16	100	0	100	OC
18FT0XW	DIGITAL FASHION	1	0	0	1	16	100	0	100	OC
18FT0XX	BUSINESS MODELS FOR SUSTAINABILITY	1	0	0	1	16	100	0	100	OC
18FT0XY	GARMENT DRAPING AND FIT ANALYSIS	1	0	0	1	16	100	0	100	OC
ADDITIONAL ONE CREDIT COURSE										
18GE0XA	ETYMOLOGY	1	0	0	1	1	100	0	100	EEC
18GE0XB	GENERAL PSYCHOLOGY	1	0	0	1	1	100	0	100	EEC
18GE0XC	NEURO BEHAVIORAL SCIENCE	1	0	0	1	1	100	0	100	EEC
18GE0XD	VISUAL MEDIA AND FILM MAKING	1	0	0	1	1	100	0	100	EEC
18GE0XE	YOGA FOR HUMAN EXCELLENCE	1	0	0	1	1	100	0	100	EEC
18GE0XF	VEDIC MATHEMATICS	1	0	0	1	1	100	0	100	EEC
18GE0XG	HEALTH AND FITNESS	1	0	0	1	1	100	0	100	EEC
18GE0XH	CONCEPT, METHODOLOGY AND APPLICATIONS OF VERMICOMPOSTING	1	0	0	1	1	100	0	100	EEC
18GE0XI	BLOG WRITING	1	0	0	1	1	100	0	100	EEC
18GE0XJ	INTERPERSONAL SKILLS	1	0	0	1	1	100	0	100	EEC
18GE0XK	COMMUNITY SERVICE AND LEADERSHIP DEVELOPMENT	1	0	0	1	1	100	0	100	EEC
18GE0XL	NATIONAL CADET CORPS	1	0	0	1	1	100	0	100	EEC
18GE0XM	NEW AGE INNOVATION AND ENTREPRENEURSHIP	1	0	0	1	1	100	0	100	EEC
18GE0XN	DISRUPTIVE INNOVATION BASED STARTUP ACTIVITIES	1	0	0	1	1	100	0	100	EEC
18GE0XO	SOCIAL PSYCHOLOGY	1	0	0	1	1	100	0	100	EEC

PROFESSIONAL ELECTIVES										

VERTICAL I- APPAREL MARKETING

Code No.	Course	L	T	P	C	Hours /Week	Maximum Marks			Category
							CA	ES	Total	
21FT001	TREND ANALYSIS AND FASHION FORECASTING	3	0	0	3	3	40	60	100	PE
21FT002	VISUAL MERCHANDISING	3	0	0	3	3	40	60	100	PE
21FT003	ESSENTIAL OF APPAREL MARKETING	3	0	0	3	3	40	60	100	PE
21FT004	APPAREL RETAIL MANAGEMENT	3	0	0	3	3	40	60	100	PE
21FT005	FASHION BRAND MANAGEMENT	3	0	0	3	3	40	60	100	PE
21FT006	DIGITAL MARKETING AND E-BUSINESS	3	0	0	3	3	40	60	100	PE

VERTICAL II- APPAREL PRODUCT DEVELOPMENT

Code No.	Course	L	T	P	C	Hours /Week	Maximum Marks			Category
							CA	ES	Total	
21FT007	KNIT WEAR DEVELOPMENT	3	0	0	3	3	40	60	100	PE
21FT008	CLOTHING COMFORT	3	0	0	3	3	40	60	100	PE
21FT009	FASHION ACCESSORIES	3	0	0	3	3	40	60	100	PE
21FT010	GARMENT FINISHING AND CARE	3	0	0	3	3	40	60	100	PE
21FT011	HOME FURNISHING	3	0	0	3	3	40	60	100	PE
21FT012	ADVANCED PRODUCT DEVELOPMENT.	3	0	0	3	3	40	60	100	PE

VERTICAL III- GARMENT MANUFACTURING

Code No.	Course	L	T	P	C	Hours /Week	Maximum Marks			Category
							CA	ES	Total	
21FT013	AUTOMATIONS IN APPAREL MANUFACTURING	3	0	0	3	3	40	60	100	PE
21FT014	LEAN MANUFACTURING	3	0	0	3	3	40	60	100	PE
21FT015	SUPPLY CHAIN MANAGEMENT FOR APPAREL INDUSTRY	3	0	0	3	3	40	60	100	PE
21FT016	SOCIAL COMPLIANCES AND QUALITY ASSURANCE IN APPAREL INDUSTRY	3	0	0	3	3	40	60	100	PE
21FT017	ADVANCED TECHNOLOGIES FOR APPAREL INDUSTRY	3	0	0	3	3	40	60	100	PE
21FT018	COMPUTER APPLICATIONS IN APPAREL MANUFACTURING	3	0	0	3	3	40	60	100	PE

VERTICAL IV- APPAREL MANAGEMENT

Code No.	Course	L	T	P	C	Hours /Week	Maximum Marks			Category
							CA	ES	Total	

21FT019	OPERATION RESEARCH IN APPAREL INDUSTRY	3	0	0	3	3	40	60	100	PE
21FT020	ENTERPRISE RESOURCE PLANNING IN APPAREL INDUSTRY	3	0	0	3	3	40	60	100	PE
21FT021	INTERNATIONAL BUSINESS IN APPAREL INDUSTRY	3	0	0	3	3	40	60	100	PE
21FT022	ENTREPRENEURSHIP IN APPAREL MANUFACTURING	3	0	0	3	3	40	60	100	PE
21FT023	SUSTAINABLE APPAREL BUSINESS MANAGEMENT	3	0	0	3	3	40	60	100	PE
21FT024	APPAREL PRODUCTION MANAGEMENT	3	0	0	3	3	40	60	100	PE

VERTICAL V - SPECIALTY APPAREL

Code No.	Course	L	T	P	C	Hours /Week	Maximum Marks			Category
							CA	ES	Total	
21FT025	TECHNOLOGY OF NON-WOVENS	3	0	0	3	3	40	60	100	PE
21FT026	PROTECTIVE GARMENTS	3	0	0	3	3	40	60	100	PE
21FT027	INTIMATE APPARELS	3	0	0	3	3	40	60	100	PE
21FT028	SMART TEXTILES AND GARMENTS	3	0	0	3	3	40	60	100	PE
21FT029	SPORTS TEXTILES AND GARMENTS	3	0	0	3	3	40	60	100	PE
21FT030	MEDICAL TEXTILES AND GARMENTS	3	0	0	3	3	40	60	100	PE

VERTICAL VI- FASHION DESIGN

Code No.	Course	L	T	P	C	Hours /Week	Maximum Marks			Category
							CA	ES	Total	
21FT031	HISTORY OF CLOTHING AND FASHION	3	0	0	3	3	40	60	100	PE
21FT032	FASHION STYLING AND MODELLING	3	0	0	3	3	40	60	100	PE
21FT033	FASHION PHOTOGRAPHY AND CHOREO	3	0	0	3	3	40	60	100	PE
21FT034	FASHION COMMUNICATION	3	0	0	3	3	40	60	100	PE
21FT035	FASHION VISAGE	3	0	0	3	3	40	60	100	PE
21FT036	CHRONICLE OF FASHION	3	0	0	3	3	40	60	100	PE
21FT037	TEXTILE HERITAGE	3	0	0	3	3	40	60	100	PE

VERTICAL VII- IT APPLICATION FOR FASHION BUSINESS

Code No.	Course	L	T	P	C	Hours /Week	Maximum Marks			Category
							CA	ES	Total	
21FT038	DATA MANAGEMENT TECHNIQUES	3	0	0	3	3	40	60	100	PE
21FT039	PRINCIPLES OF WEB DESIGN	3	0	0	3	3	40	60	100	PE

21FT040	E-COMMERCE IN FASHION	3	0	0	3	3	40	60	100	PE
21FT041	ERP FOR FASHION BUSINESS	3	0	0	3	3	40	60	100	PE
21FT042	INTRODUCTION TO AI APPLICATION	3	0	0	3	3	40	60	100	PE
21FT043	IOT IN FASHION	3	0	0	3	3	40	60	100	PE

SUMMARY OF CREDIT DISTRIBUTION

S.No	CATEGORY	CREDITS PER SEMESTER								TOTAL CREDIT	CREDITS in %	Range of Total Credits	
		I	II	III	IV	V	VI	VII	VIII			Min	Max
1	BS	10	10	4						24	15%	15%	20%
2	ES	6	8		3					17	10.4 %	15%	20%
3	HSS	2	2				2			6	3.8%	5%	10%
4	PC			19	21	18	11	8		77	47%	35%	45%
5	PE					6	9	12		27	16.5%	15%	20%
6	EEC							3	9	12	7.3%	5%	10%
	Total									163	100	-	-

BS   - Basic Sciences
ES   - Engineering Sciences
HSS   - Humanities and Social Sciences
PC   - Professional Core
PE   - Professional Elective
EEC   - Employability Enhancement Course
CA   - Continuous Assessment
ES   - End Semester Examination

18FT101 ENGINEERING MATHEMATICS I 3 1 0 4

Course Objectives

- Understand the concepts of vectors and Eigenvectors for different matrices to describe the stability of the linear systems in engineering fields.
- Exemplify the concepts of differentiation and integration to identify the area of 2D and 3D surfaces in engineering problems.
- Explain the concepts of analytic functions in complex domain to predict the nature of different engineering systems.

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Course Outcomes (COs)

1. Represent the different forms of coordinate system in complex plane and characteristics of linear systems by Eigenvalues and Eigenvectors.
2. Analyse various types of functions and their differentiation techniques involved in engineering fields.
3. Implement different methods of integration used in engineering problems.
4. Execute the suitable integration technique to calculate the area and volume of different surfaces.
5. Apply the concept of analytic function to estimate the integral in complex plane.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	3												
2	2	3												
3	2	3												
4	3	3												
5	1	3												

UNIT I 9 Hours
COMPLEX NUMBERS, VECTORS AND MATRICES
Complex plane, polar coordinates and polar form of complex numbers, powers and roots, fundamental theorem of algebra. Vector algebra in 2-D and 3-D space, dot product and cross product. Matrices : Eigen values and Eigen vectors, Properties of eigen values and eigen vectors.

UNIT II 9 Hours
CALCULUS
Limits and Continuity of Functions: Limits of functions, types of limits, evaluation of limits, continuity of functions, properties of continuous functions. Derivatives: Derivatives, differentiability, rules and properties, differentiation of transcendental functions, higher order derivatives, implicit differentiation, and differentiation of hyperbolic functions. Integration: Anti-derivatives, Riemann

Sum, indefinite and definite integration, Mean Value Theorem for definite integral, Fundamental Theorem of Calculus.

UNIT III   **9 Hours**
INTEGRATION METHODS
Basic integration formulae for algebraic and transcendental functions. Integration by special devices: integration by parts, rationalizing substitution or trigonometric substitution, partial fractions, reduction formulas, improper integrals, convergence tests.

UNIT IV   **9 Hours**
APPLICATIONS OF DERIVATIVES AND INTEGRATIONS
Extreme values, points of inflection and curve sketching, Rolles Theorem, Mean Value Theorem, optimization, indeterminate forms, L Hopitals Rule. Area between curves, volume of a general solid by slicing and cylindrical shell methods, volume of a solid of revolution, length of plane curves, area of a surface of revolution.

UNIT V   **9 Hours**
COMPLEX ANALYSIS
Analytic Functions- Properties of Analytic function - Determination of Analytic Function using Milne Thompson method. Cauchys Integral Formula - Classification of Singularities - Cauchys Residue Theorem.

Total: 60 Hours

Reference(s)

1. Finney RL, Weir MD and Giordano FR, Thomas Calculus, 10th edition, Addison-Wesley, 2001

2. Smith RT and Minton RB, Calculus, 2nd Edition, McGraw Hill, 2002.

3. Kreysgiz E, Advanced Engineering Mathematics, 8th edition, John Wiley & Sons, 1999.

4. Anton H, Calculus with Analytic Geometry, 5th edition, John Wiley & Sons, 1995.

5. Ayres F Jr and Mendelson E, Schaum s Outline of Theory and Problems of Calculus, 4th edition, McGraw Hill, 1999.

6. S.C. Gupta, Fundamentals of Statistics, 7th Edition, Himalaya Publishing House Pvt. Ltd. 2018.

18FT102 ENGINEERING PHYSICS I   **2 0 2 3**

Course Objectives

- Illustrate the Newtons laws of motion and wave motion with applications
- Understand the basic properties of electricity, magnetism and optics
- Differentiate the special theory of relativity and quantum physics from classical physics

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
i. i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Course Outcomes (COs)

1. Illustrate the Newtons three laws of motion and apply the same to solve the real world problems involving elevator, atwood machine and acceleration of objects

2. Exemplify the physical characteristics of simple harmonic motion, wave motion and find the solutions for wave equations

3. Infer the fundamental laws, properties of electricity and magnetism and apply the same to electric and magnetic elements

4. Apply the principles of physical and geometrical optics in the mirrors, lenses, microscopes and diffraction gratings

5. Outline the importance of special theory of relativity, quantum physics and analyse the wave and particle nature of matter

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	1							2					
2	2								2					
3	2	2												
4	2	2							2					
5	2	1							2					

UNIT I   **6 Hours**
MECHANICS
Newtons laws of motion: Concept of force and its nature - Newtons first law and inertial frames-definition of mass- Newtons second law-gravitational force and weight - Newtons third law. Applications of Newtons laws: particle in equilibrium, particle under net force - weighing a mass in an elevator, the atwood machine and acceleration of two objects connected by a cord

UNIT II   **6 Hours**
OSCILLATIONS AND WAVES
Fundamentals of simple harmonic motion -energy of simple harmonic oscillator - spring mass system - time period of simple pendulum, compound pendulum and torsional pendulum -Damped

oscillations.
Travelling wave motion - sinusoidal waves on strings - speed of a wave - reflection and transmission - rate of energy transfer in wave motion

UNIT III   **6 Hours**
ELECTRICITY AND MAGNETISM
Point charges - electric fields - Gauss law and its applications - electric potential - capacitance - energy stored in a capacitor.
Concept and source of magnetic fields - Amperes theorem - determination of magnetic field due to different current distributions - Faradays law - self-induction and mutual induction - energy stored in an inductor

UNIT IV   **6 Hours**
LIGHT AND OPTICS
Nature of light - laws of reflection and refraction -refractive index and Snells law - dispersion of light - total internal reflection - image formation: concave mirrors - convex mirrors - thin lenses - compound microscope - human eye.
Conditions of interference -Youngs double slit experiment- intensity distribution of interference - phase change due to reflection - diffraction-narrow slit diffraction - single slit and two slit - intensity distribution - diffraction grating - applications

UNIT V   **6 Hours**
MODERN PHYSICS
Special theory of relativity - simultaneity and time dilation - twin paradox - length contraction - relativistic mass variation - space time graph.
Black body radiation and Planck hypothesis - allowed energy levels - thermal radiation from different objects - photo electric and Compton effect. Matter waves - de-Broglie hypothesis - wave nature of particles - Davisson-Germer experiment

1   **5 Hours**
EXPERIMENT 1
Determination of resultant of system of concurrent coplanar forces-Parallelogram law of forces

2   **5 Hours**
EXPERIMENT 2
Determination of moment of inertia-Torsional pendulum

3   **5 Hours**
EXPERIMENT 3
Determination of wavelength of mercury spectral lines-spectrometer

4   **4 Hours**
EXPERIMENT 4
Determination of refractive index of solid and liquid-travelling microscope

5   **3 Hours**
EXPERIMENT 5
Determination of wavelength of laser-diffraction grating

6   **4 Hours**

EXPERIMENT 6

Determination of frequency of a tuning fork-Melde's apparatus

7   **4 Hours**

EXPERIMENT 7

Thickness of a thin wire using interference of light-Air wedge method

Total: 60 Hours

Reference(s)

1. R A Serway and J W Jewitt, Physics for Scientists and Engineers, Thomson Brooks/Cole, 2011

2. Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc, 2011

3. H C Verma, Concepts of Physics (Vol I & II), Bharathi Bhawan Publishers & Distributors, New Delhi, 2017

4. H D Young and R A Freedman, Sears and Zemanskys University Physics with Modern Physics, Pearson education, 2016

5. R K Gaur and S L Gupta, Engineering Physics, Dhanpat Rai Publications, 2012

18FT103 ENGINEERING CHEMISTRY I   **2 0 2 3**

Course Objectives

- Explain the composition and properties of clothing care items
- Differentiate between ionic, covalent, coordinate bonding and classify the bonding between dye and fabric as ionic or covalent
- Review types, sources, chemical composition/properties and applications of different fibres used in fashion industry
- Select suitable accessories to create new designs by analyzing its properties

Programme Outcomes (POs)

a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Course Outcomes (COs)

1. Summarize the influence of hard water, chemical action of soap and role of stiffening agents on fabrics
2. Illustrate the influence of different chemical bonds on the dye fiber interaction
3. Classify fibres based on source/applications and identify the type of fibre through chemical test
4. Exemplify natural, synthetic and semi synthetic fibres based on its chemical composition, properties and applications
5. Outline the chemical properties and uses of metals and gems as fashion accessories

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2												
2	2	1												
3	2	2												
4	2	2												
5	3	2												

UNIT I   **7 Hours**

CLOTHING CARE

Water- hard and soft water - determination of water hardness (EDTA method) - methods of softening water: Ion exchange process. Stain Removal: Laundry soaps - composition of soap - chemical action. Difference between soap and detergents. Various solvents for stain removing blood, tea, rust, oil/grease. Stiffening Agents: Purpose of stiffening - classification - uses of stiffeners - natural and commercial starches

UNIT II   **5 Hours**

CHEMICAL BONDING

Ionic, covalent and co-ordinate bonds (overview only) - hydrogen bonding and its consequences-Vander Waals forces (dipole-dipole and dipole-induced dipole). Interaction between fibres/polymers and dyes (basic concept only) - dye substrate affinity (dyes for cellulose fibres and silk)

UNIT III   **5 Hours**
INTRODUCTION TO FIBRES
Types of fibres (staple and filament fibres) - classification of fibres (based on source, and applications) - polymeric nature of fibres- difference between natural and synthetic fiber - fiber identification - burn test - difference between fiber and fabrics

UNIT IV   **6 Hours**
FIBRES IN FASHION INDUSTRY
Natural fibres: Classification - identification - chemical composition/properties and applications: Cellulosic fibres (cotton and hemp) - protein fibres (wool and silk) - semisynthetic fibers (rayon). Synthetic fibers (polyester and nylon)

UNIT V   **7 Hours**
FASHION ACCESSORIES
Definition/ chemical properties and uses- Terracotta and quilling. Metals in fashion accessories: Atomic structure, properties and applications of base/coat metals - iron, nickel, copper, gold and silver. Electroplating of copper. Gemstones - classification - inorganic and organic gemstones: Composition and properties of ruby, emerald, topaz, pearl, amber and coral

FURTHER READING
Applications of fibres in day to day life
Fibre composites - smart clothes using composite fibres
Impact of corrosion in textile and fashion industry

1   **2 Hours**
EXPERIMENT 1
Lab safety rules and guidelines for students

2   **2 Hours**
EXPERIMENT 2
Preparation of N/10 and M/10 oxalic acid and sodium carbonate solutions

3   **4 Hours**
EXPERIMENT 3
Determination of hardness in the water sample by EDTA method

4   **2 Hours**
EXPERIMENT 4
Identify suitable solvent to remove the stain due to organic or inorganic compounds

5   **4 Hours**
EXPERIMENT 5
Preparation of starch indicator and application in iodometric titration for determination of Hypochlorite in a Commercial Bleach Product

6   **4 Hours**

EXPERIMENT 6

Collect and document three natural as well as synthetic fibers and list its properties and uses

7   **4 Hours**

EXPERIMENT 7

Design suitable fashion accessories using economically viable recyclable materials (Paper/clay)

8   **4 Hours**

EXPERIMENT 8

Demonstration of electroplating of copper on stainless steel object

9   **4 Hours**

EXPERIMENT 9

Estimation of amount of copper in brass by EDTA method

Total: 60 Hours

Reference(s)

1. J.D. Lee, Concise inorganic chemistry, Blackman Science Ltd, France, Wiley-India, 5th edition(Reprint), 2016
2. V.R. Gowariker, N.V. Viswanathan and Jayader Sreedhar, Polymer Science, New Age International (P) Limited, 2nd edition, 2015
3. P. C. Jain and M. Jain, Engineering Chemistry, Dhanpat Rai Publications., New Delhi, 2016
4. B. R. Puri, L. R. Sharma and Madan S. Pathania, Principles of Physical Chemistry, Shoban Lal Nagin Chand & Co., 2010
5. Mihir Deb, Sanjib Chandra Sarkar, Minerals and Allied Natural Resources and their Sustainable Development, Springer, 2017

18FT104 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

2 0 2 3

Course Objectives

- To understand the basic concepts of electrical circuits and machines.
- To examine the speed control methods of DC motor and electrical safety devices.
- To illustrate the measurement techniques of illumination and noise levels.

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Course Outcomes (COs)

1. Explain the electrical properties and means of measuring them.
2. Examine the construction and operation principles of electrical machines.
3. Illustrate the fundamental concepts of electronics.
4. Demonstrate knowledge of the measurement techniques applied for measuring Illumination levels and noise levels.
5. Analyze the safety measures incorporated in electrical machines and devices.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2												
2	3	2												
3	3	2												
4	2	2												
5	3	2												

UNIT I 5 Hours
PROPERTIES OF MATERIALS AND MEASUREMENT
Electrical properties such as Conductivity, Resistivity, Capacitance of Nano Materials and Fibres ,Measurement of Voltage, Current, Power and Power factor using Digital meter - LCRQ meter.

UNIT II 8 Hours
ELECTRICAL MACHINES AND DRIVES
Construction and Operation of Permanent magnet DC motors, Single phase Induction Motor, Servo Motor - Drive system for Sewing Machines.

UNIT III 5 Hours
FUNDAMENTALS OF ELECTRONICS
Characteristics of PN Junction diode, Timers - Display system, Interfacing DC motor with electronic control system.

UNIT IV   **6 Hours**

LIGHTS AND SOUNDS

Lux, Luminance, Luminance Intensity, measurement using Lux meter - Types of Lamps: Mercury Vapour Lamp, LED, CFL - Fundamentals of Sound: Noise level, Decibels, Noise meter.

UNIT V   **6 Hours**

EARTHING SAFETY AND ACCESSORIES

Earthing: Necessity- Types of Earthing, Measurement of Earth Resistance - Types of fuses, MCB, ELCB Necessity of Insulation - Types of Switches, Sockets and Plugs for sewing and automated cutting machines.

1   **6 Hours**

EXPERIMENT 1

Measurement of conductivity, resistivity of fibres and conducting polymers.

2   **6 Hours**

EXPERIMENT 2

Develop a prototype driving mechanism for sewing mechines.

3   **6 Hours**

EXPERIMENT 3

Develop a electronic speed control system for DC motor.

4   **6 Hours**

EXPERIMENT 4

Develop a Lighting system with uniform luminous intensity for a given location.

5   **6 Hours**

EXPERIMENT 5

Fuse replacement and earthing of equipment.

                                                                          Total: 60 Hours

Reference(s)

1. A.L.Anwari, Basic of Electrical Engineering, Dhanpat Rai,2016.
2. Open Shaw Taylor, Utilization of Electrical Energy, University Press,2017.
3. Alan.S.Moris, Reza Langari, Measurement and Instrumentation, Elsevier,2011.
4. R. S. Sedha, A Textbook of Applied Electronics, S.Chand & Company Ltd, 2013.
5. D.S.Mathur, Elements of properties of materials, S.Chand Company, 2010.

18HS101 COMMUNICATIVE ENGLISH I   **1 0 2 2**

Course Objectives

- Read and understand the main points on familiar matters regularly encountered in work, school, or leisure
- Listen and respond in most common situations where English is spoken
- Write simple connected texts on topics which are familiar or of personal interest
- Describe experiences and events, hopes and ambitions and briefly give reasons and explanations for opinions and plans

Programme Outcomes (POs)

i. i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Course Outcomes (COs)

1. Use appropriate grammar and vocabulary that is expected at the BEC Preliminary exam level
2. Understand the general meaning of non-routine letters within own work area, and short reports of a predictable nature
3. Write formal, routine letters of factual nature, and make notes on routine matters, such as taking/placing orders
4. Follow simple presentations/demonstrations
5. Deal with predictable requests from a visitor, state routine requirements, and offer advice within own job area on simple matters

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1														
2									2					
3														
4										1				
5										2				

UNIT I   **9 Hours**

GRAMMAR

Tenses Future continuous, Past continuous, Past perfect, Past simple, Past tense responses, Present perfect continuous, Present perfect/past simple Reported speech Adverbs intensifiers Comparatives and superlatives Conditionals 2nd and 3rd Connecting words expressing cause and effect, contrast Phrasal verbs Prepositions of place Simple passive - Wh-questions in the past Question tags Will and going to, for prediction.

UNIT II   **9 Hours**

READING

Understanding short real-world notices, messages Detailed comprehension of factual material; skimming and scanning skills - Interpreting visual information Reading for detailed factual information Reading for gist and specific information - Grammatical accuracy and understanding of text structure - Reading and information transfer.

UNIT III 9 Hours
WRITING

Internal communication including note, message, memo or email - arranging / rearranging appointments, asking for permission, giving instructions - Business correspondence including letter, fax, email apologising and offering compensation, making or altering reservations, dealing with requests, giving information about a product.

UNIT IV 9 Hours
LISTENING

Listening for specific information Listening for numbers and letters Note completion Listening for gist listening to monologues (presentations, lectures, announcements and briefings) listening to interacting speakers (telephone conversations, face-to-face conversations, interviews and discussions).

UNIT V 9 Hours
SPEAKING

Exchanging personal and factual information expressing and finding out about attitudes and opinions organise a larger unit of discourse Turn-taking, negotiating, collaborating, exchanging information, expressing and justifying opinions, agreeing and/or disagreeing, suggesting, speculating, comparing and contrasting, and decision-making. 1.Goodbye party for Miss Pushpa T S - Nissim Ezekiel 2.Our Casuarina Tree - Toru Dutt 3.Palanquin Bearers - Sarojini Naidu 4.The Tyger - William Blake 5.Ode on a Grecian Urn - John Keats

Total: 45 Hours

Reference(s)

1. Alexander Garrett, Cambridge BEC Preliminary Students Book with Answers, Cambridge University Press, 2016.
2. Lan Wood, Anne Williams and Anna Cowper. Pass Cambridge BEC Preliminary, Second Edition, New Delhi, 2014.
3. Norman Whitby. Cambridge Business Benchmark. Pre-Intermediate to Intermediate, Students Book. South Asian Edition, 2018.

18FT106 ENGINEERING DRAWING   1 0 4 3

Course Objectives

- To learn conventions and use of geometry in producing Engineering curves.
- To draw 3D objects and structures using projection concepts.
- To produce multiple views of the given objects and structures.
- To represent 3D objects using analytical drawing techniques.
- To depict humans in their environment by adopting appropriate scales.

Programme Outcomes (POs)

a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

Course Outcomes (COs)

1. Illustrate different types of curves applying geometrical concepts.
2. Illustrate in representative style, basic 3D forms and visual patterns.
3. Construct 3D objects and structures applying projection concepts.
4. Develop geometrical objects and complex forms using analytical drawing techniques.
5. Illustrate humans and their environment applying appropriate scales.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2												
2	2	2			2									
3	2	2			2								1	
4	3	2			2								1	
5	3	2			2								1	

UNIT I   **3 Hours**

ENGINEERING CURVES

Construction of hyperbola - eccentricity method. Construction of ellipse by concentric circle method, Construction of parabola by parallelogram method. Construction of Roulettes - Cycloids, Involutes.

UNIT II   **3 Hours**

REPRESENTATION OF BASIC 3D FORMS AND VISUAL PATTERNS
Foreshortening, Overlapping, Shades and Shadows. Visual pattern and texture - Dialation and rotation, rotation and radiation, reflection, patterns as repetition. Basic design explorations - Exploration of design elements.

UNIT III   **3 Hours**
PCITORIAL SYSTEMS
Orthographic projections. Axonometric projections - isometric and diametric. Perspective projections - 1 point perspective, 2 point perspective.

UNIT IV   **3 Hours**
ANALYTICAL DRAWING
Analytical drawing - Geometrical objects, Additive forms, Subtractive forms, Complex forms.

UNIT V   **3 Hours**
SCALES IN REPRESENTING ART
Bird's Eye view, Ant's Eye view, Human scales in situation sketching. Architecture and human scale, Human figure and Anatomy.

1   **6 Hours**
EXPERIMENT 1
CONSTRUCTION OF HYPERBOLA BY ECCENTRICITY METHOD AND ELLIPSE BY CONCENTRIC CIRCLE METHOD

2   **6 Hours**
EXPERIMENT 2
Construction of roulettes: cycloid and involutes

3   **6 Hours**
EXPERIMENT 3
Render a 3D object by foreshortening technique. highlight the shadows.

4   **6 Hours**
EXPERIMENT 4
Develop a visual pattern by dialation and rotation, radiation and rotation with reference to given inspiration

5   **6 Hours**
EXPERIMENT 5
Develop an orthographic projection of the given object

6   **6 Hours**
EXPERIMENT 6
Develop an isometric drawing and diametric drawing of the given reference object

7   **6 Hours**
EXPERIMENT 7
Develop a single point perspective drawing and two point perspective of the given scenario

8   **6 Hours**

EXPERIMENT 8

Develop an analytical drawing of the given geometric object. Show additive forms, subtractive forms and complex forms

9   **6 Hours**

EXPERIMENT 9

Depict the given picture in bird's eye view and ant's eye view.

10   **6 Hours**

EXPERIMENT 10

Depict the given scenario in situation sketching style.

Total: 75 Hours

Reference(s)

1. Allan Mcrobie, The seduction of curves: The lines of beauty that connects Mathematics, Art and the nude, Princeton University press, 2017.

2. Matt Rota, Pencil Art workshop: Techniques, ideas and inspirations for drawing and designing with pencil, Rockport publishers, 2017.

3. Deborah Velesquez, Drawing in Black and White: Creative excercises, Art techniques and Explorations in positive and negative design, Quarry books, 2016.

4. Francis D.K. Ching with Steven P Juroszek, Design drawing, John Wiley and sons, 2nd edition 2013.

5. K.V.Natarajan, A Text Book of Engineering Graphics, Dhanalakshmi Publishers, 2013.

18FT201 ENGINEERING MATHEMATICS II   **3 1 0 4**

Course Objectives

- Understand the concepts of partial derivatives and multiple integrals to define the area, volume and extreme values of various surfaces in engineering fields.
- Classify the sequences and series in linear systems is convergent or divergent.
- Formulate the real time engineering problem into mathematical model using ordinary differential equation and solve it by appropriate method.

Programme Outcomes (POs)

a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Course Outcomes (COs)

1. Illustrate the various parameters in partial differentiation and characterize the maxima and minima functions for signals and systems.
2. Apply multiple integral concepts to calculate the area and volume by appropriate vector integral theorems.
3. Analyse the convergence and divergence of sequences and series by various tests.
4. Construct first order differential equations from real time phenomena and solve it by suitable method.
5. Execute the appropriate method to solve the second order differential equations.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3												
2	2	3												
3	2	3												
4	1	3												
5	1	3												

UNIT I   **9 Hours**

PARTIAL DIFFERENTIATION

Functions of several variables, plotting of 2-variable functions, introduction to cylindrical and spherical coordinates, chain rule, total differential, gradient, directional derivatives, normal lines and tangent planes, extreme of functions of two variables, applications.

UNIT II   **9 Hours**

MULTIPLE INTEGRALS

Double integrals, regions of integrations, triple integrals, applications (Cartesian coordinates only-Green's theorem and Gauss Divergence theorem).

UNIT III   **9 Hours**

SEQUENCES AND SERIES

Sequences and series, convergence and divergence of series, absolute convergence, conditional convergence, test for convergence and divergence. Power series for functions, interval of convergence, Taylor and Maclaurin series, Taylors Theorem with remainder.

UNIT IV   **9 Hours**

FIRST ORDER DIFFERENTIAL EQUATIONS

Separable differential equations, homogeneous differential equations, exact differential equations, integrating factor, Bernoullis equation, applications.

UNIT V   **9 Hours**

SECOND ORDER DIFFERENTIAL EQUATIONS

Second order homogeneous and non-homogeneous equations with constant coefficients, variation of parameters, method of undetermined coefficients, series solutions of differential equations, applications.

FOR FURTHER READING

Fast Fourier Transform in Paper making and Printing.

Total: 60 Hours

Reference(s)

1. Finney RL, Weir MD and Giordano FR, Thomas Calculus, 10th edition, Addison-Wesley, 2001
2. Smith RT and Minton RB, Calculus, 2nd Edition, McGraw Hill, 2002.Kreysgiz E, Advanced Engineering Mathematics, 8th edition, John Wiley & Sons, 1999.
3. Ray Wylie and C Louis Barrett, Advanced Engineering Mathematics, Sixth Edition, Tata McGraw-Hill Publishing Company Ltd, 2003.
4. Peter V. O Neil , Advanced Engineering Mathematics, Seventh Edition , Cengage Learning India Private Limited, 2012.
5. Glyn James, Advanced Engineering Mathematics, Third Edition,Wiley India, 2014.

18FT202 ENGINEERING PHYSICS II   **2 0 2 3**

Course Objectives

- Understand the elastic and surface properties of materials for their relevant applications to various streams of engineering and technology
- realize the importance of static and dynamic friction in textile materials
- apply the concepts involved in thermodynamics for solving the real world problems

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
i. i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Course Outcomes (COs)

1. Understand the elastic properties of materials in terms of the three modulii of elasticity and surface properties of liquids
2. exemplify the wave properties, generation of ultrasonics and their applications in the field of nondestructive testing methods
3. illustrate the crystal structure, crystal planes and unit cell characteristics of cubic crystal systems
4. assess the differences between static and dynamic friction and effect of wear and abrasions in textile machinery parts
5. apply the knowledge of thermodynamics in calculating the heat requirement for fabric process and analyze kinetics of dyeing

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	1							2					
2	2	1							2					
3	2	1							2					
4	2	1							2					
5	2	1							2					

UNIT I   **6 Hours**
ELASTICITY AND SURFACE PROPERTIES
Elasticity: elastic and plastic behavior of materials - stress - strain diagram - Hookes law types of elastic modulii: Youngs modulus - bulk modulus - rigidity modulus - Poissons ratio - factors affecting elasticity. Surface properties: cohesive force - adhesive force - factors affecting surface tension - interfacial tension - emulsions - detergency - foaming - wettability - coefficient of viscosity - Stokes law - Poiseuilles law - coefficient of viscosity of various liquids.

UNIT II   **6 Hours**
ULTRASONICS

Properties of ultrasonic waves - generation: magnetostriction and piezoelectric methods - detection of ultrasonic waves - velocity of ultrasonic waves using acoustic grating. Nondestructive testing: pulse echo method - merits and demerits - applications: drilling - cutting - SONAR - Applications of ultrasonic in Textile and apparels

UNIT III   **6 Hours**
SOLID STATE PHYSICS
Crystalline and noncrystalline materials - lattice points - space lattice - crystal structure -unit cells - Bravais lattice and crystal systems - Miller indices - procedure for finding Miller indices-relation between interplanar distance and interatomic distance - unit cell characteristics of SC, BCC, FCC and HCP structures

UNIT IV   **6 Hours**
FRICTION
Friction: basic laws - static and dynamic friction - adhesion - sheering theory - surface roughness - deformation - ploughing - normal adhesion - effects of speed on friction - wear and abrasion - frictional behaviour of elastomers - rolling friction.

UNIT V   **6 Hours**
THERMODYNAMICS
Heat - equilibrium and quasistatic process - path functions - comparison between heat and work - internal energy - laws of thermodynamics - isothermal and adiabatic process - work done - reversible and irreversible process - entropy diffusion- model for diffusion - diffusion coefficient - rate of dyeing, equilibrium, exhaustion, migration, adsorption and absorption of dyes - kinetics of dyeing with disperse dyes.

1   **4 Hours**
EXPERIMENT 1
Find the elevation of the given wooden beam at the midpoint by loading at the ends and hence calculate the Youngs modulus of the material.

2   **4 Hours**
EXPERIMENT 2
Find the depression at the midpoint of the given wooden beam for 50g, 100 g, 150 g, 200 g and 250 g subjected to non-uniform bending and determine the Youngs modulus of the material of the beam.

3   **4 Hours**
EXPERIMENT 3
Determine the moment of inertia of the disc and calculate the rigidity modulus of a given wire using torsion pendulum (symmetrical masses method).

4   **4 Hours**
EXPERIMENT 4
Determine the coefficient of viscosity of a given liquid by Poiseuille's method.

5   **4 Hours**
EXPERIMENT 5
Determine the
(i) wavelength of ultrasonics in a liquid medium,

(ii) velocity of ultrasonic waves in the given liquid

(iii) compressibility of the given liquid using ultrasonic interferometer.

6   **5 Hours**

EXPERIMENT 6

Determine the coefficient of thermal conductivity of a bad conductor by Lee's disc method

7   **5 Hours**

EXPERIMENT 7

Form the interference fringes from the air wedge setup and calculate the thickness of the given material (yarn).

Total: 60 Hours

Reference(s)

1. A. Serway and John W. Jewett, JR. Physics for Scientists and Engineers with Modern Physics, Ninth Edition Raymond, 2016.

2. Bhattacharya, D.K. & Poonam, T. Engineering Physics. Oxford University Press, 2015.

3. Gaur, R.K. & Gupta, S.L. Engineering Physics. Dhanpat Rai Publishers, 2012

4. Pandey, B.K. & Chaturvedi, S. Engineering PhysicsÃ¢??. Cengage Learning India, 2012

5. B.S. Gupta, Friction in textile materials, Wood Cut Publishing Pvt Ltd. 2008

18FT203 ENGINEERING CHEMISTRY II   **2 0 2 3**

Course Objectives

- Explain the sign ificance of electromagnetic spectrum on color theory based on complementary colors of light, chromophore, auxochrome, intensity shifts and illustrate photoprocesses based on Jablonski diagram
- Classify dyes based on source, its extraction methods and measures towards sustainable development
- Summarize the ingredients in paint for different applications in fashion industry

Programme Outcomes (POs)

a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

g. g. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Course Outcomes (COs)

1. Summarize different regions in an electromagnetic spectrum and exemplify chromophores based on intensity shifts

2. Explain the influence of electromagnetic radiation in photochemical process of dyes

3. Classify natural and synthetic dyes based on its source, three extraction methods of natural dyes and research outcomes for sustainable dyeing process

4. Exemplify constituents and functions in paint, varnish and lacquers

5. Select suitable colouring chemicals based on the composition and properties for different applications in fashion industry

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2												
2	2	1												
3	2	2					1							
4	3	2												
5	3	2					1							

UNIT I   **6 Hours**

COLOUR THEORY FOR DESIGNERS

Colour terminology: Electromagnetic spectrum - absorption of radiation - electronic, vibrational and rotational transitions. Regions of electromagnetic spectrum - complementary colours. Chromophores, auxochromes, hyperchromic shift, hypochromic shift, hypsochromic shift and bathochromic shift - conjugated chromophores.

UNIT II   **7 Hours**

PHOTOCHEMISTRY OF DYES

Photochromic dyes. Thermochromic dyes (Leuco dyes). Laws of photochemistry - Lambert-Beer Law and its limitations. Photoprocesses - Jablonski diagram (Internal Conversion, Inter-system crossing, Fluorescence, Phosphorescence) Chemiluminesence and Photo-sensitization. Principle, instrumentation (Block diagram)and applications: Colorimetric analysis (estimation of prussian blue dye).

UNIT III   6 Hours
CLASSIFICATION OF DYES
Natural and synthetic dyes - examples. Evolution of natural dyes - sources - extraction methods - applications -sustainability - from unsustainable to sustainable development.

UNIT IV   5 Hours
PAINTS
Characteristics of a good paint. Constituents and functions: Pigment, drying oil, thinners, driers, fillers, plasticizers, antiskinning agents. Varnish: Types constituents and functions. Lacquers: Constituents, examples and functions.

UNIT V   6 Hours
COLORS OF FASHION
Historical painting materials. Paints for fabrics: Acrylic composition - mechanism of drying. Fire retardant paint -composition and properties. Face and body paint: Types-(natural and synthetic) - composition. Hair colour: Types-composition - effect of pH.

SELF STUDY
Finger   print   region   (IR)
Fire   proof   paint
Nanotechnology in fashion industry

1   4 Hours
EXPERIMENT 1
Interpretation of extended chromophore present in organic compound by UV-Visible spectrum

2   4 Hours
EXPERIMENT 2
Estimation of the concentration of Prussian blue dye by Colorimetric analysis

3   4 Hours
EXPERIMENT 3
Extraction of natural dye from plants using different methods soxhlet extraction/IR extraction/microwave extraction/Ultrasonic extraction

4   4 Hours
EXPERIMENT 4
Application of extracted natural dye on different fabrics of cotton and silk.

5   4 Hours
EXPERIMENT 5
Removal of dye effluents in water by activated charcoal

6   **4 Hours**

 EXPERIMENT 6

Application of varnish on naturally derived product

7   **2 Hours**

 EXPERIMENT 7

Estimation of strength of HCl by pH metric titration method

8   **4 Hours**

 EXPERIMENT 8

Preparation of face and body paint for fashion applications

                                                                        Total: 60 Hours

 Reference(s)

1. J.D. Lee, Concise inorganic chemistry, Blackman Science Ltd, France, Wiley-India, 5th edition(Reprint), 2016

2. V.R. Gowariker, N.V. Viswanathan and Jayader Sreedhar, Polymer Science, New Age International (P) Limited, 2nd edition, 2015

3. P. C. Jain and M. Jain, Engineering Chemistry, Dhanpat Rai Publications., New Delhi, 2016

4. P. Gregory, Classification of Dyes by Chemical Structure, Springer, Boston, MA, 1990.

5. D. R. Waring et al. (eds.), The Chemistry and Application of Dyes Plenum Press, New York 1990

18FT204 COMPUTER PROGRAMMING   **2 0 2 3**

Course Objectives

- To learn the basics of Excel.
- To study the basics of C primitives, operators and expressions.
- To understand the different primitive and user defined data types.

Programme Outcomes (POs)

a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

Course Outcomes (COs)

1. Design applications using Excel and work with formulas and functions in Excel
2. Develop programs using operators and input-output functions
3. Apply decision making and looping statements in writing C programs
4. Apply the concepts of arrays and strings in developing C programs
5. Design applications using structures and functions in C

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3	3		3									
2	2	2	1		3									
3	2	3	2		3									
4	2	2	2		3									
5	2	2	2		3									

UNIT I   **3 Hours**

WORKING WITH EXCEL

Introduction-Working with Excel workbook-Working with Worksheet-Formulas and functions-Inserting charts-Sorting.

UNIT II   **3 Hours**

INTRODUCTION TO C PROGRAMMING

Overview of C-Structure of C program-Keywords-Constants- Variables-Data types-Type conversion Operators and Expressions: Arithmetic-Relational-Logical-Assignment- Increment and Decrement-Conditional-Bitwise operators.

UNIT III   **3 Hours**

CONTROL STATEMENTS

Decision Making and Branching: simple if statement-if else statement-nesting of if else Statement-Switch Statement.Decision Making and Looping: while statement-do while statement-for statement - Jump Statements: goto-break-continue-return statement

UNIT IV   **3 Hours**

ARRAYS AND STRINGS

Arrays: Introduction, one dimensional array, declaration - Initialization of one dimensional array, two-dimensional   arrays,   multi   dimensional   arrays.
Strings: String handling functions.

UNIT V   **3 Hours**

STRUCTURES AND FUNCTIONS

Structures: Introduction-defining a structure- declaring structure variables-accessing structure members-   structure   initialization-   Enumerated   data   type
User Defined Functions: Elements of user defined functions -Definition of functions-return values and their types- function calls-function declaration-categories of function -call by value and call by reference-recursion.

UNIT VI   **4 Hours**

SELF STUDY

Creating and manipulating document using word - Mail merge - Creating spread sheet with charts and formula using excel - developing power point presentation with Animations - C graphics using built in functions

1   **6 Hours**

EXPERIMENT 1

Working with Excel sheet

2   **6 Hours**

EXPERIMENT 2

Implement a C program using data types and operators.

3   **4 Hours**

EXPERIMENT 3

Implement C program using if else and switch statements.

4   **6 Hours**

EXPERIMENT 4

Implement C program using looping statements.

5   **6 Hours**

EXPERIMENT 5

Implement C program using arrays.

6   **6 Hours**

EXPERIMENT 6

Implement C program using string handling functions.

7   **6 Hours**

EXPERIMENT 7

Implement C programs using structures.

8   **5 Hours**

EXPERIMENT 8

Implement C programs using functions.

Total: 64 Hours

Reference(s)

1. 1. Pradeep K. Sinha, Priti Sinha, Computer Fundamentals, BPB publications, 2008
2. 2. Ashok. N. Kamthane, Computer Programming, Second Edition, Pearson Education, 2012
3. 3. E.Balagurusamy, Programming in ANSI C, Tata McGraw-Hill, 2012
4. 4. Herbert Schildt, C -The complete Reference, Tata McGraw-Hill, 2013
5. 5. Byron Gottfried, Programming with C, Schaum's Outlines, Tata Mcgraw-Hill, 2013

18FT206 DESIGN THINKING   2 0 2 3

Course Objectives
- To enable students comprehend the fundamentals of design thinking process
- To impart knowledge of photography foundations for design
- To enable students conceptualize design developments and understand visual ethics

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c. c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.
n. n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)
1. Identify and interpret the fundamental concepts of design thinking.
2. Demonstrate knowledge of attributes of the color and their schemes applied in design.
3. Produce layouts for brochure design and calendar events applying grid theory.
4. Classify typography types by their style and appraise applications in various printed designs.
5. Demonstrate knowledge about the creative thinking process applied in design practice.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	1											
2	3	2											2	2
3	3	2			2								3	3
4	3	2			-								2	2
5	3	2											2	

UNIT I   **6 Hours**
DESIGN FUNDAMENTALS
Design fundamental - Characteristics of a good design - Elements of design Line, Colour, Texture, Shape or form, Size. principles of design - Balance, Harmony, Emphasis, Proportion, Rhythm. creativity, importance of creativity, developing creativity.

UNIT II   **6 Hours**

COLOR THEORY FOR DESIGN

Colour theory - introduction - basics of colour theory - attributes of colour - hue, value, saturation , tint - shade - colour wheel - colour harmony - colour schemes - achromatic, monochromatic, polychromatic, warm colours, cool colours, analogous colours, complementary colours, split complements, incongruous, triads and tetrads - colour blending - additive model, subtractive model - colour contrast - colour psychology.

UNIT III   **6 Hours**

GRIDS AND LAYOUT

Grids and layouts - role of grids - structure - grid system and templates- layouts - layout guidelines - important parts of a page layout - factors influencing a layout -organizing layouts - capturing readers attention - visual composition - Collage.

UNIT IV   **6 Hours**

TYPOGRAPHY TYPOGRAPHY

Typography - typeface anatomy, measurements - typeface classifications - type families - spacing and alignment selecting appropriate fonts - tips and techniques - Graphics -importance of graphics - types of graphics - vector graphics, raster graphics - vector file formats, raster graphic file formats, format conversion - crop and scale.

UNIT V   **6 Hours**

CREATIVE THINKING PROCESS

Design process - approach - stages of design process - demonstrations and guidelines - Logo Design. Approach to design development - SCAMPER

1   **4 Hours**

EXPERIMENT 1

Create a Textile Print Patterns for Womens/Mens/Kids wear with appropriate layouts.

2   **6 Hours**

EXPERIMENT 2

Prepare the following Charts
o Prang colour chart
o Value Chart
o Intensity Chart

3   **6 Hours**

EXPERIMENT 3

Illustrate print designs for the Elements of Design
o Line
o Colour
o Texture
o Shape or form
o Size

4   **6 Hours**

EXPERIMENT 4

Illustrate Principles of Design
o Balance in print

o Harmony in print
o Emphasis in print
o Proportion in print
o Rhythm in print

5   **8 Hours**

EXPERIMENT 5
Illustrate the colour harmony in dress design
o Monochromatic colour harmony
o Analogous colour harmony
o Complementary colour harmony
o Double complementary colour harmony
o Split complementary colour harmony
o Triad colour harmony

                                                                              Total: 60 Hours

Reference(s)
1. Jeff Davis, Foundations of Design, Tempe Digital, 2016.
2. Vic Costello, Multinedia foundations: Core concepts for digital design, CRC press, 2016.
3. Judith wilde and Richard wilde, The process: A new foundation in Art and Design, Lawrence king, 2015.
4. Gavin Ambrose, Paul harris, Basics Design 08 - Design thinking, AVA publishing, 2009.
5. Alan pipes, Foundations for art and design, Lawrence king, 3rd edition, 2008.

18FT207 ENGINEERING PRACTICES LABORATORY

0 0 4 2

Course Objectives
- To demonstrate conceptualizing skills in developing decorative design ideas.
- To demonstrate fundamental concepts of braiding, crocheting and embroidery.
- To demonstrate skills for making coasters, greeting cards, table mats, wall hangings and hand bags

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

Course Outcomes (COs)
1. Fabricate simple decorative articles used in everyday life.
2. Choose and apply painting materials and medium for producing painting artworks
3. Apply fundamental craft techniques of crocheting, braiding and embroidery for making decorative articles

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3				2								2	
2	3				2								2	
3	3				2								2	

1   **6 Hours**

EXPERIMENT 1
Development of Greeting card design using Indian script font.

2   **6 Hours**

EXPERIMENT 2
Development of Warli motifs and prepare painting.

3   **6 Hours**

EXPERIMENT 3
Development of saree embroidery pattern using any one of the Indian traditional embroidery techniques

4   **6 Hours**

EXPERIMENT 4
Development of madhubani theme wall decor items.

5   **6 Hours**
 EXPERIMENT 5
Development of kalamkari style decor tea coasters and table mats

6   **6 Hours**
 EXPERIMENT 6
Development of hand bag artwork using chikankari stitches

7   **6 Hours**
 EXPERIMENT 7
 Apply braiding technique and prepare handbag.

8   **6 Hours**
 EXPERIMENT 8
 Apply smocking technique and prepare the base for Indian injiri dress

9   **6 Hours**
 EXPERIMENT 9
Development of crochet applique appropriate for hand bags

10   **6 Hours**
 EXPERIMENT 10
Development of silk thread embroidery pattern for Womens apparel tops

                                                                        Total: 60 Hours

Reference(s)
1. Natalie chanin, The Geometry of Hand-Sewing: A Romance in Stitches and Embroidery from Alabama Chanin and The School of Making (Alabama Studio), Abrams, 2017

2. Carol marine, Daily painting: Paint small and often to become a more creative, productive and successful artist, Watson-Guptill publications, 2014.

3. Alison Ellen, Hand knitting: new directions, 2nd edition, D&N publishing, 2011.

18FT301 ENGINEERING MATHEMATICS III   **3 1 0 4**

Course Objectives

- Understand the concepts of Fourier series, Fourier and Laplace transforms which will enable them to model and analyze the physical phenomena
- Implement the Fourier analysis, an elegant method in the study of heat flow, fluid mechanics and electromagnetic fields
- Apply the numerical techniques to offer an approximate solution for the differential equations in a real world situation

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Course Outcomes (COs)

1. Apply the Fourier analysis for the periodicity and non-periodicity of combination of sine and cosine functions
2. Classify partial differential equation and able to solve various equations
3. Formulate a function in frequency domain whenever the function is defined in time domain by Laplace transform
4. Interpret the solution of system of linear equations by various numerical techniques
5. Execute the numerical solution of initial and boundary value problems of differential equations by different methods

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	2												
2	1	2												
3	1	2												
4	1	2												
5	1	2												

UNIT I   **9 Hours**
FOURIER ANALYSIS
Fourier series for periodic functions - Orthogonal functions - The Euler coefficients - Fourier transforms -Properties of Fourier transform - Applications of Fourier series and transform analysis

UNIT II   **9 Hours**
PARTIAL DIFFERENTIAL EQUATION
Introduction to partial differential equations - One-dimensional wave equation - Method of separation of variables - D Alembert s solution of the wave equation. Heat equation. Laplace equation

UNIT III   **9 Hours**
LAPLACE TRANSFORM

Properties and theorems of Laplace transform - Shifting theorems - Convolution - Applications to ordinary differential equations - Applications to linear system analysis

UNIT IV   **9 Hours**
NUMERICAL SOLUTION OF SYSTEM OF LINEAR EQUATIONS
Solution of algebraic and transcendental equations: Fixed point iteration method - Newton- Raphson method - Solution of system of linear equations: Gauss elimination method - Inverse of a matrix: Gauss-Jordan method- Eigen values of a matrix by Power method

UNIT V   **9 Hours**
NUMERICAL SOLUTION OF DIFFERENTIAL EQUATIONS
Solution of first order ordinary differential equations: Eulers method - Fourth order Runge- Kutta method - Milnes predictor and corrector method - Solution of partial differential equations: Parabolic equations by Crank Nicholson method- Hyperbolic equations by explicit finite difference method
Total: 60 Hours

Reference(s)

1. Kreyszig Erwin, Advanced Engineering Mathematics, 7th Edition, John Wiley, 1993

2. Johnson Richard A. and Bhaltacharyya Gouri K., Statistics, Principles and Methods, 3rd Edition, John Wiley, 1996

3. O Neil Peter V., Advanced Engineering Mathematics, 4th Edition, PWS-Kent, 1995

4. James Glyn, Advanced Modern Engineering Mathematics, Addison-Wesley, 1993

5. Grewal B. S, Numerical Methods in Engineering and Science with Programms in C & C++, Ninth Edition, Khanna Publications, 2010

6. Sankara Rao. K, Numerical Methods for Scientists and Engineers, Third Edition, PHI Learning Private Limited, New Delhi, 2009

18FT302 PATTERN MAKING   2 0 2 3

Course Objectives
- Acquire knowledge on human body measurements and creating pattern from the measurements.
- Develop commercial pattern with design aspect by manipulating the basic pattern.
- Fabricate patterns of different sizes by grading the basic pattern.

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c. c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Course Outcomes (COs)
1. Upon the completion of the course, the students will be able to explain the basic proportions of human body and determine the anthropometric measurement points.
2. Upon the completion of the course, the students will be able to explain the pattern making techniques and terminologies applied in them
3. Upon the completion of the course, the students will be able to apply draping and flat pattern technique to draft patterns of basic bodice, sleeve, skirt and trousers.
4. Upon the completion of the course, the students will be able to apply the principles of pattern making to manipulate the basic pattern according to the styles.
5. Upon the completion of the course, the students will be able to generate stylelines, altered and graded patterns.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	2										2	1
2	3	2											2	1
3	3	2											2	1
4	3	2	3										2	1
5	3	2	3										2	1

UNIT I   **6 Hours**
UNIT 1 ANTHROPOMETRY AND SIZE SYSTEMS
Anthropometry- Basic Measurements, Human Anatomy, Rule of Proportion-the human body: Height Weight distribution. Size Systems, Standards, Size charts.

UNIT II   **6 Hours**
UNIT 2 PATTERN MAKING
Pattern - Definition and Types- Individual and Commercial patterns. Pattern making - definition and types of pattern making- drafting, draping, flat pattern techniques. Pattern making - Tools and

functions. Pattern Details, Trueing, blending, pattern grain line, balance line terms, notches, seam allowance, jog seam, dart points, pleats, flares, gather and true bias.

UNIT III   **6 Hours**
UNIT 3 PATTERN MAKING AND DRAPING - BASIC SET
Drafting - Basic blocks for Men, Women and Kid - Bodice, Sleeve, Skirt and Trousers. Draping - Tools used, Basic blocks for Men, Women and Kid - Bodice, Sleeve, Skirt and Trousers.

UNIT IV   **6 Hours**
UNIT 4 PRINCIPLES OF PATTERN MAKING
Dart manipulation- Single dart series: slash-spread technique and pivotal transfer technique. Two dart series- slash spread and pivotal transfer technique. Graduated and radiating darts. Parallel, asymmetric and intersecting darts. Types of added fullness and Contouring Principle.

UNIT V   **6 Hours**
UNIT 5 STYLE LINES, PATTERN ALTERATION AND GRADING
Style lines: Classic princess style line and variations, Armhole princess style line and variations, Panel Style line and variations. Pattern Alteration: Defects in pattern - Causes and remedies, checking for fit, Pattern alteration for fit. Grading: Grading process, grade rules, and types of grading system.

1   **3 Hours**
 EXPERIMENT 1
Interpretation of the different types of body measurements like circumferential, vertical and horizontal measurements by taking body measurements from the human body and mannequin.

2   **4 Hours**
 EXPERIMENT 2
 Development of patterns by drafting and draping - Basic bodice and sleeve

3   **6 Hours**
 EXPERIMENT 3
 Development of patterns by drafting and draping - skirt and trousers.

4   **4 Hours**
 EXPERIMENT 4
 Single dart series: Slash spread technique and Pivotal transfer technique

5   **4 Hours**
 EXPERIMENT 5
 Double dart series: Slash spread technique and Pivotal transfer technique

6   **2 Hours**
 EXPERIMENT 6
 Drafting of style lines: Classic princess style line and variations.

7   **2 Hours**
 EXPERIMENT 7
 Drafting of style lines: Armhole princess style line and variations

8   **2 Hours**

EXPERIMENT 8

Drafting of style lines: Panel Style line and variations

9   **3 Hours**

EXPERIMENT 9

Grading of patterns - Manual method.

Total: 60 Hours

Reference(s)

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. Deepti Gupta, Norsaadah Zakaria, Anthropometry, apparel sizing and design, 1st Edition, Woodhead Publishing Ltd, 2014

18FT303 APPAREL MANUFACTURING I   **2 0 2 3**

Course Objectives
- To impart knowledge on various types of sewing machine settings and operating functions.
- To impart knowledge on the spreading and marker planning concepts along with cutting process parameters.

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c. c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
i. i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
j. j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Course Outcomes (COs)
1. Explain the basic spreading concepts and resolve the different spreading techniques with reference to fabric design types.
2. Analyze the marker planning parameters and resolve the cutting machine specifications with reference to different cutting parameters.
3. Analyze the sewing machine working components and explain the functions of them.
4. Analyze the operating mechanism of SNLS and the components coordinating the operation cycle.
5. Analyze the operating functions of flat lock machines and over lock machines.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	1	2		1				1	1			2	1
2	2	1	3		1				1	1			2	1
3	1	2	3		1				1	1			2	1
4	1	2	3		1				1	1			2	1
5	2	2	3		1				1	1			2	1

UNIT I   **5 Hours**
SPREADING CONCEPTS AND TECHNIQUES
Type of fabric packages received at garment industry, Manual spreading, Computerized spreaders, Spread relaxation, Types of spreads, NOW, NEW, NUD, Symmetrical and Asymmetrical patterns, effect on marker making.

UNIT II   **7 Hours**

MARKER PLANNING AND CUTTING MACHINES

Marker plan preparation, marker efficiency, factors affecting marker efficiency, marker duplicating methods, computer aided marker making. 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, common defects in cutting and their remedies.

UNIT III   **6 Hours**

PARTS OF SEWING MACHINE

Basic parts of a sewing machine - needle, bobbin case/bobbin hook, loppers, loop spreader, threading fingers, throat plate, tongue chaining plates, take up devices, tensioner, feed dog, presser foot, folders and

attachments. Types of needles, parts of needles and their function, needle size, sewing thread, properties

of sewing threads, ticket number, fabric sewability,

UNIT IV   **6 Hours**

OPERATING FUNCTIONS OF SNLS

Classification of sewing machines - basic SNLS machine, parts and their functions, adjustments, stand height, pedal, needle bar, presser foot, feed dog, differential feed ratio, reverse feed, stitch length selection, feed timing, needle and bobbin thread tension, stitch cycle timing diagram, Maintenance of SNLS machine, Common defects and remedies.

UNIT V   **6 Hours**

OPERATING FUNCTIONS OF FLATLOCK MACHINES AND OVERLOCK MACHINES

Over-lock and Flat-lock Sewing Machines: Loopers - eye and blind, spreader, Trimmers, Take-up devices: types, Stitch cycle timing diagram, Machine adjustments, Feeding mechanism-types and functions- drop, differential, belt, variable top and bottom feed, puller, needle feed and unison feed. Machine speed and rate of feed, stitch size regulation. Types, guides- arm, cylindrical and flat guides, folders and binders, types of presser foot & its functions.

1   **3 Hours**

EXPERIMENT 1

For the given fabric designs, plan the spreading technique to be adopted for executing the cut plan.

2   **3 Hours**

EXPERIMENT 2

Calculate the total spreading time per lay comprising of 80 plies for marker length 4m.

3   **3 Hours**

EXPERIMENT 3

Prepare a marker plan for the give cut order quantity and size breakup.

4   **3 Hours**

EXPERIMENT 4

Calculate the cutting time for lay of 7m length covering a total cutting perimeter of 560metres and 80 plies, if the CAM cutting head operates at a average speed of 2.5 meters per min. The cutting head stops for 1min every 30 minutes in between.

5   **3 Hours**

EXPERIMENT 5

Prepare illustrated examples of sewing needle positions in SNLS, Over lock machine, Flat lock machine Button sewing machine and Button hole making machine.

6   **3 Hours**

EXPERIMENT 6

Prepare a collection of sewing needles and sewing thread ticket no. Match the sewing thread count to Sewing needle size for any four types.

7   **3 Hours**

EXPERIMENT 7

Illustrate SNLS machine stitch cycle timing diagram for all stages of one complete stitch.

8   **3 Hours**

EXPERIMENT 8

Illustrate the feed dog motion cycle for one cycle of stitch formation

9   **3 Hours**

EXPERIMENT 9

Illustrate the over lock machine looper threading layout

10   **3 Hours**

EXPERIMENT 10

Illustrate the Flat lock machine looper threading layout

Total: 60 Hours

Reference(s)

1. R.Rathinamoorthy & R.Surjit, Apparel Machinery and Equipment, Woodhead Publishing India in Textiles, New Delhi, 2015

2. Marie Clayton, Ultimate Sewing Bible A Complete Reference with Step-by-Step Techniques, Collins & Brown, London, 2008.

3. Carr and Latham"s, Technology of Clothing Manufacture, 4th Edition, Om Books International, New DelhiMay 2008

4. Clair B. Shaeffer -The Complete Book of Sewing Shortcuts- Sterling Publishing Company, 1981.

5. Marry Mathew, Practical Clothing Construction Part I and II Basic Sewing Process, Cosmic Press, Chennai, 1999.

6. Claire Shaeffer,-Sewing for Apparel Industry Prentice Hall, 2000.

18FT304 FASHION SILHOUETTES   2 0 2 3

Course Objectives

- To enable Students understand and comprehend the fundamentals of visual art.
- To impart the knowledge of properties of lines, shapes, colors and compositions applied in silhouettes
- To enable the students develop fashion silhouettes in different styles.

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
f. f. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
h. h. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
l. l. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.
n. n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)

1. Interpret the aesthetics of art and determine their characteristic features.
2. Exemplify the principles of fashion silhouettes such as biomorphic forms, layered styles, wrapping styles, embellished garments, Asymmetrical silhouettes and structured garments
3. Exemplify the principles of fashion silhouettes such as draping styles, body conscious dresses, Feminine patterns, movement, pattern and texture..
4. Explain the classification system of fashion silhouettes and appraise their salient features.
5. Explain the different types of ethnic silhouettes and critique them.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2						2				2	3	2
2	3	2				2		2				2	3	2
3	3	1						2				1	3	2
4	3	1				2		2				1	2	2
5	3	1						2				2	2	2

UNIT I   **6 Hours**
FUNDAMENTALS OF VISUAL ART

Different types of Art styles-Romantism, Neo classicism, Art deco, Modern art, Abstract expressionism, Surrealism, Pop art & Post modern Art. Aesthetics of art -subject view, composition view, content view and context view. Gestalt principles of perception.

UNIT II   **6 Hours**
PRINCIPLES IN FASHION SILHOUETTES
Principles of fashion designing: embellishments, asymmetrical forms, biomorphic forms, structured garments, layering and wrapping styles.

UNIT III   **6 Hours**
FASHION PRINCIPLES
Draping styles - flagging drape lines, fluid drape lines. Body conscious dresses, feminine patterns, movement and pattern, texture and motifs. Compression silhouettes -Compacting the body, following the exact shapes of the body.

UNIT IV   **6 Hours**
CLASSIFICATION OF SILHOUETTES
Structural silhouettes - form that stands away from body and lines are created by shaping and seams. Fluid silhouettes -fabrics that flow over the body and follow the human form. Ornamentation - Creating details will enhance the form. Expansion silhouettes -exaggerating shapes formed away from the body.

UNIT V   **6 Hours**
ETHNIC SILHOUETTES
Indian ethnic silhouettes Men: Sherwani, Kurta-pyjama, Kurta-Dhoti, Angraks, Nehru collar. Women: Anarkali, Salwar kameez, Shararas, Ghararas, Lehenga Choli, Sarees. South east Asian women silhouettes : Ao Dai, Kimono, Cheongsam, Hanbok, Sarongs, Pareo, Gho, Tunic, Deel, Chut thai.

1   **4 Hours**
EXPERIMENT 1
Collars and Necklines - Develop a mao neck top and halterneck dress. Compare the differences in neckline features.

2   **4 Hours**
EXPERIMENT 2
Shoulders and sleeves - Draw a grace jones style exaggerated shoulder pads silhouette and a sleeve with ruffles.

3   **4 Hours**
EXPERIMENT 3
Waistlines - Draw a low waist line silhouette and a high waist line silhouette. Resolve the illusion created by the position of waist band in determining the proportion of torso and legs.

4   **4 Hours**
EXPERIMENT 4
Closures - Draw a eighties style leather jacket emphasizing the zipper and cargo pocket with snap buttons

5   **4 Hours**

EXPERIMENT 5

Pleats and flounces -Draw Delphos: a tea gown of minutely pleated silk inspired by the ancient Greek chiton. Resolve the difference between pleat and flounce

6   **4 Hours**

EXPERIMENT 6

Gathering and draping -Draw a surplice wrap draped silhouette and harem pant.

7   **2 Hours**

EXPERIMENT 7

Decorative applique-Draw a manish arora's silhouette laced with beads, fringes, tassels and other metals.

8   **4 Hours**

EXPERIMENT 8

Accessories -Develop a 3D sketch of hand bag and shoe. highlight its values and tones.

Total: 60 Hours

Reference(s)

1. Andrew Graham dixon and Ian Chilvers, ART: The definitive visual guide, DK publishers, 2018.
2. Laura Volintesta, language of fashion design: 26 principles every fashion designer should know, Rockport publishers, 2014.
3. Alicia Kennedy, Emily stoehrer, Jay calderin, Fashion design referenced, Rockport publishers, 2013.
4. Macarena San martin, Fashion Details: 1000 ideas from neckline to waist line, pockets to pleats, Rockport publishers, 2011
5. Celia Stall- Meadows, Fashion now: A global perspective, Prentice hall, 2010.
6. Https://www.instyle.com

18FT305 BASICS OF FIBER, YARN AND FABRIC MANUFACTURING   **3 0 0 3**

Course Objectives

- To learn and acquaint with the basics of yarn formation and fabric formation to supplement the subsequent learning of garment making and fashion portfolio development
- To learn the physical, mechanical and comfort properties of fibers.
- To learn and acquaint with the basics of yarn formation and fabric formation.

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Course Outcomes (COs)

1. Classify the physical and chemical properties of textile fibers, production techniques (Both natural &manmade fibers) and its applications.

2. Classify the different types of mechanical and comfort properties of fibers and its measuring techniques.

3. Analyze the principles of preparatory process in spinning and comprehend their production and quality parameters.

4. Analyze the principles of modern spinning systems and comprehend their production and quality parameters.

5. Explain the principles of fabric formation in looms and classify the types of fabrics produced in them.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2												1
2	3	1												
3	2	3												1
4	2	3												
5	2	2												1

UNIT I   **9 Hours**
NATURAL AND MANMADE FIBERS
Introduction to fibres: Definition of Staple fibre and Filament, Yarn, and Thread. Classification - Natural fibres, Man-made fibres. Properties - essential properties, desirable properties. Production, cultivation and chemical properties of Natural Fibers: Cotton, Silk and wool. Production sequence, physical & chemical properties of Viscose Rayon, Polyester, Nylon.Applications of natural & man - made fibers.

UNIT II   **9 Hours**
MECHANICAL AND COMFORT PROPERTIES

Degree of order, degree of orientation of molecular chains. Definitions: breaking strength, breaking extension, yield point, initial modulus, work of rupture and work factor. Stress-strain curves for various textile fibres and their significance. Definitions: humidity - Absolute humidity - Relative humidity - Moisture content, moisture regain. Factors influencing moisture regain - Conditioning of fibres. Static electricity, causes, problems and its elimination techniques

UNIT III   9 Hours
YARN MANUFACTURING
Fiber and yarn numbering system (count). Introduction about ginning, blow room, carding, combing, drawing, simplex and ring spinning system, processes, principle of operation and applications. Post spinning system, types and its applications

UNIT IV   9 Hours
MODERN SPINNING SYSTEMS
Modern spinning systems: Definition and Classification - rotor spinning, friction spinning, air jet spinning, and bobtex spinning: processes, principle of operation, spinnability, output yarn quality characteristics, application areas and production capability -Comparison of modern spinning systems and their yarn quality parameters.

UNIT V   9 Hours
FABRIC MANUFACTURING
Fabric Manufacturing: Definition - Classification of fabric forming methods: weaving, knitting, nonwovens: classification, processes, and principle of operation. Loom: Definition and Classification - Basic shuttle loom, shuttleless loom and other popular modern looms - Classification, principle of operation Rapier, Projectile, Air jet and Water jet.

Total: 45 Hours

Reference(s)
1. J.W.S. Hearle&W.E.Morton Physical Properties of Textile Fibers, Woodhead publishing, 4th Edition, ISBN 9781845694425, 2008
2. M. K. Talukdar, P. K. Sriramulu, and D. B. Ajgaonkar, Weaving: Machines, Mechanisms, Management, Mahajan Publishers Pvt. Ltd. 1998.
3. W. S. Murphy, Handbook of Weaving, Abhishek Publications, 2001.
4. Albrecht Wilhelm,Fuchs Hilmar, and Kittelmann Walter, Nonwoven Fabrics: Raw Materials, Manufacture, Applications, Characteristics, Testing Processes, 2002.
5. R. K. Dharmadhikary, T. F. Gilmore, H. A. Davis and S. K. Batra, Thermal Bonding of Nonwoven Fabrics, Textile Progress, Vol. 26, No.2, Textile Institute, 1995.

18FT306 KNITTING TECHNOLOGY   **3 0 0 3**

Course Objectives
- To understand the basics of warp and weft knit structures and its derivatives.
- To comprehend the design for various knitted fabric structures
- To understand the knitting machine parameters for producing various knitted structures

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c. c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Course Outcomes (COs)
1. Analyze the warp knitted and weft knitted fabrics by interpreting their structure
2. Distinguish between the various knitted fabrics
3. Determine the production of weft knitted fabrics by varying the fabric forming parameters.
4. Explain and outline the working principles of warp knitting machines and the pattern of fabric formation
5. Determine the production of warp knitted fabrics by varying the fabric forming parameters

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3												1
2	2	2	1											1
3	2	3												1
4	2	2												1
5	2	3	1											1

UNIT I   **9 Hours**
FUNDAMENTALS OF KNITTING
Introduction to knitting, Comparison of weaving and knitting, classification of warp and weft knitting machines, comparison of warp and weft knitted fabrics, elements of knitted loop structure. Symbolic, Graph paper and Diagrammatic representation of stitches. Knitting needles - Types, Knitting action, advantages and disadvantages

UNIT II   **9 Hours**
WEFT KNITTING MACHINE
Elements of knitting machine - Cylinder, Sinker, Cam, Needle, Creel, Feeders - positive feeder, storage positive feeder, elastane feeder, take down mechanism. Patterning mechanism. Electronic devices for needle selection. Working principle of plain, rib, interlock and purl knitting machines. Formation of knit, tuck and float stitches. Effect of loop length

UNIT III   **9 Hours**

WEFT KNITTED STRUCTURES

Production of weft knitted fabric structures -Single jersey, Rib, Purl, Interlock. Derivatives of single and double jersey structures: plaited fabrics, 2X2 rib structure, half cardigan, full cardigan, Ponte-di-Roma, Ottoman rib, Texi- pique, Pin-tuck, Milano rib, French pique, Swiss pique. Applications of weft knit fabric, Common defects in weft knit fabric

UNIT IV   **9 Hours**

WARP KNITTING MACHINE

Elements of Tricot and Raschel warp knitting machines - warp beam, guide bar, needle, needle bar, sinker, presser bar, links, and trick plate. Knitting cycle and working principles of Tricot and Raschel knitting machine. Pattern controlling mechanism - pattern wheels, pattern chains links, Electronic Jacquard

UNIT V   **9 Hours**

WARP KNITTED STRUCTURES

Representation of warp knit structures. Point Paper, Chain-Link Notation, single fabrics, Chain stitch, Tricot lap, Full tricot, Lock Knit, Reverse Lock Knit, satin, Loop raided fabrics, Queen's cord, Sharkskin, Blind lap. Applications of warp knit fabric

Total: 45 Hours

Reference(s)

1. D. B. Ajgaonkar, Knitting Technology, Universal Publication Corporation, Mumbai, 1998
2. Anbumani N, Knitting Fundamentals, Machines, Structures and Developments, New Age International Private Limited, New Delhi, 2007
3. Samuel Raz, Flat Knitting: The New Generation, MeisenbachGmbH, Bamberg, Meisenbach, 1991
4. D Spencer, Knitting Technology, 3rd Edition, A Comprehensive Handbook and Practical Guide, Apr 2001,Woodhead Publishing, ISBN :9781855733336
5. K.F. Au, Advances in Knitting Technology,Woodhead Publishing, England 2011

18FT307 FASHION ILLUSTRATION LABORATORY   **0 0 4 2**

Course Objectives
- To make the students understand the basic concepts of fashion art and learning the aspects of fashion rendering.
- To improve their skills in creating new designs and dresses.
- To develop their skills in fashion arts and creating innovative sketches
- Developing design improvisation of basics fashion rendering.

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
i. i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
j. j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.
n. n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)
1. Illustrate the different body sections of human anatomy and plan different postures
2. Plan the fabric and colour application for developed fashion figures
3. Generate sketches in exclusive methods suitable for distinct presentations

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1		2	2			1				2	2			-	2
2		1	2			3				2	2			-	2
3		2	2			1				2	2			-	3

1   **6 Hours**
EXPERIMENT 1
Illustration of stick figures, block figures and fleshing on block figures

2   **6 Hours**
EXPERIMENT 2
Figure analysis - Sketching of fashion figures in 8 and a half , 10 and 12 head proportions

3   **6 Hours**

 EXPERIMENT 3
 Face analysis Sketching of facial shapes

4   **6 Hours**

 EXPERIMENT 4
 Illustration of varied postures front, back, side and three fourth profiles

5   **6 Hours**

 EXPERIMENT 5
 Colour rendering techniques mixed media application

6   **6 Hours**

 EXPERIMENT 6
 Fabric rendering techniques wovens and knits

7   **6 Hours**

 EXPERIMENT 7
 Fabric rendering techniques drape lines, pleats, gathers, surface ornamentation

8   **6 Hours**

 EXPERIMENT 8
 Illustration of croquis female

9   **6 Hours**

 EXPERIMENT 9
 Illustration of croquis male

10   **6 Hours**

 EXPERIMENT 10
 Illustration of croquis children

                                                                                    Total: 60 Hours

18FT308 TEXTILE DESIGN CAD LABORATORY   0 0 4 2

Course Objectives

- To train the students on developing basic fabric weaves and simulate their appearance
- To impart the knowledge of developing print designs appropriate for a concept
- To equip them in developing concept boards, logo designs and brochure designs.

Programme Outcomes (POs)

a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

i. i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

k. k. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to oneÃ¢??s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

n. n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)

1. Design fabric weaves and renders them based on fashion trends.
2. Design different types of print designs for a concept.
3. Plan and prepare concept boards, logo designs and brochure designs for fashion communication.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2			3				2	2	-		3	-
2	2	2			3				2	2			3	-
3	2	2			3				2	2			3	

1   **6 Hours**

EXPERIMENT 1

Development of Plain and twill weave patterns with two colorways.

2   **6 Hours**

 EXPERIMENT 2
Development of dobby blanket design with a colorway.

3   **6 Hours**

 EXPERIMENT 3
Development of an elaborate jacquard design with an extra warp and weft design for a stole.

4   **6 Hours**

 EXPERIMENT 4
Development of half drop all over print pattern of geometric motifs.

5   **6 Hours**

EXPERIMENT 5
Development of directional print of floral motifs.

6   **6 Hours**

 EXPERIMENT 6
Development of t-shirt chest print design for a digital printing.

7   **6 Hours**

 EXPERIMENT 7
Development of a typographical print design for a tote bag.

8   **6 Hours**

 EXPERIMENT 8
Design a conceptual board based on a theme using a collage of images.

9   **6 Hours**

 EXPERIMENT 9
Modify an existing logo of a brand.

10   **6 Hours**

 EXPERIMENT 10
Develop a brochure design for a company featuring it's product details and logo.

                                                      Total: 60 Hours

 Reference(s)

1. . Fashion and Textile Design with Photoshop and Illustrator, Professional Creative Practice, Robert Hume, publication 2016, Fairchild books.
2. CAD for Fashion Design and Merchandising, Stacy Stewart Smith, publication 2014, Fairchild Books.
3. Learn Adobe Illustrator CC for Graphic Design and Illustration, Dena Wilson and Peter Lourekas with Rob Schwartz, Publication 2016.

18GE301 SOFT SKILLS - VERBAL ABILITY   0 0 2 0

Course Objectives
- To help students gain adequate proficiency in vocabulary
- To help students become proficient in basic writing skills related to workplace communication
- To read and understand unabridged text

Programme Outcomes (POs)
a. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

e. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

Course Outcomes (COs)

1. Take up verbal ability part of the placement tests with confidence
2. Write with confidence in professional and workplace communication
3. Distinguish fact from opinion by reading passages from a text

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1													
2	1				1									
3	1													

UNIT I   15 Hours
INTRODUCTION
Synonyms - Antonyms - Word Groups - Verbal Analogies - Etymology - Critical Reasoning - Cloze Test - One Word Substitution - Idioms and Phrases - Text & Paragraph Completion.

UNIT II   15 Hours
BASICS OF VERBAL APTITUDE
Sentence Formation - Paragraph Formation - Change of Voice - Change of Speech - Reading Comprehension - Sentence Equivalence - Jumbled Sentences - Spotting Errors -Homophones Homonyms - Commonly Mispronounced/Misspelt Words.

Total: 30 Hours

Reference(s)
1. Murphy, Raymond. English Grammar in Use A Self-Study Reference and Practice Book for Intermediate Learners of English. IV Edition. United Kingdom: Cambridge University Press. 2012.
2. Lewis, Norman. Word Power Made Easy. New York: Pocket Books. 1991.
3. Baron''s The Official Guide for New GMAT Review, New Jersey: John Wiley & Sons, Inc. 2015.

18FT401 APPLIED MATHS   **2 1 0 3**

Course Objectives
- Understand the basic concepts of probability and the distributions with characteristics and also two dimensional random variables
- Apply different statistical inference techniques in testing of hypothesis in a real time fashion industry.
- Analyse the design in identifying the suitable product by comparing the characteristics of the material in industries.

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Course Outcomes (COs)
1. Demonstrate the basic probability axioms and concepts, Probability distributions of the random variables in designing process.
2. Identify the relationship and properties of two dimensional random variables using Correlation techniques in textile manufacturing.
3. Implement basic statistical inference techniques, including confidence intervals and hypothesis testing to science/engineering problems.
4. Design an experiment for an appropriate situation using ANOVA technique.
5. Compare statistical data in quality control by various control chart techniques.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	-	-												
2	-	-												
3	-	-												
4	-	-												
5	-	-												

UNIT I   **9 Hours**
PROBABILITY THEORY
Axioms of probability - Conditional probability - Bayes theorem - Random variable: Probability mass function - Probability density function: Moment Generating function-Binomial, Poisson and Normal distributions.

UNIT II   **9 Hours**
TWO DIMENSIONAL RANDOM VARIABLES

Joint distributions - Marginal and Conditional distributions -Covariance - Correlation and Regression analysis in Textile Manufacturing.

UNIT III   **9 Hours**

TESTING OF HYPOTHESIS

Sampling distributions - Estimation of parameters -Statistical hypothesis - Large sample test based on Normal distribution for single mean and difference of means -Small sample tests: t-test for mean-F-test - Chi-square test for Goodness of fit and Independence of attributes.

UNIT IV   **9 Hours**

DESIGN OF EXPERIMENTS

One way and Two way classifications -Completely randomized design- Randomized block design - Latin square design.

UNIT V   **9 Hours**

STATISTICAL QUALITY CONTROL

Control charts for measurements (X and R charts) -Control charts for attributes (p, c and np charts)- Tolerance limits- Acceptance sampling.

Total: 60 Hours

Reference(s)

1. Milton J. S. and Arnold Jesse C., Introduction to Probability and Statistics: Principles and Applications for Engineering and The Computing Sciences, McGraw Hill Inc, 3rd Edition, 1995.

2. S.C. Gupta, Fundamentals of Statistics, 7th Edition, Himalaya Publishing House Pvt. Ltd. 2018.

3. Johnson Richard A. and Bhaltacharyya Gouri K., Statistics, Principles and Methods, 3rd Edition, John Wiley, 1996.

4. Milton J. S. and Arnold Jesse C., Introduction to Probability and Statistics: Principles and Applications for Engineering and The Computing Sciences, McGraw Hill Inc, 3rd Edition, 1995.

5. Kreyszig Erwin, Advanced Engineering Mathematics, 7th Edition, John Wiley, 1993.

18FT402 BASICS OF CHEMICAL PROCESSING   3 0 2 4

Course Objectives

- Apply fundamental knowledge on chemical processing of textiles.
- Learn and apply the method of application of pre-treatments / dyes / prints /finishing/ process.
- Demonstrate knowledge of the machinery used for pre-treatment / dyeing/printing/finishing/ process

Programme Outcomes (POs)

a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

d. d. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

i. i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Course Outcomes (COs)

1. Explain the preparatory process and produce desized, scoured, bleached and mercerized fabric
2. Analyze the various dyeing machines and produce dyed fabrics with different dyes
3. Differentiate styles of printing, methods of printing and create printed fabrics
4. Evaluate suitable mechanical and chemical finishing techniques for fabric
5. Analyze the color matching using spectrophotometer for measuring the quality of dyed material

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3	2						2	2			2	1
2	2	3	2		1				2	2			2	1
3	2	3	2						2	2			2	1
4	2	2	2	2	1								2	1
5	2	2	2	2	1								2	1

UNIT I   **9 Hours**
PREPARATORY PROCESSES

Introduction - Process sequence of wet processing for woven and knits. Singeing: plate singeing, roller singeing and gas singeing. Desizing hydrolytic, oxidative and enzymatic. Scouring alkaline and enzymatic. Bleaching - hypochlorite, peroxide and sodium chlorite bleaching. Optical whitening. Mercerizing: Hot and Cold mercerization, tension, tensionless and tubular mercerization.

UNIT II   **9 Hours**
 DYEING

Dyeing equipment - jigger, winch, soft flow, jet dyeing, J-box, padding mangles, package dyeing and garment dyeing machine. Classification of dyes. Dyeing of cotton using natural, direct, reactive, vat and sulphur dyes. Dyeing of polyester using carrier, HTHP and thermo sol. Dyeing of cellulosic blends (one bath and two bath process). Kinetics and thermodynamics of textile dye absorption.

UNIT III   **9 Hours**
 PRINTING

Ingredients of print paste and their role in printing. Viscosity of print paste, Rheology properties and flow of print paste, Styles of printing - direct, discharge, resist, tie and dye and batik. Methods of printing - block, stencil, roller, rotary, flat bed, transfer and chest printing. Special prints -flock, foam, foil, glitter, khadi, leather, pearl and rubber. After treatments of printed goods. Troubleshooting in textile printing

UNIT IV   **9 Hours**
 FINISHING

Mechanical finishing -raising, shearing, sueding, anti shrink finish, compacting, decatizing, calendaring, embossing. Chemical finishing - softening, crease resist, biopolishing, flame retardant, water repellent, water proof, soil release, antimicrobial, UV protection finish. Denim washing - stone washing, acid washing, enzymatic washing and sand blasting.

UNIT V   **9 Hours**
COMPUTER COLOR MATCHING CONCEPTS

Color; Electromagnetic spectrum - visible range, measurement of color strength - color matching - theory and applications. Spectrophotometer and color matching systems. Quality control using computerised color matching systems, color difference - pass / fail system and computerised shade sorting.

1   **3 Hours**
 EXPERIMENT 1

Hydrolytic desizing and scouring of grey cotton fabric and assessment of the desized and scoured fabric

2   **3 Hours**
 EXPERIMENT 2

Comparison of whiteness index and tenacity of peroxide and sodium hypochlorite bleached samples

3   **3 Hours**
 EXPERIMENT 3

Assessment of rubbing and perspiration fastness of cotton fabrics

4   **3 Hours**
 EXPERIMENT 4

Comparison of different ISO wash fastness tests on fabrics dyed with direct dyes

5   **3 Hours**
 EXPERIMENT 5
 Dyeing of cotton using direct / vat / reactive dyes

6   **3 Hours**
 EXPERIMENT 6
 Dyeing of polyester, nylon, polyester/ cotton and polyester / viscose

7   **3 Hours**
 EXPERIMENT 7
 Dyeing of silk yarn / fabric with acid dyes

8   **3 Hours**
 EXPERIMENT 8
 Printing of cotton fabric using direct or discharge styles.

9   **3 Hours**
 EXPERIMENT 9
 Printing of cotton fabric using resist style.

10   **3 Hours**
 EXPERIMENT 10
 Bio polishing finish on denim fabric. Crease resistant finishing of cotton fabrics and measurement of dry and wet CRA

                                                                      Total: 75 Hours

Text Book(s)
1. D. Gopalakrishnan, Basics of Chemical Processing, Daya Publishing House, New Delhi, 2016
Reference(s)

1. E. R. Trotman, Dyeing and Chemical Technology of Textile Fibres, Charles Griffin and Co. Ltd., London. 1990.
2. V. A. Shenai, Technology of Bleaching and Mercerzing - Vol. III, Sevak Publications, Mumbai 1991
3. V. A. Shenai, Technology of Dyeing - Vol. VI, Sevak Publications, Mumbai, 2000
4. V. A. Shenai, Technology of Printing - Vol. IV, Sevak Publications, Mumbai 1996
5. http://nptel.ac.in/courses/116102016/

18FT403 APPAREL MANUFACTURING II   **2 0 2 3**

Course Objectives

- To impart knowledge on constructing the different types components like collars, sleeve, pocket, plackets used in garments.
- To impart the knowledge about different types of fabrics and it relation to garment cutting and sewing process.
- To Impart knowledge about different categories of garments and fasteners used in apparel industry.

Programme Outcomes (POs)

a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c. c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
i. i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
j. j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Course Outcomes (COs)

1. Analyze the techniques involved in constructing the collar in different garments.
2. Analyze the techniques involved in constructing the sleeves of different garments and assembly of woven shirts and trousers.
3. Predict the seams suitable for knitted garments and resolve the factors affecting their seam performance.
4. Analyze the garment sewing defects and the possible remedies for improving seam quality.
5. Outline the preventive maintenance requirements of industrial sewing machines.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	1	2		1				1	1			2	1
2	1	2	3		2				2	1			2	1
3	2	1	3		-				1	1			2	1
4	2	1	3		-				1	1			2	1
5	3	1	3		-				1	1			2	1

UNIT I   **6 Hours**
SEAMS IN COLLAR NAD YOKE CONSTRUCTION

Formal shirt collar construction steps, seams and stitches used, Difference in stitching collar with folder and without folder. Yoke construction steps, Seams and stitches used. Folders used in yoke construction. Issues in collar construction.

UNIT II   **6 Hours**
SEAMS IN SLEEVE AND BODY CONSTRUCTION
Seams used in sleeve construction and construction steps of the same with folders and without folders. Factors to be considered while sewing sleeves. Seams used in garment assembly of shirts and trousers. Factors affecting sewing performance of woven shirts and trousers.

UNIT III   **6 Hours**
SEAMS FOR KNITTED GARMENTS
Superimposed seams, bound seams, flat seams, decorative seams and lap seams in knitted garments. Stitch classes used in knitting, Seam strength test and factors affecting seam strength in knitted garments. Seam slippage and factors affecting seam slippage in knits.

UNIT IV   **6 Hours**
SEAM DEFECTS AND REMEDIES
Factors affecting sewability. Sewing defects in garments. Seam types and stitch density for children's apparel and Adult apparels. Acceptable seam puckering standards.

UNIT V   **6 Hours**
TROUBLE SHOOTING SEWING MACHINE
Sewing machine remedies -avoiding breaking of needles, looped stitches, skipped stitches, upper thread breaking, lower thread breaking, puckered seams. Preventive maintenance for industrial sewing machine - General cleaning requirements, Lubrication, Periodical service.

1   **5 Hours**
EXPERIMENT 1
Prepare samples for Collars-peter pan, turtle neck, Chinese, shawl, shirt

2   **5 Hours**
EXPERIMENT 2
Develop samples for Sleeves - set in sleeve (Plain, Puff, Kimono

3   **4 Hours**
EXPERIMENT 3
Construct samples of Pockets-patch pocket, bound pocket and front hip pocket

4   **4 Hours**
EXPERIMENT 4
Design samples for Pockets-Patch pockets, Patch pockets with flap, Seam pockets

5   **4 Hours**
EXPERIMENT 5
Design samples of plackets Continuous bound placket,2-piece placket, tailors placket, fly opening

6   **4 Hours**

EXPERIMENT 6

Applying fullness in various parts of the children's wear.

7   **4 Hours**

EXPERIMENT 7

Application of seams in appropriate places based on garment types

Total: 60 Hours

Reference(s)

1. B. Claire and Shaeffer, Sewing for Apparel Industry, Pearson"s Prentice Hall, New Jersey, 2000.

2. B. Claire Shaeffer& Glee Barre, High Fashion Sewing Secrets from the World"s Best Designers: A Step- By-Step Guide to Sewing Stylish Seams, Buttonholes, Pockets, Collars, Hems, And More, Rodale Books Publisher, New York, 2001.

3. Marry Mathew, Practical Clothing Construction Part I, Basic Sewing Process, Cosmic Press, Chennai,1999.

4. Cooklin Gerry, Garment Technology for Fashion Designers, Blackwell Science Publisher, USA, 1997.

5. Leila Aitken, Step by Step Dress MakingCourse, Sterling Publishing Co. Inc. NewYork,1994.

6. www.fashiondex.com/Bubonia_Sample_1.pdf

18FT404 WOVEN FABRIC STRUCTURE   **2 0 2 3**

Course Objectives
- To understand the various types of woven fabric structures
- To comprehend the design, draft and peg plan for various woven fabric structures
- To determine the suitability of loom requirements to produce fabrics with different structures

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c. c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
d. d. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
f. f. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.
n. n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)
1. Explain the elements of woven fabric structure and analyze their construction parameters
2. Classify the special rib and cord woven structures and analyze their construction parameters.
3. Identify the suitable looms to produce the various types of woven fabric structures
4. Analyze the formation techniques of pile fabric structures
5. Analyze the formation techniques of pile fabric structures and double cloth

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2			2									1	
2	2					2							1	2
3	2			2									2	
4	2	2	2										2	
5	2												2	

UNIT I   **6 Hours**
ELEMENTS OF WOVEN DESIGN AND ELEMENTARY WEAVES

Construction of elementary weaves- plain: warp rib, weft rib, mat, hopsack. Twills: modification of twills, Herring bone twill, broken twill, elongated twill, rearranged twills, diamond weaves. Satin - sateen and their derivatives.

UNIT II   **6 Hours**
SPECIAL RIB AND CORD STRUCTURES
Ordinary and Brighton honey comb, Crepe weaves, Huck-a-back. Cork-Screw weaves, Bedford cords: plain faced, twill faced, Wadded, crepe-on. Welts & piques: wadded piques, Loose and fast back welts and piques. Mock-leno

UNIT III   **6 Hours**
COLOUR AND WEAVE EFFECTS
Color theory: light and pigment theory, modification of color, color combination, application of colors, color and weave effects. Spot figuring: arrangement of figuring for dobby and jacquard, Extra warp and extra weft figuring.

UNIT IV   **6 Hours**
BACKED FABRIC PILE AND DOUBLE CLOTHS
Backed fabrics: Warp and weft back, reversible and non-reversible. Warp pile, fast wire pile, terry weaves, terry stripe and terry check. Weft pile: plain back, twill back velveteen, Lashed pile, corduroy, Weft plush.

UNIT V   **6 Hours**
STITCHED DOUBLE CLOTHS
Double cloth: 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

FOR FURTHER READING
Effect of different weaves on fabric properties, Braiding, Extra warp and extra weft figuring with multi colour, Effect of Length, density and fatness on pile, 3D Fabrics, other types of double cloth.

1   **3 Hours**
EXPERIMENT 1
Analysis of Plain, Twill weave and Satin weaves

2   **3 Hours**
EXPERIMENT 2
Analysis of Huck-a-back and Honey Comb weaves

3   **3 Hours**
EXPERIMENT 3
Design, Draft and Peg plan of Mock Leno, Bedford cords

4   **3 Hours**
EXPERIMENT 4
Analysis of Extra Warp and Extra Weft Figuring

5   **3 Hours**
EXPERIMENT 5

Design, Draft and Peg plan of Double cloth, Pile Fabric

6   **3 Hours**

EXPERIMENT 6

Evaluation of Color and Weave Effects

7   **3 Hours**

EXPERIMENT 7

Design the set of parameters of a woven fabric for the given specific end-use

8   **3 Hours**

EXPERIMENT 8

Analyze the knitted fabric and state the end-uses

9   **3 Hours**

EXPERIMENT 9

Sourcing and analysis of the given woven fabrics

10   **3 Hours**

EXPERIMENT 10

Sourcing and analysis of the given woven fabrics.

Total: 60 Hours

Reference(s)

1. Grosicki Z. J., Â??WatsonÂ??s Textile Design and ColourÂ??, Vol.1, Woodhead Publications, Cambridge England, 2004

2. Z. Grosicki, Watson"s Textile Design and Colour, Universal Publishing Corporation, Mumbai, 1998

3. E G Gilligan,Woollen and Worsted Woven Fabric Design,,Woodhead publication,UK,2004

4. Seyam A. M., Â??Structural Design of Woven Fabrics, Theory and PracticeÂ??, Textile Institute, Manchester, 2002

5. W. S. Murphy, Textile weaving & Design, Abhishek Publications, 2000

6. nptel.ac.in/courses/116102005/26

18FT405 PATTERN MAKING II   **3 0 2 4**

Course Objectives

- Acquire knowledge on developing pattern style variants for body components.
- Develop patterns for commercial categories.
- Develop patterns for functional wear.

Programme Outcomes (POs)

a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

i. i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

n. n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)

1. Upon the completion of the course , the students will be able to resolve the methods for drafting sleeve variants and collar variants

2. Upon the completion of the course, the students will be able to explain the procedure for drafting patterns for top wear garments and predict the fine changes that needs to be incorporated in real production patterns.

3. Upon the completion of the course, the students will be able to explain the procedure for drafting patterns for bottom wear and one piece garments and predict the fine changes that need to be incorporated in real production patterns.

4. Upon the completion of the course, the students will be able to exemplify the factors affecting knit wear patterns and intimate apparels and resolve the methods of making them.

5. Upon the completion of the course, the students will be able to determine the pattern making adjustments and changes required for manufacturing functional wear.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	3		2				2	2			2	2
2	3	2	3						2	2			2	2

3	3	2	3		-			2	2			2	2
4	3	2	3					2	2			2	2
5	3	2	3		2			2	2			2	2

UNIT I   **9 Hours**

UNIT 1 DRAFTING OF BODY COMPONENTS
Drafting of body components using slash and spread or pivotal transfer methods: Procedure
Sleeve: Set in sleeve- puff, bell, bishop, circular, leg-o-mutton, Juliet, petal, marmaluke, butterfly,
cold shouldered sleeve. Raglan sleeves. Sleeve combined with bodice - kimono, dolman,
Magyar/batwing.
Collars: Flat collar, Shirt collar, Peter pan collar, Sailor collar, Shawl collar.

UNIT II   **9 Hours**

UNIT 2 PATTERN MAKING -TOP WEAR
Top wear: Drafting & draping -Procedure for Formal shirt, Polo shirt, Single and Double breasted
blazer, Kameez, Blouse, Ladies jacket.

UNIT III   **9 Hours**

UNIT 3 PATTERN MAKING - ONE PIECE WEAR
One piece wear: Drafting & draping -Procedure for Jump suit, Romper and Dresses.
Bottom wear: Drafting & draping Ã¢?? Procedure for Denim trousers, Cargo shorts, Salwar, pants,
knickers.

UNIT IV   **9 Hours**

UNIT 4 PATTERN MAKING -KNITS
Knit wear: Factors to be considered to draft knit wear.
Intimate Apparel: Drafting & draping - Procedure for Vests, Brazier, Camisoles, Briefs, Boxers -
briefs and shorts, Panty.

UNIT V   **9 Hours**

UNIT 5 PATTERN MAKING - FUNCTIONAL WEAR
Functional wear: Drafting & draping -Procedure for Sports/Active wear - Swim suit, Track suit.
Chemical protective clothing - Lab coat. Medical functional clothing - Surgical gown, aprons. Cold
weather protective clothing -Down jackets. Clothing for special needs.

1   **6 Hours**

EXPERIMENT 1
Drafting of patterns for different styles of sleeves and collars

2   **7 Hours**

EXPERIMENT 2
Drafting of patterns for Top wear:
1. Formal shirt and
2. Single breasted blazer

3   **5 Hours**

EXPERIMENT 3

Drafting of patterns for Bottom wear:
1. Denim trousers and
2. Knickers

4   **6 Hours**
EXPERIMENT 4
Drafting of patterns for Bottom wear:
1. Vests and Briefs
2. Brazier

5   **6 Hours**
EXPERIMENT 5
Drafting of patterns for Functional wear:
1. Sports/Active wear - Swim suit.

Total: 75 Hours

Reference(s)

1. Helen Joseph Armstrong, Ã¢??Pattern Making for Fashion Design- Pearson Education (Singapore)Pvt. Ltd.,2005

2. Winifred Aldrich, Ã¢??Metric Pattern Cutting- Blackwell Science Ltd., 1994

3. Amaden-Crawford Connie, Ã¢??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 Ã¢??More Dress Pattern Designing- Blackwell Scientific Publications, 1986.

18FT406 FASHION DESIGN CAD   **2 0 2 3**

Course Objectives
- To train the students on developing flat sketches of different apparels
- To impart the knowledge of developing Tech packs of industrial standards.
- To equip them to present their designs in rendered illustrations developed by using software.

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
i. i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
j. j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.
n. n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)
1. 1. Explain functions and tools of adobe illustrator
2. 2. Develop silhouettes for different categories in digital platform
3. 3. Develop story boards for different apparel categories of industrial standards.
4. 4. Develop and render trim boards for different types.
5. 5. Develop technical flat sketches of different apparel categories as per the industrial standards.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	2			2				2	2			3	2
2	1	2			2				2	2			3	2
3	1	2			2				2	2			3	2
4	1	2			2				2	2			3	2
5	1	2			2				2	2			3	2

UNIT I   **6 Hours**
FUNDAMENTAL TOOLS IN ILLUSTRATOR

Image formats. Tools. Create a new file. Create new layers. Prepare a file for export to jpeg format. Preparation of technical drawing. Pattern creation. Offset pattern repeats. Prepare pattern brushes. Masking. Creating new brush strokes.

UNIT II   **6 Hours**

SILHOUETTES IN DIGITAL PLATFORM
SILHOUETTES IN DIGITAL PLATFORM

UNIT III   **6 Hours**

STORY BOARDS
Croquis development, Adding effects to an illustration, working with text, Downloading fonts and clip art. Edit a photograph. hand drawing. Color filling the garments. Changing the color of scanned fabric. Gradient editor.

UNIT IV   **6 Hours**

PREPARATION OF TRIM BOARDS
Zipper development. Changing zipper color and size. brand label development. Size label development. embroidery pattern development. Develop button designs in different sizes.

UNIT V   **6 Hours**

TECHNICAL FLAT SKETCHES
Formal shirts, trousers, jackets, Trench coats, Jump suits, Polo shirts, Swimsuits, Blazers.

1   **3 Hours**

EXPERIMENT 1
Develop a flat sketch of Men's full hand formal shirt with monochromatic soft floral prints.

2   **3 Hours**

EXPERIMENT 2
Develop a flat sketch of women's pleated skirt.

3   **3 Hours**

EXPERIMENT 3
Develop a flat sketch of Sequined Women's peasant blouse.

4   **3 Hours**

EXPERIMENT 4
Develop a flat sketch of Men's cargo pants.

5   **3 Hours**

EXPERIMENT 5
Develop a tech pack for a Boys T-shirt with a chest print.

6   **3 Hours**

EXPERIMENT 6
Develop a Tech pack for women's embroidered Kurti.

7   **3 Hours**

EXPERIMENT 7

Develop a Tech pack for All Over Printed Men's Joggers.

8   **3 Hours**

EXPERIMENT 8

Develop a Full Fashion Illustration of Women's denim trousers on a croquie that is in trend and render it.

9   **3 Hours**

EXPERIMENT 9

Develop a Full Fashion Illustration of kid's casual wear on a croquie and render it.

10   **3 Hours**

EXPERIMENT 10

Develop a Full Fashion Illustration of a Men's croquie in formal wear and render it.

Total: 60 Hours

Reference(s)

1. Robert Hume. Fashion and Textile Design with Photoshop and Illustrator, Professional Creative Practice. Fairchild books, 2016.
2. Stacy Stewart Smith. CAD for Fashion Design and Merchandising, Fairchild Books, 2014.
3. Dena Wilson and Peter Lourekas with Rob Schwartz Learn Adobe Illustrator CC for Graphic Design and Illustration. 2016
4. Marianne Centner and Frances Verekar. Fashion designer's handbook for Adobe Illustrator. 2nd edition. A. John Wiley and Sons. 2011.
5. Kathleen Colussy and Steve Greenberg. Rendering fashion, fabric and prints. Pearson education. 2005.
6. Marianne Centner and Frances Verekar. Fashion designer's handbook for Adobe Illustrator. 2nd edition. A. John Wiley and Sons. 2011.

18FT407 GARMENT CONSTRUCTION I   0 0 4 2

Course Objectives
- To demonstrate conceptualizing skills in developing seam specifications.
- To demonstrate fundamental concepts of preparing sample seams.
- To demonstrate skills for making body components of garments.

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
i. i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
j. j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

Course Outcomes (COs)
1. Upon the completion of the course, the students will be able to organize the seam specification parameters for preparing samples.
2. Upon the completion of the course, the students will be able to construct samples making use of garmenting techniques.
3. Upon the completion of the course, the students will be able to predict the technical problems faced in seam sample preparation

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3				2				2	2			2	
2	3				2				2	2			2	
3	3				2				2	2			2	

1   **6 Hours**
EXPERIMENT 1
Preparing samples for basic Hand stitches, Seams and Seam finishes with seam diagram and specification (cross section)

2   **6 Hours**
EXPERIMENT 2
Preparing samples for basic garmenting techniques: Fullness -Darts, Tucks, Pleats and Gathers

3   **6 Hours**
EXPERIMENT 3

Preparation of samples for Sleeves: Set in sleeve and cold shoulder sleeve.

4   **6 Hours**

EXPERIMENT 4

Preparation of samples for Collars: Shirt collar and Nehru collar.

5   **6 Hours**

EXPERIMENT 5

Preparation of samples for
Neckline finishes: Bias facing, Bias binding, fitted facing and French binding.

6   **6 Hours**

EXPERIMENT 6

Application of suitable neckline finishes and collars in men's wear with seam specification and seam diagram.

7   **6 Hours**

EXPERIMENT 7

Preparation of samples for Shawl collar with facing

8   **6 Hours**

EXPERIMENT 8

Preparation of yoke for men's wear formal shirt with seam diagram and specification.

9   **6 Hours**

EXPERIMENT 9

Construction of (Formal shirt) front placket and full sleeve placket.

10   **6 Hours**

EXPERIMENT 10

Construction of Blazer notch collar with specification

Total: 60 Hours

Reference(s)

1. Natalie chanin, The Geometry of Hand-Sewing: A Romance in Stitches and Embroidery from Alabama Chanin and The School of Making (Alabama Studio), Abrams, 2017

2. Carol marine, Daily painting: Paint small and often to become a more creative, productive and successful artist, Watson-Guptill publications, 2014.

3. Alison Ellen, Hand knitting: new directions, 2nd edition, D&N publishing, 2011.

4. https://www.makersrow.com

18FT408 TESTING AND QUALITY CONTROL LABORATORY

0 0 4 2

Course Objectives

- To understand working principles/ procedures of various textile testing instruments
- To test the fibre, yarn, fabric and accessories

Programme Outcomes (POs)

a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

d. d. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

e. e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

h. h. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

j. j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

n. n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)

1. Identify the textile fibers by using fiber identification tests
2. Assess the essential & desirable properties of fibers, yarn & fabric
3. Analyze the properties of both woven & knitted fabrics
4. Analyze the performance related properties of apparels and accessories

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3	2	3	2			2		-			1	1
2	2	3	2	2	1			2		-			2	1
3	3	3	2	2	1			2		-			1	
4	3	3	2	2				2		-				

1   **6 Hours**

EXPERIMENT 1
Fibre identification tests by microscopic, burning and chemical tests

2   **6 Hours**
EXPERIMENT 2
Analysis of Cotton fibre length (Baer Sorter)

3   **6 Hours**
EXPERIMENT 3
Measurement of Fibre fineness (air-flow)

4   **6 Hours**
EXPERIMENT 4
Measurement of single yarn twist

5   **6 Hours**
EXPERIMENT 5
Measurement of yarn strength: Lea strength

6   **6 Hours**
EXPERIMENT 6
Testing of fabric thickness, stiffness and crease recovery

7   **6 Hours**
EXPERIMENT 7
Testing of fabric tensile strength, tearing strength and bursting strength

8   **6 Hours**
EXPERIMENT 8
Measurement of Shrinkage in Knitted Fabric

9   **6 Hours**
EXPERIMENT 9
Analysis of fabric abrasion resistance and fabric pilling of various GSM

10   **6 Hours**
EXPERIMENT 10
Measurement of seam strength and button strength

                                                                           Total: 60 Hours

18HS001 ENVIRONMENTAL SCIENCE   **2 0 0 0**

Course Objectives
- Understand the interdisciplinary and holistic nature of the environment
- Identify the significance of natural resources and environment on the quality of life and stimulate the quest for sustainable development
- Assess the socio-economic, political and ethical issues in environmental science

Programme Outcomes (POs)
a. a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
g. g. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Course Outcomes (COs)
1. Explain the importance of interdisciplinary nature of environment studies, uses and exploitation of natural resources
2. Analyze the different types of ecosystems and biodiversity, its values and also role of professionals in protecting the environment from degradation
3. Identify the existing environmental challenges related to pollution and its management
4. Select suitable strategies for sustainable management of components of environmental science
5. Correlate the impacts of population and human activities on environment

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	2												
2	1	1												
3	2	2					1							
4	1													
5	2													

UNIT I   **6 Hours**
NATURAL RESOURCES
Forest resources: Use - over exploitation - deforestation - case studies. Water resources: Use - over utilization of surface and ground water - conflicts over water. Mineral resources: Use - exploitation - environmental effects of extracting and using mineral resources - case studies. Food resources: Effects of modern agriculture - fertilizer-pesticide problems (eutrophication, blue baby syndrome, biomagnification). Energy resources: renewable (solar, wind, and hydro).

UNIT II   **6 Hours**
ECOSYSTEMS AND BIODIVERSITY

Concept of an ecosystem: Structure and function of an ecosystem - producers - consumers - decomposers - food chains - food webs and ecological pyramids - Types of ecosystem: Introduction - characteristic features: desert ecosystem. Biodiversity - value of biodiversity - threats to biodiversity - endangered and endemic species - Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

UNIT III   **6 Hours**
ENVIRONMENTAL POLLUTION
Pollution: Definition - causes - effects - control measures of air pollution - water pollution : (Sewage water treatment by activated sludge and trickling filter process) - noise pollution- thermal pollution. Disaster management: causes - effects - control measures of floods Ã¢?? earthquake

UNIT IV   **7 Hours**
SOCIAL ISSUES AND ENVIRONMENT
Sustainable development : Definition - Unsustainable to sustainable development - solid waste management - causes - effects - 5R Principles (landfills, incineration, composting). Water conservation - rain water harvesting - watershed management. Climate change - global warming - acid rain - ozone layer depletion. E-waste.

UNIT V   **5 Hours**
HUMAN POPULATION AND ENVIRONMENT
Human population: Population growth - characteristics - variation among nations - population explosion - value education - HIV / AIDS. Role of information technology in environment and human health - occupational safety and health administration (OSHA)

FOR FURTHER READING
Human rights:Biomedical waste -Identification of adulterants in food materials

Total: 30 Hours

Reference(s)
1. Anubha Kaushik, C.P. Kaushik, Environmental Science and Engineering , 4th Multi Colour Edtion, New Age International Publishers, New Delhi, 2014
2. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons
3. T. G. Jr. Miller, S. Spoolman, New Environmental Science, 14th Edition, Wadsworth Publishing Co, New Delhi, 2014
4. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press
5. A. K. De, Environmental Chemistry, 7th Edition , New age international publishers, New Delhi, 2014

18GE401 SOFT SKILLS-REASONING   0 0 2 0

Course Objectives
- To acquire command of both the receptive skills (Listening, Reading) and the productive skills (Writing and Speaking) of English language
- To understand and make effective use of English language in business contexts

Programme Outcomes (POs)
a. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

e. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

Course Outcomes (COs)
1. Listen, Read, Speak, and Write Business English at the level of independent users
2. Appear for the Business English Certificate (BEC) Vantage level examination conducted by the Cambridge Assessment English

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1													
2	1				1									

UNIT I   **15 Hours**
LISTENING AND READING
Listening for writing short answers - filling gaps in sentences - identifying topic, context and function - identify different functions of language in business situations - identify prompts -identify paraphrases   of   required   information
Scanning - reading for gist - understanding sentence structure - error identification - identify paraphrases - cohesive words and phrases - understand the importance of analysing the distractors - identify grammatical and semantic relationships

UNIT II   **15 Hours**
WRITING AND SPEAKING
Business emails - notes - memos to colleagues or friends - giving instructions - explaining a development - asking for comments - requesting information - agreeing to requests - explaining - apologising - reassuring - complaining - describing - summarising - recommending - persuading turn - taking - sustaining interaction - initiating - responding - giving personal information - talking about present circumstances, past experiences and future plans - expressing opinion - speculating - organising a larger unit of discourse - giving information - expressing and justifying opinions - speculating - comparing and contrasting - agreeing and disagreeing

1   **15 Hours**
LISTENING AND READING

Listening for writing short answers - filling gaps in sentences - identifying topic, context and function - identify different functions of language in business situations - identify prompts -identify paraphrases of required information - Scanning - reading for gist - understanding sentence structure - error identification - identify paraphrases - cohesive words and phrases - understand the importance of analysing the distractors - identify grammatical and semantic relationships

2   **15 Hours**

WRITING AND SPEAKING

Business emails - notes - memos to colleagues or friends - giving instructions - explaining a development - asking for comments - requesting information - agreeing to requests - explaining - apologising - reassuring - complaining - describing - summarising - recommending - persuading turn - taking - sustaining interaction - initiating - responding - giving personal information - talking about present circumstances, past experiences and future plans - expressing opinion - speculating - organising a larger unit of discourse - giving information - expressing and justifying opinions - speculating - comparing and contrasting - agreeing and disagreeing

Total: 60 Hours

Reference(s)

1. Whitehead, Russell and Michael Black. Pass Cambridge BEC Vantage Self - study Practice Tests with Key, Heinle - a part of Cengage Learning, Delhi, 2003.

21FT501 FASHION MERCHANDISING AND MARKETING

3 0 0 3

Course Objectives

- To understand the fashion merchandising and marketing process in apparel business
- To comprehend the various types of merchandising in apparel business
- To exemplify the marketing research and product launching in apparel industry.

Programme Outcomes (POs)
a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
f. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
h. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
k. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
l. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)

1. Compare and contrast the different merchandising terms, functions and interpret the merchandising requirements of different groups of buyers.
2. Analyze the process flow in merchandising and the responsibilities of merchandisers in order execution.
3. Formulate market research, data collection techniques for inferring statistical results in apparel market research.
4. Assess the market research techniques
5. Interpret the industrial buying and sourcing process of apparel.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2										3		1
2	2	2						2		2				1

3	2	3		2							2		1
4	2	2								2		1	1
5	2			2							3		1

UNIT I   **9 Hours**
INTRODUCTION TO MERCHANDISING
Merchandising terminology-supplier, sub contractor, direct order, merchant export, Evaluation of sub contractors, vendors in evaluation, CM and CMT. Need of merchandising- advantages and disadvantages. Different forms of merchandising, Functions and tools of Merchandising.

UNIT II   **9 Hours**
PROCESS FLOW IN MERCHANDISING
Teck Pack-Importance and contents of Tech pack, merchandisers perspective of tech pack. Sampling-Importance of sampling, different forms of sampling. Approvals- Types of approvals. Pre Production meeting, Production scheduling-Preparation of BOM, Time and Action calendar, Fabric and trims consumption. Time management in merchandise.

UNIT III   **9 Hours**
FASHION MARKETING
The concept of fashion marketing. Types and methods of market research. Fashion marketing - Purpose of market research, an overview of the marketing research process, data sources. Fashion marketing communications, Sales forecasting. Marketing mix- 4 Ps.

UNIT IV   **9 Hours**
MARKET RESEARCH TECHNIQUES
Market segmentation- behavioral, demographic, geographic. Types of sampling- cluster, convenience, judgment, quota, simply random sampling, systematic sampling. Techniques -interviews, attitude, likert scale, projective scales, observation.

UNIT V   **9 Hours**
FASHION BUYING PROCESS AND SOURCING
Buying process- Buyer behavior, aspects of buying process, buying decision process. Pricing strategy, selection of distribution channel. Sourcing- types and process of sourcing, factors affecting sourcing, types of suppliers. Costing- components of cost of garment.
                                                                    Total: 45 Hours

Reference(s)
1. Dr. V.R. Sampath, Garment Marketing and Merchandising, Published by Kalaiselvi Pathippakam.
2. Elaine Stone, Fashion Merchandising -An Introduction, Fourth Edition.
3. Virginia Grose, Basics Fashion Management 01: Fashion Merchandising, AVA publiser,switerland, 2011
4. Philip Kotler, Principles of Marketing, Pearson Education India, 2008.
5. Fashion Merchandising: Principles and practice by James Clark, published by Palgrave Macmillan, 2014.
6. www.vasantkothari.com

21FT502 INDIAN TRADITIONAL EMBROIDERY   3 0 2 4

Course Objectives
- To introduce the technique(s) of Indian traditional embroidery for value addition.
- To create awareness about the different embroidered textiles of India.
- To initiate identification of regional embroideries developed by various communities.
- To understand the origin of technique and design with reference to colors, motifs, stitches of different Indian traditional embroidery.

Programme Outcomes (POs)
a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
g. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
l. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.
n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)
1. Analyze the specific embroidery style of Northern India on the basis of region, technique, motifs, Materials, colors, stitches, style of embroidery and Applications.
2. Structure the specific embroidery style of Western India on the basis of region, technique, motifs, Materials, colors, stitches, style of embroidery and Applications.
3. Outline the specific embroidery style of Central India on the basis of region, technique, motifs, Materials, colors, stitches, style of embroidery and Applications
4. Organize the specific embroidery style of Southern India on the basis of region, technique, motifs, Materials, colors, stitches, style of embroidery and Applications.
5. Differentiate the specific embroidery style of Eastern India on the basis of region, technique, motifs, Materials, colors, stitches, style of embroidery and Applications.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2				2		3					2	3	2
2	2				2		3					2	3	2
3	2				2		3					2	3	2
4	2				2		3					2	3	2
5	2				2		3					2	3	2

UNIT I   **9 Hours**

TRADITIONAL EMBROIDERY-NORTHERN INDIA
Kashida from Kashmir, Phulkari from Punjab, Chamba rumal from Himachal Pradesh -region, technique, motifs, Materials, colours, stitches, style of embroidery, Applications.

UNIT II   **9 Hours**

TRADITIONAL EMBROIDERY-WESTERN INDIA
Embroidery from Gujarat, Parsi embroidery - region, technique, motifs, Materials, colours, stitches, style of embroidery, Applications.

UNIT III   **9 Hours**

TRADITIONAL EMBROIDERY -CENTRAL INDIA
Chikkankari from Uttar Pradesh, Phool Patti ka Kaam from Uttar Pradesh, Zardozi from Uttar Pradesh- region, technique, motifs, fabric, Materials, stitches, style of embroidery, Applications.

UNIT IV   **9 Hours**

TRADITIONAL EMBROIDERY -SOUTHERN INDIA
Kasuti from Karnataka, Lambadi embroidery from Andhra Pradesh - region, technique, motifs, fabric, colours, stitches Materials, colours, stitches, style of embroidery, Applications.

UNIT V   **9 Hours**

TRADITIONAL EMBROIDERY-EASTERN INDIA
Kantha from West Bengal, Sujani from Bihar, Pipli applique from Orissa - region, technique, motifs, Materials, colours, stitches, style of embroidery, Applications.

1   **3 Hours**

EXPERIMENT 1
Prepare a report showing the origin of Indian traditional embroidery.

2   **3 Hours**

EXPERIMENT 2
Collect the swatches and images on each type of traditional embroidery and make a scrap book.

3   **3 Hours**

EXPERIMENT 3
Collect the swatches and images on each type of traditional embroidery and make a scrap book.

4   **3 Hours**

EXPERIMENT 4
Design and develop a sample for Ladies Kurti showing the motifs of any two Indian traditional embroidery.

5   **3 Hours**

EXPERIMENT 5
Design and develop a sample for Boys pajamas showing the motifs of any two Indian traditional embroidery.

6   **3 Hours**

EXPERIMENT 6

Design and develop a sample for Kids Frock showing the motifs of any two Indian traditional embroidery.

7   **3 Hours**
EXPERIMENT 7
Prepare a sample of any one traditional embroidery on 4"x4" fabric with a design size of 2"x2". Indicate the fabric used, type, size of needle and type of thread and amount of all material consumed for the same.

8   **3 Hours**
EXPERIMENT 8
Design a lifestyle product using any one traditional embroidery.

9   **3 Hours**
EXPERIMENT 9
Collect traditional embroidery motifs and create designs from collected motifs using Software.

10   **3 Hours**
EXPERIMENT 10
Collect traditional embroidery motifs and transform into digital form.
                                                                          Total: 75 Hours

Reference(s)

1. Shailaja D.Naik, S Traditional Embroideries of India. A.P.H. Publishing Corporation, N.Delhi,1996.

2. Mary E Waring,Handbook of Traditional Embroidery,2017

3. Mary Gostelow, Embroidery-Traditional designs, techniques, and patterns from all over the world,1989.

4. Jangir, S. Digital embroidery designing: A new opportunity for textile designer. International Journal of Home Science. 2(3),2016

5. Veenu,Symbolic motifs in Traditional Indian Textiles and Embroideries, International Journal of Research in Economics and Social Sciences. 6(3),2016.

6. https://sewguide.com/indian-embroidery-patterns

21FT503 FASHION DESIGN PROCESS   3 0 2 4

Course Objectives
- To enable Students identify end user design needs and expectations
- To impart the knowledge of conceptualizing designs and present them
- To enable students prototype the concepts

Programme Outcomes (POs)
a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
h. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
l. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.
n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)
1. Explain trend analysis techniques and resolve the design requirements
2. Apply design research methodologies and execute design developments
3. Create thematic mood board and develop silhouettes
4. Exemplify constituents of fabric and determine the fabric specification.
5. Develop patterns and construct design

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2			2			2				2	2	
2	3	2			2			2				2	2	3
3	2	2	3					2					2	3
4	3	2	2					2					2	3
5	2	2	3					2					2	3

UNIT I   **9 Hours**
FASHION TRENDS AND FORECASTING

Fashion cycle, trend analysis techniques, types of forecasting, Color forecasting process - Key colors. Social and Cultural aspects. Consumer segmentation based on Psychographic profiles.

UNIT II   **9 Hours**
FASHION DESIGN RESEARCH METHODOLOGY
Design process - approach - stages of design process - demonstrations and guidelines - Fashion Design. Approach to design development - SCAMPER

UNIT III   **9 Hours**
CONCEPTUALIZATION AND SILHOUETTE DEVELOPMENT
Development of designs and silhouettes, Concept editing and finalization, mood board creation processes, color story creation processes. Types of fashion looks - classic, bohemian, casual, eclectic, minimalistic and sporty

UNIT IV   **9 Hours**
FABRIC SPECIFICATION
Classification of fabric types: woven fabric categories and knitted fabric categories. Fabric specification development: color specification, weight specification, drape specification.

UNIT V   **9 Hours**
PROTOTYPE DEVELOPMENT
Pattern development processes - draping & alterations, Flat sketches. Story board preparation. Fashion photoshoot. Lookbook contents.

1   **6 Hours**
EXPERIMENT 1
Create a inspiration journal, brainstorm, visualize and focus

2   **6 Hours**
EXPERIMENT 2
Develop thematic mood board and color board with palette

3   **6 Hours**
EXPERIMENT 3
Visualize and develop silhouettes (minimum 30 silhouettes of any chosen garment)

4   **6 Hours**
EXPERIMENT 4
Show color story of the chosen silhouette and draft patterns for the same

5   **6 Hours**
EXPERIMENT 5
Construct the chosen silhouette

                                                                         Total: 75 Hours

Text Book(s)
1. Anette Fischer and Kiran Gobin, Construction for fashion design, Bloomsbury, 2017.
Reference(s)
   1. Karl Aspelund, The design process, Fairchild, 2015.

2. Amolie Claude and Valerie Praguin, The collection process: fashion design process 4, Esmod editions, 2012.

3. Mckelvey and J. Munslow, Fashion design: process, innovation and practice, John wiley and sons, 2nd edition, 2011.

4. Simon Seivewright, Basics Fashion Design 01: Research and Design, A & C Black, 2nd edition, 2012

5. John Hopkins, Fashion Design: The Complete Guide, A & C Black, 2012

21FT504 QUALITY ASSURANCE IN GARMENT PRODUCTION

3 0 0 3

Course Objectives

- Students will have fundamental knowledge on quality and quality standards
- Students will know the methodology of quality assurance in the apparel industry
- Students will apply statistical tools in the apparel industry

Programme Outcomes (POs)

a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

f. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

g. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

h. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Course Outcomes (COs)

1. Explain the fundamentals of quality concepts and choose quality tools and inspection for each garment manufacturing stage

2. Interpret the specifications of quality standards and resolve the testing requirements of different organization protocols

3. Classify the quality inspection system procedures for fabric and accessories and implement them for carry out sample inspections

4. Determine tolerance limits for garment manufacturing processes and design standard operating procedures

5. Compare the costs of quality and determine the product care and safety requirements for different garments

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	3			2	2						1		2
2	3	2				2	2	1						3
3	3	3			1	2							2	
4	3	3			1	2								3
5	3	3	3			1		1					2	3

UNIT I **9 Hours**

FUNDAMENTALS

Quality: Definition, Dimensions & its importance. Inspection: Inspection loop, Systems of inspection, Types of inspection, Quality Control, Quality Assurance, Quality Management, Operating characteristic curve: Producers risk, Consumers risk, AQL, LTPD, Q-7 tools and its application

UNIT II **9 Hours**

QUALITY STANDARDS, SYSTEMS AND INSPECTION AGENCIES

Quality Standards: AATCC, ASTM, BIS, ISO, CSE. ISO 9001, ISO 14001, OHSAS 18000:2000, GOTS, CPS (Children Protection Standards), Social Compliance. Inspection agencies: Government and private agencies, third party testing / inspection services, AEPC, Textiles Committee, Test and inspection report

UNIT III **9 Hours**

QUALITY ASSURANCE IN FABRICS AND ACCESSORIES

Establishing spec sheet for raw materials and accessories, Types of defects in fabrics, major and minor faults, Fabric grading & inspection systems: types, 4 point and 10 point, sampling procedure, prescribing inspection procedure for raw materials and accessories. Tolerance limits and quality standards for fabrics, other raw materials and accessories

UNIT IV **9 Hours**

QUALITY ASSURANCE IN APPAREL PRODUCTION

Standard Operating Procedure (SOP), Prescribing specifications for process and machines: Spreading, Pattern Making, Cutting, Bundling, Ticketing, Stitching, Pressing / Finishing. Care labeling of apparel: Standards and methods. Safety issues for different accessories in children garment, prescribing inspection procedures for process and finished garment. Tolerance limits and quality standards for cutting, sewing and finished garments

UNIT V **9 Hours**

QUALITY ASSURANCE IN PACKING AND ORGANIZATION

System and standards for packing, warehousing and shipping. Cost of quality: Cost of conformance, cost of non-conformance. Relationship between various costs, value of tracking quality costs, Reporting quality cost. Customer Complaints / Returns and their handling mechanism, Protection and Satisfaction. Quality maturity grid, Quality and profitability, Organization for Quality

Total: 45 Hours

Reference(s)

1. Janace E. Bubonia, Apparel Quality: A Guide to Evaluating Sewn Products, Bloomsbury Publishing, 2014
2. Quality Management Handbook for the Apparel Industry, Clothing trade, New Age International Publishers, 2012
3. Subrata Das, Quality Characterization of apparel, Woodhead Publishing.2010
4. Douglas C. Montgomery, Statistical Quality Control: A Modern Introduction, 6th edition, Wiley India Pvt. Limited, 2010
5. Sara J Kadolph, Quality Assurance for Textiles and Apparel, Fairchild Publications Inc., Chicago, 2007
6. www.astm.org

21FT507 APPAREL CAD I LABORATORY   0 0 4 2

Course Objectives
- To impart them knowledge in identifying the pattern making tools used in Lectra software and develop efficient patterns.
- To equip them in developing different garment patterns and grading the patterns in efficient manner.

Programme Outcomes (POs)
a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Course Outcomes (COs)
1. Identify the tools and applications of Lectra software (Pattern making and grading software)
2. Draft the "basic pattern set"patterns in Lectra software.
3. Develop the patterns and grade them into different sizes.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2	3		1							2	3	
2	1		3		2					1		2	3	1
3			3		3					1			3	2

1   **6 Hours**
EXPERIMENT 1
Identification of primary tools for navigation of Lectra modari's interface.

2   **6 Hours**
EXPERIMENT 2
Construct the pattern for Basic Bodice front(refer the standard measurement)

3   **6 Hours**
EXPERIMENT 3
Construct the pattern for Basic sleeve (refer the standard measurement)

4   **6 Hours**
EXPERIMENT 4
Draft the pattern for Basic skirt front and back (refer the standard measurement)

5   **6 Hours**
 EXPERIMENT 5
 Draft the pattern for Trouser front and Back (refer the standard measurement)

6   **6 Hours**
 EXPERIMENT 6
 Design a baba suit and draft the pattern, seam them and grade them into three different sizes.

7   **6 Hours**
 EXPERIMENT 7
 Draft a pattern for frock, develop a style variant of the drafted pattern, seam them and grade in three sizes.

8   **6 Hours**
 EXPERIMENT 8
 Draft a women's top, seam them and grade them into three different sizes.

9   **6 Hours**
 EXPERIMENT 9
 Draft the men's formal shirt pattern and grade them into different four sizes.

10   **6 Hours**
 EXPERIMENT 10
 Draft a men's trouser pattern, develop three different leg fits from it, seam the patterns and grade them in three inseam lengths

                                                                          Total: 60 Hours

21FT508 GARMENT CONSTRUCTION II LABORATORY

0 0 4 2

Course Objectives

- To demonstrate skills in sewing different types of seams
- To demonstrate skills in constructing commercial garment categories
- To demonstrate skills in finishing garment samples

Programme Outcomes (POs)

a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

Course Outcomes (COs)

1. Fabricate seam specifications of commercial garment categories.
2. Choose and apply sewing techniques in constructing the garment.
3. Apply fundamental concepts and prepare technical specifications.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1				2					2			3	
2	1				2					2			2	1
3	1				2					2			3	2

1   **6 Hours**

EXPERIMENT 1

Construction of Polo shirt with suitable seam specification and seam diagrams

2   **6 Hours**

EXPERIMENT 2

Construction of long coat with suitable seam specification and seam diagrams.

3   **6 Hours**

EXPERIMENT 3

Construction of Kameez and its varieties with suitable seam specification and seam diagrams.

4   **6 Hours**

EXPERIMENT 4

Construction of Ladies blouse with suitable seam specification and seam diagrams.

5   **6 Hours**

 EXPERIMENT 5

Preparation of Tech pack for Top wear for Men, women and kids wear

6   **6 Hours**

 EXPERIMENT 6

 Construction of casual trouser with suitable seam specification and seam diagrams.

7   **6 Hours**

 EXPERIMENT 7

 Construction of knickers with suitable seam specification and seam diagrams.

8   **6 Hours**

 EXPERIMENT 8

 Construction of salwar with suitable seam specification and seam diagrams.

9   **6 Hours**

 EXPERIMENT 9

 Construction of kameez with suitable seam specification and seam diagrams.

10   **6 Hours**

 EXPERIMENT 10

Preparation of Tech pack for Bottom wear for Men

                                                                            Total: 60 Hours

 Reference(s)

1. B. Claire and Shaeffer, Sewing for Apparel Industry, Pearson's Prentice Hall, New Jersey, 2000.

2. B. Claire Shaeffer & Glee Barre, High Fashion Sewing Secrets from the World's Best Designers: A Step- By-Step Guide to Sewing Stylish Seams, Buttonholes, Pockets, Collars, Hems, And More, Rodale Books Publisher, New York, 2001.

3. Marry Mathew, Practical Clothing Construction Part I, Basic Sewing Process, Cosmic Press, Chennai,1999.

18GE501 SOFT SKILLS - APTITUDE I   0 0 2 0

Course Objectives

- Expose the undergraduate students to such methods and practices that help, develop and nurture qualities such as character, effective communication, aptitude and holding ethical values. It will provide a lot of activities and examples for a student to learn and develop these life skills.

Programme Outcomes (POs)
Course Outcomes (COs)

1. Explain various concepts of number systems and their techniques in solving the percentage, average and age problems.
2. Analyse the profit and loss of real time situations and the relation between ratio, proportion and variation.
3. Apply different techniques to find the distance, speed and time of various moving objects.
4. Understand the concepts of coding, sequences and series, data interpretation and critical reasoning to solve real time logical reasoning problems.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1														
2														
3														
4														

1   **2 Hours**
NUMBER SYSTEMS
Introduction - Definition - Classification on Numbers- Power cycles and remainders - Short cut process- Concept of Highest Common Factor-Concept of Least Common Multiple- Divisibility-Number of zeros in an expression.

2   **2 Hours**
PERCENTAGE
Introduction - Definition and Utility of Percentage - Importance of base/denominator for percentage calculations-Concept of percentage values through additions-Fraction to percentage conversion table.

3   **3 Hours**
AVERAGES AND AGES
Introduction-Average of different groups-Addition or removal of items and change in average-Replacement of some of the items.

4   **3 Hours**
RATIO, PROPORTIONS AND VARIATION
Introduction- Ratio- Properties-Dividing a given number in the given ratio-Comparison of ratios-Proportions-Useful results on proportion- Continued proportion-Relation among the quantities more than two-Variation.

5 **2 Hours**

PROFIT AND LOSS

Gain/Loss and percentage gain or percentage loss-Multiplying equivalents to find sale price-Relation among cost price, sale price, gain/loss and percentage gain or percentage loss-An article sold at two different selling price-Two different articles sold at same selling price-Percentage gain or percentage loss on selling price-Percentage gain or percentage loss on whole property.

6 **2 Hours**

TIME AND WORK

Introduction-Basic concepts-Concepts on working with different efficiencies-Pipes and Cisterns-Work Equivalence (Man Days) -Alternative approach.

7 **2 Hours**

TIME, SPEED AND DISTANCE

Definition-Basics of Time, Speed and Distance - Relative speed-Problems based on Trains-Problems based on Boats and Streams-Problems based on Races-Time taken with two difference modes of transport-Time and distance between two moving bodies.

8 **3 Hours**

CODING AND DECODING

Introduction-Description of Coding method-Coding patterns - Concepts of Coding and Decoding-Problems involving Coding and Decoding methods.

9 **2 Hours**

SEQUENCE AND SERIES

Introduction-Sequences of real numbers - Number and Alphabet series-Description of Number and Alphabet series-Analogy-Odd man out-Power series.

10 **3 Hours**

DATA SUFFICIENCY

Introduction to Data Sufficiency - Overview of the wide variety of Data Sufficiency problems - Basic introduction on how to determine what information is sufficient to solve a given problem - Common pitfalls to avoid.

11 **3 Hours**

DIRECTION

Introduction to Direction - sense test - Overview of the wide variety of Direction problems-Direction-Plotting diagrams.

12 **3 Hours**

CRITICAL REASONING

Introduction-Basic concept of critical reasoning- Weaken the argument-Strengthen the argument-Flaw in the argument-Evaluate the conclusion.

Total: 30 Hours

Reference(s)

1. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Fourth Edition, Mc Graw Hill Publications.

2. U. Mohan Rao, Quantitative Aptitude for Competitive Examinations, Scitech Publications Pvt Ltd, India.

3. Dinesh Khattar, The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Third Edition, Pearson Education Pvt Ltd, India, 2016.

4. Dr. R S Aggarwal, A Modern Approach to Verbal and Non Verbal Reasoning, Revised Edition, S Chand Publications.

5. Arun Sharma, How to prepare for Logical Reasoning for CAT & other Management Exams, Fifth Edition, Mc Graw Hill Publications.

6. Jaikishan and Premkishan, How to Crack Test of Reasoning in all Competitive Examinations, Revised Edition, Arihant Publications.

21HS002 HUMAN VALUES AND ETHICS   2 0 0 2

Course Objectives

- Understand the concept of good values and comprehend the importance of value-based living.
- Recognize the culture of peace through education.
- Identify and apply the practices for value development and clarification.

Programme Outcomes (POs)

h.   Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i.   Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j.   Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Course Outcomes (COs)

1. Understand the importance of human values and ethics in life.
2. Execute the importance of harmonious living in a diverse society.
3. Analyze the sensitivity to the crying needs of society such as ungodliness, corruption, poverty, and suffering, and play a vital role in eradicating them.
4. Plan intellectually mature, morally upright, ethically correct, and spiritually inspired decisions.
5. Execute a correct balance between professional excellence and social commitment.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1								3	2	2				
2								3	2	2				
3								3	2	2				
4								3	2	2				
5								3	2	2				

UNIT I   **6 Hours**

COURSE INTRODUCTION - NEED, BASIC GUIDELINES AND ANALYSIS
1. Importance of Human Values & Ethics in 21st Century
2. Understanding the theory of basic human values and ethics
Openness to change
Self-enhancement
Conservation
Self-transcendence
3. Schwartz Value Survey: Self-Assessment

UNIT II
                                                                                                          6 Hours

EMBRACING THE COMMON ETIQUETTE
Altruism – Integrity -Freedom -Justice -Honesty -Truthfulness -Responsibility –Compassion

UNIT III   **6 Hours**

CONTINUOUS HAPPINESS AND PROSPERITY
An overview on basic Human Aspirations - Understanding and living in harmony at various levels of life -Embracing self-love and wellness -Understanding harmony in the family and society

UNIT IV   **6 Hours**

UNIVERSAL HUMAN VALUES AND PROFESSIONAL ETHICS
Reflection on growing global multifold problems: poverty, pollution, hunger, disease, unemployment, caste system, child labour, gender equality, politics and violence.
Understanding the challenges in cultural, personal, social, political, and economic environment

UNIT V   **6 Hours**

UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE - WHOLE EXISTENCE AS CO-EXISTENCE
Understanding the harmony in the Nature - Holistic perception of harmony at all levels of existence - Practice Exercises and Case Studies will be taken up in Practice Sessions

Total: 30 Hours

Reference(s)
1. Martin, G. (2011). The Little Book of Ethics: A Human Values Approach. Australia: G.P. Martin.
2. Gupta, N. L. (2002). Human Values For The 21St Century. India: Anmol Publications Pvt. Limited.
3. Mishra, A. (2017). Happiness Is All We Want. India: Bloomsbury Publishing.
4. Universal Human Values. (2023). (n.p.): Booksclinic Publishing.
5. A Textbook On Professional Ethics And Human Values. (2007). India: New Age International (P) Limited

21FT602 INDUSTRIAL ENGINEERING   3 0 2 4

Course Objectives
- To understand the Industrial Engineering concepts and their uses.
- To utilize the various Industrial Engineering techniques in apparel manufacturing process.
- To understand the Material movement in the apparel manufacturing process.

Programme Outcomes (POs)
a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
f. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Course Outcomes (COs)
1. Implement the industrial Engineering concepts and determine the factors affecting productivity.
2. Assess the productivity in the apparel industry and plan productivity management strategies.
3. Determine the material management functions and execute planning techniques in calculating the material requirements.
4. Analyze the concepts of time and motion study and execute work study procedures for calculating SAM values.
5. Interpret Value Management Techniques and design strategies for value management.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	2		2			1					1		2
2	1	2	1				1					2		2
3	1	2					2							2
4	2	3	2	3			2					3		2
5	1	3					2					2		2

UNIT I   **9 Hours**
INTRODUCTION TO INDUSTRIAL ENGINEERING
Industrial Engineering - concepts, functions, applications and role of industrial engineer; Tailoring vs Garmenting, Fundamentals of industrial engineering - operations analysis and design, operations control and management; productivity concept and importance, factors affecting productivity, kinds of productivity measures. Cycle time, basic time, SAM and SMV calculation.

UNIT II   **9 Hours**

CONCEPTS OF PRODUCTIVITY

Productivity Definition-Importance-Productivity-Managements Role and Responsibility-The Key Elements Of Productivity-Productivity Measurement-Productivity Analysis-Productivity Improvement; Total Productivity Management - Introduction- Adoption of Total Productivity Management And Techniques For Total Productivity Expansion- Procedures For Adopting And Advancing The Use of Total Productivity Management. Benefits of increased productivity.

UNIT III   **9 Hours**

PRODUCTION PLANNING AND INVENTORY CONTROL

Materials management - meaning, functions and objectives; Production, planning and control. Pre production activities of a supervisor. Inventory control: purpose, types, functions, EOQ, ABC, VED and FMEA analysis. Introduction to MRP, JIT, Kanban, SMED.

UNIT IV   **9 Hours**

WORK STUDY

Definition and concepts of work study (time and motion study); objectives of method study and work measurement for the apparel industry; method study procedure; flow process charts for the various processes in the apparel industry; flow diagram, string diagram, multiple activity chart, SIMO chart and Travel chart. Time study procedures, standard data required for time study, Calculation of SAM.

UNIT V   **9 Hours**

VALUE MANAGEMENT

Toyota Production System (TPS), Lean Manufacturing, World Class Manufacturing, Increasing the productivity of resources - Building design and storage space requirement for the apparel industry - Financial planning and control- Ergonomics in apparel industry - Sales forecasting and techniques.

1   **3 Hours**

EXPERIMENT 1

Calculate standard allowed minute for the particular style (Men's T shirt

2   **3 Hours**

EXPERIMENT 2

Study the work measurement of level of garment industry for automatic welt pocket attaching machine (Activity sampling

3   **3 Hours**

EXPERIMENT 3

Analyze optimized techniques for manufacturing apparel products through Methods study (Outline process chart

4   **3 Hours**

EXPERIMENT 4

Analyze optimized line sequence for manufacturing apparel products through Methods study (Flow diagram

5   **3 Hours**

EXPERIMENT 5

Analyze optimized line sequence for manufacturing apparel products through Methods study (Various Charts) for collar turning and sleeve preparation process.

6   **3 Hours**
 EXPERIMENT 6
 Analyze the Factory simulation game of apparel production unit with all the necessary items.

7   **3 Hours**
 EXPERIMENT 7
 Create plant layout for given lot production

8   **3 Hours**
 EXPERIMENT 8
 Analyze the Operation break down for the particular style (Men's formal shirt)

9   **3 Hours**
 EXPERIMENT 9
 Analyze the performance of the operator for the particular style by using on standard efficiency technique.

10   **3 Hours**
 EXPERIMENT 10
 Prepare time and action plan for the particular style of garment.
                                                                              Total: 75 Hours

Reference(s)
1. V.Ramesh babu, Industrial Engineering in Apparel Production,Woodhead publishing india,ISBN 9780857091079,November 2011
2. Kjell B. Zandin and Harold B. Maynard, Maynard""s Industrial Engineering Handbook, McGraw-Hill Professional, 2001.
3. Jacob Solinger, Apparel Manufacturing Handbook, Bobbin Blenheim Media Corporation, Nashville, USA, 1988.
4. W. G. Ireson and E. L. Grant, Handbook of Industrial Engineering and Management, Prentice Hall of Robi, New Delhi, 1988.
5. Johnson Maurice, Introduction to Work Study, International Labour Organization, Geneva, 1995.
6. O. P. Khanna, Industrial Engineering & Management, DhanpatRai& Sons, Delhi, 1987.

21FT603 FASHION PORTFOLIO   2 0 2 3

Course Objectives

- To equip the students to curate and express inspiration and mood board ideas.
- To apply sketching skills and design exploration techniques.
- To impart knowledge of organizing different elements in a portfolio and bringing out the desired look.

Programme Outcomes (POs)

a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)

1. Execute trend analysis, identify key concepts: color, style, fabric and prepare trend reports for the chosen apparel category.
2. Exemplify the appropriate inspiration sources befitting the target customer.
3. Develop design exploration sketches, fashion illustrations and determine fabric specifications.
4. Determine intended design outcomes by manipulating fabrics.
5. Construct garments and bring out the look desired through photoshoot with a proper presentation.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2	3		3				2	2			3	2
2	2	2	3		3				2	2			3	2
3	2	2	3		3				2	2			3	2
4	2	2	3		3				2	2			3	2
5	2	2	3		3				2	2			3	2

UNIT I   **6 Hours**

TREND ANALYSIS

Trend analysis: Introduction to online trend forecasting platforms, Segmentation of consumes, performing online visual research, interpreting trends, generation of forecast report.

UNIT II   **6 Hours**

FASHION DESIGN COMPONENTS

Inspiration board: elements to be present, visual arrangements. Mood board: Deriving mood board elements from the trend forecast report, Color board: color story, base color, ascent and descent colors and color proportions.

UNIT III   **6 Hours**

DESIGN DEVELOPMENT

Design exploration techniques, fashion illustration: poses, rendering different fabrics, flat sketch: seam details, fabric and trim details, accessory board. Fabric selection parameters; flowy fabrics, sheer fabrics, suiting fabrics, shirting fabrics, heavy fabrics, denims, self designed fabrics. Fabric end use parameters.

UNIT IV   **6 Hours**

FABRIC MANIPULATION

Fabric manipulation techniques: surface embellishments, different dyeing techniques: batik, tie and dye, vegetable dyeing, marbling. other ornamentation techniques.

UNIT V   **6 Hours**

PROTOTYPE DEVELOPMENT

Garment construction: the selection of appropriate needles, seams, stitches. fit testing. fashion photoshoot: product and model photo hoot. Developing theme; Choosing poses, Hair and makeup, accessories, background selection. Arranging elements in the portfolio.

1   **3 Hours**

EXPERIMENT 1

Develop a trend analysis report for the chosen apparel category and target customer.

2   **3 Hours**

EXPERIMENT 2

Develop an inspiration board appropriate for the season, category and target customer's AIO.

3   **3 Hours**

EXPERIMENT 3

Develop a Mood board and color story elaborating the theme chosen.

4   **3 Hours**

EXPERIMENT 4

Develop 25 design exploration for garments from the elements taken from the mood board.

5   **3 Hours**

EXPERIMENT 5
Develop 10 fabric manipulated swatches (Draping, dyeing, surface embellishments, print artworks) for the mood board chosen and develop a Fabric manipulation board.

6   **3 Hours**
EXPERIMENT 6
Develop full length illustrations for the final designs and render them appropriately, also develop flat sketches. Develop trims and accessories board.

7   **3 Hours**
EXPERIMENT 7
Construct 3 garments finalized from the design explorations with measurements of your model.

8   **3 Hours**
EXPERIMENT 8
Construct 3 garments finalized from the design explorations with measurements of your model.

9   **3 Hours**
EXPERIMENT 9
Develop a photoshoot expressing the moods of the garments made with appropriate styling styling.

10   **3 Hours**
EXPERIMENT 10
Arrange all the boards and picture and present them in a proper portfolio format, Conclude the developed designs by correlating it with the mood and inspiration.

Total: 60 Hours

Reference(s)

1. Designing Your Fashion Portfolio From Concept to Presentation 1st edition, Joanne Barrett, Publication 2014.
2. Portfolio Presentation for Fashion Designers, Linda Tain 4th edition.Publication 2018
3. Anette Fischer and Kiran Gobin, Construction for fashion design, Bloomsbury, 2017.
4. Karl Aspelund, The design process, Fairchild, 2015.
5. www.29andseptemberstudio.com

21FT607 APPAREL CAD II LABORATORY   0 0 4 2

Course Objectives

- To impart them knowledge in identifying the pattern making tools used in Lectra software and develop efficient patterns.
- To equip them in developing different garment patterns and grading the patterns in efficient manner

Programme Outcomes (POs)

a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Course Outcomes (COs)

1. Explain the functions of tools of Diamino marker making module of Lectra software
2. Prepare a marker plan for the pattern pieces included in the Variant with reference to given fabric
3. Develop 3D digital illustrations of design and on mannequins in Reach fashion studio

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	1			3					1			2	1
2	2	1			3					1			2	2
3	2	1			3					1			2	2

1   **6 Hours**

EXPERIMENT 1

Draft a men's trouser pattern, develop three different leg fits from it, seam the patterns and grade them in three inseam lengths. Develop a marker plan on a fabric width of 135cm.

2   **6 Hours**

EXPERIMENT 2

Draft a menÃ¢??s casual shirt pattern and develop a marker plan on a plaid fabric having 2X2 cm size pattern. The patterns should be matched at sleeve setting, pocket attachment, yoke and placket. Consider the fabric width as 140cm.

3   **6 Hours**

EXPERIMENT 3

Draft a full skirt. Assume a engineered stripe line passes through the princess seam line on the both sides of center front. The fabric width is 120cm with the engineered stripe located at 45cm from the selvedge. Develop an appropriate marker.

4   **6 Hours**
EXPERIMENT 4
Draft a Shawl collar jacket pattern in misses size 8 and prepare a marker plan in 120cm plain weave poplin fabric and 120cm herring bone twill fabric

5   **6 Hours**
EXPERIMENT 5
Draft a womens night suit and prepare marker plan in 140cm plaided fabric.

6   **6 Hours**
EXPERIMENT 6
Develop a 3D visual display of Womens business suit with coordinating accessories. Suggest a suitable fabric structure and show its simulation.

7   **6 Hours**
EXPERIMENT 7
Develop a 3D visual display of conceptual Figure skating suit for men and women both. Coordinate it with right accessories.

8   **6 Hours**
EXPERIMENT 8
Develop a 3D visual display of biker jackets and cargo shorts. Coordinate it with right accessories

9   **6 Hours**
EXPERIMENT 9
Develop a 3D visual display of any three Bohemian silhouettes with coordinating accessories.

10   **6 Hours**
EXPERIMENT 10
Develop a 3D visual display of womens gown for red carpet wear and Coordinate it with right accessories

Total: 60 Hours

21FT608 GARMENT CONSTRUCTION III LABORATORY   **0 0 4 2**

Course Objectives
- To demonstrate skills in sewing different types of seams.
- To demonstrate skills in constructing commercial garment categories
- To demonstrate skills in finishing garment samples

Programme Outcomes (POs)
a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

Course Outcomes (COs)
1. Fabricate seam specifications of commercial garment categories.
2. Design silhouettes and construct the designer garment applying garmenting techniques.
3. Apply fundamental concepts and prepare technical specifications.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2		3						2			2	2	2
2	2	2	3						2			2	3	3
3	2		3						1			2	2	3

1   **6 Hours**
EXPERIMENT 1
Design and construction of women's airhostess jacket with shawl collar.

2   **6 Hours**
EXPERIMENT 2
Design and construction of women's airhostess skirt style.

3   **6 Hours**
EXPERIMENT 3
Prepare a technical specification for women's airhostess ensemble with suitable seam specification and seam diagrams.

4   **6 Hours**
EXPERIMENT 4

Design and construction of men's athletic wear: trunk and shorts.

5   **6 Hours**

EXPERIMENT 5

Prepare a technical specification for men's athletic wear: trunk and shorts with suitable seam specification and seam diagrams.

6   **6 Hours**

EXPERIMENT 6

Design and construction of women's sheath dress.

7   **6 Hours**

EXPERIMENT 7

Prepare a technical specification for women's sheath dress with suitable seam specification and seam diagrams.

8   **6 Hours**

EXPERIMENT 8

Design and construction of long anarkali top.

9   **6 Hours**

EXPERIMENT 9

Prepare a technical specification for long anarkali top with suitable seam specification and seam diagrams.

10   **6 Hours**

EXPERIMENT 10

Preparation of Tech pack for Men's formal shirt and
women's formal shirt. Determine the difference between

Total: 60 Hours

Reference(s)

1. B. Claire and Shaeffer, Sewing for Apparel Industry, Pearson's Prentice Hall, New Jersey, 2000.
2. B. Claire Shaeffer& Glee Barre, High Fashion Sewing Secrets from the World's Best Designers: A Step- By-Step Guide to Sewing Stylish Seams, Buttonholes, Pockets, Collars, Hems, And More, Rodale Books Publisher, New York, 2001.
3. Marry Mathew, Practical Clothing Construction Part I, Basic Sewing Process, Cosmic Press, Chennai,1999.

18GE601 SOFT SKILLS-APTITUDE II   0 0 2 0

Course Objectives

- Expose the undergraduate students to such methods and practices that help, develop and nurture qualities such as character, effective communication, aptitude and holding ethical values. It will provide a lot of activities and examples for a student to learn and develop these life skills.

Programme Outcomes (POs)
Course Outcomes (COs)

1. Apply the concepts of probability, Sets, Permutation and Combinations in estimating data for real time problems.
2. Understand the concept of logarithms, progressions and Simple and Compound interest to solve various practical problems.
3. Analyse objects involving cubes and cuboids in determining the number of sides colored.
4. Interpret various data from graphs and tables to determine ratio, percentage and averages.
5. Apply the logical reasoning skills for identifying age, relations, visual relations and puzzles.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1														
2														
3														
4														
5														

1   **2 Hours**
PERMUTATION AND COMBINATION
Definition-Fundamental rules-Theorems on Permutation-Theorems on Combination.

2   **2 Hours**
PROBABILITY
Concept and Importance of Probability-Underlying factors for real Life estimation of probability-Basic facts about probability-Some important consideration while defining event.

3   **2 Hours**
SYLLOGISM AND VENN DIAGRAM
Concepts on Syllogisms-Venn diagram-Interpretation-Venn diagram-solving.

4   **4 Hours**
SIMPLE INTEREST AND COMPOUND INTEREST
Introduction-Definition - Effect of change of P, R, T on simple interest-Amount-Amount becomes N times the principle-Repayment of debt in equal installments-Rate and time are numerically equal-Compound Interest-Conversion period-Basic formula-Special cases-To find the principle / Time

/Rate-Difference between Compound Interest and Simple Interest-Equal annual installment to pay the borrowed amount.

| 5 | 2 Hours |

MIXTURES AND ALLIGATION
Definition-Alligation rule-Mean value (cost price) of the mixture-Some typical situations where allegation can be used.

| 6 | 4 Hours |

CUBE AND LOGARITHM
Introduction-Basic Concepts of Cube and Cuboid-Problems involving cubes and cuboids of various dimensions-Problems involving coloured cubes and cuboids - Basic concepts of Logarithm-Laws of Logarithms including change of base-Common logarithm (base 10) - Properties of Logarithms to solve equations involving logarithmic expressions.

| 7 | 2 Hours |

DATA INTERPRETATION
Introduction-Ratio-Percentage-Average-Tables - Graphs and Charts.

| 8 | 2 Hours |

PROGRESSION AND LOGICAL REASONING
Arithmetic progression-Geometric progression-Harmonic progression-Theorems related with progressions.

| 9 | 2 Hours |

PROBLEM ON AGES
Introduction-Basic concept-Usage of Percentage and Averages -Applications.

| 10 | 2 Hours |

ANALYTICAL REASONING
Introduction-Basic concept-Non verbal Analytical Reasoning -Arrangements.

| 11 | 2 Hours |

BLOOD RELATION
Introduction-Basic concept-Kinds of relation-Tree diagram -Relations.

| 12 | 2 Hours |

VISUAL REASONING
Introduction-Basic concepts-Odd man out-Next series-Mirror image and water image

| 13 | 2 Hours |

SIMPLIFICATIONS
Introduction-Basic concepts-Arithmetic operations-Equation solving methods-Puzzles.

Total: 30 Hours

Reference(s)

1. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Fourth Edition, Mc Graw Hill Publications.

2. U. Mohan Rao, Quantitative Aptitude for Competitive Examinations, Scitech Publications Pvt Ltd, India.

3. Dinesh Khattar, The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Third Edition, Pearson Education Pvt Ltd, India, 2016.

4. Dr. R S Aggarwal, A Modern Approach to Verbal and Non Verbal Reasoning, Revised Edition, S Chand Publications.

5. Arun Sharma, How to prepare for Logical Reasoning for CAT & other Management Exams, Fifth Edition, Mc Graw Hill Publications.

6. Jaikishan and Premkishan, How to Crack Test of Reasoning in all Competitive Examinations, Revised Edition, Arihant Publications.

21FT701 APPAREL SOURCING AND COSTING   3 0 0 3

Course Objectives
- To know the sourcing strategies concept
- To impart knowledge on various costing techniques

Programme Outcomes (POs)
a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Course Outcomes (COs)
1. Analyze sourcing strategies concepts and determine the sourcing methods
2. Choose and apply the sourcing design formats in processing orders
3. Differentiate budgeting concepts and different elements of costing
4. Generate manufacturing and material cost estimates of Apparel styles
5. Analyze the demand and supply chain concepts and formulate pricing strategies

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	3	3	2								2		2
2	2	3	3									3	3	2
3	2	3	3									3		2
4	2	3	3	3								3	1	2
5	3	3	3	1								3	1	2

UNIT I   **9 Hours**
SOURCING STRATEGIES
Principles of sourcing strategy -out sourcing. Sourcing goals and objectives. Source selection - contracts and incentives, supplier strategies. Sourcing data and reports.

UNIT II   **9 Hours**
SOURCING DESIGN
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.

UNIT III   **9 Hours**
BUDGETING AND PRINCIPLES OF COSTING
Budgeting - aims of Budgeting, types of budget. Costing - aims of costing, Elements of cost - Material cost, Labour cost and overheads, difference between budgeting and costing. Depreciation cost - reasons and methods of calculating depreciation.

UNIT IV   **9 Hours**

COST FACTORS AND PRACTICES

Costing of garments: cost determinants - cost of yarn - fabric production - processing, lot size and design affecting cost, cutting, making and trim cost. Cost of bought out components - Thread, Button, Zipper, Interlining. Costing methods, Cost estimation bulk production. Cost calculation by interpreting Specification sheet Practical cost calculation for Ladies, Men's and Children's wear - woven and knitted

UNIT V   **9 Hours**

PRICING OF APPAREL PRODUCTS

Determining Pricing of apparel products: Price elasticity of demand and supply, sample costing-marginal revenue and marginal cost, cost plus pricing methods; Full cost pricing, conversion cost pricing differential cost pricing, variable cost pricing, direct cost pricing derivation of cost of apparel products-woven/knits; The budgeting process: Budgeting principles for the apparel industry, fixed vs. variable budget, master budget, laminations of budgets any justification effort

FOR FURTHER READING

The act of purchasing, the work that is performed in a procurement department, how to differentiate different supplier categories with strategic sourcing, and how to elevate a firm's performance with strategic sourcing. Best practices in sourcing and procure-to-pay systems which enable firms to automate and accelerate essential sourcing functions

Total: 45 Hours

Reference(s)

1. Sudhi Sheshadri -Sourcing Strategy- Principles, Policy and Design , Springer, 2005.

2. Charles T. Horngren, Introduction to Management Accounting, Prentice Hall, New Delhi, 2001

3. M. I. Mahajan, Export Policy, Procedures and Documentation, Snow-white Publishers, Mumbai, 2007

4. R. Narayanaswamy, Financial Accounting - A Managerial Perspective, Prentice Hall India Pvt. Ltd.,New Delhi,1997.

5. S. K. Bhattacharya & John Dearden, Accounting for Management Text and Cases, Vikas Publishing House, New Delhi, 2000.

6. https://www.onlineclothingstudy.com

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21FT702 GARMENT TESTING - PERFORMANCE AND SUSTAINABILITY

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3 0 0 3

Course Objectives

- To have fundamental knowledge on garment testing protocol and management of restricted substances.
- To acquire knowledge of the methodology of garment testing in the apparel industry.
- To apply testing of harmful substances as par international regulations to achieve sustainability in the apparel industry.

Programme Outcomes (POs)

a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

d. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

f. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

g. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

h. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Course Outcomes (COs)

1. Explain the fundamentals of garment testing and test data management.

2. Interpret the specifications of quality standards and resolve the testing requirements of different protocols.

3. Classify the testing procedures of fabric and garment for determining care instruction of a garment.

4. Determine limits for restricted substances for achieving sustainability in garment quality.

5. Compare the regulatory requirements of harmful substances in different countries for different garments.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3		-	3	2	3	3	1	1				
2	3	3	-	-	3	2	3	3	2	1				
3	3	3	-	-	3	2	2	3	2	1			1	2
4	3	3	-	-	3	2	3	3	2	1				1
5	2	1	-		1	2	3	3	3	3				2

UNIT I   **9 Hours**
ESSENTIAL ELEMENTS OF GARMENT TESTING
Garment testing and its importance, Routine testing, Random testing and Supplier initiated testing, Test data management and analysis, Role of regulatory and special tests, Management of restricted substances for RSL compliance.

UNIT II   **9 Hours**
COMMON PROTOCOLS FOR GARMENT TESTING
Label verification, Identification, Washability, Performance, Colour fastness tests for woven, knitted, leather/suede and apparel related accessories such as belts, caps, ear muffs, gloves, hats, neckties, scarves and headbands, Special tests for technical outerwear, rainwear, intimate and sleepwear, sweaters, swimwear, down fill product and wrinkle resistance garment.

UNIT III   **9 Hours**
GARMENT TESTING FOR DETERMINING GARMENT CARE
Washing tests: Machine wash at different temperature, Normal cycle, Permanent press and Delicate cycle, Hand wash, Bleaching tests: Chlorine bleach and Non-chlorine bleach, Drying tests: Drip dry, Flat dry, Line dry and Tumble dry, Ironing tests: Cool, Warm and Hot, Drycleaning: Petroleum, Fluorocarbon and Perchloroethylene, Professional drycleaning.

UNIT IV   **9 Hours**
GARMENT TESTING FOR SUSTAINABILITY
Definition, Sustainable development and its goals, three dimensions of sustainability, Restricted Substances List (RSL), Testing of restricted substances such as carcinogenic and allergenic dyes, azo dyes, formaldehyde, chlorinated and other phenols, Chlorinated organic carriers, chromium VI, lead, cadmium, nickel, APEOs, Organotin compounds, phthalates, PVC, SCCPs, PAH, fluorocarbons, residual pesticides in garments, trims and embellishments, Overview of Manufacturing Restricted Substances List (MRSL) and its scope.

UNIT V   **9 Hours**
GLOBAL REGULATORY TESTING REQUIREMENTS ON HARMFUL SUBSTANCES IN TEXTILE AND APPAREL
US regulations: CPSA, CPSIA, FHSA, FIFRA, TSCA, Cal Prop 65, WCSPA, EPA, EU regulations: REACH, BPR, GOTS, OEKO TEX Standard, China regulation, Korea Certification, Japanese regulation, Regulations of Vietnam, Regulations of Taiwan, Regulations of India.

Total: 45 Hours

Reference(s)

1. Subrata Das, Product Safety and Restricted Substances in Apparel -2nd edition, Woodhead Publishing, 2016,

2. Nimkartek Technical Services Private Limited, Guidebook of Chemical Management for Textile and Apparel Industry, 2015.

3. Janace E. Bubonia, Apparel Quality: A Guide to Evaluating Sewn Products, Bloomsbury Publishing, 2014.

4. Texan Laboratories Private Limited, Ecological Considerations, parameters, and testing, 2011.

5. Subrata Das, Quality Characterisation of apparel, Woodhead Publishing.2010.

6. Sara J Kadolph, Quality Assurance for Textiles and Apparel, Fairchild Publicatons Inc., Chicago, 2007.

21FT707 PRODUCT DEVELOPMENT LABORATORY

0 0 4 2

Course Objectives

- To train the students in calculating material consumption for the fashion product.
- To impart the knowledge of executing sourcing activities for the materials identified in the fashion product
- To equip them develop technical specification sheet for the fashion product

Programme Outcomes (POs)
b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
d. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
g. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
h. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
m.Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

Course Outcomes (COs)

1. Create a problem brief based on the needs of the industry.
2. Carryout ideation and prototyping of possible solutions for the developed brief.
3. Develop products as a solution for the defined problems and present them visually.

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3		1					3	1		2		1
2	2	3		2					3	1		2		1
3	2	3		1					3	1		2	3	3

1   **6 Hours**
EXPERIMENT 1
Identify an area for a product development opportunity which can be a design problem, technical problem, industry related opportunity and define the same.

2   **6 Hours**

EXPERIMENT 2
Develop an empathy map from the inputs curated from the stake holders.

3   **6 Hours**
 EXPERIMENT 3
 Prepare a board with the recent possible solutions available in the market and other innovations.

4   **6 Hours**
 EXPERIMENT 4
 Develop atleast 25 possible ideas that would be the possible solution to the defined problem through different ideation techniques.

5   **6 Hours**
 EXPERIMENT 5
 Develop 6 prototypes of possible design solution selected from the 25 ideas and document the same.

6   **6 Hours**
 EXPERIMENT 6
 Develop a technical specification sheet for the final chosen design.

7   **6 Hours**
 EXPERIMENT 7
 Raise a BOM (Bill of materials) for the product to be developed and source the same.

8   **6 Hours**
 EXPERIMENT 8
 Develop the proposed product and record the steps (Phase I).

9   **6 Hours**
 EXPERIMENT 9
 Develop the proposed product and record the steps (Phase II).

10   **6 Hours**
 EXPERIMENT 10
 Develop a presentation board and a broacher highlighting your product and its features.
                                                                            Total: 60 Hours

21FT708 PROJECT WORK I   0 0 6 3

Course Objectives

- To develop knowledge to formulate a real world problem and project's goals.
- To identify the various tasks of the project to determine standard procedures.
- To identify and learn new tools, algorithms and techniques.
- To understand the various procedures for validation of the product and analysis the cost effectiveness.
- To understand the guideline to Prepare report for oral demonstrations.

Programme Outcomes (POs)

a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

d. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

f. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

g. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

h. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

k. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

l. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)

130

1. Formulate a real world problem, identify the requirement and develop the design solutions
2. Express the technical ideas, strategies and methodologies.
3. Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
4. Test and validate through conformance of the developed prototype and analysis the cost effectiveness.
5. Prepare report and present the oral demonstrations

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	2	2	1			2					1	2	3
2			3			1					1		2	3
3			3		2						2	1	2	3
4				3	3	1	2			1			2	3
5										3		2	2	3

21FT801 PROJECT WORK II   0 0 18 9

Course Objectives

- To develop knowledge to formulate a real world problem and project's goals.
- To identify the various tasks of the project to determine standard procedures.
- To identify and learn new tools, algorithms and techniques.
- To understand the various procedures for validation of the product and analysis the cost effectiveness.
- To understand the guideline to Prepare report for oral demonstrations.

Programme Outcomes (POs)

a. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

d. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

e. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

f. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

g. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

h. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

k. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

l. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

m. m. Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.

n. Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

Course Outcomes (COs)

1. Formulate a real world problem, identify the requirement and develop the design solutions
2. Express the technical ideas, strategies and methodologies.
3. Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
4. Test and validate through conformance of the developed prototype and analysis the cost effectiveness.
5. Prepare report and present the oral demonstrations

Articulation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	2	2	1			2					1	2	3
2			3			1					1		2	3
3	2		3		2						2	1	2	3
4	1			3	3	1	2			1			2	3
5										3		2	2	3