KCG

COLLEGE OF TECHNOLOGY

AFFILIATED TO ANNA UNIVERSITY | AUTONOMOUS

REGULATIONS - 2023

CURRICULUM AND SYLLABI

(2023-2024)

B.TECH.-FASHION TECHNOLOGY

KCG College of Technology was founded in 1998 to fulfill the Founder-Chairman, Dr. KCG Verghese's vision of **"To Make Every Man a Success and No Man a Failure".** It is a Christian minority institution, affiliated to Anna University (Autonomous), Chennai and approved by AICTE, New Delhi.

VISION OF KCG

KCG College of Technology aspires to become a globally recognized centre of excellence for science, technology & engineering education, committed to quality teaching, learning and research while ensuring for every student a unique educational experience which will promote leadership, job creation, social commitment and service to nation building.

MISSION OF KCG

- Disseminate knowledge in a rigorous and intellectually stimulating environment.
- Facilitate socially responsive research, innovation and entrepreneurship.
- Foster holistic development and professional competency.
- Nurture the virtue of service and an ethical value system in the young minds.

VISION OF FASHION TECHNOLOGY

The Department of Fashion Technology aims to be a center of excellence to create fashion technocrats by inculcating creativity, technical expertise and managerial proficiency for contributing innovative, aesthetic and functional fashion clothing to the society.

MISSION OF FASHION TECHNOLOGY

- ***Impart*** comprehensive technical knowledge with ethical values in all fashion apparel domains to contribute sustainable fashion products to the society.
- ***Imbibe*** professional approach and hands-on-experience through state-of–the-art infrastructure.
- ***Inculcate*** creativity and analytical thinking to provide techno-economic solutions for the advancement of apparel industry.
- ***Instill*** life-long learning to build excellent careers in higher education, employment, research and entrepreneurship.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

The graduates will:

PEO 1	Enrich a powerful base to pursue a successful professional and technical career with ethical values.
PEO 2	Cultivate managerial acumen in apparel domain and provide techno-economic solutions to the problems.
PEO 3	Equip the students to develop practical and innovative products and services with societal impact
PEO 4	Engross in life-long learning to keep abreast with emerging technology.

PROGRAM OUTCOMES (POs)

Engineering graduates will be able to:

PO 01	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 02	Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 03	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.
PO 04	Use research based knowledge and methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 05	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.
PO 06	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.

PO 07	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 08	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 09	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	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.
PO 11	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.
PO 12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadcast context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 01	Analyse, design and solve complex problems in textile based garment and fashion industries
PSO 02	Apply fashion design concepts, digital tools, sustainable and smart materials to execute fashion business
PSO 03	Develop ethical products and manufacturing process for fashion and garment fields as per societal requirements

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KCG COLLEGE OF TECHNOLOGY
AUTONOMOUS
REGULATIONS 2023
B.TECH – FASHION TECHNOLOGY
CHOICE BASED CREDIT SYSTEM
CURRICULUM FOR SEMESTERS I TO VIII

SEMESTER–I

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact Periods	Credits
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23AD101	Programming in Python	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23AD121	Python Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				16	0	12	28	21

*** The grades earned by the students will be recorded in the Mark Sheet. However, the same shall not be considered for the computation of CGPA**

SEMESTER –II

Sl. No.	Course code	Course Title	Category	Periods Per Week			Total Contact Periods	Credits
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English/ Foreign language	HSMC	3	0	0	3	3
2	23MA203	Statistics and Numerical Methods	BSC	3	1	0	4	4
3	23PH206	Material Science	BSC	3	0	0	3	3
4	23FT201	Introduction to Global Fashion Industry and Fashion Design	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE282	Basic Electrical, Electronics and Instrumentation Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	PCC	0	0	4	4	2
9	23FT221	Fashion Designing Laboratory	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**14**	**33**	**25**

*** The grades earned by the students will be recorded in the Mark Sheet. However, the same shall not be considered for the computation of CGPA**

SEMESTER-III

Sl. No.	Course code	Course Title	Category	Periods Per Week			Total Contact Periods	Credits
				L	T	P		
THEORY								
1	23MA304	Probability and Statistical Methods	BSC	3	1	0	4	4
2	23FT301	Technology of Spinning Processes	PCC	3	0	0	3	3
3	23FT302	Garment Construction I	PCC	3	0	0	3	3
4	23HS301	Universal Human Values and Ethics	HSMC	3	0	0	3	3
THEORY AND PRACTICALS								
5	23FT311	Textile Fiber Science and Characteristics	PCC	3	0	2	5	4
6	23FT312	Pattern Engineering	PCC	2	0	4	6	4
PRACTICALS								
7	23FT321	Computer Aided Fashion Designing Laboratory	PCC	0	0	4	4	2
8	23FT322	Garment Components Construction Laboratory	PCC	0	0	4	4	2
9	23ES391	Presentation Skills	EEC	0	0	2	2	1*
TOTAL				17	1	16	34	25

*** The grades earned by the students will be recorded in the Mark Sheet. However, the same shall not be considered for the computation of CGPA**

SEMESTER-IV

Sl. No.	Course code	Course Title	Category	Periods Per Week			Total Contact Periods	Credits
				L	T	P		
THEORY								
1	23CY401	Chemistry for Textile Technologists	BSC	3	0	0	3	3
2	23FT401	Woven Fabric Manufacturing and Structures	PCC	3	1	0	4	4
3	23FT402	Knitted Fabric Manufacturing and Structures	PCC	3	0	0	3	3
4	23FT403	Apparel Machineries and Equipment	PCC	3	0	0	3	3
5		Department Elective - 1	DEC	3	0	0	3	3
6		Department Elective - 2	DEC	3	0	0	3	3
PRACTICALS								
7	23FT421	Fabric Structure Laboratory	PCC	0	0	4	4	2
8	23FT422	Garment Construction Laboratory I	PCC	0	0	4	4	2
9	23ES491	Aptitude and Logical reasoning -1	EEC	0	0	2	2	*1
10	23FT423/ 23FT424	In-plant Training / Mini Project – 1	EEC	0	0	2	2	1
TOTAL				18	1	12	31	24

SEMESTER-V

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact Periods	Credits
				L	T	P		
THEORY								
1	23RE501	Research Methodology and Intellectual Property Rights	ESC	2	0	0	2	2
2	23FT501	Apparel Marketing and Merchandising	PCC	3	0	0	3	3
3		Department Elective - 3	DEC	3	0	0	3	3
4		Department Elective - 4	DEC	3	0	0	3	3
5		Open Elective - 1 (Emerging Technology)	OEC	3	0	0	3	3
THEORY AND PRACTICALS								
6	23FT511	Textile Chemical Processing	PCC	3	0	2	5	4
PRACTICALS								
7	23FT521	Computer Aided Garment Designing Laboratory	PCC	0	0	4	4	2
8	23FT522	Mini Project – 2	EEC	0	0	4	4	2
9	23ES591	Aptitude and Logical Reasoning -2	EEC	0	0	2	2	1*
TOTAL				17	0	12	29	22

*** The grades earned by the students will be recorded in the Mark Sheet. However, the same shall not be considered for the computation of CGPA**

SEMESTER VI

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact Periods	credits
				L	T	P		
THEORY								
1		Department Elective – 5	DEC	3	0	0	3	3
2		Department Elective – 6	DEC	3	0	0	3	3
3		Open Elective – 2 (Management / Safety Courses)	OEC	3	0	0	3	3
THEORY AND PRACTICALS								
4	23CE611	Environmental Science and Engineering	ESC	3	0	2	5	4
5	23FT611	Garment Construction II	PCC	2	0	4	6	4
6	23FT612	Fabric and Garment Quality Evaluation	PCC	3	0	2	5	4
PRACTICALS								
7	23FT621	Project Work-Phase 1	EEC	0	0	4	4	2
8	23FT622	Technical Training	EEC	0	0	2	2	1
9	23FT623	Technical Seminar - 1	ESC	0	0	2	2	1
TOTAL				**17**	**0**	**16**	**33**	**25**

SEMESTER -VII

Sl. No.	Course Code	Course Title	Category	periods Per Week			Total Contact Periods	Credits
				L	T	P		
THEORY								
1		Open Elective - 3 (Management Courses)	OEC	3	0	0	3	3
2	23FT701	Apparel Production Planning and Process Control	PCC	3	0	0	3	3
3	23FT702	Fundamentals of Accounting and Apparel Costing	PCC	3	0	0	3	3
4	23FT703	Comprehension	EEC	2	0	0	2	2
THEORY AND PRACTICALS (INTEGRATED COURSE)								
5	23FT711	Industrial Engineering in Garment Manufacturing	PCC	3	0	2	5	4
PRACTICALS								
6	23FT721	Project work Phase - 2	EEC	0	0	6	6	3
7	23FT722	Industrial Training	EEC	0	0	4	4	2
TOTAL				14	0	12	26	20

SEMESTER -VIII

Sl. No.	Course code	Course Title	Category	Periods Per Week			Total Contact Periods	Credits
				L	T	P		
PRACTICALS								
1	23FT821/ 23FT822	Capstone Project / Internship cum Project	EEC	0	0	20	20	10
TOTAL				0	0	20	20	10

TOTALCREDITS: 172

DEPARTMENT ELECTIVE COURSES: VERTICALS

VERTICAL 1: FASHION DESIGNING

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact periods	Credits
				L	T	P		
1	23FT031	Fashion Evolution	DEC	3	0	0	3	3
2	23FT032	Indian Traditional Textiles and Crafts	DEC	3	0	0	3	3
3	23FT033	Color Psychology and Forecasting	DEC	3	0	0	3	3
4	23FT034	Surface Embellishments	DEC	2	1	0	3	3
5	23FT035	Principles and Elements of Designing	DEC	3	0	0	3	3
6	23FT036	Digital Fashion and Apparel Design	DEC	3	0	0	3	3
7	23FT037	Fashion Communication and Design Foundation	DEC	3	0	0	3	3

VERTICAL 2 : SUSTAINABLE FASHION PRODUCT DEVELOPMENT

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact periods	Credits
				L	T	P		
1	23FT038	Fashion Product Development	DEC	3	0	0	3	3
2	23FT039	Sustainable Textiles	DEC	3	0	0	3	3
3	23FT040	Sustainable and Eco-fashion	DEC	3	0	0	3	3
4	23FT041	Garment Finishing and Care	DEC	3	0	0	3	3
5	23FT042	Knit Product Development	DEC	3	0	0	3	3
6	23FT043	Home Furnishing	DEC	3	0	0	3	3
7	23FT044	Apparel Trims and Accessories	DEC	3	0	0	3	3

VERTICAL 3 : TECHNICAL TEXTILES

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact periods	Credits
				L	T	P		
1	23FT045	Basics of Technical textiles	DEC	3	0	0	3	3
2	23FT046	Coating and laminates	DEC	3	0	0	3	3
3	23FT047	Nano textiles	DEC	3	0	0	3	3
4	23FT048	Protective Textiles	DEC	3	0	0	3	3
5	23FT049	Medical textiles	DEC	3	0	0	3	3
6	23FT050	Smart and Intelligent Textiles	DEC	3	0	0	3	3
7	23FT051	Sports Textiles	DEC	3	0	0	3	3

VERTICAL 4 : SPECIALITY APPARELS

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact periods	Credits
				L	T	P		
1	23FT052	Clothing Science, Comfort and Fit	DEC	3	0	0	3	3
2	23FT053	Functional Apparels	DEC	3	0	0	3	3
3	23FT054	Manufacturing of Functional Apparels	DEC	3	0	0	3	3
4	23FT055	Intimate Apparels	DEC	3	0	0	3	3
5	23FT056	Denim Processing and Apparels	DEC	3	0	0	3	3
6	23FT057	Leather Garment Technology	DEC	3	0	0	3	3
7	23FT058	Smart wearables	DEC	3	0	0	3	3

VERTICAL 5 : APPAREL MARKETING AND RETAIL

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact periods	Credits
				L	T	P		
1	23FT059	Fashion Forecasting	DEC	3	0	0	3	3
2	23FT060	Visual Merchandising	DEC	2	1	0	3	3
3	23FT061	Apparel Retail Management	DEC	2	1	0	3	3
4	23FT062	Apparel Brand Management	DEC	3	0	0	3	3
5	23FT063	Digital Marketing and E- Business	DEC	3	0	0	3	3
6	23FT064	Fashion Photography	DEC	3	0	0	3	3
7	23FT065	Digital Fashion and Branding	DEC	3	0	0	3	3

VERTICAL 6 : APPAREL MANUFACTURING

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact periods	Credits
				L	T	P		
1	23FT066	Computer Applications in Apparel Manufacturing	DEC	3	0	0	3	3
2	23FT067	Advanced Technologies and Automations for Apparel Industry	DEC	3	0	0	3	3
3	23FT068	Lean Manufacturing	DEC	3	0	0	3	3
4	23FT069	Supply Chain Management for Apparel Industry	DEC	3	0	0	3	3
5	23FT070	Social Compliances and Quality Assurance in Apparel Industry	DEC	3	0	0	3	3
6	23FT071	ERP and MIS in Apparel Industry	DEC	3	0	0	3	3
7	23FT072	Operation Research in Apparel Industry	DEC	3	0	0	3	3

VERTICAL 7 : APPAREL BUSINESS MANAGEMENT

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact periods	Credits
				L	T	P		
1	23FT073	Entrepreneurship in Apparel Manufacture	DEC	3	0	0	3	3
2	23FT074	Sustainable Apparel Business Management	DEC	3	0	0	3	3
3	23FT075	International Textile and Apparel Business Management	DEC	3	0	0	3	3
4	23FT076	Energy Management in Apparel Industry	DEC	3	0	0	3	3
5	23FT077	Human Resource Management	DEC	3	0	0	3	3
6	23FT078	Boutique management	DEC	3	0	0	3	3
7	23FT079	E -commerce business management	DEC	3	0	0	3	3

OPEN ELECTIVE – EMERGING TECHNOLOGIES

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact periods	Credits
				L	T	P		
1	23OAD971	Artificial Intelligence and Machine Learning Fundamentals	OEC	3	0	0	3	3
2	23OAD972	Foundation of Big Data Analytics	OEC	3	0	0	3	3
3	23OCB971	Cyber Law	OEC	3	0	0	3	3
4	23OCS971	Augmented Reality and Virtual Reality	OEC	3	0	0	3	3
5	23OCS972	Data Science and Fundamentals	OEC	3	0	0	3	3
6	23OEC971	IoT concepts and applications	OEC	3	0	0	3	3
7	23OED971	Introduction to Design Thinking	OEC	3	0	0	3	3
8	23OED972	Intellectual Property Law	OEC	3	0	0	3	3
9	23OED973	Circular Economy	OEC	3	0	0	3	3
10	23OEE971	Renewable Energy Technologies	OEC	3	0	0	3	3
11	23OEE972	Integrated Energy Planning for Sustainable Development	OEC	3	0	0	3	3
12	23OIT971	Block Chain Technology	OEC	3	0	0	3	3

OPEN ELECTIVE – MANAGEMENT COURSES

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact Periods	Credits
				L	T	P		
1	23OMG971	Total Quality Management	OEC	3	0	0	3	3
2	23OMG972	Engineering Economics and Financial Accounting	OEC	3	0	0	3	3
3	23OMG973	Engineering Management and Law	OEC	3	0	0	3	3
4	23OMG974	Knowledge Management	OEC	3	0	0	3	3
5	23OMG975	Industrial Management	OEC	3	0	0	3	3
6	23OMG976	Entrepreneurship and Business Opportunities	OEC	3	0	0	3	3
7	23OMG977	Modern Business Administration and Financing	OEC	3	0	0	3	3
8	23OMG978	Essentials of Management	OEC	3	0	0	3	3

OPEN ELECTIVE – SAFETY RELATED COURSES

Sl. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact Periods	Credits
				L	T	P		
1	23OAU981	Automotive Safety	OEC	3	0	0	3	3
2	23OCE981	Disaster Management	OEC	3	0	0	3	3
3	23OME981	Industrial Safety	OEC	3	0	0	3	3

SEMESTER-WISE CREDIT DISTRIBUTION

SEMESTER	HSMC	BSC	ESC	PCC	DEC	OEC	EEC	Total
Semester I	**5**	**11**	**5**					**21**
Semester II	**4**	**7**	**9**	**5**				**25**
Semester III	**3**	**4**		**18**				**25**
Semester IV		3		**14**	**6**		**1**	**24**
Semester V			**2**	**9**	**6**	**3**	**2**	**22**
Semester VI			**5**	**8**	**6**	**3**	**3**	**25**
Semester VII				**10**		**3**	**7**	**20**
Semester VIII							**10**	**10**
Total	**12**	**25**	**21**	**64**	**18**	**9**	**23**	**172**

SEMESTER –I

23IP101	INDUCTION PROGRAMME	L	T	P	C
		-	-	-	0

COURSE OBJECTIVES:

- This is a mandatory 2 weeks Programme to be conducted as soon as the students enter the institution. Normal classes start only after the induction program is over.
- The induction Programme has been introduced by AICTE with the following objectives
- Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his/her study. However, he/she must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed.
- One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character
- Hence, the purpose of this Programme is to make the

students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature

- **Physical Activity**
  This would involve a daily routine of physical activity with games and sports, yoga, gardening, etc.,
- **Life skills**
  Every student would choose one skill related to daily needs such as stitching, accounting, finance management, etc.,

Universal human values

This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human Values provides the base. Methodology of teaching this content is extremely important. It must not be through dos and don'ts, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real-life activities rather than lecturing.

Club Activity

Students will be introduced to more than 20 Clubs available in the college-both technical and non-technical. The student can choose as to which club the student will enroll in.

Value Based Communication
This module will focus on improving the communication skills of students
Lectures by Alumni
Lectures by alumni are arranged to bring in a sense of belonging to the student towards the institution and also to inspire them to perform better
Visits to Local Area
A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged
Familiarization to Dept./Branch & Innovations
They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities
Address by different heads
Heads of Placement, Training, Student affairs, counsellor, etc would be interacting with the students to introduce them to various measures taken in the institution for the betterment of students.
Induction Programme is totally an activity-based Programme and therefore there shall be no tests / assessments during this Programme.
REFERENCES:
Guide to Induction program from AICTE

23HS101	ESSENTIAL COMMUNICATION	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To help learners extract information from short and simple correspondence
- To familiarize learners with different text structures by engaging them in reading, writing and grammar learning activities
- To help learners write coherent, short paragraphs and essays
- To enable learners to use language efficiently while expressing their opinions via various media.

UNIT I	FORMATION OF SENTENCES	9

Reading- Read pictures-notices- short comprehension passages and recognize main ideas and specific details. Writing- framing simple and compound sentences, completing sentences, developing hints, writing text messages. Language development- Parts of Speech, Wh- Questions, yes or no questions, direct and indirect questions. Vocabulary development– prefixes- suffixes- articles – countable and uncountable nouns

UNIT II	NARRATION AND DESCRIPTION	9

Reading – Read short narratives and descriptions from newspapers, dialogues and conversations. Reading strategies and practices. Language development – Tenses- simple present, present continuous, present perfect, simple past, past continuous, past perfect, simple future, future continuous, past participle, pronouns. Vocabulary development- guessing meanings of words in context. Writing – Write short narrative paragraphs, biographies of friends/relatives - writing- topic sentence- main ideas- free writing, short narrative descriptions using some suggested vocabulary and structures.

UNIT III	COMPARING AND CONTRASTING	9
Reading- short texts and long texts -understanding different types of text structures, -coherence-jumbled sentences. Language development- degrees of comparison, concord- Vocabulary development – single word substitutes- discourse markers- use of reference words Writing - comparative and contrast paragraphs writing- topic sentence- main idea, free writing, compare and contrast using some suggested vocabulary and structures.		
UNIT IV	**SOCIAL MEDIA COMMUNICATION**	**9**
Reading- Reading blogs, social media reviews, posts, comments, process description, Language development - relative clause, Vocabulary development- social media terms-words, abbreviations and acronyms Writing- -e-mail writing-conventions of personal email, descriptions for simple processes, critical online reviews, blog, website posts, commenting to posts.		
UNIT V	**ESSAY WRITING**	**9**
Reading- Close reading non-technical longer texts Language development - modal verbs, phrasal verbs- Vocabulary development - collocation. Writing- Writing short essays- brainstorming – developing an outline- identifying main and subordinate ideas.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:

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

CO1:	Summarize simple, level-appropriate texts of around 300 words recognizing main ideas and specific details.
CO2:	Demonstrate the understanding of more complex grammatical structures and diction while reading and writing.

CO3:	Use appropriate expressions to describe, compare and contrast people, things, situations etc., in writing.
CO4:	Establish the ability to communicate effectively through emails.
CO5:	Determine the language use appropriate for different social media platforms.
CO6:	Use appropriate expressions for narrative descriptions and process descriptions.
TEXT BOOKS:	
1	Susan Proctor, Jack C. Richards, Jonathan Hull. Interchange Level 2. Cambridge University Press and Assessment
2	Susan Proctor, Jack C. Richards, Jonathan Hull. Interchange Level 3. Cambridge University Press and Assessment
REFERENCES:	
1	Dutt P. Kiranmai and Rajeevan Geeta. Basic Communication Skills, Foundation Books: 2013
2	Means,L. Thomas and Elaine Langlois. English & Communication for Colleges. Cengage Learning , USA: 2007

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	-	-	-	-	-	1	1	-	2	3	-	2	-	-	-
2	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-
3	-	-	-	-	-	1	1	-	2	3	-	2	-	-	-
4	-	-	-	-	-	-	-	-	-	3	-	2	-	-	-
5	-	-	-	-	-	1	1	-	3	3	-	2	-	-	-
6	-	-	-	-	-	1	1	-	3	3	-	2	-	-	-
Overall Correlation	-	-	-	-	-	**1**	**1**	-	**3**	**3**	-	**2**	-	-	-

Recommended by Board of Studies	**02-08-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

23MA101	MATRICES AND CALCULUS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications

UNIT I	MATRICES	9

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms – Applications: Stretching of an elastic membrane.

UNIT II	DIFFERENTIAL CALCULUS	9

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications : Maxima and Minima of functions of one variable.

UNIT III	FUNCTIONS OF SEVERAL VARIABLES	9

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multiplier.

UNIT IV	INTEGRAL CALCULUS	9

Definite and Indefinite integrals - Substitution rule - Techniques of

Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.		
UNIT V	**MULTIPLE INTEGRALS**	**9**
Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Apply the matrix algebra techniques and applications in Engineering Problems.
CO2:	Make use of the concept of limits and rules of differentiation to differentiate functions
CO3:	Find the derivative of functions of several variables
CO4:	Examine the application of partial derivatives
CO5:	Compute integrals by different techniques of Integration.
CO6:	Apply the concept of integration to compute multiple integrals.
TEXT BOOKS:	
1	Kreyszig. E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
2	James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 8th Edition, New Delhi, 2015.
REFERENCES:	
1	Dr.P.Sivaramakrishnadas, Dr.C.Vijayakumari., — Matrices and Calculus‖ Pearson Publications Andrews. L.C and Shivamoggi. B, "Integral Transforms for Engineers" SPIE Press, 1999.
2	Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2016

3	Bali. N., Goyal. M. and Watkins. C., ―Advanced Engineering Mathematics‖, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
4	Narayanan. S. and Manicavachagom Pillai.T. K., ―Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
2	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
3	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
4	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
5	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
6	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
Overall Correlation	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-

Recommended by Board of Studies	**02-08-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

23AD101	PROGRAMMING IN PYTHON	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To know the basics of Programming.
- To convert an algorithm into a Python program.
- To construct Python programs with control structures.
- To structure a Python Program as a set of functions.
- To use Python data structures-lists, tuples, dictionaries and files.

UNIT I	COMPUTATIONAL THINKING	9

Introduction to Computing and Problem Solving: Fundamentals of Computing –Computing Devices – Identification of Computational Problems – Pseudo Code and Flowcharts – Instructions – Algorithms – Building Blocks of Algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion).

UNIT II	INTRODUCTION TO PYTHON	9

Introduction to Python Programming: Python Interpreter and Interactive Mode– Variables and Identifiers – Arithmetic Operators – Values and Types – Statements, Reading Input, Print Output, Type Conversions, type () Function and Is Operator, Dynamic and Strongly Typed Language. Control Flow Statements: if, if…else, if…elif…else Decision Control Statements, Nested if Statement, while Loop, for Loop, continue and break Statements.

UNIT III	FUNCTIONS AND STRINGS	9

Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments. Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.

UNIT IV	LISTS, TUPLES, DICTIONARIES AND FILES	9
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list Parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension. Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages.		
UNIT V	**OBJECT-ORIENTED AND FUNCTIONAL PROGRAMMING**	**9**
Object-Oriented Programming: Classes and Objects, Creating Classes in Python,Creating Objects in Python, The Constructor Method, Classes with Multiple Objects, Class Attributes versus Data Attributes, Encapsulation, Inheritance, Polymorphism. Functional Programming: Lambda. Iterators, Generators, List Comprehensions.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Develop algorithmic solutions to simple computational problems.
CO2:	Develop and execute simple Python programs using Control Statements
CO3:	Develop simple Python programs for solving problems using Functions and Strings
CO4:	Build a Python program using lists, tuples, dictionaries and files.
CO5:	Construct a code related to Object-Oriented.
CO6:	Construct a code related to Functional Programming.

TEXT BOOKS:	
1	Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think- python/).

2	Karl Beecher, “Computational Thinking: A Beginner's Guide to Problem Solving and Programming”, 1st Edition, BCS Learning & Development Limited, 2017.
REFERENCES:	
1	Learning To Program with Python. Richard L. Halterman. Copyright © 2011
2	Python for Everybody, Exploring Data Using Python 3. Dr. Charles R. Severance. 2016.
3	Paul Deitel and Harvey Deitel, “Python for Programmers”, Pearson Education, 1st Edition, 2021.
4	G Venkatesh and Madhavan Mukund, “Computational Thinking: A Primer for Programmers and Data Scientists”, 1st Edition, Notion Press, 2021.
5	John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data‘‘, Third Edition, MIT Press , 2021
6	Eric Matthes, “Python Crash Course, A Hands - on Project Based Introduction to Programming”, 2nd Edition, No Starch Press, 2019.
7	https://www.python.org/
8	Martin C. Brown, “Python: The Complete Reference”, 4th Edition, Mc-Graw Hill, 2018.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	1	1	1	-	-	-	-	1	3	1	-
2	3	2	1	1	1	-	-	-	-	-	-	1	3	1	-
3	3	2	1	1	1	-	-	-	-	-	-	1	3	1	-
4	3	2	1	1	1	-	-	-	-	-	-	1	3	1	-
5	3	2	1	1	1	-	-	-	-	-	-	1	3	1	-
6	3	2	1	1	1	-	-	1	1	1	1	1	3	1	1
Overall Correlation	**3**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**3**	**1**	**1**

Recommended by Board of Studies	**02-08-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

23HS102	HERITAGE OF TAMILS	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

- Explain the classical literature of Tamil and highlight notable Tamil poets.
- Explain the creation of traditional Tamil musical instruments.
- Explain the sports and games associated with Tamil heritage.
- Explore the education and literacy practices during the Sangam period.
- Explain the contributions of Tamils to the Indian freedom struggle.
- Explain the development and history of printing in Tamil Nadu.

UNIT I	LANGUAGE AND LITERATURE	3

Language Families in India – Dravidian Languages – Tamil as a Classical Language – Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature – Management Principles in Thirukural – Tamil Epics and Impact of Buddhism & Jainism in Tamil Land – Bakthi Literature Azhwars and Nayanmars – Forms of minor Poetry – Development of Modern literature in Tamil – Contribution of Bharathiyar and Bharathidhasan.

UNIT II	HERITAGE – ROCK ART PAINTINGS TO MODERN ART – SCULPTURE	3

Hero stone to modern sculpture – Bronze icons – Tribes and their handicrafts – Art of temple car making – – Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments – Mridhangam, Parai, Veenai, Yazh and Nadhaswaram – Role of Temples in Social and Economic Life of Tamils.

UNIT III	**FOLK AND MARTIAL ARTS**	**3**
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance – Sports and Games of Tamils.		
UNIT IV	**THINAI CONCEPT OF TAMILS**	**3**
Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature – Aram Concept of Tamils – Education and Literacy during Sangam Age – Ancient Cities and Ports of Sangam Age – Export and Import during Sangam Age – Overseas Conquest of Cholas		
UNIT V	**CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE**	**3**
Contribution of Tamils to Indian Freedom Struggle – The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement – Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.		
TOTAL: 15 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Explain the evolution of Tamil language and literature, focusing on its cultural, ethical, and secular themes.
CO2:	Outline the making of musical instruments related to Tamil heritage.
CO3:	Discuss the sports and games of Tamils
CO4:	Explain the education and literacy during Sangam age.
CO5:	Express the importance and contribution of Tamils to Indian Freedom Struggle
CO6:	Outline the print history of books in Tamil Nadu

TEXT BOOKS:	
1	தமிழக வரலாறு-மக்களும் பண்பாடும்-கே.கேபிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2	கணினித்தமிழ் – முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்).
REFERENCES:	
1	**கீழடி- வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)**
2	பொருனை- ஆற்றங்கரை **நாகரிகம் (தொல்லியல் துறை வெளியீடு)**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-
2	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-
3	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-
4	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-
5	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-
6	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-
Overall Correlation		-	-	-	-	**2**	**2**	-	-	-	-	-	-	-	-

Recommended by Board of Studies	02-08-2023		
Approved	1st ACM	Date	09-09-2023

23PH111	ENGINEERING PHYSICS	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To make the students effectively achieve an understanding of mechanics.
- To enable the students to gain knowledge of electromagnetic waves and its applications.
- To introduce the basics of optics and lasers.
- To equip the students successfully understand the importance of quantum physics.
- To motivate the students towards the applications of quantum mechanics.

UNIT I	MECHANICS	9

Types of stress, Stress-strain diagram and its uses- factors affecting elastic modulus- tensile strength- Bending of beams, bending moment – theory and experiment: Uniform and non-uniform bending, Center of mass (CM) – CM of continuous bodies –rod, motion of the CM. Rotation of rigid bodies: Rotational kinematics – rotational kinetic energy and moment of inertia - theorems of M .I –moment of inertia of rod, disc, solid sphere – M.I of a diatomic molecule - torque -rotational energy state of a rigid diatomic molecule – M.I of disc by torsional pendulum

UNIT II	ELECTROMAGNETIC WAVES	9

Concept of field-introduction to gradient, divergence and curl of field – Stokes theorem (No proof)-Gauss divergence theorem (No proof) - The Maxwell's equations in integral form and differential form - wave equation; Plane electromagnetic waves in vacuum - properties of electromagnetic waves: speed, amplitude, phase, orientation and waves in matter - Energy and momentum in EM waves-Poynting's vector - Cell-phone reception.

UNIT III	OPTICS AND LASERS	9

Reflection and refraction of light waves - total internal reflection –

types of optical fiber, Numerical Aperture and acceptance angle - interference –Theory of air wedge and experiment. Theory of laser - characteristics - Spontaneous and stimulated emission - Einstein's coefficients(Qualitative) - population inversion - CO2 laser, semiconductor laser (Homo junction) - Applications of lasers in industry.

UNIT IV	BASIC QUANTUM MECHANICS	9

Photons and light waves - Electrons and matter waves –Compton effect - The Schrodinger equation (Time dependent and time independent forms) - meaning of wave function - Normalization – Free particle - particle in a infinite potential well: 1D,2D and 3D Boxes- Normalization, probabilities and the correspondence principle.

UNIT V	ADVANCED QUANTUM MECHANICS	9

The harmonic oscillator(qualitative)- Barrier penetration and quantum tunneling(qualitative)- Tunneling microscope - Resonant diode - Finite potential wells (qualitative)- Bloch's theorem for particles in a periodic potential –Basics of Kronig-Penney model and origin of energy bands.

TOTAL: 45 PERIODS

PRACTICAL EXERCISES: (Any Seven Experiments)

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects
2. Simple harmonic oscillations of cantilever
3. Non-uniform bending- Determination of Young's modulus
4. Uniform bending–Determination of Young's modulus
5. Laser-Determination of the wavelength of the laser using grating
6. Airwedge- Determination of thickness of a thinsheet /wire

7. a) Optical fibre-Determination of Numerical Aperture and acceptance angle b) Compact disc-Determination of width of the groove using laser. 8. Acoustic grating-Determination of velocity of ultrasonic waves in liquids. 9. Ultrasonic interferometer–determination of the velocity of sound and compressibility of liquids 10. Post office box-Determination of Band gap of a semiconductor. 11. Photoelectric effect 12. Michelson Interferometer. 13. Melde's string experiment 14. Experiment with lattice dynamics kit.	
TOTAL: 30 PERIODS	
COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Determine the mechanical properties of materials.
CO2:	Apply the principles of electromagnetic waves to real world system.
CO3:	Determine the thickness of thin wire and the characteristic parameter of an optical fiber.
CO4:	Apply the principles of lasers to real world application.
CO5:	Organize the quantum mechanical properties of particles and waves.
CO6:	Utilize the quantum mechanical principles towards the formation of energy bands.
TEXT BOOKS:	
1	D.Kleppner and R.Kolenkow, "An Introduction to Mechanics", McGraw Hill Education (Indian Edition), 2017.
2	Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, "Concepts of Modern Physics", McGraw-Hill (Indian Edition), 2017.

REFERENCES:	
1	R.Wolfson," Essential University Physics", Volume 1 & 2. Pearson Education (Indian Edition), 2009.
2	Paul A. Tipler, "Physic – Volume 1 & 2", CBS, (Indian Edition), 2004.
3	K.Thyagarajan and A.Ghatak,"Lasers: Fundamentals and Applications," Laxmi Publications, (Indian Edition), 2019.
4	D.Halliday, R.Resnick and J.Walker, "Principles of Physics", Wiley (Indian Edition), 2015.
5	N.Garcia, A.Damask and S.Schwarz, "Physics for Computer Science Students",Springer Verlag, 2016.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
2	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
3	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
4	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
5	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
6	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
Overall Correlation	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-

Recommended by Board of Studies	02-08-2023		
Approved	1st ACM	Date	09-09-2023

23CY111	ENGINEERING CHEMISTRY	L	T	P	C
		3	0	1	4

COURSE OBJECTIVES:

- To inculcate sound understanding of water quality parameters and water treatment techniques.
- To impart knowledge on the basic principles and preparatory methods of nanomaterials.
- To introduce the basic concepts and applications of phase rule and composites.
- To facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics.
- To familiarize the students with the operating principles, working processes and applications of energy conversion and storage batteries.

UNIT I	WATER AND ITS TREATMENT	9

Water: Sources and impurities, Water quality parameters: Definition and significance of-color, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, flouride and arsenic. Sewage treatment primary treatment and disinfection (UV, Ozonation, break-point chlorination). Hardness-Estimation of Hardness of water by EDTA-numerical Problems-Desalination of brackish water: Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming &foaming. Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and External treatment – Ion exchange demineralization and zeolite process

UNIT II	NANOCHEMISTRY	9

Basics: Distinction between molecules, nanomaterials and bulk materials; Size-dependent properties (optical, electrical, mechanical and magnetic); Types of nanomaterials (Metal oxide and Metal) Synthesis and Characterization of nanomaterials: sol-gel, solvothermal, laser ablation, chemical

vapour deposition, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, energy, sensor , electronics and catalysis.

UNIT III	PHASE RULE AND COMPOSITES	9

Phase rule: Introduction, definition of terms with examples. One component system – water system; CO_2 system; Reduced phase rule; Two component system: lead-silver system – Pattinson process. Composites: Definition & Need for composites; Constitution: Matrix materials (Polymer matrix, metal matrix and ceramic matrix) and Reinforcement (fiber, particulates, flakes and whiskers). Properties and applications of: Metal matrix composites (MMC), Ceramic matrix composites and Polymer matrix composites. Hybrid composites – definition and examples.

UNIT IV	FUELS AND COMBUSTION	9

Fuels: Fossil Fuels, Classification of fuels; Coal and coke: Analysis of coal (proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and Diesel: Manufacture of synthetic petrol (Bergius process), Knocking – octane number, diesel oil – cetane number; Power alcohol and biodiesel. Combustion of fuels: Introduction: Calorific value – higher and lower calorific values, Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis – ORSAT Method. CO_2 emission and carbon sequestration, Green Hydrogen.

UNIT V	ENERGY SOURCES AND STORAGE DEVICES	9

Nuclear fission and fusion- light water nuclear power plant, breeder reactor. Solar energy conversion: Principle, working and applications of solar cells; Recent developments in solar cell materials. Wind energy; Geothermal energy; Batteries: Types of batteries, Primary battery – dry cell, Secondary battery – lead acid battery and lithium-ion battery; Electric vehicles – working

principles; Fuel cells: H_2-O_2 fuel cell, microbial fuel cell and its advanced technology, supercapacitor.	
TOTAL: 45 PERIODS	
LIST OF EXPERIMENTS	**TOTAL: 30 PERIODS**
1. Determination of hardness causing salts in water sample by EDTA method. 2. Determination of alkalinity in water sample. 3. Determination of chloride content of water sample by argentometric method. 4. Determination of strength of given Barium chloride using conductivity meter. 5. Determination of strength of Acid using pH meter. 6. Determination of strength of FAS by potentiometer 7. Determination of strength of acids in a mixture using conductivity meter. 8. Preparation of nanoparticles (TiO_2/ZnO/CuO) by Sol-Gel method. **9.** Estimation of Nickel in steel	
COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Interpret the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
CO2:	Illustrate the basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
CO3:	Estimate the knowledge of phase rule and composites for material selection requirements
CO4:	Choose a suitable fuel for engineering processes and applications
CO5:	Relate the different forms of energy resources and apply them for suitable applications in energy sectors.
CO6:	Explain the different types of batteries, fuel cells and working principles of Electric vehicles

TEXT BOOKS:	
1	P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2	Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3	S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018.
REFERENCES:	
1	B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2	O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3	Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014New Delhi, 2018.
4	ShikhaAgarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019
5	O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	-	2	-	-	-	-	1	2	-	-
2	2	1	-	-	-	-	2	-	-	-	-	1	2	-	-
3	2	1	-	-	-	-	2	-	-	-	-	1	2	-	-
4	3	2	1	1	-	-	3	-	-	-	-	2	3	-	-
5	3	2	1	1	-	-	3	-	-	-	-	2	3	-	-
6	2	1	-	-	-	-	2	-	-	-	-	1	2	-	-
Overall Correlation	**3**	**2**	**1**	**1**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**2**	**3**	**-**	**-**

Recommended by Board of Studies	**28-07-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

23AD121	PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

The main objective of this laboratory is to put into practice computational thinking. The students will be expected to write, compile, run and debug Python programs to demonstrate the usage of:

- Operators and Conditional Statements
- Control Structures and Functions (both recursive and iterative) and Recursion.
- String functions
- Lists, Sets, Dictionaries, Tuples and Files.
- Object-Oriented Programming

Exercise 1 **Programs to demonstrate the usage of operators and conditional statements.**

1. Write a program that takes two integers as command line arguments and prints the sum of two integers.
2. Program to display the information:
   Your name, Full Address, Mobile Number, College Name, Course Subjects
3. Program that reads the URL of a website as input and displays contents of a webpage.

Exercise 2 **Programs to demonstrate usage of control structures.**

4. Program to find the sum of all prime numbers between 1 and 1000.
5. Program to find the product of two matrices.
6. Program to find the roots of a quadratic equation.

Exercise 3 **Programs to demonstrate the usage of Functions and Recursion**

7. Write both recursive and non-recursive functions for the following:
   a. To find GCD of two integers
   b. To find the factorial of positive integer
   c. To print Fibonacci Sequence up to given number ‗n'

	d. To convert decimal number to Binary equivalent 8. Program with a function that accepts two arguments: a list and a number ‗n'. It should display all the numbers in the list that are greater than the given number ‗n'. 9. Program with a function to find how many numbers are divisible by 2, 3,4,5,6 and 7 between 1 to 1000.
Exercise 4	**Programs to demonstrate the usage of String functions.**
	10. Program that accepts two strings S1, S2, and finds whether they are equal are not. 11. Program to count the number of occurrences of characters in each string. 12. Program to find whether a given string is palindrome or not.
Exercise 5	**Programs to demonstrate the usage of lists, sets, dictionaries, tuples and files.**
	13. Simple sorting, Histogram, Students marks statement, Retail bill preparation 14. Write a program that combines lists L1 and L2 into a dictionary. 15. Program to display a list of all unique words in a text file and word count, copy file, Voter's age validation, Marks range validation (0-100).
Exercise 6	**Programs to demonstrate the usage of Object-Oriented Programming**
	16. Program to implement the inheritance. 17. Program to implement polymorphism
	TOTAL: 60 PERIODS
COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Develop algorithmic solutions to simple computational problems.
CO2:	Develop and execute simple Python programs.

CO3:	Construct programs in Python using conditionals and loops for solving problems.
CO4:	Utilize functions to decompose a Python program.
CO5:	Analyse compound data using Python data structures.
CO6:	Interpret data from/to files in Python Programs

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	1	1	1	-	-	-	-	1	3	1	-
2	3	2	1	1	1	-	-	-	-	-	-	1	3	1	-
3	3	2	1	1	1	-	-	-	-	-	-	1	3	1	-
4	3	2	1	1	1	-	-	-	-	-	-	1	3	1	-
5	3	3	2	2	1	-	-	-	-	-	-	1	3	1	-
6	2	1	-	-	1	-	-	1	1	1	1	1	3	1	1
Overall Correlation	**3**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**3**	**1**	**1**

Recommended by Board of Studies	**02-08-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

23HS121	COMMUNICATION SKILLS LABORATORY	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To enable the students to comprehend the main idea and specific information of the listening passage
- To help students express themselves clearly, and communicate effectively with others.
- To introduce authentic language use and context-specific vocabulary that might not be encountered in textbooks.

Exercise : 1	Listening to conversations set in everyday social context and complete gap-filling exercise
Exercise : 2	Listening to a monologue in everyday social context. Diagram labelling and MCQ
Exercise : 3	Listening to a group conversation in academic setting and answer MCQ
Exercise : 4	Listening to a lecture and answer MCQ or gap filling
Exercise : 5	Listening to Ted Talks, podcasts, documentaries - discussion
Exercise : 6	Listening to a lecture and reading a text on the same subject- compare and contrast
Exercise : 7	Speaking Introducing oneself
Exercise : 8	Answering questions based on the introduction
Exercise : 9	Speaking on a given prompt for 2 mins.
Exercise : 10	Answering questions based on the topic spoken
Exercise : 11	Role play- Engaging in conversation
Exercise : 12	Engaging in Podcast Discussion

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1:	Demonstrate fluency in speaking in variety of situations
CO2:	Express their knowledge by talking continuously for more than two minutes on a topic

CO3:	Develop active listening for more meaningful interactions and conversations
CO4:	Use a full range of structures naturally and appropriately
CO5:	Identify the specific information in conversations, interviews, talks and lectures
CO6:	Develop the ability to compare and analyse different forms of information, identifying key similarities and differences.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	-	-	-	-	-	1	1	-	2	3	-	2	-	-	-
2	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-
3	-	-	-	-	-	1	1	-	2	3	-	2	-	-	-
4	-	-	-	-	-	-	-	-	-	3	-	2	-	-	-
5	-	-	-	-	-	1	1	-	3	3	-	2	-	-	-
6	-	-	-	-	-	1	1	-	2	3	-	-	-	-	-
Overall Correlation	-	-	-	-	-	**1**	**1**	-	**3**	**3**	-	**2**	-	-	-

Recommended by Board of Studies	**02-08-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

SEMESTER - II

23HS201	PROFESSIONAL ENGLISH	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To help learners extract information from longer, technical and scientific texts
- To familiarize learners with different text structures by engaging them in reading, writing and grammar learning activities
- To help learners write coherent, extensive reports and essays.
- To enable learners to use language efficiently while expressing their opinions in professional and business situations

UNIT I	WORKPLACE COMMUNICATION	9

Reading – Reading brochures (technical context), advertisements, telephone messages, gadget reviews social media messages, digital communication relevant to technical contexts and business. Writing – Writing emails -emails on professional contexts including introducing oneself, writing checklist, writing single sentence definition, product description- advertising or marketing slogans, Language Development– Tenses, Concord, Question types: Wh/ Yes or No/ and Tags, imperative sentences, complex sentences. Vocabulary - One-word substitutes; Abbreviations & Acronyms as used in technical contexts and social media.

UNIT II	EXPRESSING CAUSE AND EFFECT	9

Reading - Reading longer technical texts– Cause and Effect Essays, and emails of complaint. Writing - writing complaint emails (raising tickets) and responses to complaints, writing Cause and effect paragraphs and essays. Language Development– Active, Passive and Impersonal Passive Voice transformations, Infinitive and Gerunds Vocabulary – Synonyms- contextual meaning of

words, Same word acting as different parts of speech, causal expressions.		
UNIT III	**PROVIDING SOLUTIONS TO PROBLEMS**	**9**
Reading - Case Studies, editorials, news reports etc. Writing – Letter to the Editor, Writing instructions and recommendations, Problem solution essay / Argumentative Essay, Language Development – Error correction; If conditional sentences Vocabulary - Compound Words, discourse markers.		
UNIT IV	**INTERPRETATION OF GRAPHICS**	**9**
Reading - Reading newspaper articles, nonverbal communication (charts and graphs) Writing –Transferring information from nonverbal (chart, graph etc, to verbal mode) Process– description. Language development–Possessive & Relative pronouns, numerical adjectives Vocabulary Homonyms and Homophones, sequence words.		
UNIT V	**REPORT WRITING AND RESUME WRITING**	**9**
Reading – Company profiles, journal reports. Language Development– Reported Speech Vocabulary-reporting words and phrases. Writing - Writing accident report, survey report and progress report, project proposal, minutes of the meeting, writing statement of purpose, internship application and resume		
		TOTAL: 45 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Summarize long technical and scientific text of not less than 500 words recognizing main ideas and specific details	
CO2:	Demonstrate the understanding of more complex grammatical structures and diction while reading and writing	
CO3:	Use appropriate expressions to describe process and product, compare and contrast data, analyze problems, provide solutions and prove an argument in writing	

CO4:	Establish the ability to communicate effectively in professional environment through emails and reports
CO5:	Determine the language use appropriate for different social media platforms used for digital marketing
CO6:	Convert skills to assets and position themselves in job market through their own professional narratives
TEXT BOOKS:	
1	V. Chellammal, Deepa Mary Francis, K N Shoba, P R Sujatha Priyadharshini, Veena Selvam, English for Science & Technology I, Cambridge University Press and Assessment
2	V. Chellammal, Deepa Mary Francis, K N Shoba, P R Sujatha Priyadharshini, Veena Selvam, English for Science & Technology II, Cambridge University Press and Assessment
REFERENCES:	
1	Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
2	Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	-	-	-	-	-	1	1	-	2	3	-	2	-	-	-
2	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-
3	-	-	-	-	-	-	1	-	2	3	-	2	-	-	-
4	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-
5	-	-	-	-	-	-	1	-	2	3	-	2	-	-	-
6	-	-	-	-	-	-	-	-	2	3	-	3	-	-	-
Overall Correlation	-	-	-	-	-	1	1	-	2	3	-	3	-	-	-

Recommended by Board of Studies	**02-08-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

23MA203	STATISTICS AND NUMERICAL METHODS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

- This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.
- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology.
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

UNIT I	TESTING OF HYPOTHESIS	9+3

Sampling distributions – Standard error-Large sample test for single mean, proportion, difference of means -Small sample Tests– T Test for single mean and difference of means-F test for equality of variance – Chi square test for single variance- Independence of attribute-Goodness of fit (Binomial Distribution, Poisson Distribution).

UNIT II	DESIGN OF EXPERIMENTS	9+3

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

UNIT III	SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS	9+3

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear

system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a square matrix by Power method		
UNIT IV	**INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION**	**9+3**
Interpolation - Newton's forward and backward difference interpolation -Lagrange's and Newton's divided difference interpolations –- Approximation of derivative using interpolation polynomials – Numerical single integration and double using Trapezoidal and Simpson's 1/3 rules.		
UNIT V	**NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS**	**9+3**
Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge- Kutta method for solving first order differential equations - Multi step methods: Milne's and Adam's Bashforth method.		
		TOTAL: 60 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Examine the given data for large and small samples problems.	
CO2:	Examine the problems involving design of experiments.	
CO3:	Find the numerical solutions for nonlinear (algebraic or transcendental) equations, large system of linear equations and Eigen value problem of a matrix, when analytical methods fail to give solution.	
CO4:	Determine the intermediate values of the experimental data, using Newton's forward, backward, divided difference and Lagrange's methods.	
CO5:	Find the solutions for the problems involving numerical differentiation and integration.	
CO6:	Solve numerically, ordinary differential equations which is used to solve different kinds of problems occurring in engineering and technology.	

TEXT BOOKS:	
1	Grewal. B.S. and Grewal. J.S., "Numerical Methods in Engineering and Science ", 10th Edition, Khanna Publishers, New Delhi, 2015.
2	Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.
REFERENCES:	
1	P. Sivarama Krishna Das "A Text Book of Statistics and Numerical Methods" Viji's Academy.
2	Burden, R.L. and Faires, J.D. "Numerical Analysis" 9th Edition, Cengage Learning, 2016.
3	Devore.J.L " Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014
4	Gerald.C.F. and Wheatley.P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
2	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
3	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
4	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
5	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
6	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
Overall Correlation	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-

Recommended by Board of Studies	**28-07-2023**		
Approved by Academic	**1st ACM**	**Date**	**09-09-2023**

23PH206	MATERIAL SCIENCE	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To make the students to understand the basics of crystallography and its importance in studying materials properties.
- To understand the electrical properties of materials including free electron theory, applications of quantum mechanics and magnetic materials.
- To instil knowledge on physics of semiconductors, determination of charge carriers and device applications.
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
- To inculcate an idea of significance of nano structures, quantum confinement and ensuing nano device applications.

UNIT I	CRYSTALLOGRAPHY	9

Crystal structures: BCC, FCC and HCP – directions and planes - linear and planar densities – crystal imperfections- edge and screw dislocations – grain and twin boundaries - Burgers vector and elastic strain energy- Slip systems, plastic deformation of materials - Polymorphism.

UNIT II	ELECTRICAL AND MAGNETIC PROPERTIES OF MATERIALS	9

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Quantum free electron theory: Tunneling – degenerate states – Fermi- Dirac statistics – Density of energy states. Magnetic materials: Dia, para and ferromagnetic effects –Domain theory and hysteresis of ferromagnets – exchange interaction and ferromagnetism – quantum interference devices – GMR devices.

UNIT III	SEMICONDUCTORS AND TRANSPORT PHYSICS	9
Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – Carrier transport in Semiconductors: Drift, mobility and diffusion (qualitative) – Hall effect and devices – Ohmic contacts – Schottky diode – introduction to solid state drive (SSD).		
UNIT IV	**OPTICAL PROPERTIES OF MATERIALS**	**9**
Classification of optical materials – Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption loss and gain. Optical processes in quantum wells – Optoelectronic devices: light detectors and solar cells – light emitting diode – laser diode - optical processes in organic semiconductor devices –excitonic state.		
UNIT V	**NANOELECTRONIC DEVICES**	**9**
Quantum confinement – Quantum structures – quantum wells, wires and dots – Zener-Bloch oscillations – Resonant tunnelling – quantum interference effects - mesoscopic structures - Single electron phenomena – Single electron Transistor. Active and passive optoelectronic devices – photo processes – spintronics – carbon nanotubes: Properties and applications.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1:	Apply the basics of crystallography and its importance in studying materials properties.
CO2:	Compute charge carrier density of metals and fermi energy level.
CO3:	Apply the knowledge of magnetic properties of materials in

	data storage
CO4:	Compute carrier concentration in intrinsic and extrinsic semiconductor.
CO5:	Build a sound grasp of knowledge in different optical properties of materials, optical displays and applications.
CO6:	Develop an idea of significance of nano structures, quantum confinement and ensuring nano device applications
TEXT BOOKS:	
1	V.Raghavan. Materials Science and Engineering: A First Course, Prentice Hall India Learning Private Limited, 2015.
2	Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, Mc- Graw Hill India (2019.
3	G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.
REFERENCES:	
1	R.Balasubramaniam, Callister's Materials Science and Engineering. Wiley (Indian Edition), 2014.
2	Wendelin Wright and Donald Askeland, Essentials of Materials Science and Engineering, CL Engineering, 2013.
3	Robert F.Pierret, Semiconductor Device Fundamentals, Pearson, 2006
4	Pallab Bhattacharya, Semiconductor Optoelectronic Devices, Pearson, 2017.
5	Ben Rogers, Jesse Adams and Sumita Pennathur, Nanotechnology: Understanding Small Systems, CRC Press, 2017.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
2	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
3	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
4	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
5	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
6	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
Overall Correlation	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**	**-**

Recommended by Board of Studies	**14-08-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

23FT201	INTRODUCTION TO GLOBAL FASHION INDUSTRY AND FASHION DESIGN	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To introduce briefly about the global and Indian fashion industry
- To introduce briefly about the basic concepts of fashion and design to the students.
- To acquaint the student with the history of fashion, its elements, traditional costumes of various cultures of the world.

UNIT I	INTRODUCTION TO GLOBAL FASHION INDUSTRY	9

A brief introduction to the history of global and Indian fashion industry. An outline on the various processes involved from idea conceptualization to manufacturing of garments. Brief on the roles of various entities of the fashion triangle. Overview on the current status of global and Indian fashion industry

UNIT II	BASICS OF DESIGN FUNDAMENTALS	9

Introduction and application of Elements of Design –line, shape, form, size, colour, texture and pattern; Introduction and application of Principles of design – Harmony, Balance, Rhythm introducing element and principles of design in apparel's; Emphasis and Proportion; Introduction and application of Colour – definition; dimensions of colour-hue, value and intensity; colour harmonies, warm and cool colours; advancing and receding colours; colour theories – Prang colour system and Munsell colour system.

UNIT III	FASHION FUNDAMENTALS & TERMINOLOGIES	9

Fashion fundamentals– definition, tangibles and intangibles of fashion; fashion life cycle; fact influencing fashion; fashion adoption theories. Fashion terminology -street fashion, recurring

fashion, mass fashion, fashion trend, fashion shows, style, chic, boutique, Haute Couture; role of a fashion designer.		
UNIT IV	**HISTORY OF WORLD COSTUMES**	**9**
World costumes –principle garments and textiles of Egyptian, Greek, medieval English, Renaissance French costumes History of Indian costumes – Ancient garments during the Mauryan and Guptha period Traditional Indian costumes - Tamil Nadu, Kerala, Gujarat, Rajasthan, Bengal, Manipur, Jammu & Kashmir, Manipur, Orissa, Maharashtra		
UNIT V	**TRADITIONAL INDIAN TEXTILES**	**9**
Motifs, colour combinations and designs of Hand-woven Textiles - Banaras Brocades, Jamdani Saris, Paithani Saris, Kanchipuram Saris, Chanderi Saris Printed Textiles - Bagru prints from Rajasthan, Kalamkari from Andhra Pradesh. Embroidered Textiles - Kashida, Phulkari, Chamba, Rumal, Chikankari, Phool Patti ka Kaam, Zardozi, Kasuti, Kantha, Pipli Applique. Resist Dyed Textiles - Bandhani, Bandhej & Lehariya of Rajasthan, Ikat and Patola of Gujarat.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1:	Infer the history and current status of the global and Indian fashion industry
CO2:	Apply elements & principles of design in context to Textiles and Apparels
CO3:	Identify basic concepts of fashion fundamentals and terminologies
CO4:	Classify the traditional world costumes and textiles of India.
CO5:	Classify the traditional costumes of India
CO6:	Classify the traditional Indian textiles, embroideries and printing

TEXT BOOKS:	
1	Vandana Bhenderi, ―Costume, Textiles and Jewellery of India – Traditions in Rajasthan‖, 78 Prakash Books, New Delhi, 2004.
2	Fillow J and Bernard N Thomas and Hudson, ―Traditional Indian Textiles‖, Prentice Hall, India,1993. 3. Alkazi, Roshen. Ancient Indian Costume. [New Delhi]: Art Heritage, 1983.
REFERENCES:	
1	Hart A North S V and A Museum, ―Historical Fashion in detail the 17th and 18th Centuries‖, McMillan, India, 1998.
2	Kathy Alert, "Traditional folk costumes of Europe paper dolls in full color‖, Dover publications, Inc., Newyork,1984.
3	Diane T. and Cassidy T., ―Colour forecasting‖, Blackwell Publishing, 2005, ISBN: 1405121203 / ISBN: 978-1405121200.
4	Elaine Stone and Jean A. Samples, ―Fashion Merchandising‖, McGraw-Hill Book Company, 1985, ISBN: 0070617422

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	-	-	-	1	1	2	2	3	1	2
2	3	2	1	1	1	-	-	-	1	1	2	2	3	1	2
3	3	2	1	1	1	-	-	-	1	1	2	2	3	1	2
4	2	1	-	-	-	-	-	-	1	1	2	2	3	1	2
5	2	1	-	-	-	-	-	-	1	1	2	2	3	1	2
6	2	1	-	-	-	-	-	-	2	1	2	2	3	1	2
Overall Correlation	2	1	1	1	1	-	-	-	2	1	2	2	3	1	2

Recommended by Board of Studies	14-08-2023		
Approved	1st ACM	Date	09-09-2023

23HS203	TAMILS AND TECHNOLOGY	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

- To summarize the weaving industry and ceramic technology during Sangam Age
- To explain the design and construction of houses during Sangam Age and the sculptures and temples of Chola,Pallava and Pandya period
- To Explain about the water bodies of Sangam age and relate it to the agricultural usage
- To Outline to students the agriculture and irrigation technology during the Chola Period
- To help students Interpret and explain the digitalization of Tamil books and development of Tamil software

UNIT I	WEAVING AND CERAMIC TECHNOLOGY	3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II	DESIGN AND CONSTRUCTION TECHNOLOGY	3

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram – Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III	MANUFACTURING TECHNOLOGY	3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads - Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences – Gem stone types described in Silappathikaram.

UNIT IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3
Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.		
UNIT V	**SCIENTIFIC TAMIL & TAMIL COMPUTING**	**3**
Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books –Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.		
TOTAL: 15 PERIODS		
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Summarize the weaving industry and ceramic technology during Sangam Age	
CO2:	Explain the design and construction of houses during Sangam Age	
CO3:	Explain the sculptures and temples of Chola,Pallava and Pandya period.	
CO4:	Explain about the water bodies of Sangam age and relate it to the agricultural usage	
CO5:	Outline the agriculture and irrigation technology during the Chola Period.	
CO6:	Interpret and explain the digitalization of tamil books and development of Tamil software	
TEXT BOOKS:		
1	Dr.K.K.Pillay ,"Social Life of Tamils", A joint publication of TNTB & ESC and RMRL	

REFERENCES:	
1	Dr.S.Singaravelu ,"Social Life of the Tamils - The Classical Period", Published by: International Institute of Tamil Studies.
2	Dr.S.V.Subatamanian , Dr.K.D. Thirunavukkarasu, "Historical Heritage of the Tamils", Published by: International Institute of Tamil Studies

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
2	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
3	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
4	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
5	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
6	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
Overall Correlation	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-

Recommended by Board of Studies	14-08-2023		
Approved	1st ACM	Date	09-09-2023

23EE282	BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING	L	T	P	C
		2	0	2	3

COURSE OBJECTIVES:

- To introduce the basics of electric circuits and analysis
- To impart knowledge in domestic wiring
- To impart knowledge in the basics of working principles and application of electrical machines
- To introduce analog devices and their characteristics
- To introduce the functional elements and working of sensors and transducers

UNIT I	ELECTRICAL CIRCUITS	6

DCCircuits:CircuitComponents:Conductor,Resistor,Inductor,Capacitor–Ohm'sLaw-Kirchhoff'sLaws -Nodal Analysis, Mesh analysis within dependent sources only (Steady state)-Introduction to AC Circuits–Steady state analysis of RL, RC, and RLC Circuits(Simple problems only)

UNIT II	ELECTRICAL INSTALLATIONS	6

Domestic wiring, types of wires and cables, earthing, protective devices- switch fuse unit-Miniature circuit breaker-moulded case circuit breaker- earth leakage circuit breaker, safety precautions and First Aid

UNIT III	ELECTRICAL MACHINES	6

Construction and Working principle of DC Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. -Construction, Working principle and Applications of Single- Phase Transformer

UNIT IV	ANALOG ELECTRONICS	6

PN Junction Diodes, Zener Diode –characteristics Applications – Bipolar Junction Transistor- JFET,SCR - I-V Characteristics and Applications- Rectifier

UNIT V	SENSORSANDTRANSDUCERS	6
Sensors, proximity sensors, piezo-electric hall effect, photo sensors, Strain gauge, LVDT, differential pressure transducer, Introduction to Smart sensors.		
		TOTAL : 30 PERIODS
LAB COMPONENT 1. Verification of ohms and Kirchhoffs Laws. 2. Load test on DC Shunt Motor. 3. Load test on Single phase Transformer 4. Characteristics of PN and Zener Diodes 5. Design and analysis of Half wave and Full Wave rectifiers 6. Measurement of displacement of LVDT		
		TOTAL : 30 + 30 = 60 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Apply fundamental laws to DC electric circuits and demonstrate it experimentally.	
CO2:	Explain the steady state AC circuits with RL, RC, and RLC circuits.	
CO3:	Summarize the concept of domestic wiring and protective devices.	
CO4:	Identify the working principle and applications of electrical machines with experimental results.	
CO5:	Demonstrate the characteristics of various analog electronic devices	
CO6:	Infer the types and operating principles various sensors and transducers and demonstrate the use of LVDT to measure displacement.	
TEXT BOOKS:		
1	D P Kothari and I.J Nagarath, "Basic Electrical and Electronics Engineering", McGraw Hill Education (India) Private Limited, Second Edition, 2020	

2	A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements &Instrumentation', Dhanpat Rai and Co, 2015.
3	S.K. Bhattacharya, Basic Electrical Engineering, Pearson Education, 2019
4	James A Svoboda, Richard C. Dorf, Dorf's Introduction to Electric Circuits, Wiley,2018
REFERENCES:	
1	John Bird, "Electrical Circuit theory and technology", Routledge; 2017.
2	Thomas L. Floyd, 'Electronic Devices', 10th Edition, Pearson Education, 2018.
3	Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition,2017
4	Muhammad H. Rashid, "Spice for Circuits and electronics", 4th Edition., Cengage India,2019.
5	H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	-	-	1	1	1	-	1	3	-	1
2	2	1	-	-	-	-	-	1	1	1	-	1	2	-	1
3	2	1	-	-	-	1	1	1	1	1	-	1	2	-	1
4	3	2	1	1	-	1	1	1	1	1	-	1	3	-	1
5	2	1	-	-	-	-	-	1	1	1	-	1	3	-	1
6	2	1	-	-	-	-	-	1	-	-	-	-	2	-	1
Overall Correlation	3	2	1	1	-	1	1	1	1	1	-	1	3	-	1

Recommended by Board of Studies	**14-08-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

23ME211	ENGINEERING GRAPHICS	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- Gain a solid foundation in the fundamental principles and concepts of engineering graphics, including conic sections, orthographic projection, isometric projection, section views and development of surfaces, perspective projection, and dimensioning.
- Develop graphic skills for communication of concepts, ideas and design of engineering products.
- Gain knowledge on drafting software to construct part models.
- Familiarize with existing national standard practices and conventions related to technical drawings.
- Enhance the ability to visualize objects in three dimensions and translate them into 2D representations.

UNIT I	PLANE CURVES	9+6

Basic Geometrical constructions, Curves used in engineering practices: Conics - Construction of ellipse, parabola and hyperbola by eccentricity method - Construction of cycloid - construction of involutes of square and circle - Drawing of tangents and normal to the above curves.

LIST OF EXERCISES:

1. Drawing of a title block with necessary text, projection symbol and lettering using drafting software
2. Drafting of Conic curves - Ellipse, Parabola and Hyperbola

UNIT II	PROJECTION OF POINTS, LINES AND PLANE SURFACE	9+6

Orthographic projection - principles - Principal planes - First angle projection - projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method. Projection of planes (hexagonal and pentagonal planes

only) inclined to both the principal planes by rotating object method.

LIST OF EXERCISES:

1. Draw the projection of points when it is placed in different quadrants
2. Draw the projection of lines when it is placed in first quadrant
3. Draw the planes when it is placed in first quadrant.

UNIT III	PROJECTION OF SOLIDS AND FREE HAND SKETCHING	9+6

Projection of simple solids - hexagonal prism, pentagonal pyramid and cone inclined to the horizontal plane by rotating object method. Free Hand sketching: Visualization principles - Representation of Three Dimensional objects - Layout of views - Free hand sketching of multiple views from pictorial views of objects

LIST OF EXERCISES:

1. Practicing three dimensional modelling of simple objects.
2. Drawing of orthographic views from the given pictorial diagram

UNIT IV	PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES	9+6

Sectioning of hexagonal prism, pentagonal pyramid and cone when the cutting plane is inclined to the horizontal plane, Development of lateral surfaces of simple and sectioned solids – hexagonal prism and cone cut by a plane inclined to horizontal plane only.

LIST OF EXERCISES:

1. Draw the sectioned views of prisms and pyramids
2. Draw the development of hexagonal prism cut by a section plane inclined to the horizontal plane

UNIT V	ISOMETRIC PROJECTION	9+6
Principles of isometric projection - Isometric scale – Isometric view - Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions. **LIST OF EXERCISES:** 1. Drawing Isometric view and projection of simple solids. 2. Drawing three dimensional modeling of isometric projection of combination of solids.		
		TOTAL: 75 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Construct the conic curves, involutes and cycloids.	
CO2:	Develop and Sketch the orthographic projections of points, lines and plane surfaces.	
CO3:	Develop and Sketch the orthographic projections of simple solids.	
CO4:	Construct the projections of sectioned solids and development of the lateral surfaces of solids.	
CO5:	Develop and Sketch the isometric sections of solids.	
CO6:	Develop and Sketch the orthographic projection 2D and 3D objects using Auto CAD.	
TEXT BOOKS:		
1	Bhatt N.D. and Panchal V.M., ―Engineering Drawing‖, Charotar Publishing House, 53rd Edition, 2019.	
2	Basant Agarwal and Agarwal C.M.,―Engineering Drawing‖, McGraw Hill, 2nd Edition, 2019	
REFERENCES:		
1	Natrajan K.V., ―A Text Book of Engineering Graphics‖, Dhanalakshmi Publishers, Chennai, 2018.	
2	Gopalakrishna K.R., ―Engineering Drawing‖ (Vol. I and II combined), Subhas Publications, Bangalore, 27th Edition, 2017.	

3	Luzzader, Warren.J. and Duff, John M., —Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4	Parthasarathy N. S. and Vela Murali, —Engineering Graphics‖, Oxford University, Press, New Delhi, 2015. 5. Shah M.B., and Rana B.C., —Engineering Drawing‖, Pearson Education India, 2nd Edition, 2009.
5	Venugopal K. and Prabhu Raja V., —Engineering Graphics", New Age International (P) Limited, 2008.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	2	-	-	1	-	3	2	2	2	2	-
2	3	2	1	1	2	-	-	1	-	3	2	2	2	2	-
3	3	2	1	1	2	-	-	1	-	3	2	2	2	2	-
4	3	2	1	1	2	-	-	1	-	3	2	2	2	2	-
5	3	2	1	1	2	-	-	1	-	3	2	2	2	2	-
6	3	2	1	1	2	-	-	1	-	3	2	2	2	2	-
Overall Correlation	3	2	1	1	2	-	-	1	-	3	2	2	2	2	-

Recommended by Board of Studies	**14-08-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

23ME221	ENGINEERING PRACTICES LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- Familiarize students with basic engineering tools and equipment.
- Educate students on the importance of safety practices, including proper handling of equipment, adherence to safety protocols, and understanding potential hazards in the laboratory environment. Develop basic manufacturing and fabrication skills.
- Provide hands on training to the students in plumbing and woodworking.
- Provide hands on training to the students in welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment; Making a tray out of metal sheet using sheet metal work.
- Demonstrate the wiring and measurement methods in common household electrical applications.
- Study the basic electronic components, gates and provide hands on training in soldering.

PART I	CIVIL ENGINEERING PRACTICES	15

PLUMBING WORK

a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in households.
b) Preparation of plumbing line sketches.
c) Laying pipe connection to the suction side of a pump
d) Laying pipe connection to the delivery side of a pump.
e) Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK

a) Sawing
b) Planning
c) Making of T-Joint, Mortise joint and Tenon joint and Dovetail joint.

WOOD WORK STUDY

a) Study of joints in door panels and wooden furniture
b) Study of common industrial trusses using models.

PART II	**MECHANICAL ENGINEERING PRACTICES**	**15**

WELDING WORK

a) Study of Welding and its tools.
b) Welding of Butt Joints, Lap Joints and Tee Joints by metal arc welding.
c) Study of Gas Welding.

BASIC MACHINING PRACTICE

a) Facing and Plain Turning
b) Taper Turning
c) Drilling and Tapping

SHEET METAL WORK

a) Forming and Bending
b) Making of a square Tray

MACHINE ASSEMBLY WORK

a) Study of Centrifugal Pump
b) Study of Air Conditioner

FOUNDRY PRACTICE

Demonstration on Foundry operations like mould preparation.

TOTAL : 30 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Plan the pipeline layout for common household plumbing work.
CO2:	Make use of welding equipment and carpentry tool for making joints.
CO3:	Demonstrate on centrifugal pump, air conditioner and foundry operations.
CO4:	Demonstrate the electrical wiring connections for household applications and study the working of iron box and fan regulator.
CO5:	Identify the basic electronic components and explain the gates and soldering methods.
CO6:	Examine the performance and operation of CRO, LED TV and Smart phone.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	1	1	1	-	-	2	2	2	2	1	-
2	3	2	1	1	1	1	1	-	-	2	2	2	2	1	-
3	3	2	1	1	1	1	1	-	-	2	2	2	2	1	-
4	3	2	1	1	1	1	1	-	-	2	2	2	2	1	-
5	3	2	1	1	1	1	1	-	-	2	2	2	2	1	-
6	3	2	1	1	1	1	1	-	-	2	2	2	2	1	-
Overall Correlation	**3**	**2**	**1**	**1**	**1**	**1**	**1**	**-**	**-**	**2**	**2**	**2**	**2**	**1**	**-**

Recommended by Board of Studies	**14-08-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

23FT221	FASHION DESIGNING LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To introduce students to various drawing and coloring media
- To develop the textile and garment designing skills in students
- To explain the human anatomy
- To train students to sketch proportionate human body
- To train the students in fashion illustration

LIST OF EXPERIMENTS:

1. Motif Development – Design Repeat and positioning.
2. Practice various shading concepts.
3. Drape of fabrics and shading with different mediums.
4. Preparing swatches for dimensions of colour, different colour theories and harmonies.
5. Rendering prints and textures with various fabric constructions (wovens,non-wovens and knit).
6. Drawing different Silhouettes & garment components - sleeves, collars, necklines , cuffs, skirts, pants.
7. Human Anatomy- Figure basics, Constant proportions, Shapes and parts of human body.
8. Understanding human anatomy and practicing 8 head, 10 head, 12 headtheories
9. Different postures of male and female figure - ¾ view, back view, side view. S-Pose, X-Pose, and T-pose.
10. Drawing croqui figures using template, model, imagination and photograph.
11. Create a mood board based on a selected theme.
12. Design garments on croqui figures (Male and female) deriving inspirationsfrom the developed mood board.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1:	Develop motifs, draw objects and shade them

CO2:	Illustrate fabric drapes and shading with different color mediums.
CO3:	Illustrate different fabric swatches and garment components
CO4:	Illustrate basic human figures
CO5:	Prepare a mood board based on a selected theme and design garments
CO6:	Demonstrate creativity in designing textiles and garments

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	2	1	-	1	1	3	1	2	3	3	3
2	2	1	-	-	-	1	-	1	1	3	1	2	3	3	3
3	2	1	-	-	2	1	-	1	2	3	1	2	3	3	3
4	2	1	-	-	2	1	-	1	3	3	1	2	3	3	3
5	2	1	-	-	-	1	-	2	3	3	1	2	3	3	3
6	2	1	-	-	1	1	-	2	3	3	2	2	3	3	3
Overall Correlation	**3**	**2**	**1**	**1**	**2**	**1**	**-**	**2**	**3**	**3**	**2**	**2**	**3**	**3**	**3**

Recommended by Board of Studies	**14-08-2023**		
Approved	**1st ACM**	**Date**	**09-09-2023**

23HS221	SOFT SKILLS	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To help learners improve their interpersonal skills and critical thinking
- To familiarize learners with the attributes of a leader to enhance team performance
- To prepare students to face job interviews
- To help learners to know the importance of ethics in work place

UNIT I	INTERPERSONAL COMMUNICATION	

Basic communication- verbal and non-verbal communication; passive, assertive and aggressive communication; presentation skills; giving feedback and responding to feedback.

UNIT II	TEAM WORK AND LEADERSHIP	

Vision- setting realistic goals and objectives, collaboration, cooperation, dependability, empathy, sympathy, motivation, delegation of responsibilities, open mindedness, creativity, flexibility, adaptability, cross cultural communication and group dynamics.

UNIT III	TIME MANAGEMENT AND STRESS MANAGEMENT	

Effective Planning, Planning activities at macro and micro levels, setting practical deadlines and realistic limits/targets, punctuality, prioritizing activities, spending the right time on the right activity, positive attitude, emotional intelligence, self- awareness and regulation.

UNIT IV	CRITICAL THINKING AND WORK ETHICS	

Questioning, analysing, inferencing, interpreting, evaluating, solving problems, explaining, self-regulation, open-mindedness, conflict management- ethical dilemmas, appearance, attendance, attitude, character, organizational skills, productivity, respect.

UNIT V	INTERVIEW SKILLS AND RESUME BUILDING TECHNIQUES	
Telephonic interview, online interviews, f2f interviews, FAQ soft skills interview questions, drafting error-free CVs/ Resumes and Cover Letters, selecting the ideal format for resume, content drafting along with sequencing, art of representing one's qualifications and most relevant work history, video resume, website resume.		
TOTAL: PERIODS		
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Express their thoughts, opinions and ideas confidently to one or more people in spoken form	
CO2:	Develop evolving competences required for professional success	
CO3:	Demonstrate knowledge and skills in a group as team player and leader	
CO4:	Compose a comprehensive resume reflecting qualifications, exposure and achievements	
CO5:	Exhibit knowledge and skills confidently during job interviews	
CO6:	Demonstrate ethical and professional behaviour at workplace in all situations	
TEXT BOOKS:		
1	Soft Skills: Key to Success in Workplace and Life by Meenakshi Raman & Shalini Upadhyay. Cengage	
REFERENCES:		
1	English for Job Seekers (Language and Soft Skills for the Aspiring) by Geetha Rajeevan, C.L.N. Prakash) Cambridge University Press pvt, Ltd.	
2	Business Benchmark by Norman Whitby. Cambridge University Press pvt, Ltd	

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-
2	-	-	-	-	-	2	2	2	3	3	2	2	-	-	2
3	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-
4	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-
5	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-
6	-	-	-	-	-	-	-	3	3	3	-	-	-	-	3
Overall Correlation	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**2**	**3**	**3**	**2**	**2**	**-**	**-**	**2**
Recommended by Board of Studies							**14-08-2023**								
Approved							**1st ACM**			**Date**			**09-09-2023**		

SEMESTER –III

23MA304	PROBABILITY AND STATISTICAL METHODS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

- To develop Probability techniques in manufacturing and quality evaluation process.
- To familiarize the students with two dimensional random variables.
- To familiarize the student with Differential Equations.
- To make the students to understand various techniques of Correlation and Time series Analysis.
- To acquaint the student with mathematical tools needed in evaluating Statistical quality control and to apply in the textile manufacturing industry.

UNIT I	PROBABILITY AND RANDOM VARIABLES	9+3

Probability – axioms of probability – Conditional probability – Baye's theorem - Discrete and continuous random variables – Moments – Moment Generating functions – Binomial, Poisson, Geometric, Uniform distribution (Continuous), Exponential and Normal distributions.

UNIT II	TWO DIMENSIONAL RANDOM VARIABLES	9+3

Joint distributions – Marginal distributions and conditional distributions –Moments - Covariance - Transforms of random variables – Central limit theorem (for independent and identically distributed random variables (without proof).

UNIT III	DIFFERENTIAL EQUATIONS	9+3

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients.

UNIT IV	CORRELATION, REGRESSION, INDEX NUMBERS AND TIMES SERIES ANALYSIS	9+3

Correlation analysis, estimation of regression line. Time series analysis: Variations in time series, trend analysis, cyclical

variations, seasonal variations and irregular variations. Index Numbers – Lasperyre's, Paasche's and Fisher's Ideal Index.		
UNIT V	**STATISTICAL QUALITY CONTROL**	**9+3**
Control charts for measurements ($\bar{X}$ and R chart) – Control charts for attributes (p ,C and np) charts – Tolerance limits – acceptance Sampling.		
		TOTAL: 60 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Make use of the Probability techniques for solving practical problems.	
CO2:	Find the standard probability distributions which can describe real life Phenomenon.	
CO3:	Apply two dimensional random variable tools in solving various problems.	
CO4:	Solve differential Equations by applying various techniques.	
CO5:	Apply different methods of Correlation, Regression, Index Numbers and Times series analysis in solving practical problems.	
CO6:	Apply statistical techniques in solving manufacturing and management related problems.	
TEXT BOOKS:		
1	Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015	
2	Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10 th Edition, New Delhi, 2016.	
3	Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44 th Edition , 2018.	
4	Richard I. Levin, David S. Rubin, Sanjay Rastogi Masood Husain Siddiqui, Statistics for Management, Pearson Education, 7th Edition, 2016.	

REFERENCES:	
1	P.Sivaramakrishna Das and C.Vijayakumari "A Text Book on Probability and random variables " Pearson Publications".
2	Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
2	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
3	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
4	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
5	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
6	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
Overall Correlation	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-

Recommended by Board of Studies	04-04-2024		
Approved	2nd ACM	Date	25-05-2024

23FT301	TECHNOLOGY OF SPINNING PROCESSES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the process flow involved in the carded yarn spinning
- To understand the process flow involved in the combed yarn spinning
- To understand the yarn twist and yarn numbering system
- To understand the process flow involved in the open-end spinning
- To understand the manufacturing of sewing thread and fancy yarns
- To understand the process of speciality spinning.

UNIT I	PROCESS OUTLINE OF CARDED YARN SPINNING	9

Carded yarn spinning process; Ginning, blow room, carding, drawing, simplex, and ring spinning machines.

UNIT II	PROCESS OUTLINE OF COMBED YARN SPINNING	9

Combed yarn spinning process; Pre comb sliver, pre comb lap, ribbon lap, and combing machines; S twist and Z twist; two-ply and doubled yarn; Ne, Denier, and Tex systems of yarn numbering and their conversion.

UNIT III	PROCESS OUTLINE OF OPEN-END SPINNING	9

Principles of yarn formation and material flow – rotor, friction, air-jet spinning machines; core spinning, wrap spinning system; comparison of yarn properties.

UNIT IV	SEWING THREAD AND FANCY YARN MANUFACTURING	9

Sewing thread manufacture: Fibers used and their characteristics;

essential quality requirements of sewing threads, sequence of the manufacturing process for sewing threads for cotton, polyester and polyester/cotton blends; different types of fancy yarns; textured yarns.		
UNIT V	**PROCESS OUTLINE OF SPECIALITY SPINNING**	**9**
Melt spinning, dry spinning, wet spinning, sol-gel spinning, hollow and electrospinning, specialized non-circular cross-section fibers, spinning for - nonwovens, optical fibers, and thermotropic liquid-crystal polymers.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Infer the process involved in the carded yarn spinning.
CO2:	Infer the process involved in the combed yarn spinning
CO3:	Outline the yarn twist and yarn numbering system.
CO4:	Summarize the process involved in open-end spinning
CO5:	Summarize the sewing thread and fancy yarn.
CO6:	Outline the process of speciality spinning.

TEXT BOOKS:	
1	Lawrence C.A. Advances in Yarn Spinning Technology, Woodhead publishing, 2010
2	Klein W., "The Technology of Short-staple Spinning", The Textile Institute, Manchester,1998.
3	Oxtoby E., "Spun Yarn Technology ", Butterworth, London, 1987, ISBN: 0408014644/ISBN- 13: 9780408014649.
4	Bin Ding, Xianfeng Wang and Jianyong Yu, Electrospinning: Nanofabrication and Applications, Woodhead publishing, 2019

REFERENCES:	
1	Purushothama, B. Handbook on Cotton Spinning Industry, Woodhead publishing, 2015.

2	Senthil Kumar, R. Process Management in Spinning, CRC Press, 2015.
3	Lord P. R., "Yarn Production: Science, Technology and Economics", The Textile Institute, Manchester, 2003, ISBN: 1855736969 | ISBN-13: 9781855736962.
4	Salhotra K. R., and Ishtiaque S. M., "Rotor Spinning; its Advantages", Limitations and Prospects in India, ATIRA, Ahmedabad, 1995

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	1	-	2	1	1	-	3	-	1	1	2
2	2	1	-	-	1	-	2	1	1	-	3	-	1	1	2
3	2	1	-	-	1	-	2	1	1	-	3	-	1	1	2
4	2	1	-	-	1	-	2	1	1	-	3	-	1	1	2
5	2	1	-	-	1	-	2	1	1	-	3	-	1	1	2
6	2	1	-	-	1	-	2	1	1	-	3	-	1	1	2
Overall Correlation	2	1	-	-	1	-	2	1	1	-	3	-	1	1	2

Recommended by Board of Studies	**04-04-2024**		
Approved	**2nd ACM**	**Date**	**25-05-2024**

23FT302	GARMENT CONSTRUCTION I	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To impart knowledge on fundamentals of garment manufacture.
- To impart knowledge on children's wear.

UNIT I	APPAREL INDUSTRY PROCESS FLOW	9

Introduction to Indian apparel industry. Structure of an apparel industry-work flow, Pre production planning; types of samples and sample approval; Technical pack, Specification sheet – preparation, analysis and approval. Preparation of proto pattern and developing production pattern.

UNIT II	PATTERN LAYOUT AND CUT ORDER PLANNING	9

Objectives and requirements of fabric inspection, spreading - modes of spreading, different fabric packages, spreading tension, uniformity and alignment. Importance of grain in garment performance. Principles and types of layout and marker planning - woven fabric lay, knitted fabric lay, types of fabric lay and Marker efficiency. Principles of cutting and cut order plan, bundling and numbering. Control parameters and planning for inspection to numbering.

UNIT III	SEAMS AND STITCHES	9

Stitch types and uses; seam types and uses; Needle - parts, types and numbers. Selection of needle according to choice of fabric and seam. Characteristics of sewing threads, types and construction. Seam performance. Stitches and seam defects.

UNIT IV	TRIMS SELECTION	9

Types and applications of garment accessories/trims – labels, linnings, inter-linnings, waddings, lace, braid, elastic, hook and loop fasteners, shoulder pads, eyelets, zip fasteners, buttons, rivets.

UNIT V	CHILDREN'S WEAR	9
Fabric selection, drafting procedure and operation breakdown of garment assembly - kids - top and bottom, rompers, creeper, and jumpsuit.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Outline the apparel industry process flow.
CO2:	Classify the types of lay planning.
CO3:	Classify the types of seams and stitches.
CO4:	Choose the needle and thread for sewing.
CO5:	Choose the suitable trims for the garments
CO6:	Develop children's wear.

TEXT BOOKS:	
1	Harrold Carr., and Barbara Latham., "The Technology of Clothing Manufacture" Backwell Science, U.K., 1994,ISBN: 0632037482 | ISBN-13: 9780632037483.
2	Winifred Aldrich, "Metric Pattern Cutting for Children's Wear and Baby Wear", Blackwell Publishing, 2004.

REFERENCES:	
1	Raj kishore Nayak., and Rajiv Pandhya.,"Garment Manufacturing Technology", Woodhead publications 2015, ISBN: 1782422323 | ISBN-13: 9781782422327.
2	ChutterA. J., "Introduction to Clothing Production Management", Wiley-Blackwel Science, U.K., 1995, ISBN: 0632039396 | ISBN-13: 9780632039395.
3	Harold Carr, "The Clothing Factory", Clothing and Footwear Institute, 1972. ISBN: B0012PP566.
4	Jay Diamond., "Fashion Apparel and Accessories", Delmar Publication, 1994, ISBN: 0827356242 | ISBN-13: 9780827356245.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	3	-	-	2	1	-	-	3	2	1	2
2	2	1	-	-	3	-	-	2	1	-	-	3	2	1	2
3	2	1	-	-	3	-	-	2	1	-	-	3	2	1	2
4	3	2	1	1	3	-	-	2	1	-	-	3	2	1	2
5	3	2	1	1	3	-	-	2	1	-	-	3	2	1	2
6	3	2	1	1	3	-	-	2	1	-	-	3	2	1	2
Overall Correlation	3	2	1	1	1	-	-	2	1	-	-	3	2	1	1
Recommended by Board of Studies							04-04-2024								
Approved							2nd ACM			Date			25-05-2024		

23HS301	UNIVERSAL HUMAN VALUES AND ETHICS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To develop a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
- To understand (or developing clarity) the harmony in the human being, family, society and nature/existence.
- To strengthen the self-reflection.
- To develop commitment and courage to act.

UNIT I	COURSE INTRODUCTION	9

Need, Basic Guidelines, Content and Process for Value Education - Understanding the need, basic guidelines, content and process for Value Education -Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration - Continuous Happiness and Prosperity- A look at basic Human Aspirations -Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority -Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario - Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

UNIT II	UNDERSTANDING HARMONY IN THE HUMAN BEING	9

Harmony in Myself- Understanding human being as a co-existence of the sentient 'I' and the material 'Body' -Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) -Understanding the characteristics and activities of 'I' and harmony in 'I' -Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity.

UNIT III	UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY	9
Harmony in Human-Human Relationship -Understanding Harmony in the family – the basic unit of human interaction - Understanding values in human-human relationship; meaning of Nyaya and program for its fulfilment to ensure satisfaction; Trust(Vishwas) and Respect as the foundational values of relationship -Understanding the meaning of Vishwas; Difference between intention and competence -Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship -Understanding the harmony in the society (society being an extension of family)-Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order- from family to world family.		
UNIT IV	**ENGINEERING ETHICS**	**9**
Senses of ‗Engineering Ethics‟ – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.		
UNIT V	**SAFETY, RESPONSIBILITY AND RIGHTS**	**9**
Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination-Moral Leadership –Code of Conduct – Corporate Social Responsibility.		
TOTAL: 45 PERIODS		
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Explain the need of value education.	
CO2:	Interpret the difference between self and body.	

CO3:	Demonstrate the need to exist as a unit of Family and society.
CO4:	Classify Harmony at all levels.
CO5:	Apply the values acquired in the professional front.
CO6:	Identify appropriate technologies for ecofriendly production systems.
TEXT BOOKS:	
1	R R Gaur, R Sangal, G P Bagaria,Human Values and Professional Ethics, Excel Books, New Delhi, 2010 3.
2	Mike W. Martin and Roland Schinzinger, —Ethics in Engineering‖, Tata McGraw Hill, New Delhi, 2003.
3	Govindarajan M, Natarajan S, Senthil Kumar V. S, —Engineering Ethics‖, Prentice Hall of India, New Delhi, 2004
REFERENCES:	
1	Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3	The Story of Stuff (Book).
4	The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi AICTE Model Curriculum in Humanities, Social Science and Management Courses (UG Engineering & Technology) 169 | Page .
5	Small is Beautiful - E. F Schumacher.
6	Slow is Beautiful - Cecile Andrews.
7	Economy of Permanence - J C Kumarappa 8. Bharat Mein Angreji Raj – Pandit Sunderlal.
8	Rediscovering India - by Dharampal.
9	Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi.
10	India Wins Freedom - Maulana Abdul Kalam Azad.
11	Vivekananda - Romain Rolland (English) 13. Gandhi - Romain Rolland (English).
12	Charles B. Fleddermann, —Engineering Ethics‖, Pearson Prentice Hall, New Jersey, 2004.

13	Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, ―Engineering Ethics – Concepts and Cases‖, Cengage Learning, 2009.
WEB SOURCES:	
1	www.onlineethics.org
2	www.nspe.org
3	www.globalethics.org

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	-	-	-	-	-	3	3	3	3	3	-	-	-	-	3
2	-	-	-	-	-	3	3	3	3	3	-	-	-	-	3
3	-	-	-	-	-	3	3	3	3	3	-	-	-	-	3
4	-	-	-	-	-	3	3	3	3	3	-	-	-	-	3
5	-	-	-	-	-	3	3	3	3	3	-	-	-	-	3
6	-	-	-	-	-	3	3	3	3	3	-	-	-	-	3
Overall Correlation	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**3**

Recommended by Board of Studies	**08-04-2024**		
Approved	**2nd ACM**	**Date**	**25-05-2024**

23FT311	TEXTILE FIBER SCIENCE AND CHARACTERISTICS	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To familiarize the student with the types of fibre and its properties
- To acquaint the student with the physical characteristics of textile fibre.

UNIT I	INTRODUCTION	9

Definition - staple fibre and filament - monofilament and multifilament, Classification - natural fibres and man-made fibres, Properties - essential properties and desirable properties. Production and cultivation of Natural Fibers: Cotton, Silk, Wool - Physical and chemical structure of the above fibres.

UNIT II	REGENERATED AND SYNTHETIC FIBRES	9

Production sequence of regenerated cellulosic fibres - Viscose rayon. Physical and chemical properties of Viscose rayon, Acetate rayon and high wet modulus fibres - Modal and Lyocel, Tencel. Production Sequence physical and chemical properties of synthetic fibers: -Polyester, Nylon, acrylic. Factors to be considered while mixing with natural fibres.

UNIT III	STRUCTURE AND INVESTIGATION TECHNIQUES OF FIBRES	9

Study of morphological structures of fibers - Transmission and Scanning electron microscopes-principle; construction and working; X-ray diffraction techniques – estimation of crystallinity; Infrared radiation and dichroism techniques.

UNIT IV	MOISTURE ABSORPTION, TENSILE AND ELASTIC CHARACTERISTICS OF FIBRES	9

Moisture absorption, Tensile characteristic and Elastic recovery of fibres - Definition, Influence of fibre structure, humidity and temperature. Moisture absorption and regain behavior of natural and man-made fibres; Tensile characteristics –study of strength,

elongation, work of rupture, initial modulus, work factor and yield point, determination of yield point. Elastic recovery behaviour of fibres - Elastic recovery and its relation to stress and strain of fibres; mechanical conditioning of fibres.

UNIT V	OPTICAL, FRICTIONAL, AND THERMAL CHARACTERISTICS	9

Reflexion and lustre-objective and subjective methods of measurement - refractive index and its measurement - friction – its measurement, comparison of fibres, directional friction in wool – friction. Thermal transitions of fibres - thermal conductivity, thermal expansion and contraction, Tg, melting; static electricity in textile fibres.

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS:

1. Identification of natural fibres by burning and microscopic test.
2. Identification of natural fibres by chemical test.
3. Identification of man-made fibres by burning and microscope test.
4. Identification of natural fibres by burning and microscopic test.
5. Identification of natural fibres by chemical test.
6. Identification of man-made fibres by burning and microscope test.
7. Identification of man-made fibres by chemical test.
8. Identification of regenerative fibres by burning and microscope test.
9. Identification of regenerative fibres by chemical test.
10. Identify the given SEM images of selected fibres.
11. Find out the ply count and fibre/blend composition of sewing thread.
12. Find out the fibre/blend composition of given fabric samples.
13. Collect and find out the GSM of Low, Heavy and Medium fabric samples for different end uses.

TOTAL:30 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Outline the types, classification, properties and production of various fibres.
CO2:	Explain the process sequence of various fibres.
CO3:	Outline the structure and morphology of fibres.
CO4:	Summarize the moisture, tensile and elastic characteristics of fibres.
CO5:	Infer the optical and frictional characteristics.
CO6:	Explain the thermal characteristics.
TEXT BOOKS:	
1	MortonW.E.,andHearleJ.W.S.,"Physical PropertiesofTextileFibres",TheTextileInstitute,Washington D.C., 2008, ISBN978-1-84569-220-95
2	HearleJ.W.S,LomasB.,andCookeW.D.,"AtlasofFibreFracture andDamagetoTextiles", The Textile Institute, 2nd Edition, 1998, ISBN:1855733196
3	Saville. B. P., "Physical Testing of Textiles", Woodhead Publishing, 1999,ISBN:1855733676 | ISBN-13:9781855733671
REFERENCES:	
1	Mukhopadhyay S. K., "Advances in Fibre Science", The Textile Institute,1992, ISBN:1870812379
2	MeredithR.,"MechanicalPropertiesofTextileFibres",NorthH olland,Amsterdam,1986,ISBN:1114790699, ISBN-13:9781114790698
3	RaheelM. (ed.)., "Modern Textile Characterization Methods", Marcel Dekker, 1995, ISBN:0824794737
4	Hearle J.W.S., "Polymers and Their Properties: Fundamentals of Structures and Mechanics Vol1", EllisHorwood, England, 1982, ISBN:047027302X|ISBN-13:9780470273029

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	1	-	2	1	-	-	3	2	2	2	2
2	2	1	-	-	1	-	2	1	-	-	3	2	2	2	2
3	2	1	-	-	1	-	2	1	-	-	3	2	2	2	2
4	2	1	-	-	1	-	2	1	-	-	3	2	2	2	2
5	2	1	-	-	1	-	2	1	-	-	3	2	2	2	2
6	2	1	-	-	1	-	2	1	-	-	3	2	2	2	2
Overall Correlation	2	1	-	-	1	-	2	1	-	-	3	2	2	2	2
Recommended by Board of Studies							04-04-2024								
Approved							2nd ACM			Date			25-05-2024		

23FT312	PATTERN ENGINEERING	L	T	P	C
		2	0	4	4

COURSE OBJECTIVES:

- To enhance the fundamental knowledge in human anthropometrics from the scientific and technological viewpoint.
- To equip students with comprehensive pattern making skills.

UNIT I	STUDY OF BODY MEASUREMENTS AND SIZING SYSTEMS	6

Anthropometry- human anatomy, - Sequence of taking body measurements – landmark terms, vertical and horizontal measurements. Industrial sizing system - Principles of sizing system - size categories in children's, women's and men's wear - standard measurement chart.

UNIT II	BASICS OF PATTERN MAKING TERMS AND TOOLS	6

Introduction to pattern making and methods - drafting, draping and flat pattern. Bespoke method and industrial method- Pattern Validation. Functions of pattern making tools, pattern making terminologies - pattern instructions - grain line, dart, fold, pattern number, notches and drill hole. Pattern allowance - ease, seam and tolerance.

UNIT III	TECHNIQUES OF PATTERN DRAFTING	6

Drafting basic bodice blocks - front and back blocks, block preparation and correction, skirt and trouser blocks. Fitting the blocks - necklines, arm hole and sleeve.

UNIT IV	PATTERNS FOR COLLARS AND SLEEVES	6

Collar: classification and terms, basic shirt collar, Peter Pan collar, sailor collar, mandarin collar, built-up neck lines, cowls

Sleeve: Cap, sleeve cuffs, puff, petal, lantern and leg-of-mutton sleeves.

UNIT V	BASICS OF PATTERN ALTERATIONS AND GRADING	6

Pattern alteration for fit, Factors affecting the pattern making process. Contouring principle. Grading process, grade rules, and types of grading system. Principles of grading, grading techniques - master and basic grading - front, back, sleeve, cuff, collar, pocket, yoke and facing.

TOTAL: 30 PERIODS

LIST OF EXPERIMENTS:

1. Drafting and grading of women's basic bodice and sleeves.
2. Drafting of men's basic trousers.
3. Draping of women's bodice and sleeves.
4. Draping of women's trousers.
5. Draping of women's skirt.
6. Drafting of Peter Pan collar and mandarin collar.
7. Drafting of built-up neck lines.
8. Drafting of plain, puff and petal sleeve.
9. Drafting of darts, pleats and tucks.
10. Dart manipulation using slash-spread technique and pivotal transfer technique for both single dart and two dart series.
11. Parallel and asymmetric darts.
12. Radiating and intersecting darts.
13. Specification sheet interpretation.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1:	Interpret body measurements and sizing system.
CO2:	Explain the pattern making tools and terms.
CO3:	Outline techniques of pattern making.
CO4:	Develop patterns for collars, sleeves and plackets.
CO5:	Infer pattern alterations.
CO6:	Interpret grading concepts.

TEXT BOOKS:	
1	Harrold Carr., and Barbara Latham., "The Technology of Clothing Manufacture" Backwell Science, U.K., 1994,ISBN: 0632037482 | ISBN-13: 9780632037483.
2	Gerry Cooklin., Steven George Hayes., and John McLoughlin., "Introduction to Clothing Manufacture", Wiley-Blackwell Science, U.K., 2006, ISBN: 0632058463 | ISBN-13:9780632058464.
3	Helen Joseph Armstrong, "Pattern Making for Fashion Design" Pearson Education (Singapore)Pvt. Ltd.,2005 2. Winifred Aldrich, "Metric Pattern Cutting" Blackwell Science Ltd., 1994
REFERENCES:	
1	Gerry Cooklin, "Master Patterns and Grading for Women's Outsizes", Blackwell Scientific Publications, 1995.
2	Gerry Cooklin, "Master Patterns and Grading for Men's Outsize", Blackwell Scientifi Publications, 1992.
3	Jeenne Price and Bernard Zamkoff, "Grading Techniques for Modern Design" Fairchild Publications, 1990.
4	Amaden-Crawford Connie, "The Art of Fashion Draping (3rd edition)" Om Books International Publications, 2005
5	Winifred Aldrich, "Metric Pattern Cutting" Blackwell Science Ltd., 1994

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	3	-	-	1	1	-	-	3	2	3	2
2	2	1	-	-	3	-	-	1	1	-	-	3	2	3	2
3	2	1	-	-	3	-	-	1	1	-	-	3	2	3	2
4	3	2	1	1	3	-	-	1	1	-	-	3	3	3	2
5	2	1	-	-	3	-	-	1	1	-	-	3	2	3	2
6	2	1	-	-	3	-	-	1	1	-	-	3	2	3	2
Overall Correlation	3	2	1	1	3	-	-	1	1	-	-	3	3	3	2

Recommended by Board of Studies	04-04-2024		
Approved	2nd ACM	Date	25-05-2024

23FT321	COMPUTER AIDED FASHION DESIGNING LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To train the students in CAD used for designing of garments

LIST OF EXPERIMENTS

1. Introduction to tools and workspace of image editing software & vector software.
2. Development of motifs suitable for printed textile and woven textile.
3. Development of woven fabrics designs – plain, twill, satin and denim.
4. Development of technical diagrams –T-shirt and trousers.
5. Illustration of Kid's romper (all over print).
6. Illustration of Kid's frock (lace).
7. Illustration of Men's T-shirt with a chest print design.
8. Illustration of Men's Basic formal shirt (checks plaids and stripes).
9. Illustration of Men's Basic trouser (solid combos).
10. Illustration of Women's long dress (all over print).
11. Illustration of children's school uniform.
12. Illustration of Women's maternity wear with functionality.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1:	Develop textile print design
CO2:	Develop fabric design
CO3:	Develop technical drawings
CO4:	Illustrate different kid's garments
CO5:	Illustrate different men's garments
CO6:	Illustrate different women's garments

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	3	-	-	1	3	2	2	2	3	2	2
2	3	2	1	1	3	-	-	1	3	2	2	2	3	2	2
3	3	2	1	1	3	-	-	1	3	2	2	3	3	2	2
4	2	1	-	-	3	-	-	1	3	2	2	2	3	2	3
5	2	1	-	-	3	-	-	1	3	2	2	2	3	2	3
6	2	1	-	-	3	-	-	1	3	2	2	2	3	2	3
Overall Correlation	3	2	1	1	3	-	-	1	3	2	2	3	3	2	3
Recommended by Board of Studies							04-04-2024								
Approved							2nd ACM			Date			25-05-2024		

23FT322	GARMENT COMPONENTS CONSTRUCTION LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To train the students in fundamentals of garment construction.

LIST OF EXPERIMENTS

1. Study of SNLS and DNLS machines.
2. Preparing samples for stitches – slip basting, running, back, overcasting, hemming and even basting.
3. Preparing samples for seams and seam finishes – Plain seam, double top stitch seam, lapped seam, slot seam, French seam, flat felt seam, pinked finish, edge stitched finish.
4. Preparing samples for Fullness - Darts, Tucks, Pleats and Gathers.
5. Preparing samples for Necklines – Bias facing, Bias Binding and Fitted facing.
6. Preparing samples for plackets – Continuous Bound Placket, Two Piece Placket, Fly Opening.
7. Preparing Samples for Sleeves – Plain, Puff at Both Sides, Raglan and Kimono.
8. Preparing samples for collars – Peter Pan collar and Standing collar.
9. Preparing samples for pockets – Patch Pocket, Bound Pocket and Front Hip Pocket.
10. Preparing embroidery stitch samples - running, chain, stem, french knot, bullion knot and lazy daisy.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1:	Prepare samples for seams and stitches.
CO2:	Prepare samples for plackets.
CO3:	Prepare samples for fullness.

CO4:	Prepare samples for necklines.
CO5:	Develop samples in various special machines.
CO6:	Develop various garment components.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	3	-	-	2	2	3	2	3	3	3	2
2	3	2	1	1	3	-	-	2	2	3	2	3	3	3	2
3	3	2	1	1	3	-	-	2	2	3	2	3	3	3	2
4	3	2	1	1	3	-	-	2	2	3	2	3	3	3	2
5	3	2	1	1	3	-	-	2	2	3	2	3	3	3	2
6	3	2	1	1	3	-	-	2	2	3	2	3	3	3	2
Overall Correlation	3	2	1	1	3	-	-	2	2	3	2	3	3	3	2

Recommended by Board of Studies	**04-04-2024**		
Approved	**2nd ACM**	**Date**	**25-05-2024**

23ES391	PRESENTATION SKILLS	L	T	P	C
		0	0	2	1*

COURSE OBJECTIVES:

- To help learners use brainstorming techniques for generating, organizing and outlining ideas.
- To familiarize learners with different speech structures by engaging them in watching speeches with great opening and closing
- To give practice on voice modulation and use of body language and eye contact for making captivating presentations
- To give hands on training on preparing presentation slides and using remote presentation tools
- To train students on responding to question and feedback with confidence.

UNIT I	BRAINSTORMING AND OUTLINING	6

Mind Mapping based on prior knowledge, collecting additional information from external resources, giving prompts to Generative AI tools seeking information, organizing ideas generated, knowing your audience.

UNIT II	STRUCTURING THE PRESENTATION	6

3 Ts of a presentation, writing effective introduction- Beginning the introduction with a hook (question, data, storytelling) and closing the introduction with the objective of the presentation. Structuring the body paragraphs -Choosing key ideas from the list of ideas generated during brainstorming. Substantiating ideas with examples, data, reasons and anecdotes. Summarizing the ideas for conclusion.

UNIT III	DELIVERY TECHNIQUES	6

Vocal variety, intonation, reducing filler words and improving articulation, inflection, engaging the audience. Body language- eye

contact, gestures, movement on stage.		
UNIT IV	**USE OF TECHNOLOGICAL AIDS**	**6**
Use of presentation software like MS Power Point, Google Slides etc, incorporating images, graphs, charts and videos, using interactive tools like quizzes and polls, using remote presentation tools like zoom, MS Teams, WebEx for screen sharing, virtual whiteboards and chat functionalities, incorporating AR/VR for more immersive presentations.		
UNIT V	**HANDLING QUESTIONS AND FEEDBACK**	**6**
Audience engagement through questions, PAR (Point, Answer, Redirect) strategy for structuring responses to questions. Understanding feedback process - Receiving, interpreting and evaluating constructively, active listening techniques for processing feedback, responding to feedback- acknowledging, clarifying and appreciating, Dealing with challenging feedback.		
TOTAL: 30 PERIODS		

COURSE OUTCOMES:

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

CO1:	Construct ideas for presentation through mind mapping techniques
CO2:	Organize ideas and structure the presentation with captivating introduction, body paragraphs illustrated with examples and reasons and compelling conclusion
CO3:	Apply vocal variety and body language techniques to enhance delivery
CO4:	Prepare engaging presentations by integrating multimedia elements
CO5:	Demonstrate proficiency in delivering presentations in remote platforms utilizing various technological tools and strategies to engage audience in Virtual environments
CO6:	Exhibit active listening skills by responding to questions with clarity and confidence and incorporating constructive feedback for professional development

TEXT BOOKS:	
1	Nancy Duarte "Slide:ology: The Art and Science of Creating Great Presentations" O' Reilly Media.
2	Garr Reynolds "The Naked Presenter: Delivering Powerful Presentations with or Without Slides" New Riders.
REFERENCES:	
1	Talk Like TED: The 9 Public-Speaking Secrets of the World's Top Minds" by Carmine Gallo.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	1	-	-	-	1	1	1	-	1	2	2	1
2	2	2	1	1	-	-	-	1	1	1	-	1	2	2	1
3	2	2	1	1	-	-	-	1	1	1	-	1	2	2	1
4	2	2	1	1	-	-	-	1	1	1	-	1	2	2	1
5	2	2	1	1	-	-	-	1	1	1	-	1	2	2	1
6	2	2	1	1	-	-	-	1	1	1	-	1	2	2	1
Overall Correlation	**2**	**2**	**1**	**1**	**-**	**-**	**-**	**1**	**1**	**1**	**-**	**1**	**2**	**2**	**1**

Recommended by Board of Studies	04-04-2024		
Approved	2nd ACM	Date	25-05-2024

SEMESTER –IV

23CY401	CHEMISTRY FOR TEXTILE TECHNOLOGIST	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To gain proper understanding on spectroscopic and surface analytical techniques.
- To impart knowledge to students on the chemistry of surface and interfaces.
- To make students well versed on the chemical analysis of oils, fats, soaps & lubricants.
- To firmly establish a sound understanding on the student's mind about chemicals and auxiliaries.
- To familiarize students with the identification and characteristics of dyes and their applications.

UNIT I	SPECTROSCOPIC TECHNIQUES	9

Spectroscopy: Electromagnetic spectrum - absorption of radiation - electronic, vibrational and rotational transitions. Atomic absorption spectroscopy, UV- Vis, IR spectroscopy, Scanning Electron Microscope (SEM) and Transmission Electron Microscope (TEM) - principles, instrumentation (Block diagram) and applications.

UNIT II	CHEMISTRY OF INTERFACES	9

Interface region-curved interfaces-thermodynamics of surfaces - Surface film on liquids- Adsorption of gases on Solids-adsorption isotherms – types. Applications of adsorption studies- detergency, wetting, foaming, de foaming, spreading, water repellency

UNIT III	WATER TECHNOLOGY	9

Water: Sources and impurities; Significance and estimation (only mention of methods) of - turbidity, colour, pH, acidity,

alkalinity, hardness, DO, BOD, COD. Treatment of water: Zeolites process and ion exchange demineralization; Desalination of water: Reverse osmosis and Electro dialysis; Municipal water treatment: Primary treatment and Disinfection (UV, Ozonation, break-point chlorination).		
UNIT IV	**OILS, FATS, SOAPS & LUBRICANTS**	**9**
Chemical constitution, Chemical analysis of oils and fats – acid, saponification and iodine values, Definitions, determinations and significance. Definition, mechanism of lubrication, preparation of Petro lubes, desirable characteristics – viscosity, viscosity index, carbon residue, oxidation stability, flash and fire points, cloud and pour points, aniline point. Semisolid lubricant – greases, preparation of sodium, lithium, calcium and axle greases and uses, consistency test and drop point test. Solid lubricants – graphite and molybdenum disulphide.		
UNIT V	**CHEMICALS AND AUXILIARIES**	**9**
Estimation of available chlorine in hypochlorite bleach liquor. Determination of strength of hydrogen peroxide. Colorants - Theory of colour and constitution: chromophore and auxochrome, bathochromic and hypsochromic shift, classification of dyes based on application and composition. Chemistry of azo dye – synthesis of Methyl red, Methyl orange, Congo red, phenolphthalein, fluorescein and eosin, 2D Materials.		
TOTAL: 45 PERIODS		
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Apply spectroscopic techniques for the analysis of engineering materials for their end use applications	

CO2:	Extend the applications of adsorption in detergency, wetting, spreading, foaming, de- foaming, and water repellence and separation processes..
CO3:	Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water
CO4:	Explain the importance of oils, fats, soaps and various lubricants for their intended applications
CO5:	Apply the determination of Chlorine and H2O2 for suitable applications in textile field.
CO6:	Classify the chemical structures, properties and relationships of different types of dyes and their applications
TEXT BOOKS:	
1	Dhara S. S., "A Text Book of Engineering Chemistry", 12thEd., S. Chand & Co. Ltd., New Delhi, 2016.
2	Jain. P.C. and Monica Jain, "Engineering Chemistry", Dhanpet Rai & Sons, New Delhi, 17th Edition, 2018.
3	Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, 2019. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
REFERENCES:	
1	B.K. Sharma, "Industrial chemistry", Krishna Prakashan Media (P) Ltd, Meerut, 2014.
2	Shore J., "Colourants and Auxiliaries: 2nd Edition, Volume 1 & 2, Wood head Publishing Ltd., 2002.
3	Shenai V. A., "Chemistry of Dyes and Principles of Dyeing", Sevak Publications, Mumbai, 1995.
4	Trotman E. R., "Dyeing and Chemical Technology of Textile Fibres", B.Y Publishing Pvt. Ltd., New Delhi, 1994.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	-	-	-	-	-	-	-	-	2	-	-
2	2	1	-	-	-	-	-	-	-	-	-	-	1	-	-
3	2	1	-	-	-	-	-	-	-	-	-	-	1	-	-
4	2	1	-	-	-	-	-	-	-	-	-	-	1	-	-
5	3	2	1	1	-	-	-	-	-	-	-	-	2	-	-
6	2	1	-	-	-	-	-	-	-	-	-	-	1	-	-
Overall Correlation	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
Recommended by Board of Studies							**04-04-2024**								
Approved							**2nd ACM**			**Date**			**25-05-2024**		

23FT401	WOVEN FABRIC MANUFACTURING AND STRUCTURES	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

- To familiarize the students with the basics of woven fabric manufacturing and the preparatory processes involved in weaving.
- To make students understand the basics of woven fabric structures and construct the graph designs of simple woven fabric structures.
- To acquaint the students with the mechanisms involved in the motions of power loom weaving.
- To make students aware of the construction of compound woven fabric structures.
- To educate students about the principles of Shuttleless looms, other shedding devices, commercial names and woven fabric defects.

UNIT I	BASICS OF WOVEN FABRICS AND PREPARATORY PROCESSES	9+3

Basics of Woven Fabrics and Loom: Different kinds of fabrics, Woven fabrics, Warp, Weft; Motions of Weaving; Loom, Parts of Loom, Path of Warp in Loom; Types of looms.

Winding and Warping Machines, Preparatory processes for single and folded yarn; Objectives of Winding, yarn passage in Cone Winding machine and Pirn Winding machine; Objectives of Warping, warp passage in Back beam warping machine and Sectional warping machine. Drawing-in, Denting, and Knotting or Piecing, Gaiting.

Sizing: Objects of sizing, sizing ingredients and their function.

UNIT II	BASICS AND SIMPLE WOVEN FABRIC STRUCTURES	9+3

Basics of Woven Fabric Structures: Principles of constructing

Graph Design of Woven Fabric Structures, Principles of deriving Draft and Peg-Plan of given Weave.

Basic Weaves: Plain, Twill, Sateen, Warp Rib, Weft Rib, Mat.

Simple Weaves: Wavy Twill, Herring Bone, Diamond, Diaper; Ordinary Honeycomb, Mock-leno, Huck-a-back, Colour and Weave Effect.

UNIT III	MECHANISM OF POWER LOOM	9+3

Basics of Power Loom: Basic working principles of Power Loom; Loom Speed and Efficiency.

Motions of Loom, Introduction and objectives of the mechanisms: Tappet Shedding, Over Picking and Under Picking, Crank Beat-up. Warp Let-off, Cloth Take-up, Warp stop, Weft stop, Drop box. Introduction and objectives of other Shedding Devices: Dobby shedding, Jacquard shedding – mechanical and electronic.

UNIT IV	COMPOUND WOVEN FABRIC STRUCTURES	9+3

Compound Weave Structures: Basic construction of – Plain face Bedford cord; Plain face welt; Twill face Warp Backed, and Weft Backed structures.

Plain face Extra Warp, Extra Weft structures produced by heald; Twill face self-stitched Double Cloth; Computer-Aided Graph Designing of Woven Fabric Structures.

Pile Weaves and Leno: Basic construction of - Warp pile-Velvet, 3 Pick -Terry Pile, Weft Pile- Velveteen and Corduroy; Basic Leno structure.

UNIT V	SHUTTLELESS LOOM, END USES AND DEFECTS OF WOVEN FABRICS	9+3

Shuttleless Looms: Introduction to weft insertion by Projectile, Single Rapier, Double Rapier, Air jet, and Water jet.

Advancement in weaving: Multiphase weaving, Three Directional and Three-Dimensional weaving End uses and defects of woven fabrics: End uses of Woven Fabrics; Woven Fabric Defects, Causes and Remedies	
TOTAL: 60 PERIODS	
COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Outline the basics of woven fabric manufacturing and the preparatory processes involved in weaving.
CO2:	Describe the basics of woven fabric structures and construct the graph designs of simple woven fabric structures.
CO3:	Discuss the objectives of the motions of power loom weaving.
CO4:	Interpret the construction of compound woven fabric structures.
CO5:	Enumerate the introduction to Shuttleless looms and other advancement in weaving.
CO6:	Summarize the end uses of woven fabrics; causes, and remedies of woven fabric defects.
TEXT BOOKS:	
1	Marks R. and Robinson T.C., "Principles of Weaving", The Textile Institute, Manchester, 1989, ISBN: 0 900739 258
2	Grosicki Z. J., "Watson's Textile Design and Colour", Vol.1, Woodhead Publications, Cambridge England, 2004, ISBN: 9781782420088
REFERENCES:	
1	Talukdar M.K., Sriramulu P.K. and Ajgaonkar D.B., "Weaving: Machines, Mechanisms, Management", Mahajan Publishers, Ahmedabad, 1998, ISBN: 81-85401-16-0
2	Abhijit Majumdar, Principles of Woven Fabric Manufacturing 1st Edition, Kindle Edition ISBN-13 978-1498759113

3	Grosicki Z. J., "Watson's Advanced Textile Design and Colour", Vol.II, Butterworths, London, 1989, ISBN: 9781845698522
4	H. Nisbet, "Grammar of Textile Design", Taraporewala and Sons Co. Pvt. Ltd., 1994, ISBN: 1362902470

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	2	-	-	-	-	1	2	2	3	2	-
2	2	1	-	-	2	-	-	-	-	1	2	2	3	2	-
3	2	1	-	-	2	-	-	-	-	1	2	2	3	2	-
4	2	1	-	-	2	-	-	-	-	1	2	2	3	2	-
5	2	1	-	-	2	-	-	-	-	1	2	2	3	2	-
6	2	1	-	-	2	-	-	-	-	1	2	2	3	2	-
Overall Correlation	2	1	-	-	2	-	-	-	-	1	2	2	3	2	-

Recommended by Board of Studies	**04-04-2024**		
Approved	**2nd ACM**	**Date**	**25-05-2024**

23FT402	KNITTED FABRIC MANUFACTURING AND STRUCTURES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To familiarize the students with the fundamentals of knitted fabric manufacturing.
- To make students understand the principles involved in different weft-knitted fabric manufacturing.
- To acquaint the students with the construction of various weft-knit structures.
- To make students aware of the principles involved in different warp-knitted fabric manufacturing and the construction of simple warp-knit structures.
- To educate students about the characteristics and end uses of seamless garments.

UNIT I	INTRODUCTION AND FUNDAMENTALS OF KNITTING	9

Reasons for the growth of the knitting industry. Comparison of fabric properties - wovens, knits and bonded fabrics; classification of knitting processes - weft knit & warp knit; yarn quality requirements for knitting. General definitions and principles of knitting; Types of knitting needles - Bearded, Latch & Compound Needle. Elements of knitted loop structure

UNIT II	WEFT KNITTING	9

Classification of weft knit structures,- Symbolic and diagrammatic representation of weft knit structures. Comparison of single jersey, rib and interlock and purl structures- comparison knit, tuck, float Stitches–unconventional stitches - Single jersey derivatives, accordion, check and stripe effect.- Rib derivatives derby rib and Swiss rib, royal rib, polka rib- Rib gated structures Milano Rib and Double pique.

UNIT III	WARP KNITTING	9

Comparison of warp and weft knitting-basic warp knitting elements, knitting cycle- tricot, Rachel machines. Comparison of

tricot and Rachel Warp knitting –Basic stitches- pillar, blind lap, tricot, inlay, satin and atlas stitches. – Basic Tricot Warp Knit Structures full tricot, lock knit and loop raised fabrics. Basic Raschel Warp Knit structures- power nets, curtains and laces. – Latest developments in warp knitting machines. - warp knitting calculations for GSM, production. Commercial warp knitted structures and their end uses.		
UNIT IV	**FLAT KNITTING AND JACQUARD KNITTING**	**9**
Basic principles, elements, System of flat machines - Cam plate, yarn carrier sequences, feed machines, knitting needle. Working of V bed flat knitting machine. CAM track - single and multi-track system, function and limitations. Jacquard - Pattern wheel, pattern drum, punched steel tape needle selection mechanism - Electronic Jacquard knitting machines.		
UNIT V	**SEAMLESS GARMENTS**	**9**
Seamless garments – Introduction, Seamless technique, Common seamless products, Raw materials, Seamless knitting machines, Advantages of seamless garments, Disadvantages of seamless garments, Applications of seamless garments.		
		TOTAL: 45 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Outline the fundamentals of knitted fabric manufacturing.	
CO2:	Identify the principles involved in different weft-knitted fabric manufacturing.	
CO3:	Make use of the principles involved in different warp-knitted fabric manufacturing and the construction of warp-knit structures.	
CO4:	Summarize the principles involved in different flat-knitted fabric manufacturing.	
CO5:	Infer the principles involved in different jacquard-knitted fabric manufacturing.	

CO6:	Summarize the machines and methods of seamless garments manufacturing.
TEXT BOOKS:	
1	Spencer D.J., Knitting Technology, III Ed., Textile Institute, Manchester, 2001, ISBN: 1855733331
2	D J Spencer, Knitting Technology: A Comprehensive Handbook and Practical Guide Woodhead Publishing Series in Textiles, 2001, ISBN 1855733331
REFERENCES:	
1	Ajgaonkar D.B., "Knitting technology", Universal Publishing Corporation, Mumbai, 1998, ISBN: 0818502738/ISBN: 9780818502736
2	N. Anbumani, Knitting Fundamentals Paperback, New Age International Publisher, 2007, ISBN: 8122419542
3	Samuel Raz., "Flat Knitting: The new generation", Meisenbach GmbH, Bamberg, 1997, ISBN: 3- 87525-054-0.
4	Nonwoven Fabrics: Raw Materials, Manufacture, Applications, Characteristics, Testing Processes, Edited by Wilhelm Albrecht, Hilmar Fuchs, and Walter Kittelmann, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, ISBN: 3-527- 30406-1, 2003

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	2	-	-	-	-	1	2	2	3	2	-
2	3	2	1	1	2	-	-	-	-	1	2	2	3	2	-
3	3	2	1	1	2	-	-	-	-	1	2	2	3	2	-
4	2	1	-	-	2	-	-	-	-	1	2	2	3	2	-
5	2	1	-	-	2	-	-	-	-	1	2	2	3	2	-
6	2	1	-	-	2	-	-	-	-	1	2	2	3	2	-
Overall Correlation	3	2	1	1	2	-	-	-	-	1	2	2	3	2	-

Recommended by Board of Studies	**04-04-2024**		
Approved	**2nd ACM**	**Date**	**25-05-2024**

23FT403	APPAREL MACHINERIES AND EQUIPMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To impart knowledge on the machineries and equipment.
- To acquaint the students with the latest developments in the garment production machineries.

UNIT I	SPREADING MACHINES	9

Fabric inspection machines, Types of Fabric Packages. Methods of Fabric spreading. Types of spreading machines – Manual and Computerized spreaders. Limitations and control parameters in spreading. Marker planning, Marker efficiency, Factors affecting marker efficiency.

UNIT II	CUTTING MACHINES	9

Introduction to cutting machines. Types and functions of cutting machines – straight knife, round knife, band knife cutting machines. Notches, drills, die cutting machines. Types of Computerized cutting machines and its functional advantages. Maintenance & safety measures of cutting machines.

UNIT III	SEWING MACHINES	9

Basic parts of sewing machine –primary and auxiliary parts and their functions. Bobbin case / bobbin hook, throat plate– take up devices – tensioners – feed dog – pressure foot. Types of needles – Parts of needles and their function. Needle finishes and numbers. Adjustments of stand height – pedal – needle bar – stitch length selection – feed timing – needle and bobbin thread tension – stitch cycle timing diagram; Classifications of sewing machines; Basic parts and functions of chain and SNLS sewing machines. Maintenance & safety measures of machines.

UNIT IV	MULTI THREAD SEWING MACHINES	9

Over lock machines - Types of over lock machines. Parts and their functions. Threading diagram for overlock machines. Stitch Cycle

Diagram for overlock machines – Adjustment of needle height, feed dog height, angle, differential feed ratio, and position of upper and lower knives, Defects and remedies. Flat lock machines – types. Parts and their functions. Threading diagram of flat lock machines – Stitch cycle diagram. Adjustment of parts – needle height, feed dog height, differential feed ratio, loopers. Maintenance & safety measures of machines.		
UNIT V	**SPECIALIZED SEWING MACHINES**	**9**
Special sewing machines – Buttonhole and button sewing machines, Parts and their Functions, threading diagram. Rib cutting machine, zig zag and feed off the arm machine - parts and their functions, threading diagram ; usage of special attachments and tools for operation simplifications. Maintenance & safety measures of machines.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
	After completion of the course, the students will be able to:
CO1:	Apply different types of fabric laying methods and interpret its effect on spreading.
CO2:	Classify different types of spreading machines and its control methods.
CO3:	Identify different types of cutting machines and its control methods.
CO4:	Explain sewing machine and its basic parts, functions and safety measures.
CO5:	Interpret different types of multi thread sewing machines and its purpose.
CO6:	Identify special sewing machines, its purpose and control measures.

TEXT BOOKS:	
1	Harold Carr and Barbara Latham, The Technology of Clothing Manufacture, Om Book Service, 2002.
2	Shaeffer Claire, Sewing for the Apparel Industry, Prentice Hall, New Jersey, 2001.

REFERENCES:	
1	Singer, "Sewing Lingerie", Cy DeCosse Incorporated, 1991.
2	Laing R.M. and Webster J, "Stitches and Seams", The Textile Institute, Manchester, 1999
3	Technical Advisory Committee of AAMA, "A New Look at Apparel Mechanization", 1978.
4	Jacob Solinger, Apparel Production Handbook, Reinhold Publications, 1998.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	2	1	-	-	-	-	-	3	3	3	-
2	2	1	-	-	2	1	-	-	-	-	-	3	3	3	-
3	3	2	1	1	2	1	-	-	-	-	-	3	3	3	-
4	2	1	-	-	2	1	-	-	-	-	-	3	3	3	-
5	2	1	-	-	2	1	-	-	-	-	-	3	3	3	-
6	3	2	1	1	2	1	-	-	-	-	-	3	3	3	-
Overall Correlation	3	2	1	1	2	1	-	-	-	-	-	3	3	3	-

Recommended by Board of Studies	04-04-2024		
Approved	2nd ACM	Date	25-05-2024

23FT421	FABRIC STRUCTURE LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To train the students in analyzing the cloth to identify construction parameters and structure of woven and knitted fabrics.

LIST OF EXPERIMENTS:

1. Plain and its derivatives
2. Twill and its derivatives
3. Satin & Sateen (Regular and irregular)
4. Honeycomb (ordinary and Brighton)
5. Huck-a-back & Mock-leno
6. Extra warp and extra weft figuring
7. Pile fabrics (warp and weft)
8. Bedford cord & Backed fabrics
9. Gauze and Leno
10. Double cloth
11. Crepe
12. Tapestry
13. Basic Warp knitted and basic Weft knitted structures

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1:	Identify the constructional parameters of woven fabric
CO2:	Analyze the structure of woven fabric
CO3:	Identify the construction particulars of warp knitted structures
CO4:	Identify the construction particulars of Weft knitted structures
CO5:	Analyze the structure of warp knitted fabrics
CO6:	Analysis of the structure of weft knitted fabrics

Cos	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	1	1	1	2	3	3	-	1	3	2	2
2	3	2	1	1	1	1	1	2	3	3	-	1	3	2	2
3	3	2	1	1	1	1	1	2	3	3	-	1	3	2	2
4	3	2	1	1	1	1	1	2	3	3	-	1	3	2	2
5	3	2	1	1	1	1	1	2	3	3	-	1	3	2	2
6	3	2	1	1	1	1	1	2	3	3	-	1	3	2	2
Overall Correlation	3	2	1	1	1	1	1	2	3	3	-	1	3	2	2
Recommended by Board of Studies							04-04-2024								
Approved							2nd ACM			Date			25-05-2024		

23FT422	GARMENT CONSTRUCTION LABORATORY I	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To train the students in pattern making.
- To train the students in garment construction.
- To acquaint the students with knowledge of special machine used for garment construction

LIST OF EXPERIMENTS:

1. Study of elastic attachment and feed-of-the-arm machine.
2. Study of overlock and zig-zag embroidery machine.
3. Designing and developing pattern for Baby Top and Bottom.
4. Construction of Baby Top and Bottom.
5. Designing and developing pattern for Rompers.
6. Construction of Rompers.
7. Designing and Developing Pattern for Men's Shirt.
8. Construction of Men's Shirt.
9. Designing and Developing Pattern for Women's Skirt.
10. Construction of Women's Skirt
11. Grading of Men's Shirt and Women's skirt.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1:	Develop samples in various special machines.
CO2:	Develop patterns for various children's, women's and men's garments.
CO3:	Construct various children's garments.
CO4:	Construct various women's garments.
CO5:	Construct various men's garments.
CO6:	Develop grading for children's, women's and men's garments.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	2	1	1	2	3	3	-	1	3	2	2
2	3	2	1	1	2	1	1	2	3	3	-	1	3	2	2
3	3	2	1	1	2	1	1	2	3	3	-	1	3	2	2
4	3	2	1	1	2	1	1	2	3	3	-	1	3	2	2
5	3	2	1	1	2	1	1	2	3	3	-	1	3	2	2
6	3	2	1	1	2	1	1	2	3	3	-	1	3	2	2
Overall Correlation	3	2	1	1	2	1	1	2	3	3	-	1	3	2	2
Recommended by Board of Studies							04-04-2024								
Approved							2nd ACM			Date			25-05-2024		

23ES491	APTITUDE AND LOGICAL REASONING –1	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To improve the problem solving and logical thinking ability of the students.
- To acquaint student with frequently asked questions and patterns in quantitative aptitude and logical reasoning.

UNIT I	**4**
Numbers, LCM, HCF, Averages, Ratio & Proportion, Mixtures & Allegation.	
UNIT II	**4**
Percentages, Time and work, Pipes and Cistern, coding and decoding.	
UNIT III	**4**
Time Speed Distance, Train, Boats and Streams, Analogy.	
UNIT IV	**4**
Data Interpretation (BAR,PIE,LINE), Seating arrangement.	
UNIT V	**4**
Simple Interest and Compound Interest, Profit loss and Discount, Partnership.	
TOTAL: 20 PERIODS	

COURSE OUTCOMES:

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

CO1:	Analyse and solve complex problems, and foster critical thinking and logical reasoning skills.
CO2:	Solve fundamental mathematical problems, and enhance their computational skills and numerical ability.
CO3:	Develop strategies for tackling a variety of problem types, and encourage the use of multiple approaches to solve problems efficiently.
CO4:	Analyse and solve different data analysis problems for time and distance, and interpret data analysis for a case study.
CO5:	Derive information from graphs, and solve questions based on mathematical operations such as ratios, proportions, basic algebra, and statistical estimation.
CO6:	Solve questions in a fraction of a minute using shortcut methods

TEXT BOOK:	
1	Smith, John. "APTIPEDIA." 2nd ed., Wiley Publishers, 2020.
2	Agarwal, R.S. "Quantitative Aptitude." 2nd ed., S. Chand Publishing.
REFERENCES:	
1	Agarwal, R.S. "A Modern Approach to Verbal & Non-Verbal Reasoning." 2nd ed., S. Chand Publishing

Cos	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	-	-	2	1	1	2	1	2	3	1	-	3
2	2	3	3	-	-	2	-	1	3	2	2	3	2	1	3
3	3	3	3	-	-	2	-	1	2	2	2	3	2	-	3
4	2	3	2	3	-	2	1	2	3	3	2	3	1	2	3
5	3	2	2	-	1	3	-	2	2	3	3	3	3	1	3
6	3	3	3	3	2	3	1	3	3	2	3	3	3	1	3
Overall Correlation	3	3	3	1	1	3	1	2	3	3	3	3	2	1	3

Recommended by Board of Studies	08-04-2024		
Approved	2nd ACM	Date	25-05-2024

23FT424	MINI PROJECT -1	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- Encourage students to apply foundational theoretical knowledge to practical engineering problems.
- Develop collaborative and project management skills through teamwork and effective communication.
- Train students in basic research methodology, technical documentation, and presentation techniques to articulate project outcomes clearly.
- Enhance students' ability to systematically design, analyze, and evaluate simple prototypes or models.
- Prepare students for real-world engineering challenges and lay the foundation for multidisciplinary teamwork and problem-solving in advanced projects.

COURSE DESCRIPTION:

This course serves as an introductory platform for students to apply the foundational knowledge acquired from their core and interdisciplinary subjects in a practical setting. This course enables students to work on small-scale, department-relevant projects that focus on problem identification, basic design, and preliminary prototype development. With limited prior expertise, students will explore the process of translating theoretical concepts into tangible solutions, fostering creativity, teamwork, and critical thinking. The course emphasizes hands-on learning, communication, and project documentation, laying a strong foundation for advanced projects and professional challenges in later semesters.

PROJECT OUTLINE:

Week 1	Course Orientation and Topic Selection
Week 2	Problem Definition and Objective Setting

Week 3	Literature Review and Research
Week 4	First Review and Feedback
Week 5	Problem Refinement and Research Gap Identification
Week 6	Conceptual Design and Initial Approach
Week 7	Methodology and Project Planning
Week 8	Second Review and Project Evaluation
Week 9	Design Refinement and Testing
Week 10	Resource Identification and Budget Estimation
Week 11	Report Writing and Presentation Preparation
Week 12	Third Review Presentation and Submission of Thesis

EVALUATION:

- The progress of the mini project will be evaluated through three reviews, conducted by a committee appointed by the Head of the Department. A final project report must be submitted at the end of the semester. Evaluation will be based on oral presentation and the written report, assessed by internal examiners designated by the Head of the Department.
- The project should focus on topics from first three or four semester (whichever is applicable) subjects / industry demand topics, or futuristic technologies. It is recommended for Faculty of Aeronautical Engineering, Civil Engineering, and Mechanical Engineering students, the project should demonstrate an understanding of first principles of engineering.
- Similarly for students of Faculty of Computer Science Engineering, the project may involve programming using Python or C language. For Faculty of Electronics and Communication Engineering, the student project shall

	incorporate appropriate techniques and systems relevant to the field. For the students of Faculty of Fashion Technology, the project based on material innovations, or technology in fashion is recommended. • The evaluation will focus on how well the project is structured, including clarity and logical flow in both oral presentations and written texts. • The relevance and innovation of the project will be assessed, particularly it's potential to contribute to sustainability, innovation, and SDG-aligned goals. • The accuracy of English usage, including grammar, clarity, and coherence, will be reviewed in both oral and written communication to ensure effective delivery of technical content.
COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Apply basic engineering principles to solve simple problems.
CO2:	Choose relevant sources to understand the current knowledge and identify areas to improve.
CO3:	Utilise basic tools and techniques to test simple solutions.
CO4:	Interpret the impact of engineering solutions on society and the environment.
CO5:	Combine in teams to plan and complete projects within given constraints.
CO6:	Develop comprehensive technical reports and deliver structured presentations to effectively convey project outcomes.

Cos	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
2	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
3	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
4	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
5	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
6	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
Overall Correlation	3	2	**1**	**1**	**1**	**1**	**1**	**3**	**2**	**2**	**2**	**1**	**3**	**1**	**3**
Recommended by Board of Studies							**04-04-2024**								
Approved							**2nd ACM**			**Date**			**25-05-2024**		

SEMESTER -V

23RE501	RESEARCH METHODOLOGY AND INTELLECTUAL PROPERTY RIGHTS	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:

- To provide an overview on selection of research problem based on the Literature review
- To enhance knowledge on the Data collection and Analysis
- To outline the importance of ethical principles to be followed in Research work and IPR

UNIT I	INTRODUCTION TO RESEARCH FORMULATION	6

Meaning of research problem, Sources of research problem, Criteria- good research problem, and selecting a research problem, Scope and objectives of research problem. Defining and formulating the research problem - Necessity of defining the problem - Importance of literature review in defining a problem

UNIT II	LITERATURE REVIEW	6

Literature review – Primary and secondary sources – reviews, treatise, monographs-patents – web as a source – searching the web - Critical literature review – Identifying gap areas from literature review - Development of working hypothesis

UNIT III	DATA ANALYSIS	6

Execution of the research - Data Processing and Analysis strategies - Data Analysis with Statistical Packages - Generalization and Interpretation

UNIT IV	REPORT, THESIS PAPER, AND RESEARCH PROPASAL WRITING	6

Structure and components of scientific reports - Types of report – Technical reports and thesis – Significance – Different steps in the preparation – Layout, structure and Language of typical reports –

Illustrations and tables - Bibliography, types of referencing, citations- index and footnotes, how to write report- Paper Developing,- Plagiarism- Research Proposal- Format of research proposal- a presentation - assessment by a review committee		
UNIT V	**INTELLECTUAL PROPERTY AND PATENT RIGHTS**	**6**
Ethical principles- Plagiarism, Nature of Intellectual Property - Patents, Designs, Trade and Copyright- patent search, Process of Patenting and Development: technological research, innovation, patenting, and development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of Patent Rights – Scope of Patent Rights, Geographical Indications		
TOTAL: 30 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Analyze the literature to identify the research gap in the given area of research.
CO2:	Identify and formulate the research Problem
CO3:	Analyze and synthesize the data using research methods and knowledge to provide scientific interpretation and conclusion.
CO4:	Prepare research reports and proposals by properly synthesizing, arranging the research documents to provide comprehensive technical and scientific report
CO5:	Conduct patent database search in various countries for the research problem identified.
CO6:	Apply ethical principles in research and reporting to promote healthy scientific practice

TEXT BOOKS:	
1	Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An Introduction to Research Methodology, RBSA Publishers.
2	Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.
3	Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.

4	Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270p.
5	Wadehra, B.L. 2000. Law relating to patents, Trade Marks, Copy right designs and Geographical indications. Universal Law Publishing
REFERENCES:	
1	Anthony, M., Graziano, A.M. and Raulin, M.L., 2009. Research Methods: A Process of Inquiry, Allyn and Bacon.
2	Carlos, C.M., 2000. Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options. Zed Books, New York.
3	Coley, S.M. and Scheinberg, C. A., 1990, "Proposal Writing", Sage Publications.
4	Day, R.A., 1992.How to Write and Publish a Scientific Paper, Cambridge University Press.
5	Fink, A., 2009. Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications
6	Leedy, P.D. and Ormrod, J.E., 2004 Practical Research: Planning and Design, Prentice Hall.
7	Satarkar, S.V., 2000. Intellectual property rights and copy right. ESS Publications.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	1	-	-	1	1	2	-	1	3	2	1
2	3	2	1	1	1	-	-	1	1	2	-	1	3	2	1
3	3	2	1	1	1	-	-	1	1	2	-	1	3	2	1
4	3	2	1	1	1	-	-	1	1	2	-	1	3	2	1
5	3	2	1	1	1	-	-	1	1	2	-	1	3	2	1
6	2	2	1	1	1	-	-	1	1	2	-	1	3	2	1
Overall Correlation	3	2	**1**	**1**	**1**	**-**	**-**	**1**	**1**	2	**-**	**1**	**3**	**2**	**1**

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

23FT501	APPAREL MARKETING AND MERCHANDISING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To acquaint the students with the garment industry and its environment
- To acquaint the students with the concepts of design merchandising
- To acquaint the students with the concepts of sourcing
- To acquaint the students with the concepts of marketing apparel products
- To acquaint the students with the concepts of export documentation

UNIT I	SOURCING	9

Sourcing - need and importance, sourcing strategy and best sourcing practice in apparel and textile businesses. Sourcing raw material and accessories based on prevailing trends and customer requirements. Vendor Management, supply chain and demand chain, sourcing negotiations, global co-ordination in sourcing, materials management and quality in sourcing, quick response, ERP, supplier partnership in sourcing, JIT technology.

UNIT II	MARKETING FOR APPAREL PRODUCTS	9

Uniqueness of apparel market, core concepts and orientation towards market place, strategies and planning, market research and forecast, customers, consumer markets and business markets, market segments and brand building, brand positioning and competition, programmatic marketing; digital and autonomous interventions, conversational interfaces - Artificial intelligence chat bots

UNIT III	DESIGN MERCHANDISING	9

Merchandising - principles, terminology, basic concepts, significance, scope, function. Role and responsibility of merchandiser- determination and development of new product

line and product range; creative design of garments and accessories, new product development and seasons of sale, costing, coordination Role of merchandising with other departments in the garment industry. Communications with the buyers, production house and export house		
UNIT IV	**GARMENT INDUSTRY OVERVIEW**	**9**
Segments of the garment industry – history and categories, Apparel business practices and product lines; business operations of domestic and export oriented Indian apparel industries. Analysis - market, customer profiling and product. Product development. Influence of the customer; different generations and motivations behind the changes, consumer buying behaviour, market segmentation, market positioning		
UNIT V	**EXPORT DOCUMENTATION AND POLICIES**	**9**
Apparel exporter's types. Types of buyers, buying cycle and buying seasons. Buying house - role and responsibility. Follow-ups, inspection, quality controller (QC) and quality assurance (QA) and shipment. Government policies and guide lines for apparel export and domestic trade, tax structures and government incentives in apparel trade; export documents and its purposes, banking activities, Letter of credit, logistics and shipping, foreign exchange regulation, export risk management and insurance; export finance, Special economic zones.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Outline the garment industry and its environment
CO2:	Infer on design merchandising
CO3:	Outline the sourcing strategies
CO4:	Infer the market research process and customers
CO5:	Apply the suitable brand building process and advanced technologies in marketing

CO6:	Summarize the export documentation and policies
TEXT BOOKS:	
1	Elian stone, Jean A samples, "Fashion Merchandising", McGraw Hill Book Company, New York, 1985, ISBN: 0-07-061742-2
2	Gibson G. Vedamani, "Retail Management Functional Principles andPractices",JaicoPublishingHouse, SecondEdition,2002
3	Ruth E. Glock, Grace I. Kunz "Apparel Manufacturing Sewn Product Analysis" Fourth Edition, Pearson Prentice Hall, NJ, 2005, ISBN: 81-7758-076-0
REFERENCES:	
1	Shivaramu S.," Export Marketing" – A Practical Guide to Exporters", Wheeler Publishing, Ohio, 1996, ISBN: 81-7544-166-6
2	Warren. J. Keegan and Mark.C.Green , "Global Marketing", Pearson Prentice Hall, New Delhi, 2005.
3	Philip Kotler, Kevin Lane Keller, Abraham Koshy, and Mithileshwar Jha , "Marketing Management A South Asian Perspective", Pearson Education, New Delhi, 2006
4	Nair Suja.R, "Retail Management", HimalayaPublishingHouse,2008.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	2	-	2	-	-	-	2	3	-	2
2	3	2	1	1	-	2	-	2	-	2	-	2	3	-	2
3	2	1	-	-	-	2	-	2	-	-	-	2	2	-	2
4	2	1	-	-	-	2	-	2	-	-	-	2	2	-	2
5	2	1	-	-	-	2	-	2	-	-	-	2	2	-	2
6	2	1	-	-	-	2		2	-	2	-	2	2	-	2
Overall Correlation	3	2	1	1	-	2	-	2	-	1	-	2	3	-	2

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

23FT511	TEXTILE CHEMICAL PROCESSING	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To enable the students to learn about pre-treatments involved in the wet processing of textiles.
- To enable the students to learn about pre-treatments involved in the dyeing of textiles.
- To enable the students to learn about pre-treatments involved in the printing of textiles.
- To enable the students to learn about the textile finishes.
- To acquaint the students with the concepts of computer color matching.

UNIT I	PREPARATORY PROCESSES	9

Introduction - Process sequence of wet processing for wovens and knits. Desizing hydrolytic, oxidative and enzymatic. Singeing types. Scouring alkaline and enzymatic. Bleaching - hypochlorite, peroxide and sodium chlorite bleaching. Optical whitening. Mercerizing tension, tensionless and tubular mercerization.

UNIT II	DYEING	9

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 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.

UNIT III	PRINTING	9

Ingredients 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, kadi, leather, pearl and rubber. Post treatments of printed goods.

UNIT IV	FINISHING	9

Mechanical finishing -raising, shearing, sueding, anti-shrink

finish, compacting, decatizing, calendaring, embossing. Chemical finishing - softening, crease resist, bio polishing, flame retardant, water repellent, water proof, soil release, antimicrobial, UV protection finish. Denim washing - stone washing, acid washing, sand blasting.

UNIT V	COMPUTER COLOR MATCHING CONCEPTS	9

Color; Electromagnetic spectrum - visible range, measurement of color strength - color matching - theory and applications. Spectrophotometer and color matching systems – Process, interpreting the reflectance, K/S values, CIELAB Values, tri stimulus values, color difference. Quality control using color matching systems, color difference - pass / fail system and shade sorting

TOTAL: 45 PERIODS

PRACTICAL EXERCISES:

1. Desizing and scouring of cotton fabric.
2. Peroxide Bleaching of Cotton Yarn/Fabric.
3. Degumming of silk.
4. Identification of dyes
5. Dyeing of Cotton using Reactive & Vat dyes.
6. Dyeing of silk yarn / fabric with acid dyes
7. Dyeing of polyester using disperse dyes.
8. Dyeing of polyester and cotton blend
9. Determination of wash, light, perspiration and rubbing fastness of dyed fabrics.
10. Printing of cotton fabric using direct style.
11. Water proof and Flame-retardant finishing of cotton.
12. Resin and softener finishes.
13. Analysis and interpretation of spectrophotometer data for dyed fabrics

TOTAL:30 PERIODS

COURSE OUTCOMES:

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

CO1:	Outline the preparatory process in chemical processing
CO2:	Outline the classes, machines, stages, and application of dyes

CO3:	Choose the ingredients, types of machines and faults of printing
CO4:	Apply various mechanical methods and application of finishing
CO5:	Apply various chemical methods and application of finishing
CO6:	Infer the measurement of colour strength and colour difference

TEXT BOOKS:	
1	Trotman E. R., "Dyeing and Chemical Technology of Textile Fibres", B.I Publishing Pvt. Ltd., New Delhi, 1994, ISBN: 0471809101 | ISBN-13: 9780471809104
2	Shenai V. A., "Chemistry of Dyes and Principles of Dyeing", Sevak Publications, Mumbai, 1995, ISBN: B0007BFE9Y
3	Shenai V. A., "Technology of Printing", Sevak Publications, Mumbai, 1996
REFERENCES:	
1	Hall A.J., "Textile Finishing", 2nd ed., McGraw Hill, 1995.
2	Marsh J.T., "Introduction to Textile Finishing" Vol. II, New Age, 1996
3	Heywood D.,"Textile Finishing", Woodhead Publishing Ltd.,2003 ISBN 090195681
4	Shenai V.A., "Technology of Finishing", Vol. X, Usha, 1998
5	Schindler W.D and Hauser P., "Chemical Finishing of Textiles", Wood head Publications, ISBN: 1855739054.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	-	2	-	2	-	-	-	2	2	-	2
2	2	1	-	-	-	2	-	2	-	-	-	2	2	-	2
3	3	2	1	1	-	2	-	2	-	-	-	2	3	-	2
4	3	2	1	1	-	2	-	2	-	-	-	2	3	-	2
5	3	2	1	1	-	2	-	2	-	-	-	2	3	-	2
6	2	1	-	-	-	2	-	2	-	-	-	2	2	-	2
Overall Correlation	3	2	-	-	-	2	-	2	-	-	-	2	3	-	2

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

23FT521	COMPUTER AIDED GARMENT DESIGNING LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To train the students in CAD used for designing of garments.
- To train the students in CAD used for pattern making of garments.
- To train the students in CAD used for marker planning of garments.
- To train the students in CAD used for cut order planning.
- To train the students in CAD used for development of specification sheet.

LIST OF EXPERIMENTS:

1. Introduction to the software and tools.
2. Give instructions for the following: a) Buffer for production piece to piece – manual, auto cutter, band knife and straight knife b) Assessment of shrinkage report and incorporation of inner and outer shrinkage into the pattern
3. Digitize and develop graded patterns for a Baby frock using a one-way fabric of any two widths.
4. Digitize and develop graded patterns for a kid's Rompers and plan a marker with motif alignment using a fabric with print or embroidery.
5. Develop graded patterns and marker plan for a Ladies top using a two-way fabric of any two widths. Calculate the fabric consumption.
6. Develop pattern and marker plan for a Men's Basic T shirt for the fabric of any one width. Calculate the fabric consumption. Develop a cut order plan
7. Develop graded patterns and marker plan for Men's Formal Trouser using fabric of any two widths. Calculate the fabric consumption.
8. Develop graded patterns and marker plan for a Ladies Skirt using plaid fabric of any two widths.

9. Develop graded patterns for a Men's Full arm shirt.
10. Develop marker plan and cut order plan for a Men's Full arm shirt using two different fabrics namely striped and checked. Calculate the fabric consumption.
11. Develop graded patterns and marker plan for Salwar using fabric of any two widths. Calculate the fabric consumption.
12. Develop graded patterns and marker plan for Kameez using fabric of any two widths. Calculate the fabric consumption.
13. Develop graded patterns and marker plan for a Men's brief using fabric of any two widths. Calculate the marker efficiency and fabric consumption. Develop a specification sheet and cut order plan for brief.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1:	Develop graded patterns for kid's wear
CO2:	Develop graded patterns for men's wear
CO3:	Develop graded patterns for women's wear
CO4:	Build the marker planning
CO5:	Identify the fabric consumption
CO6:	Develop cut order plan

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	3	2	-	3	3	3	-	2	3	3	2
2	3	2	1	1	3	2	-	3	3	3	-	2	3	3	2
3	3	2	1	1	3	2	-	3	3	3	-	2	3	3	2
4	3	2	1	1	3	2	3	3	3	3	-	2	3	3	2
5	3	2	1	1	3	2	3	3	3	3	-	2	3	3	2
6	3	2	1	1	3	2	-	3	3	3	-	2	3	3	2
Overall Correlation	3	2	1	1	3	2	1	3	3	3	-	2	3	3	2

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

23FT522	MINI PROJECT -2	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- Encourage students to apply foundational theoretical knowledge to practical engineering problems.
- Develop collaborative and project management skills through teamwork and effective communication.
- Train students in basic research methodology, technical documentation, and presentation techniques to articulate project outcomes clearly.
- Enhance students' ability to systematically design, analyze, and evaluate simple prototypes or models.
- Prepare students for real-world engineering challenges and lay the foundation for multidisciplinary teamwork and problem-solving in advanced projects.

COURSE DESCRIPTION:

This course serves as an introductory platform for students to apply the foundational knowledge acquired from their core and interdisciplinary subjects in a practical setting. This course enables students to work on small-scale, department-relevant projects that focus on problem identification, basic design, and preliminary prototype development. With limited prior expertise, students will explore the process of translating theoretical concepts into tangible solutions, fostering creativity, teamwork, and critical thinking. The course emphasizes hands-on learning, communication, and project documentation, laying a strong foundation for advanced projects and professional challenges in later semesters.

PROJECT OUTLINE:

Week 1	Course Orientation and Topic Selection
Week 2	Problem Definition and Objective Setting

Week 3	Literature Review and Research
Week 4	First Review and Feedback
Week 5	Problem Refinement and Research Gap Identification
Week 6	Conceptual Design and Initial Approach
Week 7	Methodology and Project Planning
Week 8	Second Review and Project Evaluation
Week 9	Design Refinement and Testing
Week 10	Resource Identification and Budget Estimation
Week 11	Report Writing and Presentation Preparation
Week 12	Third Review Presentation and Submission of Thesis

EVALUATION:

- The progress of the mini project will be evaluated through three reviews, conducted by a committee appointed by the Head of the Department. A final project report must be submitted at the end of the semester. Evaluation will be based on oral presentation and the written report, assessed by internal examiners designated by the Head of the Department.
- The project should focus on topics from first three or four semester (whichever is applicable) subjects / industry demand topics, or futuristic technologies. It is recommended for Faculty of Aeronautical Engineering, Civil Engineering, and Mechanical Engineering students, the project should demonstrate an understanding of first principles of engineering.
- Similarly for students of Faculty of Computer Science Engineering, the project may involve programming using Python or C language. For Faculty of Electronics and Communication Engineering, the student project shall

incorporate appropriate techniques and systems relevant to the field. For the students of Faculty of Fashion Technology, the project based on material innovations, or technology in fashion is recommended. • The evaluation will focus on how well the project is structured, including clarity and logical flow in both oral presentations and written texts. • The relevance and innovation of the project will be assessed, particularly its potential to contribute to sustainability, innovation, and SDG-aligned goals. • The accuracy of English usage, including grammar, clarity, and coherence, will be reviewed in both oral and written communication to ensure effective delivery of technical content.	
COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Apply basic engineering principles to solve simple problems.
CO2:	Choose relevant sources to understand the current knowledge and identify areas to improve.
CO3:	Utilise basic tools and techniques to test simple solutions.
CO4:	Interpret the impact of engineering solutions on society and the environment.
CO5:	Combine in teams to plan and complete projects within given constraints.
CO6:	Develop comprehensive technical reports and deliver structured presentations to effectively convey project outcomes.

Cos	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
2	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
3	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
4	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
5	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
6	3	2	1	1	1	1	1	3	2	2	2	1	3	1	3
Overall Correlation	3	2	**1**	**1**	**1**	**1**	**1**	**3**	**2**	**2**	**2**	**1**	**3**	**1**	**3**
Recommended by Board of Studies							**07-11-2024**								
Approved							**3rd ACM**			**Date**			**30-11-2024**		

23ES591	APTITUDE AND LOGICAL REASONING –2	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To improve the problem solving and logical thinking ability of the students.
- To acquaint the student with frequently asked patterns in quantitative aptitude and logical reasoning during various examinations and campus interviews

UNIT I		**4**
Probability, Permutation & Combination, Algebra, Problems on ages		
UNIT II		**4**
Mensuration, Logarithms, inequalities and modulus, Syllogism		
UNIT III		**4**
Directions, logical sequence words, number series, Analytical Reasoning		
UNIT IV		**4**
Blood relation, Clock and Calendar, Picture puzzles		
UNIT V		**4**
Data sufficiency, cube and cuboids, odd man out		
	TOTAL: 20 PERIODS	

COURSE OUTCOMES:

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

CO1:	Apply concepts of probability, permutation, and combination to solve real-world problems.
CO2:	Solve algebraic problems and age-related problems using logical approaches and techniques.
CO3:	Analyze and solve problems in mensuration, logarithms, and inequalities.
CO4:	Interpret and solve problems related to directions, logical sequence, and number series.
CO5:	Identify and solve problems in logical reasoning such as syllogism, blood relations, clock and calendar.
CO6:	Identify and solve problems in logical reasoning such as syllogism, blood relations, clock and calendar.

TEXT BOOK:	
1	Smith, John. "APTIPEDIA." 2nd ed., Wiley Publishers, 2020.
2	Agarwal, R.S. "Quantitative Aptitude." 2nd ed., S. Chand Publishing.
REFERENCES:	
1	Agarwal, R.S. "A Modern Approach to Verbal & Non-Verbal Reasoning." 2nd ed., S. Chand Publishing.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	1	3	2	2	2	1	3	1	2	3	2	2
2	3	2	2	2	3	2	3	2	1	2	1	2	3	2	3
3	3	3	2	2	2	2	2	2	1	3	1	2	3	3	2
4	2	3	2	1	2	3	1	2	3	3	2	3	2	2	3
5	2	3	3	2	2	2	2	3	2	2	2	3	3	3	3
6	3	3	2	2	3	2	3	3	2	2	1	2	3	3	2
Overall Correlation	3	3	3	2	3	3	3	3	2	3	2	3	3	3	3

Recommended by Board of Studies	13-11-2024		
Approved	3rd ACM	Date	30-11-2024

SEMESTER –VI

23CE611	ENVIRONMENTAL SCIENCE AND ENGINEERING	L	T	P	C
		3	0	1	4

COURSE OBJECTIVES:

- To provide basic knowledge on environment impact assessment
- To create an awareness on the pollutants in the environment
- To familiarize the student with the technology for restoring the environment.
- Applying the technology for producing ECO safe products
- To develop simple climate models and evaluate climate changes using models

UNIT I	INTRODUCTION TO ENVIRONMENT IMPACT ASSESSMENT	9

Impacts of Development on Environment – Rio Principles of Sustainable Development- Environmental Impact Assessment (EIA) – Objectives – Historical development – EIA Types – EIA in project cycle –EIA Notification and Legal Framework

UNIT II	MOVEMENT OF POLLUTANTS IN ENVIRONMENT	9

Concepts of diffusion and dispersion, point and area source pollutants, pollutant dispersal; Gaussian plume model, hydraulic potential, Darcy's equation, types of flow, turbulence. Concept of heat transfer, conduction, convection; concept of temperature, lapse rate (dry and moist adiabatic); mixing heights, laws of thermodynamics; concept of heat and work, Carnot engine, transmission of electrical power, efficiency of turbines, wind mills and hydroelectric power plants.

UNIT III	ECOLOGICAL RESTORATION	9

Wastewater treatment: anaerobic, aerobic process, methanogenesis, treatment schemes for waste water: dairy, distillery, tannery, sugar, antibiotic industries; solid waste

treatment: sources and management (composting, vermiculture and methane production, landfill. hazardous waste treatment).		
UNIT IV	**ECOLOGICALLY SAFE PRODUCTS AND PROCESSES**	**9**
Biofertilizers, microbial insecticides and pesticides, bio-control of plant pathogen, Integrated pest management; development of stress tolerant plants, biofuel; mining and metal biotechnology: microbial transformation		
UNIT V	**CLIMATE CHANGE MODELS**	**9**
Constructing a climate model – climate system modeling – climate simulation and drift – Evaluation of climate model simulation – regional (RCM) – global (GCM) – Global average response to warming –climate change observed to date		
TOTAL: 60 PERIODS		

LIST OF EXPERIMENTS

1. Determination of Bio fuel parameters such as flash point and fire point.
2. Determination of density of biofuels.
3. Determination of BOD/COD in water.
4. Simulating the RCM and GCM model for different geographic conditions.
5. Measurement of Pollutant in environment by Gaussian Plume model.

COURSE OUTCOMES:

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

CO1:	Explain the importance of the process of Environmental impact assessment and its types.
CO2:	Illustrate the chemical processes and pollutant chemistry
CO3:	Identify the methods to solve environmental problems
CO4:	Apply the knowledge to develop ecofriendly products.
CO5:	Construct the various simple climate models for simulation

CO6:	Apply the climate model simulation to monitor climate change
TEXT BOOKS:	
1	David .E Neelin "Climate Change and Modelling", Cambridge University Press, California 2012.
2	Evans, G.G. & Furlong, J. 2010. Environmental Biotechnology: Theory and Application (2nd edition). Wiley-Blackwell Publications.
3	Pani, B. 2007. Textbook of Environmental Chemistry. IK international Publishing House
4	N.S. Raman , A.R. Gajbhiye & S.R. Khandeshwar, Environmental Impact Assessment, 2014,IK International Pvt Ltd.
REFERENCES:	
1	Carson (1907-1964). Environment Conservation-book
2	Encyclopaedia of Environmental Issues by Craig W. Allin &Probe.
3	Encyclopaedia of Environmental studies by William Ashworth.
4	Climate Change and Climate Modeling- Kindle Edition.
5	Environmentally- Friendly Product development - Eberhand Abile ,Reiner Anderl,2005

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	-	2	1	-	-	-	-	-	2	-	-
2	3	2	1	1	-	3	2	-	-	-	-	1	3	-	-
3	3	2	1	1	-	3	2	-	-	-	-	1	3	-	-
4	3	2	1	1	-	3	2	-	-	-	-	1	3	-	-
5	3	2	1	1	-	3	2	-	-	-	-	1	3	-	-
6	3	2	1	1	-	3	2	-	-	-	-	1	3	-	-
Overall Correlation	**3**	**2**	**1**	**1**	**-**	**3**	**2**	**-**	**-**	**-**	**-**	**1**	**3**	**-**	**-**

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

23FT611	GARMENT CONSTRUCTION II	L	T	P	C
		2	0	4	4

COURSE OBJECTIVES:

- To impart knowledge on drafting of garment components.
- To impart knowledge on garment components construction.
- To impart knowledge on Men's wear.
- To impart knowledge on Women's wear.
- To impart knowledge on Children's wear

UNIT I	PATTERN AND CONSTRUCTION OF GARMENT COMPONENTS	9

Pocket classification - outside pockets, inserted pocket and side-seam pocket. Plackets - Pointed, Slit opening and Wing collar. Waistband, pleats, flares, gathers, facing patterns for cutout necklines and armholes.

UNIT II	PATTERN AND CONSTRUCTION OF MEN'S WEAR	9

Fabric selection, drafting and construction procedure of garment assembly -Shirt, T-shirt, Pant derivatives, Jean and Jacket.

UNIT III	PATTERN AND CONSTRUCTION OF WOMEN'S TOPS	9

Fabric selection, drafting and construction procedure of garment assembly -Kimono, Raglan foundation, princess line foundation, Bias cut dresses Tunic, Tank Tops and Sport's top.

UNIT IV	PATTERN AND CONSTRUCTION OF WOMEN'S BOTTOMS	9

Fabric selection, drafting and construction procedure of garment assembly -Trousers variations, skirt variations and leggings.

UNIT V	PATTERN AND CONSTRUCTION OF INTIMATE APPAREL	9

Fabric selection, drafting and construction procedure of garment

assembly- Men's inner wear- Vests & Briefs. Fabric selection, drafting and construction procedure of garment assembly- Women's lingerie – panties, brassier, camisoles and petticoat
TOTAL: 45 PERIODS
LIST OF EXPERIMENTS:
1. Study of button holing and button fixing machine 2. Study of computer controlled embroidery machine 3. Designing and developing patterns for men's trousers 4. Construction of men's trousers 5. Designing and developing patterns for ladies salwar 6. Construction of ladies salwar 7. Designing and developing patterns for ladies Kameez 8. Construction of ladies Kameez 9. Designing and developing patterns for basic knitted T-shirt 10. Construction of knitted T-shirt 11. Designing and developing patterns for Men's Brief and women's bra 12. Construction of Men's Brief and women's bra
TOTAL: 30 PERIODS
COURSE OUTCOMES:
After completion of the course, the students will be able to:

CO1:	Explain drafting and construction procedure for garment components
CO2:	Apply drafting techniques, prepare patterns and operation breakdown for men's top
CO3:	Develop pattern and operation breakdown for men's bottom
CO4:	Apply drafting techniques, prepare patterns and operation breakdown for women's top
CO5:	Develop pattern and operation breakdown for women's bottom
CO6:	Develop pattern and operation breakdown for lingerie

TEXT BOOKS:	
1	Helen Joseph, Armstrong, "Patternmaking for Fashion Design", Pearson Education Pte. Ltd., 2005.
2	Jacob Solinger, "Apparel Production Handbook", Reinhold Publications,1998
3	Carr H and Latham B., "The Technology of Clothing Manufacturing", Blackwell Science, U.K.,1994
REFERENCES:	
1	Ruth E. Glock, Grace I. Kunz, "Apparel Manufacturing, Sewn Product Analysis", fourth edition, Pearson Education, ISBN: 8177580760159 4
2	Laing R.M., Webster J, "Stitches & Seams", The Textile Institute, India,1998
3	Shaeffer Claire, "Sewing for the Apparel Industry", Prentice Hall, New Jersey, 2001
4	Singer, "Sewing Lingerie", Cy De Cosse Incorporated, 1991.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	3	2	-	2	-	2	-	2	2	3	2
2	3	2	1	1	3	2	-	2	-	2	-	2	3	3	2
3	3	2	1	1	3	2	-	2	-	2	-	2	3	3	2
4	3	2	1	1	3	2	-	2	-	2	-	2	3	3	2
5	3	2	1	1	3	2	-	2	-	2	-	2	3	3	2
6	3	2	1	1	3	2	-	2	-	2	-	2	3	3	2
Overall Correlation	3	2	1	1	3	2	-	2	-	2	-	2	3	3	2

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

23FT612	FABRIC AND GARMENT QUALITY EVALUATION	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To impart knowledge on quality evaluation of fabrics and garments.
- To acquaint the students with construction characteristics and sampling techniques of apparels.
- To impart knowledge on the mechanical properties of apparels.
- To impart knowledge on the serviceability properties.
- To acquaint the students with fabric and garment inspection.

UNIT I	CONSTRUCTION CHARACTERISTICS & SAMPLING TECHNIQUES	9

Basic fabric particulars – Measurement of ends and picks per inch, count of warp and weft, thickness and areal density (GSM), moisture regain and moisture content, warp and weft crimp; cover factor calculation Fabric sampling techniques Definition– random, biased sampling. Terms used in sampling. Sampling techniques for fabric. Standard conditions for testing samples.

UNIT II	MECHANICAL PROPERTIES	9

Tensile strength measurement – ravelled strip test and grab test – mechanical and electronic measuring systems. Tear strength – importance – measuring systems. Bursting strength and its measurement. Ballistic impact strength, Universal tensile tester; standards. Low stress mechanical properties - FAST; Fabric bending, Shear compression and decompression; tensile behavior, surface roughness and friction.

UNIT III	SERVICEABILITY PROPERTIES	9

Fabric stiffness – principle of measurement of flexural rigidity; Drapeability – measurement of drape coefficient; Crease recovery measurement techniques. Wrinkle recovery assessment using standard grades; Principle and functioning of air permeability

testers, water repellency, contact angle, fabric abrasion and pilling tester and fabric shrinkage testing; standards and norms Colour fastness testing – Washing, Rubbing, Light, Perspiration fastness.

UNIT IV	GARMENT QUALITY ASSESSMENT	9

Fit checking and review – process to be followed while live wear trials and on dummies. Product-wise garment quality assessment for lady's top, men's shirt, men's trousers, brassieres – Fit review and feedback, visual checking, hanger appeal, visibility of required retail information while hanging, folding and packing, color matching or variation packaging/packing.

UNIT V	FABRIC AND GARMENT INSPECTION	9

Fabric inspection – 4-point system, 10 point system, classification of fabric defects, independent product quality certification, acceptable quality level, Seam strength and seam slippage testing. Peel bond strength testing; Button, Zipper strength testing, Apparel dimensional stability – spirality. Inspection of garments and garment defects - sewing, pressing, finishing and packaging defects.

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS:

Determination of

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

12. Seam Strength, Seam Slippage, zipper strength, button pull strength 13. Peel bond strength of fusible interlinings 14. Wickability and wettability of fabric 15. Spirality and Course length of Knitted fabrics	
TOTAL:30 PERIODS	
COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Outline the construction characteristics and sampling methods
CO2:	Identify the mechanical characteristics and their testing methods
CO3:	Analyze the evaluation of serviceability properties of yarn
CO4:	Analyze the evaluation of serviceability properties of fabrics
CO5:	Infer on the evaluation of low stress mechanical characteristics
CO6:	Examine the quality of Fabric and garment
TEXT BOOKS:	
1	Booth J.E., "Principle of Textile Testing", Butterworth Publications, London, 1989
2	Kothari V. K., "Testing and Quality Management", Progress in Textile Technology Vol.1, IAFL Publications, New Delhi, 1999.
3	Sara J. Kadolph., "Quality Assurance for Textiles and Apparels", Fair Child Publications, New York, 1998.
REFERENCES:	
1	Saville,B.P. "Physical Testing of Textiles", Woodhead Publishing Ltd., England,2004.
2	Grover E G and Hamby D. S "Hand Book of Textile testing and quality Control", Wiley Eastern Pvt. Ltd., New Delhi, 1969.
3	Ruth clock and Grace Kunz., "Apparel Manufacture – Sewn Product Analysis", Upper Sadle River Publications, New York, 2000

4	Slater K., "Physical Testing and Quality Control", The Textile Institute, Vol.23, No.1/2/3 Manchester, 1993

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	-	2	-	2	-	-	-	2	2	-	2
2	3	2	1	1	2	2	-	2	-	-	-	2	3	2	2
3	3	3	2	2	2	2	-	2	-	-	-	2	3	2	2
4	3	3	2	2	2	2	-	2	-	-	-	2	3	2	2
5	2	1	-	-	2	2	-	2	-	-	-	2	2	2	2
6	3	3	2	2	2	2	-	2	-	-	-	2	3	2	2
Overall Correlation	3	3	2	2	2	2	-	2	-	-	-	2	3	2	2

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

23FT621	PROJECT WORK PHASE-1	L	T	P	C
		0	0	4	2

COURSE DESCRIPTION:

This course provides an opportunity for students to apply their engineering knowledge to solve real-world problems through project-based learning. Students, working in groups with maximum of 4 under faculty supervision, undertake a comprehensive project addressing an approved topic. The course focuses on fostering collaboration, research, and practical skills, culminating in a detailed Phase 1 project report and oral presentations. Regular reviews ensure consistent progress and adherence to academic standards.

COURSE OBJECTIVES:

- Encourage students to apply theoretical knowledge to practical engineering problems.
- Develop collaborative and project management skills through teamwork.
- Train students in research methodology, technical documentation, and presentation skills.
- Enhance students' ability to design, analyze, and evaluate solutions systematically.
- Prepare students for real-world engineering challenges and multidisciplinary teamwork

PROJECT OUTLINE:

Week 1	Orientation and course overview. Formation of project teams and approval of topics by HoD.
Week 2	Initial meeting with supervisors. Define problem statement and objectives
Week 3	Literature review: Research methodologies and topic-specific studies.
Week 4	Zeroth Review.

Week 5	Refinement of literature review and identification of research gaps.
Week 6	Identification of Base Paper.
Week 7	First Review.
Week 8	Conceptual design discussions and brainstorming solutions.
Week 9	Narrowing done on the exact work.
Week 10	Completion of first stage of the Project.
Week 11	Development of detailed conceptual design and methodology.
Week 12	Incorporation of feedback and refinement of design and methodology.
Week 13	Second Review.
Week 14	Compilation of Phase 1 results, report writing, and presentation preparation.
Week 15	Final Viva Voce Presentations.
Individual meetings will be set up on a need's basis in conjunction with developing work	
EVALUATION:	
• The progress of the project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A phase 1 project report is required to be submitted at the end of the semester. Evaluation is based on oral presentation and the phase 1 project report jointly by internal examiners constituted by the Head of the Department. • Evaluate how effectively the project is structured and communicated in both oral presentations and written texts, emphasizing logical flow and coherence. • Evaluate the relevance and innovation of practical resources or prototypes developed, focusing on their potential to support sustainability, innovation, and SDG-aligned goals.	

- Review the accuracy of English usage, including grammar, clarity, and coherence in oral and written communication, ensuring effective delivery of technical content.

COURSE OUTCOMES:

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

CO1:	Develop feasible solutions by analyzing complex engineering problems using foundational knowledge, mathematics, and science.
CO2:	Survey literatures to identify gaps, define research questions, and propose designs and methods for solving engineering problems.
CO3:	Make use of modern tools to check the feasibility of the solutions effectively.
CO4:	Evaluate societal and environmental impacts of solutions while incorporating sustainability and ethical practices.
CO5:	Combine in teams to plan, manage, and lead projects within professional and economic constraints.
CO6:	Formulate technical reports, deliver presentations, and engage in lifelong learning to adapt to new technologies.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	2	2	1	2	2	3	3	3	3	3	3	1	3
2	3	2	2	2	1	2	2	3	3	3	3	3	3	1	3
3	3	2	2	2	1	2	2	3	3	3	3	3	3	1	3
4	3	2	2	2	1	1	2	3	3	3	3	3	3	1	3
5	3	2	2	2	1	2	2	3	3	3	3	3	3	1	3
6	3	2	2	2	1	2	2	3	3	3	3	3	3	1	3
Overall Correlation	**3**	**2**	**2**	**2**	**1**	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**1**	**3**

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

23FT622	TECHNICAL TRAINING	L	T	P	C
		0	0	2	1

PREAMBLE:

The course 'Technical Training' is intended to enable a B.E./B.Tech. graduate to practice, learn, apply and prepare report about the training undergone. The learner shall be trained in the latest technology in relevant Industry preferably in computer-oriented platform. This course can help the learner to experience training and learn practical skills for the relevant domain. Learner should also be able to present his learning through PPT and report articulating his level of learning about the specific training.

COURSE OBJECTIVES:

- To equip students with practical skills and real-world experience in technical domains, enabling them to effectively apply theoretical knowledge to hands-on applications.
- To develop competencies in working with industry-relevant tools and software technologies.
- To foster teamwork, problem-solving, and technical skills through innovative technologies

COURSE OUTCOMES:

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

CO1:	Identify specific domain from the enrolled branch and to get training preferable in computer-oriented platform.
CO2:	Survey and apprehend the learning modules in the training program and to become expert in the specific domain.

CO3:	Apply theoretical learning in the practical environment and enhance the skillset of learner.
CO4:	Estimate the learning using available data.
CO5:	Defend a presentation about the learning done in the specified skillset.
CO6:	Construct a technical report about the training.

GUIDELINES:

- More than one training program may be given depending on availability and interest of the students. One training coordinator may be appointed for the same.
- Training coordinator shall provide required input to their students regarding the selection of training topic.
- Choosing a Training topic: The topic for a Technical Training should be current and broad based rather than very specific area of interest. It should also be outside the present syllabus. It's advisable to choose a training topic to be computer oriented as the resources for the same may be readily available. Every student of the program should be involved and assessed.
- Head of Department shall approve the selected training topic by the second week of the semester. Training may be assessed based on the ability to apply the skillset in a practical domain.

EVALUATION PATTERN:

Training Coordinator:

50 marks (Training Manual – 40 (Each student shall maintain a Training Manual and the Coordinator shall monitor the progress of the training work on a weekly basis and shall

approve the entries in the Training Manual during the weekly meeting with the student), Attendance – 10,).

Presentation of Application:

Candidate should apply the skillset attained in training. 20 marks to be awarded by the Examiners (Clarity of presentation – 5, Interactions – 10, Quality of the slides – 5).

Report about Application:

30 marks to be awarded by the Examiners (check for technical content, overall quality, templates followed, adequacy of application of the skillset etc.).

Training duration – 30 Hours

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	2	1	-	-	-	-	3	3	-	-
2	3	3	2	1	-	2	1	-	-	-	-	3	3	-	-
3	3	3	3	3	3	-	-	1	-	2	-	3	3	3	1
4	3	3	3	2	2	-	-	1	-	3	-	3	3	2	1
5	3	3	3	2	1	2	-	2	-	2	-	2	3	1	2
6	3	3	3	3	2	2	-	2	-	3	-	3	3	2	2
Overall Correlation	**3**	**3**	**3**	**3**	**2**	**2**	**1**	**2**	**-**	**3**	**-**	**3**	**3**	**2**	**2**

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

23FT623	TECHNICAL SEMINAR – 1	L	T	P	C
		0	0	2	1

PREAMBLE:

The course 'Technical Seminar' is intended to enable a B.E./B. Tech graduate to read, understand,present and prepare report about an academic document. The learner shall search in the literature including peer reviewed journals, conference, books, project reports etc., and identify an appropriate paper/thesis/report in her/his area of interest, in consultation with her/his seminar coordinator. This course can help the learner to experience how a presentation can be made about a selected academic document and empower her/him to prepare a technical report.

COURSE OBJECTIVES:

- To do Literature surveys in a selected area of study
- To understand an academic document from the literature and to give a presentation about it
- To prepare a technical report.

GUIDELINES:

- The Department shall form an Internal Assessment Committee (IAC) for the seminar with academic coordinator for that program as the Chairperson and seminar coordinator as member. During the seminar presentation of a student, all members of IAC shall be present.
- Formation of IAC shall be completed within a week after the End Semester Examination (or last working day) of the previous semester.
- Seminar Coordinator shall provide required input to their students regarding the selection of topic/ paper.
- Choosing a seminar topic: The topic for a UG seminar should be current and broad based rather than very specific research work, beyond the syllabus. Every member of the project team could choose or be assigned

Seminar topics that covers various aspects linked to the Project area.

- A topic/paper relevant to the discipline shall be selected by the student during the semester break.
- Topic/Paper shall be finalized in the first week of the semester and shall be submitted to the IAC. The IAC shall approve the selected topic/paper by the second week of the semester.
- Accurate references from genuine peer reviewed published material to be given in the report and to be verified.

EVALUATION PATTERN

Seminar Coordinator:

40 marks (Background Knowledge – 10 (The coordinator shall give deserving marks for a candidate based on the candidate's background knowledge about the topic selected), Relevance of the paper/topic selected – 10).
(Seminar Diary – 10 (Each student shall maintain a seminar diary and the coordinator shall monitor the progress of the seminar work on a weekly basis and shall approve the entries in the seminar diary during the weekly meeting with the student), Attendance – 10).

Presentation:

40 marks to be awarded by the IAC (Clarity of presentation – 10, Interactions – 10 (to be based on the candidate's ability to answer questions during the interactive session of her/his presentation), Overall participation – 10 (to be given based on her/his involvement during interactive sessions of presentations by other students), Quality of the slides – 10).

Report:

20 marks to be awarded by the IAC (check for technical content, overall quality, templates followed, adequacy of references etc.).

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1:	Identify academic documents from the literature which are related to her/his areas of interest.
CO2:	Survey and apprehend an academic document from the literature which is related to her/ his areas of interest.
CO3:	Compile a presentation about an academic document.
CO4:	Estimate the Contents using available literature.
CO5:	Defend a presentation about an academic document.
CO6:	Construct a technical report.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	2	2	1	1	2	3	3	2	2	3	2	2
2	3	3	3	1	2	1	1	2	3	3	2	2	3	2	2
3	3	3	2	2	2	1	1	1	3	3	1	1	3	2	2
4	3	3	2	1	1	1	2	2	3	3	2	1	3	2	2
5	3	3	2	1	1	1	1	2	2	2	2	2	3	1	2
6	3	3	2	1	1	1	1	2	2	2	2	2	3	1	2
Overall Correlation	**3**	**3**	**2**	**1**	**1**	**1**	**1**	**2**	**3**	**3**	**2**	**2**	**3**	**2**	**2**

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

SEMESTER – VII

23FT701	APPAREL PRODUCTION PLANNING AND PROCESS CONTROL	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to understand the production planning in garment industry
- To enable the students to understand the cutting room operations
- To emphasis on the improved methods of material control in apparel production
- To enable the students to understand the practices followed for style changeover.
- To acquaint students with quality concepts for implementing quality in apparel production

UNIT I	APPAREL PROCESS CONTROL PARAMETERS	9

Process control parameters in garment manufacturing, concepts of concurrent engineering, reverse engineering of standard garments, production planning, time and action calendar, sampling stages, steps between prototypes to production, product data management and understanding specification sheets.

UNIT II	MATERIAL MANAGEMENT	9

Material management - Manufacturing Resources Planning (MRP), just in time production system (JIT), Kanban system, Optimized production technology (OPT), Economic order Quantity (EOQ), ABC, VED analysis in inventory control.

UNIT III	CUTTING ROOM OPERATIONS	9

Basic principles of the lay planning process; automation of lay planning process and cutting room operations; influence of fabric design on marker making process, marker utilization, bundle distributions, Current practices in cutting room - cut piece distribution and tracking.

UNIT IV	PRACTICES FOLLOWED FOR STYLE CHANGEOVER	9
Practices followed for style changeover -Operation break down and production sequence, line balancing, identification of bottle necks and critical operations, operation wise machinery allocation – basic shirts, trousers, skirts; usage of special attachments and tools for operation simplifications, production grid and flow chart.		
UNIT V	**INSPECTION, PACKAGING AND SHIPMENT**	**9**
Final audit /inspection - finishing and packing; packing - ratio packing, solid packing, short shipment, excess shipment, calculation of volumetric weight, carton and other packing requirements; concept of AQL.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Apply process control in garment manufacturing
CO2:	Develop comprehensive production planning
CO3:	Infer planning in cutting room operations
CO4:	Develop the style changeover process
CO5:	Develop material management systems and techniques
CO6:	Interpret final audit and inspection

TEXT BOOKS:	
1	Jacob Solinger., "Apparel Production Handbook", Reinhold Publications, 1998, ISBN: 1879570009 / ISBN: 978-1879570009
2	Ruth E. Glock., and Grace I. Kunz., "Apparel Manufacturing, Sewn Product Analysis", Fourth Edition, Pearson Education, 2004, ISBN: 0131119826 ISBN-13: 9780131119826.

REFERENCES:	
1	Laing R.M., and Webster J., "Stitches & Seams", The Textile Institute, India, 1999, ISBN: 1870812735 | ISBN-13: 9781870812733

2	Shaeffer Claire., "Sewing for the Apparel Industry", Prentice Hall, New Jersey, 2001, ISBN: 0321062841 | ISBN-13: 9780321062840
3	Singer., "Sewing Lingerie", Cy DeCosse Incorporated, 1991, ISBN: 0865732604 | ISBN 13: 9780865732605
4	Carr H and Latham B., "The Technology of Clothing Manufacturing", Blackwell Science, U.K.,1994, ISBN: 0632037482 | ISBN-13: 9780632037483

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	1	-	-	1	-	-	-	-	3	2	2
2	3	2	1	1	1	-	-	1	-	1	-	-	3	2	2
3	2	1	-	-	1	-	-	1	-	1	-	-	2	2	2
4	3	2	1	1	1	-	-	1	-	-	-	-	3	2	2
5	3	2	1	1	1	-	-	1	-	2	2	-	3	2	2
6	2	1	-	-	1	-		1		-	-	-	2	2	2
Overall Correlation	3	2	1	1	1	-	-	1	-	1	1	-	3	2	2

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

23FT702	FUNDAMENTALS OF ACCOUNTING AND APPAREL COSTING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Attain knowledge in the principles of cost accounting.
- To impart knowledge to the students on cost sheet.
- Relate the factors that decide the cost of apparel products.
- Apply knowledge in calculating the raw materials and accessories cost to derive the cost of basic apparel products.
- Obtain knowledge in financial management and budgeting process in apparel industry.

UNIT I	COST ACCOUNTING	9

Cost accounting objectives, importance and use of cost accounting. Elements of cost - accounting of prime costs and overhead costs, allocation of overheads. Balance sheet preparation, profit and loss statement, Factory overhead. Types and methods of costing – fixed, variable and semi variable. Contribution margin, variable cost ratio, marginal income. Simple problems.

UNIT II	OVERHEAD EXPENSES AND ANALYSIS	9

Expenses - factory, administrative, selling and distribution. Allocation of overhead expenses. Depreciation – reasons for depreciation - methods of calculating depreciation. Simple problems. Break-even analysis. Sales mix by garment style, effect of volume change, price/volume analysis. Simple problems.

UNIT III	COST SHEET	9

Costing of yarns, fabrics; costing of apparel – woven, knits of various styles, cost control; cost sheet preparation. Components of costing sheet - labour cost, material cost, department expenses - production, administration and sales. Costing sheet particulars and preparation of sample costing sheet. Simple problems.

UNIT IV	APPAREL COSTING	9

Cost calculation in apparel production departments- cutting

department costs, sewing department costs, Trimming and checking department cost, packing department costs, calculation of shipping and forwarding cost. Calculation of overall apparel manufacturing cost (Raw material -Cut-Make-Trim – Processing-Pack and shipping) using size charts and special requirement from buyers end.		
UNIT V	**BUDGETING AND PROJECT REPORT PREPARATION**	**9**
Budgeting - principles, need. Budget plan, financial forecast and management. Detailed project report preparation: project report to set up a garment unit based on the products and services.		
		TOTAL: 45 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Apply of cost accounting in apparel industry	
CO2:	Identify the depreciation value of machineries.	
CO3:	Analyze the overhead expenses	
CO4:	Develop the cost sheet for garment industry	
CO5:	Analyze the apparel costing	
CO6:	Develop the project report in detail.	
TEXT BOOKS:		
1	Johnson Maurice, E. Moore, "Apparel Product Development", Om Book Service, 2001.	
2	B.M.Lall Nigam and I.C.Jain, "Cost Accounting Principles and Practice", Prentice Hall of India, 2007.	
REFERENCES:		
1	Jawahar-Lal, "Cost Accounting", Tata McGraw-Hill Publishers, 2008.	
2	Prasanna Chandra, "Financial Management, Theory and Practice", Tata McGraw- HillPublishing Company Ltd, New Delhi, 2001	
3	Katherin McKelvy, "Fashion Source Book", Om Book Service, 2001.	

4	Ruth E.Glock and Grace I. Kunz, "Apparel Manufacturing Sewn Product Analysis",Dorling Kindersley (India) Pvt. Ltd., 2005.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	2	-	2	-	-	3	2	3	-	2
2	3	2	1	1	-	2	-	2	-	-	3	2	3	-	2
3	3	3	2	2	-	2	-	2	-	-	3	2	3	-	2
4	3	2	1	1	-	2	-	2	-	-	3	2	3	-	2
5	3	3	2	2	-	2	-	2	-	-	3	2	3	-	2
6	3	2	1	1	-	2	-	2	-	-	3	2	3	-	2
Overall Correlation	3	3	2	2	-	2	-	2	-	-	3	2	3	-	2

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

23FT703	COMPREHENSION	L	T	P	C
		2	0	0	2

PURPOSE:

To provide a complete review of the topics covered in the previous semesters, to ensure that a comprehensive understanding of the subjects is achieved. The student will be tested as per the guidelines given by national level examinations like GATE, TANCET etc. It will also help students to face job interviews and competitive examinations.

COURSE OUTCOMES:

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

CO1:	Analyse the phenomena involved in the concerned problem and solve them.
CO2:	Apply principles to new and unique circumstances.
CO3:	Estimate concepts and principles of concerned branch of engineering.
CO4:	Distinguish between facts and opinion in the engineering field.
CO5:	Deduct cause-and-effect relationships of any relationship.
CO6:	Interpret data from charts and graphs and judge the relevance of information.

GUIDELINES:

- The Department shall form an Internal Assessment Committee for the Comprehension with Academic coordinator for that class as the Comprehension Instructor and Class coordinator as member.
- Instructor shall provide required input to their students regarding the overview of all topics covered in the previous semesters.
- Periodic tests can be conducted to assess students

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	1	-	2	1	-	-	-	-	1	3	-	-
2	3	2	1	1	-	1	1	-	-	-	-	1	3	-	-
3	3	3	3	3	3	-	-	3	-	3	-	3	3	3	3
4	3	2	1	1	2	-	-	1	-	3	-	3	3	2	1
5	3	3	3	2	1	2	-	2	-	2	-	2	3	1	2
6	3	3	3	2	1	2	-	2	-	2	-	2	3	1	2
Overall Correlation	**3**	**3**	**3**	**3**	**3**	**2**	**1**	**2**	**-**	**3**	**-**	**3**	**3**	**3**	**2**
Recommended by Board of Studies							**07-11-2024**								
Approved							**3rd ACM**			**Date**			**30-11-2024**		

23FT711	INDUSTRIAL ENGINEERING IN GARMENT MANUFACTURING	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To impart knowledge on basics of industrial engineering.
- To impart knowledge on different tools of industrial engineering in apparel industry.
- To impart knowledge on application of industrial engineering in apparel industry.
- To acquaint the students with plant layout preparation for garment manufacturing
- To acquaint the students with planning and process control for garment manufacturing.

UNIT I	INDUSTRIAL ENGINEERING BASICS	9

Productivity: Production, Productivity, types of productivity, productivity measures, factors affecting productivity in garment industry, measurement of line efficiency. Industrial engineering: Definition, Need of Industrial Engineering, Benefits, Roles and responsibilities of industrial engineer in apparel industry. IE in Ergonomics and Safe working environment: right and wrong postures, Manufacturing environment in RMG sector: Light, Noise, Vibration, Colour, Temperature and Ventilation and its Standards.

UNIT II	METHOD STUDY	9

Operation breakdown and process flow chart – Importance. Method study: Definition, Objectives, Basic procedure, Value Added and Non Value Added activity analysis, Method improvement techniques, Eliminate, combine, rearrange and simplify (ECRS), Work distribution plan(WDP) – Purpose and process Process Chart: Flow process chart, multiple activity chart, Case studies and application of process chart in garment industries. Motion Economy: Principles of motion economy, classification of movements, micro-motion study, factors of ergonomics in motion study.

UNIT III	WORK MEASUREMENT	9
Work Measurement: Definition, Objective, Techniques Time study: definition of time study, steps in making time study, breaking the job into elements, stop-watch procedure, different pre-determined motion time study (PMTS) techniques, Work sampling Technique. Standard Time: Types of rating factor, Types of allowances: Personal, Fatigue, Machine, Delay and Policy allowances, mechanism of arriving SAM, SMV, GSD and SAM examples for regular garments. Latest work measurement techniques – RFID and IoT		
UNIT IV	**PLANNING AND CONTROL**	**9**
Planning: Cost per minute, learning curve, preparation of operation bulletin, development of skill matrix, thread consumption, estimation of on-standard and off-standard time. Value stream approach and mapping – purpose, significance, factors affecting – flexibility, costing and profit, Line Balancing: WIP, factors influence on line balancing techniques, pitch diagram analysis. Material Handling: Definition, objective, classification of material handling equipment in apparel industries.		
UNIT V	**PRODUCT LAYOUT**	**9**
Layout: Objectives, Steps in planning layout, Types of layout, Work area planning, application of robotics in automated sewing production systems. Standardization: Standard operating procedure, Risk analysis during proto-type development, ROI on standardization techniques. Lean Manufacturing: Definition, objective, concepts and principles, SMED technique.		
TOTAL: 45 PERIODS		
LIST OF EXPERIMENTS:		
1. Analysis of a cutting operation elements and determine the VA-NVA elements, SAM, suggestions for method improvement and capacity study through time study technique. (1 session)		

2. Analysis of a sewing operation elements and determine the VA-NVA elements, SAM, suggestions for method improvement and capacity study through time study technique. (1 session)
3. Engineering operation sequence for a basic T shirt and calculation of standard allowed minute (SAM) value using predetermined time standards. (1 session)
4. Engineering operation sequence for a men's wear and calculation of standard allowed minute (SAM) value using predetermined time standards. (1 session)
5. Engineering operation sequence for a women's wear and calculation of standard allowed minute (SAM) value using predetermined time standards. (1 session)
6. Engineering operation sequence for a kid's wear and calculation of standard allowed minute (SAM) value using predetermined time standards (1 session)
7. Preparation of operation bulletin, line balancing, cost per minute and the development of sewing line layout for the given garment. (1 session)
8. Determination of sewing threads consumption for the given garment. (1 session)
9. Identify suitable folders and attachments for the production of given garment samples. Analyse the given operation and design a new folder/attachment.
10. Estimate the required duration for preparing the 1000 numbers the given product by adopting reverse engineering concept.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1:	Infer the basics of productivity and industrial engineering
CO2:	Identify suitable method study and ergonomics.
CO3:	Make use of techniques to do work measurement
CO4:	Examine the operation bulletin of garments
CO5:	Plan line balancing and material handling
CO6:	Analyze product layouts.

TEXT BOOKS:	
1	Jana, P., & Tiwari, M. (2018). "Industrial Engineering in Apparel Manufacturing". New Delhi, India: Apparel Resources Pvt. Ltd. (ISBN: 9788193247204)
2	Khan M.I "Industrial Engineering", New Age International, 2007.
REFERENCES:	
1	Cooklin Gerry, "Introduction to Clothing Manufacture", Blackwell Science Ltd., 2006.
2	Johnson Maurice "Introduction of Work Study", International labour Organization, Geneva, 2010.
3	Ralph M Barnes, "Motion and Time study design and measurement of work", John Willey sons Inc. 2002., New York
4	Bridger, "Introduction to Ergonomics", Tata McGraw Hill, 1995

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	2	2	2	2	3	3	1	2	2	2	2
2	3	2	1	1	2	2	2	2	3	3	1	2	3	2	2
3	3	2	1	1	2	2	2	2	3	3	1	2	3	2	2
4	3	2	1	1	2	2	2	2	3	3	1	2	3	2	2
5	3	3	2	2	2	2	2	2	3	3	1	2	3	2	2
6	3	3	2	2	2	2	2	2	3	3	1	2	3	2	2
Overall Correlation	3	3	2	2	2	2	2	2	3	3	1	2	3	2	2

Recommended by Board of Studies	07-11-2024		
Approved	3rd ACM	Date	30-11-2024

23FT721	PROJECT WORK PHASE-2	L	T	P	C
		0	0	6	3

COURSE DESCRIPTION:

Project Phase 2 is a continuation of Project Phase 1, focusing on implementing the proposed methodology through fabrication, simulation, or experimental validation. Students will refine their designs, validate test problems, and commission setups for final testing. This phase emphasizes hands-on application, calibration, and demonstration of results, culminating in a final presentation and report submission.

COURSE OBJECTIVES:

- Implement the proposed methodology to address engineering problems identified in Phase 1.
- Develop and fabricate prototypes or simulate solutions for the selected project integrating theoretical knowledge with practical application across hardware and software systems.
- Validate solutions through testing ensuring reliability and performance in both physical and virtual environments.
- Enhance problem-solving and critical thinking skills by troubleshooting and optimizing either experiment setups or software code to improve results.
- Prepare a research manuscript or applying for patent grant either for design or research.

PROJECT OUTLINE:

Week 1	Review of Phase 1 outcomes and refinement of proposed methodology.
Week 2	Material procurement/ software setup for simulation, and initiation of fabrication/simulation work.
Week 3	Intermediate fabrication/simulation work and initial testing or calibration, troubleshooting challenges.

Week 4	Second Review.
Week 5	Validation of test problem or refinement of prototype/simulation
Week 6	Optimisation of the test setup or solution trials, Data curation / uncertainty analysis
Week 7	Final testing of setup or simulation outcomes, Validation of Data .
Week 8	Third Review
Week 9	Demonstration of the solution with high level of data accuracy and precision.
Week 10	Compilation of Phase 2 results, report writing, and presentation preparation.
Week 11	Preparing or publishing of research article/ Filing or Grant of Patent
Week 12	Final Viva Voce Presentations.

Individual meetings will be set up on a need's basis in conjunction with developing work

EVALUATION:

- The progress of the project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.
- Assess the depth of understanding demonstrated in the project's conceptualization and the ability to answer questions during public presentations.

- Publication of Research article in indexed journal or Patent award is necessary at the end of completion of the project.

COURSE OUTCOMES:

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

CO1:	Apply appropriate methodologies to implement solutions for complex engineering problems identified in phase -1 using hardware / software or both systems.
CO2:	Develop existing functional prototypes or simulations models by integrating theoretical and practical knowledge.
CO3:	Evaluate solutions ensuring compliance with design specifications.
CO4:	Appraise the performance of solutions by refining designs or improving algorithms for enhanced outcomes.
CO5:	Collaborate effectively with team members to plan, manage, and execute engineering projects adhering to ethical principles and professional standards.
CO6:	Prepare technical reports, impactful presentations that communicate solutions effectively.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	2	2	1	2	2	3	3	3	3	3	3	1	3
2	3	2	2	2	1	2	2	3	3	3	3	3	3	1	3
3	3	2	2	2	1	2	2	3	3	3	3	3	3	1	3
4	3	2	2	2	1	1	2	3	3	3	3	3	3	1	3
5	3	2	2	2	1	2	2	3	3	3	3	3	3	1	3
6	3	2	2	2	1	2	2	3	3	3	3	3	3	1	3
Overall Correlation	**3**	**2**	**2**	**2**	**1**	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**1**	**3**

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

SEMESTER -VIII

23FT821	CAPSTONE PROJECT	L	T	P	C
		0	0	20	10

COURSE DESCRIPTION:

Prerequisites:

i) Team segregation.
ii) Identification of Project Guide.
iii) Identification of Area of Interest.
iv) Literature Review on the chosen area of interest.

Zeroth Review needs to be completed in the previous semester by the project coordinator

The *Capstone Project* ***(CP)*** provides an opportunity for students to engage in high-level inquiry focusing on an area of specialization within the engineering field. Capstone projects will be investigative, practice-centered. All capstones aim to bridge theory and practice and are aimed to have an impact on the professional life of students

The aim of the course is to facilitate the development of your *Capstone Projects.* Students are encouraged to apply and expend knowledge gained on teaching and learning throughout the Bachelor of Engineering Education program as part of this process

COURSE OBJECTIVES:

The Capstone Project should demonstrate the depth and extent of knowledge of students

During this course, students will

- Investigate and evaluate prominent literature connected to your CP.
- Present a clearly articulated investigative framework, while situating projects within established academic

practices and/ or ideas.

- Develop and create practical resources (either computational or experimental) for the concerned area of interest in engineering field.
- Offer inquiry-based argumentation for development in the concerned area within engineering field.
- Summarize the findings in the form of report, documentation and presentation

PROJECT OUTLINE:

Week 1	Identification problem.
Week 2	Literature review.
Week 3	Preliminary work.
Week 4	First review.
Week 5	Completion of first stage of the Project methodology.
Week 6	Development.
Week 7	Testing & Validation.
Week 8	Second review.
Week 9	Repeatability.
Week 10	Report correction and Documentation
Week 11	Third review-Submission of paper for conference/journal
Week 12	Thesis Correction and Submission

Individual meetings will be set up on a need's basis in conjunction with developing work

COURSE OUTCOMES:

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

CO1:	Take part in challenging practical problems and find solutions by formulating proper methodology.
CO2:	Plan research methodology to tackle a specific problem.
CO3:	Construct extensive study on particular research projects.
CO4:	Develop experimental and computational studies on innovative research projects.
CO5:	Estimate incremental study on existing research projects.
CO6:	Take part in real life engineering challenges and propose appropriate solutions.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2	3	2	3	3	2	3	2	3	2	3	2	3	3	2	3
3	2	3	3	3	3	3	3	3	3	3	3	3	2	3	3
4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5	2	3	3	3	3	3	3	3	3	3	3	3	2	3	3
6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Overall Correlation	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Recommended by Board of Studies	**07-11-2024**		
Approved	**3rd ACM**	**Date**	**30-11-2024**

VERTICAL -1 - FASHION DESIGNING

23FT031	FASHION EVOLUTION	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To acquaint the student with history of fashion.
- To enable the students to understand the elements of fashion.
- To acquaint the student with traditional costumes.
- To acquaint the student with theories of clothing.
- To acquaint the student with visual design of fashion with respect to the country.

UNIT I	THEORIES OF CLOTHING	9

Theories of clothing – protection, modesty and adornment, Psychology of clothing, Traditional costumes of Egyptian, Greek, Roman and Persian clothing, Visual design in dress – Australia, Brazil, Germany, India, Japan, Nigeria

UNIT II	HISTORY OF INDIAN COSTUMES	9

History of Indian Costumes – pre-vedic period, Post-vedic period, Mughal period, post-independence to modern times.

UNIT-III	HISTORY OF EUROPEAN AND AMERICAN COSTUMES	9

History of European and American costumes - Clothing styles-colour combination, designs, motifs and accessories and embellishments

UNIT-IV	HISTORY OF AFRICAN COSTUMES	9

History of African costumes – North, South, West, Central and South costumes. Tribals – Masaai, Zulu, Swahili, Ndebele - Clothing styles, colour combination, designs, motifs, accessories and embellishments.

UNIT-V	HISTORY OF ASIAN TRADITIONAL COSTUMES	9

Traditional costumes of Asian countries – China, Japan, Middle East, Russia, Burma, Malaysia, South Korea, Indonesia, Sri Lanka-

Clothing styles, colour combination, designs, motifs and accessories.	
TOTAL: 45 PERIODS	
COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Infer the theories of clothing
CO2:	Summarize the evolution of Indian costumes
CO3:	Explain the evolution of European costumes
CO4:	Explain the evolution of American costumes
CO5:	Interpret the history of African costumes
CO6:	Outline the history of Asian traditional costumes
TEXT BOOKS:	
1	Fillow J and Bernard N Thomas and Hudson, "Traditional Indian Textiles", Prentice Hall, India, 1993.
2	Marian L. Davis, "Visual Design in Dress", Pearson publisher, London, 3rd edition, 1996
REFERENCES:	
1	Hart A North S V and A Museum, "Historical Fashion in detail the 17th and 18th Centuries", McMillan, India, 1998.
2	Kathy Alert, "Traditional folk costumes of Europe paper dolls in full color", Dover publications, Inc., Newyork,1984.
3	Vandana Bhenderi, "Costume, Textiles and Jewellery of India – Traditions in Rajasthan", Prakash Books, New Delhi, 2004.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	3	-	-	-	1	-	-	3	2	3	-
2	2	1	-	-	3	-	-	-	1	-	-	3	2	3	-
3	2	1	-	-	3	-	-	-	1	-	-	3	2	3	-
4	2	1	-	-	3	-	-	-	1	-	-	3	2	3	-
5	2	1	-	-	3	-	-	-	1	-	-	3	2	3	-
6	2	1	-	-	3	-	-	-	1	-	-	3	2	3	-
Overall Correlation	2	1	-	-	3	-	-	-	1	-	-	3	2	3	-

23FT032	INDIAN TRADITIONAL TEXTILES AND CRAFTS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to understand the traditional textiles and crafts of Northern parts of India
- To acquaint the students with the traditional textiles and crafts of Western parts of India
- To enable the students to have a knowledge in the traditional textiles and crafts of Central India
- To enable the students to understand the traditional textiles and crafts of Eastern India
- To enable the students to understand the traditional textiles and crafts of Southern region of India

UNIT I	NORTHERN INDIA	9

Kashida from Kashmir, Phulkari from Punjab, Chamba rumal from Himachal Pradesh -region, technique, motifs, materials, colours, stitches, style of embroidery, applications.

UNIT-II	WESTERN INDIA	9

Embroidery from Gujarat, Parsi embroidery - region, technique, motifs, materials, colours, stitches, style of embroidery, applications.

UNIT-III	CENTRAL INDIA	9

Chikkankari from Uttar Pradesh, Phool Patti ka Kaam from Uttar Pradesh, Zardozi from Uttar Pradesh- region, technique, motifs, fabric, materials, colours, stitches, style of embroidery, applications.

UNIT-IV	SOUTHERN INDIA	9

Kasuti from Karnataka, Lambadi embroidery from Andhra Pradesh - region, technique, motifs, fabric, colours, stitches materials, colours, stitches, style of embroidery, applications.

UNIT-V	EASTERN INDIA	9

Kantha from West Bengal, Sujani from Bihar, Pipli applique from

Orissa - region, technique, motifs, materials, colours, stitches, style of embroidery, applications.	
TOTAL: 45 PERIODS	
COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Infer Northern - Indian traditional textile and crafts
CO2:	Interpret Western - Indian traditional textile and crafts
CO3:	Explain Central - Indian traditional textile and crafts
CO4:	Summarize Eastern - Indian traditional textile and crafts
CO5:	Infer Southern - Indian traditional textile and crafts
CO6:	Outline Indian traditional textile and crafts.
TEXT BOOKS:	
1	John Gillow & Nicholas Barnad, "Traditional Indian Textiles". Thames & Hudson, 1993
2	Rta Kapur chishti & Amba Sanyal, "Saris of India – Madhya Pradesh," Wiley Eastern Ltd. 1989
REFERENCES:	
1	Ancient Indian Costume, Roshen Alkazi, Art Heritage (1983)
2	Martand Singh, "Saris" of India – Bihar & West Bengal", Wiley Eastern Ltd. 1993
3	Costumes and textiles of Royal India – Ritu Kumar Published by Christie's Books.
4	Impressions – a classic collection of Indian textiles design (with cd) Prakasha. K8. Traditional Embroideries of India Shailaja D. Naik.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	-	-	1	-	1	-	-	1	2	1	1
2	2	1	-	-	-	-	1	-	1	-	-	1	2	1	1
3	2	1	-	-	-	-	1	-	1	-	-	1	3	1	1
4	2	1	-	-	-	-	1	-	1	-	-	1	2	1	1
5	2	1	-	-	-	-	1	-	1	-	-	1	2	1	1
6	2	1	-	-	-	-	1	-	1	-	-	1	3	1	1
Overall Correlation	2	1	-	-	-	-	1	-	1	-	-	1	3	1	1

23FT033	COLOR PSYCHOLOGY AND FORECASTING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to understand the colour language and communication.
- To impart knowledge about colors along with the moods and symbolism that they represent.
- To provide an insight about the colour forecasting process and its significance.
- To explain the steps involved in analysing colors suitable to individuals.
- To enable the students to understand the colors in fashion.

UNIT-I	COLOUR LANGUAGE	9

Introduction to colour science, electromagnetic spectrum, dimensions of colour – hue, value and intensity. Color psychology and communication, managing color communication. Creating colour schemes and importance of colour in the fashion market place - colors in marketing, visual merchandising, accessories designing and therapy.

UNIT-II	COLOR AND MOOD	9

Colors and emotions, Plutchik's Wheel of Emotions- concept, purpose, elements, interpretations and application in branding and marketing. Color and symbolism- Semiotics and color in dress, religion and world culture

UNIT-III	COLOR FORECASTING FOR FASHION	9

Color forecasting – Purpose, cultural trends, color forecasting associations. The role of a color forecaster. Market segments, brands and color cycles. Dissemination of color trends - trade shows and runways. The influence of ready-to-wear and fiber manufacturers on color.

UNIT-IV	PROCESS OF COLOR FORECASTING	9
Beginning the color forecasting process, the practice of observation, market data and analysis, Design thinking – from observation to concepts. Building the palette. Timeline of a season. The bell curve of color cycles, consumers and trend adoption.		
UNIT-V	**COLOUR IN FASHION**	**9**
Selecting a versatile color palette, colors suitable for human skin and its under tone. Color analysis and creating a color profile-preparing a personal color palette which suits an individual skin color, personal attributes, personal preferences and lifestyle. Incorporating the color profile into dress, wardrobe, haircolor and make up.		
TOTAL: 45 PERIODS		
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Outline the basic concepts color psychology and communication	
CO2:	Make use of Plutchik's Wheel of Emotions	
CO3:	Infer the color semiotics in the various cultures around the world	
CO4:	Explain the significance of color forecasting	
CO5:	Summarize the process involved in color forecasting	
CO6:	Choose personal colours and incorporate them in dress	
TEXT BOOKS:		
1	Rees, A. (2019). Beyond Beautiful: A Practical Guide to Being Happy, Confident, and You in a Looks-Obsessed World. Ten Speed Press.	
2	Leatrice Eiseman, The Complete Color Harmony, Pantone Edition: Expert Color Information for Professional Results, Rockport Publishers; New, Revised edition, 2017	
3	Cob, D. J., Cobb, D. J., & Scully, K. (2012). Colour forecasting for fashion. Laurence King Publishing.	

REFERENCES:	
1	Sherin, A. (2012). Design Elements, Color Fundamentals: A Graphic Style Manual for Understanding How Color Affects Design. Rockport Publishers
2	Eiseman, L. (2005). More alive with color: personal colors-personal style. Capital Books
3	Rees, A. (2018). The curated closet: Discover Your Personal Style and Build Your Dream Wardrobe, Ten Speed Press.
4	Holtzschue, L. (2017). Understanding Color: An Introduction for Designers. Wiley

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	2	-	-	1	1	-	-	3	2	2	2
2	2	1	-	-	2	-	-	1	1	-	-	3	2	2	2
3	2	1	-	-	2	-	-	1	1	-	-	3	2	2	2
4	2	1	-	-	2	-	-	1	1	-	-	3	2	2	2
5	2	1	-	-	2	-	-	1	1	-	-	3	2	2	2
6	3	2	1	1	2	-	-	1	1	-	-	3	3	2	2
Overall Correlation	3	2	1	1	2	-	-	1	1	-	-	3	3	2	2

23FT034	SURFACE EMBELLISHMENTS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To introduce the design development process of various embellishment techniques.
- To acquaint the students with embroidery.
- To impart knowledge on machine embroidery.
- To impart knowledge on computerized machine embroidery.
- To acquaint the students with surface ornamentation techniques.

UNIT-I	INTRODUCTION TO DESIGN DEVELOPMENT	9

Introduction & Overview of the traditional designs of India- Analysis of characteristics, design development for products using techniques like block printing, stenciling, screen printing, tie and dye, batik, Kalamkari, Painting& Embroidery.

UNIT-II	EMBROIDERY AS SURFACE ORNAMENTATION	9

Meaning and importance- Types and Classification. Study and compatibility of needles, thread, frames, backing materials and fabrics for embroidery. Hand embroidery stitches- classification- running, couching, buttonhole, satin, long and short, wheat, chain, stem, herring bone, cross-stitch, knotted stitches, fish bone.

UNIT-III	MACHINE EMBROIDERY	9

Machine embroidery - basic principles and operation, types of stitches, developments in embroidery machines. Selection of fabrics and accessories for machine embroidery. Attachments to sewing machines for embroidery. Washing and preserving of embroidered articles. Costing and estimation of embroidered articles.

UNIT-IV	OTHER ORNAMENTATION TECHNIQUES	9
Other surface ornamentation techniques - eyelet work, cutwork, lace work, drawn thread work, drawn fabric work, patch work, mirror work, quilting, gathering, smocking and couching. Care and maintenance of embroidered articles.		
UNIT-V	**COMPUTERIZED MACHINE EMBROIDERY**	**9**
Computerized embroidery machines - principles, types, special attachments and software used. Single and multi-head embroidery machine - parts, functions and features. Production Process – Concept of designing, punching, digitizing, special effects, networking. Selection of thread, color and stitches. Quality and production control.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Explain the traditional designs of India
CO2:	Outline the hand embroidery stitches
CO3:	Summarize the basic principles and selection of fabrics for machine embroidery
CO4:	Outline the surface ornamentation techniques
CO5:	Infer the computerized embroidery machines
CO6:	Infer the costing and care of embroidered articles

TEXT BOOKS:	
1	Shailaja D. Naik, "Traditional Embroideries of India", API Publishing Corporation, New Delhi, 2010.
2	Shailaja D. Naik and A. Jacquie Wilson, "Surface Designing of Textile Fabrics", New Age International, 2006.

REFERENCES:	
1	Joan Nicholson, "Contemporary Embroidery Design", Read Books, 2011
2	Mildred Graves Ryan, Marta Cone, "The Complete Encyclopedia of Stitchery", Sterling Publishing Company, 2005.

3	Gail Lawther, "Inspirational Ideas for Embroidery on Clothes and Accessories", Search Press Ltd., 1993.
4	Kathryn McCelvey and Janine Munslow, ―Fashion Design: Process, Innovation and Practice‖, Blackwell Publishing, USA, 2005.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	1	1	-	1	1	-	1	3	2	1	2
2	2	1	-	-	1	-	-	1	1	-	1	3	2	1	2
3	2	1	-	-	1	3	-	1	1	-	1	3	2	1	2
4	2	1	-	-	1	-	-	1	1	-	1	3	2	1	2
5	2	1	-	-	1	3	-	1	1	-	1	3	2	1	2
6	2	1	-	-	1	-	-	1	1	-	1	3	2	1	2
Overall Correlation	2	1	-	-	1	2	-	1	1	-	1	3	2	1	2

23FT035	PRINCIPLES AND ELEMENTS OF DESIGNING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the principles of design.
- To gain knowledge on the elements of design.
- To impart the knowledge of psychological effects of elements of design.
- To foster knowledge on applied illusions.
- To impart the knowledge of psychological effects of applied illusions.

UNIT-I	ELEMENTS – SPACE, LINE & SHAPE / FORM	9

Space – definition and concept, cues influencing perception of shape and space, space as ground in a composition, space as volume, visual effects of space use in clothing. Line – definition and concept, aspects of line, effects of aspect variations, combined effects of aspects in one line, effects of multiple line interactions. Shape / form – definition and concept, two and three dimensions in figures and fashions visual effects in dress, guidelines for choosing and combining shapes and forms in dress.

UNIT-II	ELEMENTS – LIGHT, TEXTURE & PATTERN	9

Light – physical aspects, psychological effects of light rays, physical effects of light rays. Texture - definition and concept, determinants of texture, aspects of texture and their uses in dress, combining qualities of hand, surface and light reaction, clothing and personal texture, psychological effects of texture in dress. Pattern - definition and concept, aspects of pattern, pattern quality, introducing pattern of fabric, visual effects, pattern in clothing.

UNIT-III	PRINCIPLES – RHYTHM, EMPHASIS & BALANCE	9

Rhythm – definition, effects, rhythm and the elements, rhythm and other principles, introducing contrast. Emphasis – definition, effects, emphasis and the elements, emphasis and other principles, introducing emphasis. Balance – definition and concept, effects,

balance and the elements, balance and other principles, introducing balance.		
UNIT-IV	**PRINCIPLES – CONTRAST, PROPORTION & HARMONY**	**9**
Contrast – definition, effects, contrast and the elements, contrast and other principles, introducing contrast. Proportion – definition and concept, proportion and the elements, proportion and other principles, introducing proportion. Harmony – definition and concept, effects, harmony and elements, harmony and other principles, introducing harmony.		
UNIT-V	**APPLIED ILLUSIONS**	**9**
Physical effects – overall height, over-all weight, face, neck, shoulder, bust, waist, hip and leg. Psychological effects – occasion, levity, age and personality.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Explain the element of design - space, line & shape / form
CO2:	Infer the element of design light and texture
CO3:	Infer the element of design pattern and principle of design - rhythm
CO4:	Interpret the principle of design - emphasis and balance
CO5:	Outline the principle of design - contrast, proportion and harmony
CO6:	Summarize the physical and psychological effects of applied illusions

TEXT BOOKS:	
1	Marian L. Davies, Visual Design in Dress, Prentice Hall, third edition.
2	Kathryn McKelvey and Janine Munslow, Fashion Design: Process, Innovation and Practice‖, Blackwell Publishing, USA, 2005

REFERENCES:	
1	Diane.T and Cassidy. T, Colour forecasting, Blackwell Publishing, 2005
2	Elizabeth Rouse, Understanding Fashion‖, Blackwell Scientific Publication, Oxford, 1989

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	1	-	1	1	-	1	2	2	1	1
2	2	1	-	-	-	1	-	1	1	-	1	2	2	1	1
3	2	1	-	-	-	1	-	1	1	-	1	2	2	1	1
4	2	1	-	-	-	1	-	1	1	-	1	2	2	1	1
5	2	1	-	-	-	1	-	1	1	-	1	2	2	1	1
6	2	1	-	-	-	1	-	1	1	-	1	2	2	1	1
Overall Correlation	2	2	-	-	-	1	-	1	1	-	1	2	2	1	1

23FT036	DIGITAL FASHION AND APPAREL DESIGN	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To explore the impact of emerging technologies on the fashion industry.
- To enable the students to understand the AR/VR applications in fashion retail.
- To impart the knowledge of the impact of AR/VR applications in fashion marketing.
- To explore the AR/VR applications in fashion design.
- To foster interdisciplinary perspectives and discussions on the future of fashion in virtual environments.

UNIT-I	DIGITAL FASHION AND RELEVANT TECHNOLOGIES	8

Introduction to Digital Fashion and Virtual Environments - 2D CAD for Illustration, Pattern Cutting and Marker Making, 3D CAD for Virtual Simulation and Fit Analysis. Definition and application of Technologies for Fashion Design and Prototyping - augmented reality, virtual reality, mixed reality, non-fungible tokens, metaverse, artificial intelligence (AI)

UNIT-II	DIGITAL DESIGN AND E-PROTOTYPING	10

Clothing Fit Evaluation: From Physical to Virtual. The Virtual Fitting Process—3D Simulation Representing Physical Reality. Virtual Fit of Bodices Constructed following Contemporary Methods - Scan2Weave: Connecting Digital Anthropometry with 3D Weaving Technology. Fashion Aesthetics and Identity in Digital Spaces. Virtual fashion shows and immersive experiences.

UNIT-III	DIGITAL HUMAN AND METAVERSE	8

4D body scanning technologies - Overview, technology and benefits of 4D body scanning technology- high-speed 4D body scanning for clothing development, precise measurements, accurate fit analysis, and enhanced customization. Process and

components of data capturing using high-speed 4D body scanning systems. Application of processed data 4D body scanning in clothing development processes, such as pattern making, garment design, and sizing optimization.		
UNIT-IV	**SMART MIRRORS TECHNOLOGY**	**10**
Smart Mirrors - Definition, evolution and role in enhancing the retail shopping experience through augmented reality (AR) technology. Features and capabilities of smart mirrors- virtual try-on, mix-and-match outfit suggestions, and interactive product information displays. Overlay virtual clothing items onto the user's reflection in real-time. Future trends - advancements in AR rendering capabilities, integration with AI-powered virtual stylists, and seamless omnichannel shopping experiences.		
UNIT-V	**TECHNOLOGIES AND TOOLS FOR CREATING METAVERSE**	**9**
Definition, purpose and features of technologies and tools used to create Metaverse- Game engines, 3D modelling software –digital fashion design software, avatar customization platforms, virtual world platforms, AR/VR tools, Social Interaction and Communication Platforms		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Explain the digital fashion and relevant technologies
CO2:	Infer the digital design and e-prototyping
CO3:	Categorize the body scanning technologies
CO4:	Outline the application of processed data in 4D body scanning
CO5:	Summarize the smart mirrors technology
CO6:	Infer the technologies and tools for creating metaverse

TEXT BOOKS:	
1	Muhammad Sayem, A. S. (2023). Digital fashion innovations: advances in design, simulation, and industry. CRC Press.
2	Genova, A., & Moriwaki, K. (2016). Fashion and Technology: A Guide to Materials and Applications-with STUDIO. Bloomsbury Publishing USA.
REFERENCES:	
1	"Fashioning Reality: A New Generation of VR Creators" by Ken Perlin and Others "The Metaverse: A Virtually Better World" by Richard Bartle:
2	"Digital Fashion: How to Make a Fashion Brand in the Digital Era" by Mercedes Gonzalez de Garay and Lorena Gomez Gonzales:
3	Daniel Malacara, Colour Vision and Colourimetry: Theory and Applications (SPIE Press Monograph Vol. PM204) 2nd Edition, 2011
4	David Hornung, "Colour-Workshop for Artists and Designers", Laurence King Publishing, 2012

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	3	1	-	1	1	-	1	3	2	3	1
2	2	1	-	-	3	1	-	1	1	-	1	3	2	3	1
3	3	3	2	2	3	1	-	1	1	-	1	3	3	3	1
4	2	1	-	-	3	1	-	1	1	-	1	3	2	3	1
5	2	1	-	-	3	1	-	1	1	-	1	3	2	3	1
6	2	1	-	-	3	1	-	1	1	-	1	3	2	3	1
Overall Correlation	3	2	1	1	3	1	-	1	1	-	1	3	3	3	1

23FT037	FASHION COMMUNICATION AND DESIGN FOUNDATION	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to learn fashion communication.
- To acquaint the students with the knowledge of event management.
- To enable the students to understand - advertising and public reaction.
- To enable the students to understand the foundation of design
- To enable the students to understand the foundation of design

UNIT-I	INTRODUCTION TO FASHION COMMUNICATION, SKILLS AND FASHION	9

Introduction to fashion communication. Fashion - context, functions and dynamics. Fashion clothing vs communication: individualistic and status representation, power and ideology; Fashion clothing and meaning – internal and external, semiology. Communication concepts and processes, fashion communication relating to brand. Effective communication - types, functions; styling, adornment, body language, gesture, presentation skills, interpersonal skills and rapport, understanding consumer's taste, fashion press, fashion editorial, shows and events.

UNIT-II	COMMUNICATION THROUGH IMAGES	9

Photojournalism, fashion photography, the catalogue and fashion journalism; creative writing; Space design: role and responsibilities, visual design, prop designing, set and art direction; design management; professional ethics and entrepreneurship.

UNIT-III	EVENT MANAGEMENT AND ADVERTISING	9

Event planning - Features, characteristics, classifications, roles and responsibilities of event manager, Fashion event - Stages of organizing an event, media planning; media design; advertising

and public relations; social media marketing; multimedia and web designing; post event.		
UNIT-IV	**FUNCTIONS OF FASHION AND CLOTHING**	**9**
Material function; protection; modesty and concealment; immodesty and attraction; cultural functions; communication; individualistic expression; social role; social worth; economic worth; political symbol, social rituals and recreation.		
UNIT-V	**FASHION CLOTHING – REPRODUCTION AND REVOLUTION**	**9**
Fashion clothing – reproduction, class, sex and gender, social revolution - revolution and resistance, passive and active consumption. Fashion clothing – modernity and postmodernity; fashion art, performance, masquerade, fashion and allegory, fashion and un-decidability, fashion and pastiche, fashion and bricolage, fashion and ambivalence.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Outline the basics of fashion communication
CO2:	Infer effective communication can be done
CO3:	Infer the communication through images
CO4:	Categorize the strategies followed for event management and advertising
CO5:	Classify the functions of fashion and clothing
CO6:	Infer the criteria to focused for fashion clothing
TEXT BOOKS:	
1	Malcolm Barnard, Fashion Theory: An Introduction, 2014, 1st edition, Taylor & Francis Books Ltd, UK
2	Marian Frances Wolbers, Connie Heller Horacek, Uncovering Fashion: Fashion Communications Across the Media, 2011, reprint, Fairchild Books, USA

REFERENCES:	
1	Malcolm Barnard, Fashion as Communication, 2012, reprint, Taylor & Francis Books Ltd., UK
2	Gaynor Lea-Greenwood, Fashion Marketing Communications, 2013, 1 edition, Wiley, USA
3	The Design of Everyday Things by Don Norman, Basic Books 2013 (Revised and Expanded Edition), ISBN: 978-0465050659
4	Design Basics by David A. Lauer & Stephen Pentak, Cengage Learning, 2016 (8th Edition), ISBN: 978-1305117171

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	1	-	1	1	-	1	3	2	1	1
2	2	1	-	-	-	1	-	1	1	-	1	3	2	1	1
3	2	1	-	-	-	1	-	1	1	-	1	3	2	1	1
4	3	3	2	2	-	1	-	1	1	-	1	3	3	1	1
5	2	1	-	-	-	1	-	1	1	-	1	3	2	1	1
6	2	1	-	-	-	1	-	1	1	-	1	3	2	1	1
Overall Correlation	3	2	1	1	-	1	-	1	1	-	1	3	3	1	1

VERTICAL -2 - SUSTAINABLE FASHION PRODUCT DEVELOPMENT

23FT038	FASHION PRODUCT DEVELOPMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To acquire knowledge on Fashion concept and able to classify apparel products.
- To understand development of Visualization and communication design on to manufacturability.
- To explore the creative design.
- To explore sustainability in fashion product development.

UNIT I	DEVELOPING FASHION CONCEPT FOR APPAREL	9

Definition and classification of apparel products. Design logic of apparel products, concept generation, concept screening. Line concept – Synthesize current issues, describe fashion trends, establish line direction, describe materials, identify group concepts and analyze current line. Principles of creative fashion ideas. Manipulation of Design Elements - silhouette, proportion, pattern, garment details, accessories, texture, prints, colour, fabric.

UNIT II	FUNCTIONAL APPAREL DESIGN AND ENGINEERING	9

Introduction to apparel design & its types – aesthetic, functional, exploratory, incremental. Requirements for functional clothing design and engineering- physiological, biomechanical, ergonomic, psychological requirements. Process involved in functional clothing design – material selection, clothing design and evaluation for functionality.

UNIT III	LINE DEVELOPMENT AND PRESENTATION	9

Creative design - Develop designs, Create prototype. Line adoption – Determining styles and balancing assortments. Technical design – perfect styling and fit, engineer production

patterns, samples, costing and grade patterns. Presentation: Review for adoption, line review, line / style release.		
UNIT IV	**CLOTHING COMFORT & SERVICEABILITY, PROTO DEVELOPMENT**	**9**
Product Positioning Strategy – Sizing and fit in material selection – Final assembly and finishing – Garment presentation. Fabric Sourcing and Selection. Analysis of functional and aesthetic characteristics of fabrics and trims - Co-ordinating with availability, ability to enhance product aesthetics and functionality and cost. Visualization and Communication design into manufacturability. Overview to E-proto development and rapid proto development.		
UNIT V	**SUSTAINABLE FASHION PRODUCT DEVELOPMENT**	**9**
Sustainable design principles, ethical considerations in design, 3Rs of sustainable development, common sustainable practices in fashion manufacturing, sustainable material selection, Slow fashion vs. fast fashion, Zero-waste and upcycling techniques.		
		TOTAL: 45 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Outline the fashion concept for apparel product development	
CO2:	Infer on the function apparel design engineering	
CO3:	Develop designs and prototype of fashion product	
CO4:	Infer on clothing comfort and serviceability	
CO5:	Outline proto development	
CO6:	Design on sustainable fashion product development	
TEXT BOOKS:		
1	Maurice J. Johnson and Evelyn C.Moore, "Apparel Product Development", Second Edition, Prentice Hall Upper saddle river, New Jersey, 2001.	

2	Ruth E Glock and Grace I Kunz, "Apparel Manufacturing - Sewn Product Analysis", Prentice Hall, New Jersey, Fourth Edition, 2005. 155.
REFERENCES:	
1	Kathryn McKelvey and Janine Munslow, "Fashion Design: Process, Innovation and Practice", Blackwell Publishing, USA, 2005.
2	Donald R.Lehmann, Rusell S.Winer, "Product Management", M.C.Graw Hill International, 1996
3	Mastudaira T and Suresh M.N., "Design Logic of Textile Products", Textile Progress, Textile Institute, Manchester, 2007.
4	Sandy Black, "Sustainable Fashion Handbook", Thames & Hudson, 2012.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	1	1	-	1	1	1	1	3	3	1	2
2	2	1	-	-	1	1	-	1	1	1	1	3	2	1	2
3	2	1	-	-	1	1	-	1	1	1	1	3	2	1	2
4	2	1	-	-	1	1	-	1	1	1	1	3	2	1	2
5	2	1	-	-	1	1	-	1	1	1	1	3	3	1	2
6	2	1	-	-	1	1	-	1	1	1	1	3	3	1	2
Overall Correlation	2	1	**-**	**-**	1	1	-	1	1	1	1	3	3	1	2

23FT039	SUSTAINABLE TEXTILES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to understand about the sustainable textiles.
- To impart knowledge about the sustainable dyeing and printing.
- To acquire knowledge on sustainable manufacturing and recycling.
- To provide the knowledge on eco-friendly processing of textiles.

UNIT I	SUSTAINABILITY TERMINOLOGIES AND ECO-FIBRES	9

Introduction- Definition and overview about the terminologies - sustainability, Green technologies and green chemistry, Life cycle assessment (LCA), Zero discharge hazardous chemicals (ZDHC), Higg index, Restricted substance list (RSL), Carbon foot print, energy foot print and ecological footprints. Sustainable and eco fibres – definition and list of fibers.

UNIT II	SUSTAINABLE DYEING AND PRINTING PROCESS	9

Co bleaching process, Eco dyeing process – CO_2 dyeing, Natural textile colourants and recent developments, Eco printing process, Developments in sustainable dyeing and printing technologies. Applications of latest technologies for dyeing and printing – Electro chemical process technology, Super critical fluid dyeing, Air dye technology, waterless dyeing process.

UNIT III	ECO FRIENDLY PROCESSING OF TEXTILES	9

Enzyme applications in textile chemical processing- definition, principle behind enzyme treatment, classification of enzymes, selection of enzymes suitable for textiles and as per end use. Applications of latest technologies for processing textiles –

ultrasound, microwave, laser technology and Plasma technology. Sustainable methods of effluent treatment.		
UNIT IV	**LCA OF TEXTILES**	**9**
Introduction, LCA and environmental impacts of textiles and clothing, standards and associations for environmental management systems, eco-labelling and certification of textiles and clothing, LCA calculator, LCA of cotton fibre and T-shirt.		
UNIT V	**RECYCLING OF TEXTILES AND APPAREL PRODUCTS**	**9**
Recycling of hard waste from textile and garment manufacturing processes. Recycling of end-of-life clothes – Open-loop recycling (OLR), Closed-loop recycling(CLR), barriers to effective OLR and CLR, Future trends in recycling.		
		TOTAL: 45 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Explain the various terminologies related to sustainability of textiles	
CO2:	Relate sustainability with textile raw materials	
CO3:	Outline the sustainable methods of dyeing and printing textiles	
CO4:	Outline the enzymes to process the textiles	
CO5:	Infer on LCA of textiles	
CO6:	Classify the various methods of recycling textiles and garments	
TEXT BOOKS:		
1	Rajkishore Nayak, Sustainable Technologies for Fashion and Textiles, Woodhead Publishing 2019.	
2	Richard Blackburn, Sustainable Textiles- Life Cycle and Environmental Impact, Woodhead Publishing 2009.	

REFERENCES:	
1	Nabil Ibrahim, Chaudhery Mustansar Hussain, Green Chemistry for Sustainable Textiles -Modern Design and Approaches, Woodhead Publishing 2021.
2	Padma Shree Vankar, Dhara Shukla, Natural Dyes for Sustainable Textiles, Woodhead Publishing 2023.
3	Subramanian Senthilkannan Muthu, Miguel Angel Gardetti, "Sustainable Fibres for Fashion Industry", Springer, 2016.
4	Marion I. Tobler-Rohr, "Handbook of Sustainable Textile Production", Woodhead Publishing, 2011.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
2	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
3	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
4	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
5	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
6	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
Overall Correlation	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1

23FT040	SUSTAINABLE AND ECO-FASHION	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to understand about the need and challenges in sustainable product development.
- To enable the students to understand about the sustainable tools used to develop the product.
- To provide the knowledge about eco-textiles.
- To acquire knowledge on recycling in textiles.

UNIT I	SUSTAINABILITY	9

Definition, Sustainable development and its goals, three dimensions of sustainability. Fashion vs. Sustainability, Significance in the present and future context, Phases of Sustainable techniques – Waste management, Recycling (downcycling and Upcycling), Energy conservation & Water conservation, Fair trade / ethical practices.

UNIT II	TOOLS	9

Tools & Techniques: 3 R method, Carbon foot print, Water foot print, Life Cycle Analysis (LCA), Recycling Potentiality Index(RPI). Standards & Labels: Environment: Eco-labels - EU flower, Oekotex, SAI, REACH, EMS: ISO 14000, EMAS, GOTS (Global Organic Textile Standards), GRS(Global Recycle Standard), Society & Economy: SA 8000, WRAP, Clean Clothes Campaign, Let's stitch together, Better Cotton Initiative.

UNIT III	ECO-TEXTILES	9

Eco-design, Natural fibers, Organic fibers, Best Available Techniques (BAT), eco-friendly practices in the manufacturing of apparel and entire supply chain, novel technologies like tandem wet-on-wet foam techniques, natural fibre resistant and absorbent materials, effluent treatment, zero discharge etc.

UNIT IV	RECYCLING	9
Designing textile products easy to recycle, Recycling technologies - Mechanical, Chemical, Recycled textile products - Development of products from reclaimed fibres, Recycled yarns, Recycled home textiles, Applications of recycled in medical, acoustics etc. Apparel development from recycled yarns.		
UNIT V	**CHALLENGES IN SUSTAINABILITY**	**9**
Slow fashion, Community couture, Techno-chic, Patch work planet / DIY (Do It Yourself), Cradle-to- cradle techniques, Garments produced from alternate natural fibres, Zero waste garment, Seamless garments, Garment produced from single machine, Garment making without the operator etc.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Explain the concept of sustainability
CO2:	Classify the tools used to attain sustainability in apparel industry.
CO3:	Infer on eco-textiles
CO4:	Interpret the recycling technologies
CO5:	Categorize the recycled apparel products
CO6:	Outline the challenges in sustainability.

TEXT BOOKS:	
1	Subramanian Senthilkannan Muthu, "Handbook of Sustainable Apparel Production", CRC Press (Taylor & Francis Group), 2015.
2	Subramanian Senthilkannan Muthu, "Sustainable Approaches in Textiles and Fashion: Circular Economy and Microplastic Pollution", Springer Singapore, 2022.

REFERENCES:	
1	Richard Blackburn, "Sustainable Textiles: Life Cycle and Environmental Impact", Woodhead Publishing, 2009.

2	M Miraftab and A. Horrocks, "Eco-Textiles: The Way Forward", Woodhead Publishing, 2007.
3	Subramanian Senthilkannan Muthu, "Textiles and the Environment", Springer, 2016.
4	P. Lu and L. Hamouda, "Eco-friendly textiles: Challenges and opportunities", Elsevier, 2017

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	-	-	3	-	1	-	-	3	2	1	1
2	2	1	-	-	-	-	3	-	1	-	-	3	2	1	1
3	2	1	-	-	-	-	3	-	1	-	-	3	2	1	1
4	2	1	-	-	-	-	3	-	1	-	-	3	2	1	1
5	2	1	-	-	-	-	3	-	1	-	-	3	2	1	1
6	2	1	-	-	-	-	3	-	1	-	-	3	2	1	1
Overall Correlation	2	1	-	-	-	-	3	-	1	-	-	3	2	1	1

23FT041	GARMENT FINISHING AND CARE	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to learn techniques and machinery for dyeing and finishing of garments.
- To acquire knowledge on chemical and sustainable finishing.
- To impart knowledge on laundry.
- To impart knowledge on different garment care and stain removal techniques.

UNIT I	SUSTAINABLE DYEING	9

Sustainable Dyeing-Classification and methods of extraction of natural dyes- Solvent extraction, Acid and alkali extraction, Supercritical Fluid Extraction, Ultrasound-assisted Extraction, Enzyme assisted extraction. Recent approaches and advancement in sustainable natural dyes.

UNIT II	CHEMICAL AND SUSTAINABLE FINISHING	9

Methodology and machineries used for chemical Finishing- Optical brightening, stiffening, softening, crease resistant, anti-static, anti-bacterial, UV protection, water proofing, flame proofing, soil release finish, mildew and moth proofing. Sustainable garment finishes, finishing material and process, sustainably finished products. Consumer education on use and care of textiles and garments.

UNIT III	LAUNDRY	9

Principles of laundering; Laundry equipment and reagents – soaps – detergents – cleaning action of soaps, Modern and industrial cleaning agents. Different methods of washing, types of house hold/industrial washing machines – rotary, swirling, pressure, tumble wash. Laundering procedures and care instructions adopted for cellulosic, protein and synthetic materials.

UNIT IV	FINISHING ROOM EQUIPMENT	9
Garment finishing room equipment – steam iron – steam busters – vacuum ironing tables– form finishing equipment – trouser topper, shirt press, collar/cuff press, form finisher for jackets and coats – study of boiler and related equipment for finishing room.		
UNIT V	**STAIN REMOVAL AND GARMENT CARE**	**9**
Stain removal – characteristics of stain and method of stain removal-blood, tea, rust, oil/grease, colour matter, chemicals. Use of care labels and standards / norms for care labels.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Summarize the classification and methods of extraction of sustainable dyes.
CO2:	Outline the chemical and sustainable finishing.
CO3:	Interpret on garment laundry techniques.
CO4:	Summarize different types of washing machines.
CO5:	Infer on various finishing room equipment
CO6:	Summarize the stain removal and garment care.

TEXT BOOKS:	
1	Dantyagi S., "Fundamentals of Textile and their care", Oriental longmans Ltd, New Delhi, 1980.
2	Subramanian Senthilkannan Muthu ,"Natural Dyes and Sustainability (Sustainable Textiles: Production, Processing, Manufacturing & Chemistry)"

REFERENCES:	
1	Marsh, J.T., "An Introduction to Textile Finishing", Chapman and Hall Ltd., London, 1979.
2	Shenai, V.A., "Technology of Textile Finishing", Sevak Publications, Bombay, 1995.
3	Hall, A.J., "Textile Finishing" Elsevier Publishing Co. Ltd., 198 158.

4	Harrison. P (Editor), "Garment Dyeing: Ready to wear fashion from the dye house", The Textile Institute, U.K. 1988.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	1	1	1	2	3	1	1	3	2	1	2
2	2	1	-	-	1	1	1	2	3	1	1	3	2	1	2
3	2	1	-	-	1	1	1	2	3	1	1	3	2	1	2
4	2	1	-	-	1	1	1	2	3	1	1	3	2	1	2
5	2	1	-	-	1	1	1	2	3	1	1	3	2	1	2
6	2	1	-	-	1	1	1	2	3	1	1	3	2	1	2
Overall Correlation	2	1	-	-	1	1	1	2	3	1	1	3	2	1	2

23FT042	KNIT PRODUCT DEVELOPMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To make students understand the need for grid generation for numerical solutions.
- To impart the exposure to both structured and unstructured grid generation methods.
- To impart knowledge on the areas of application and on the implementation methods for structured and unstructured grid generation techniques.
- To expose the students on the benefits of adaptive meshing and its methodology
- To impart training to students on the control of grid quality.
- To apply Best Practices in Grid Generation techniques for steady flows.

UNIT I	INTRODUCTION TO KNITWEAR AND SUSTAINABILITY	9

History and evolution of knitted products, overview of sustainability in the knitwear industry, Environmental challenges specific to knit production, Lifecycle analysis of knit products. Circular economy in knit product development.

UNIT II	SUSTAINABLE MATERIALS FOR KNITWEAR	9

Overview of eco-friendly yarns- organic cotton, bamboo, wool, recycled polyester, etc. Innovations in fibers- biodegradable, bioengineered, and smart materials. Sourcing sustainable materials for knitting. Sustainably developed knit products.

UNIT III	DESIGN CONCEPTS FOR SUSTAINABLE KNITWEAR	9

Concepts of zero-waste knitting, 3D knitting and seamless garment production, modular and multifunctional design approaches; Aesthetic vs functional considerations in sustainable knitwear.

UNIT IV	STITCHLESS KNIT GARMENTS	9
Selection of trims and accessories – Seams, Special machine selection and assembly operations– T-shirt, Swimwear, panties and brassier.		
UNIT V	**CONVERTIBLE KNIT GARMENTS**	**9**
Fabric, trims and accessories selection – seams, stitches, special machine selection and assembly operation – Reversable sweatshirt, convertible maxi to skirt.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Outline about the sustainability in knitwear
CO2:	Infer on sustainable materials used for knitwear
CO3:	Interpret on design concepts for sustainable knitwear
CO4:	Select the seams, machines, assembly operation, trims and accessories for stitchless garments.
CO5:	Select the seams, machines, assembly operation, trims and accessories for reversable garments.
CO6:	Select the seams, machines, assembly operation, trims and accessories for convertible garments.

TEXT BOOKS:	
1	Kate Fletcher, "Sustainable Fashion and Textiles: Design Journeys", Routledge, 2014.
2	Subramanian Senthilkannan Muthu, "Circular Economy in Textiles and Apparel: Processing, Manufacturing, and Design", Woodhead Publishing (Elsevier), 2019.

REFERENCES:	
1	Stokes Terry., "Intimate Apparel", Brooklyn: Release Press, USA, 1980, ISBN: 0913722197 | ISBN-13: 9780913722190
2	Singer., "Sewing Lingerie", CyDecosse Incorporated, Mexico, 1991,ISBN: 0865732604 | ISBN- 13: 9780865732605

3	Ann Haggar., "Pattern Cutting for Lingerie, Beachwear and Leisurewear", Black Well Science Limited, France, 2004, ISBN: 140511858X | ISBN-13: 9781405118583.
4	Debby Robinson, "Knitting for Sustainability", Artisan Press, 2020.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	-	1	3	1	-	-	1	2	3	1	1
2	2	1	-	-	1	1	3	1	1	-	1	2	3	1	1
3	2	1	-	-	1	1	3	1	1	-	1	2	3	1	1
4	3	2	1	1	1	1	-	1	1	-	1	2	3	1	1
5	3	2	1	1	1	1	-	1	1	-	1	2	3	1	1
6	3	2	1	1	1	1	-	1	1	-	1	2	3	1	1
Overall Correlation	3	2	1	1	1	1	2	1	1	-	1	**2**	3	1	1

23FT043	HOME FURNISHING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to learn about the recent developments in furnishing.
- To enable the students to understand about the Recent developments floor covering.
- To acquaint the students with various kinds of materials used in home textile.
- To acquaint the students with the developments in home furnishing.
- To enable the students to learn about the sustainable home furnishing.

UNIT I	FURNISHINGS	9

Developments in Textile Furnishing; Type of Furnishings Materials – Woven and non-woven; Factors affecting selection of Home Furnishings.

UNIT II	FLOOR COVERINGS	9

Recent Developments in manufacturing of floor coverings -Hard Floor Coverings, Resilient Floor Coverings, Soft Floor Coverings, Rugs, Cushion and Pads; Care of floor coverings.

UNIT III	CURTAINS AND DRAPERIES	9

Advances in Home decoration - Draperies – Choice of Fabrics, Curtains – Types of Developments in Finishing of Draperies; Developments in tucks and Pleats; uses of Drapery Rods, Hooks, Tape Rings and Pins.

UNIT IV	HOME FURNISHING	9

Advances in period style in different styles and use of Colours, design & texture in home furnishing. Developments in living room furnishing including upholstery, Wall Hangings, Cushion, Cushion Covers, Bolster and Bolster Cover. Advances in the production of Bed linens and pillows

UNIT V	SUSTAINABLE HOME FURNISHING	9
Sustainable home furnishing- materials, process, sustainably developed home furnishing products, assessments for sustainability, sustainability of home furnishing products, circular economy in home furnishing, green home furnishing.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Explain the developments in textile home furnishings.
CO2:	Infer the recent developments in floor coverings.
CO3:	Summarize the innovation curtains and draperies.
CO4:	Explain the advancements in home furnishings.
CO5:	Outline sustainable home furnishing.
CO6:	Infer sustainability of home furnishing products.

TEXT BOOKS:	
1	Subramanian Senthilkannan Muthu, "Sustainable Approaches in Textiles and Fashion: Home Textiles and Sustainable Development", Springer, 2021.
2	AlexanderN.G., "Designing Interior Environment", Mas Court Brace Covanorich, Newyork, 1972 67.

REFERENCES:	
1	Wingate J. F., and Mohler I. B., "Textile Fabrics& Their Selection", Prentice Hall Inc., New York, 1984, ISBN: 0139128654 | ISBN-13: 9780139128653.
2	Subtra Das, "Performance of home textiles", Woodhead Publishing India Pvt.Ltd., 2010, ISBN: 0857090070 | ISBN-13: 9780857090072.
3	Rowe T., "Interior Textiles Design and Developments", Woodhead Publishing India Pvt.Ltd., 2009, ISBN: 1845693515 | ISBN-13: 9781845693510.
4	Schindler W. D., and Hauser P. J., "Chemical finishing of textiles", Woodhead Publishing, England, 2004, ISBN: 1855739054 | ISBN-13: 9781855739055.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	1	1	-	1	1	-	1	2	2	1	2
2	2	1	-	-	1	1	-	1	1	-	1	2	2	1	2
3	2	1	-	-	1	1	-	1	1	-	1	2	2	1	2
4	2	1	-	-	1	1	-	1	1	-	1	2	2	1	2
5	2	1	-	-	1	1	-	1	1	-	1	2	2	1	2
6	2	1	-	-	1	1	-	1	1	-	1	2	2	1	2
Overall Correlation	2	1	-	-	1	1	-	1	1	-	1	2	2	1	2

23FT044	APPAREL TRIMS, ACCESSORIES AND EMBELLISHMENTS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To introduce students to different trims used in apparel industry.
- To introduce students to different components used in to enhance value addition.
- To enable students to understand the different fashion accessories used in apparel industry to enhance value addition.
- To impart the students with sustainability in printing.
- To introduce students to sustainability in apparel trims and accessories.

UNIT I	GARMENT TRIMMING	9

Garment trimmings – Buttons– tack buttons, snap fastener and rivets; buckles, frag closures, belts, ribbons, fringe, emblems and sequins, decorative and functional trimmings; performance properties of components and trims. Hook and loop fastening (Velcro), Zippers – anatomy of zipper, types, function of zipper, position of slider, standards on zipper, selection of zipper, application of zipper, shortening of zipper; evaluation of quality of accessories.

UNIT II	EMBROIDERIES	9

Embroideries - basic embroidery stitches – chain stitch, button hole stitch, herringbone stitch, feather stitch, lazy daisy, double knot stitch, interlacing stitch, stem stitch, French knot stitch, types of embroidery machines, limitations of hand embroidery; kaustic embroidery; kasida, kathiwar; Sind; chickankari; zardosi; tribal embroideries.

UNIT III	FASHION ACCESSORIES	9

Fashion accessories – footwear, handbags, gloves, hats, scarves, hosiery, jewelry, watches; testing of zippers, elastic waist band

testing, fusible interlinings; safety issues for different accessories in children garment.		
UNIT IV	**PRINTING AND SUSTAINABLE PRACTICES**	**9**
Printing – Introduction; different methods – block printing, roller, screen, discharge, resist and pigment; Styles of printing - batik, tie and dye, patch work, appliqué work, bead work. Sustainable practices in apparel trims, accessories and embellishments product development – choice of materials and production process.		
UNIT V	**SUSTAINABILITY IN APPREL TRIMS AND ACCESSORIES**	**9**
Sustainable apparel trims and accessories, LCA for conventional trims and accessories, upcycled and recycled accessories and embellishments, sustainable materials used for sewing threads.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
	After completion of the course, the students will be able to:
CO1:	Outline the different types of garment trims
CO2:	Explain the various embroidery techniques
CO3:	Interpret the functions of different fashion accessories
CO4:	Interpret the functions of different fashion accessories
CO5:	Interpret the sustainable printing techniques
CO6:	Explain the sustainability in apparel trims and accessories
TEXT BOOKS:	
1	Shailaja D. Naik, "Traditional Embroideries of India", API Publishing Corporation, New Delhi, 1996
2	Subramanian Senthilkannan Muthu, "Handbook of Sustainable Apparel Production", CRC Press (Taylor & Francis Group), 2015.
REFERENCES:	
1	Shella Paine, "Embroidered Textiles", Thames and Hudson Ltd., U. S. A., 1990.

2	Jan Beaney and Jean Little John, "Complete Guide to Creative Embroidery: Design, Textures, Stitches", Bt Batsford, 200.
3	"Sustainable Fashion and Textiles: Design Journeys", Kate Fletcher , Earthscan, 2008, ISBN-13: 978-1844075089
4	Ruth E. Glock., and Grace I Kunz., "Apparel Manufacturing Sewn Product Analysis",4th Edition, Prentice Hall, New Jersey,2004, ISBN: 0131119826 | ISBN-13: 9780131119826.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	1	1	1	1	1	-	1	2	2	1	1
2	2	1	-	-	1	1	1	1	1	-	1	2	2	1	1
3	2	1	-	-	1	1	1	1	1	-	1	2	2	1	1
4	2	1	-	-	1	1	1	1	1	-	1	2	2	1	1
5	2	1	-	-	1	1	1	1	1	-	1	2	2	1	1
6	2	1	-	-	1	1	1	1	1	-	1	2	2	1	1
Overall Correlation	2	1	-	-	1	1	1	1	1	-	1	2	2	1	1

VERTICAL 3: TECHNICAL TEXTILES

23FT045	BASICS OF TECHNICAL TEXTILES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to understand about the textiles in various fields
- To impart knowledge about the selection of raw materials based on end use
- To acquire knowledge on the specification and properties of woven fabrics suitable for technical textiles
- To acquire knowledge on the specification and properties of knitted fabrics suitable for technical textiles
- To acquire knowledge on the specification and properties of non-woven fabrics suitable for technical textiles

UNIT I	INTRODUCTION	9

Definition and significance of technical textiles – Overview of technical textiles market - classification and applications of technical textiles - automotive textile, industrial textile, medical textile , home textile, clothtech, agro textile, building and construction textile, packaging textile, sports textile, geotextiles, protective textile, oeko textile. Approaches to improve sustainability in technical textiles.

UNIT II	TECHNICAL FIBER AND YARNS	9

Introduction of technical fiber and yarns and their properties - high strength, high modulus in organic fibers; applications - medical and hygiene, protection and defense; application of technical filament yarn.

UNIT III	WOVEN FABRICS IN TECHNICAL TEXTILES	9

Introduction on woven fabrics in technical textiles, technical weave structure and their machines and operations, importance of selvedge, fabric specification and fabric geometry, production methods. Application and properties of woven fabrics used in

technical textiles.		
UNIT IV	**KNITS IN TECHNICAL TEXTILES**	**9**
Introduction on knits in technical textiles along with their applications; terms and definitions; weft, warp knitting structure and their machines and operations; process control in weft knitting. Application and properties of knitted fabrics used in technical textiles.		
UNIT V	**NONWOVENS IN TECHNICAL TEXTILES**	**9**
Introduction on nonwoven in technical textiles; methods of batt production, air laying, wet laying, dry laying, spun laying, melt blown, chemical and thermal bonding, hydro entanglement; application and properties of nonwovens fabrics in technical textiles		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
	After completion of the course, the students will be able to:
CO1:	Outline about technical textiles and its classifications
CO2:	Choose suitable fibres and yarns for technical textiles.
CO3:	Identify suitable woven fabric for technical textiles.
CO4:	Identify suitable knit fabric for technical textiles.
CO5:	Choose suitable nonwoven fabric for technical textiles.
CO6:	Application of textile materials used for technical textiles
TEXT BOOKS:	
1	A. Richard Horrocks, Subhash C. Anand, "Handbook of Technical Textiles" Woodhead Publishing, 2016.
2	Subhankar Maity, Kunal Singha, Pintu Pandit, "Functional and Technical Textiles" Woodhead Publishing 2023.
REFERENCES:	
1	R. Alagirusamy, A. Das, "Technical, Textile Yarns" Woodhead Publishing, 2010.
2	R Chapman, Applications of Nonwovens in Technical Textiles, Woodhead Publishing 2010.

3	William C. Smith, industrial textile associates, "Smart textile coating and laminates" the Textile institute, Woodhead publishing Ltd, Cambridge.
4	Guazhong Cao, "Nanostructure and Nanomaterials", Imperial College Press, USA, 2006.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	-	1	1	-	1	1	-	1	3	-	1
2	3	2	1	1	-	1	-	-	1	1	-	1	3	-	-
3	3	2	1	1	-	1	-	-	1	1	-	1	3	-	-
4	3	2	1	1	-	1	-	-	1	1	-	1	3	-	-
5	3	2	1	1	-	1	-	-	1	1	-	1	3	-	-
6	3	2	2	2	-	1	-	-	1	1	-	1	3	-	-
Overall Correlation	3	2	1	1	-	1	1	-	1	1	-	1	3	-	1

23FT046	COATING AND LAMINATES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to understand about the coatings and laminates.
- To impart knowledge about the selection of chemicals and process methods.
- To acquire knowledge on smart intelligent and its properties.
- To acquire knowledge on manufacturing process and its properties.
- To acquire knowledge on manufacturing process

UNIT I	INTRODUCTION	9

Overview of textile coating and lamination – Introduction, industry basics, application; Basic principles of coating and laminating processes, preparation for coating and lamination, methods and techniques of coating and lamination for textiles.

UNIT II	BASE FABRICS AND THEIR INTERACTION	9

Introduction, methods of characterization of base fabric and coated fabric properties, effects on weave pattern, fill yarn size, coating thickness and penetration on shear behavior, modeling of coated fabric behavior.

UNIT III	SMART AND INTELLIGENT	9

Microencapsulation technology for coating and lamination of textiles – Introduction, benefits, types and techniques; release behavior, applications, usages of microcapsules in textiles. Intelligent breathable textiles – methods of making breathable textiles, smart temperature responsive breathable coating for textile structures.

UNIT IV	CONDUCTIVE COATINGS FOR TEXTILES	9

Conductive coating - Introduction, methods for imparting, principles and procedures of polymer coating, substrates of

conductive coating, testing, properties and application of conductive coatings.		
UNIT V	**OTHER TECHNOLOGIES**	**9**
Shape memory polymers – introduction, temperature, application. Phase change materials – introduction, treatment, thermal effects and their determination, application of textile coatings and laminates with PCM. Principles and applications of nanotechnologies for nano coating, surface finishing and laminates		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Identify the coating and laminating materials.
CO2:	Summarize the technical aspects of fibre interaction.
CO3:	Interpret on microencapsulation.
CO4:	Explain the conductive coatings methods.
CO5:	Infer on application of shape memory polymers.
CO6:	Overview on nanotechnology-based coatings.
TEXT BOOKS:	
1	William C Smith, "Smart Textile Coatings and Laminates" Woodhead-publishing 2018. ISBN: 9780081024287.
2	Schindler W D & Hauser P J "Chemical Finishing of Textiles, Cambridge, Woodhead Publishing 2004.
REFERENCES:	
1	Fung W, "Coated and Laminated Textiles", Woodhead Publishing Ltd, Cambridge 2002.
2	Stout EE, "Introduction to Textiles", John Wiley and Sons Inc.,.
3	Hoboken, NJ. Taox, "Smart Fibers, Fabrics and Clothing, Woodhead Publishing Ltd, Cambridge 2001.
4	William C. Smith, industrial textile associates, "Smart textile coating and laminates" the Textile institute, Woodhead publishing Ltd, Cambridge.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	-	-	1	1	1	1	1	1	1	1	2	1	1
2	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
3	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
4	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
5	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
6	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
Overall Correlation	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1

23FT047	NANO TEXTILES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to understand about the Nano fibre production.
- To impart knowledge about nanoparticles.
- To acquire knowledge about carbon based nanomaterials.
- To acquire knowledge about nano particles in textiles.
- To acquire knowledge about nanocomposites.

UNIT I	NANOFIBRE PRODUCTION	9

Principle of electrospinning. Electrospinning of nano fibres – conditions, structure formation, properties, effect of process parameters upon fibre formation. Methods to produce continuous filaments. Electrospinning of polyamides and polyesters.

UNIT II	NANOPARTICLES	9

Preparation, characterization, and application of silver nanoparticles, Fe nanoparticles ZnO, TiO2, MgO, SiO2 & Al2O3 with PP or PE coating, Indium-tin oxide Nanoparticles, Ceramic NanoParticles, Carbon black Nanoparticles, Clay nanoparticles, Cellulose Nanowhiskers and Nanoparticles. Self- assembled nanolayer films, Nano structuring of polymers with cyclo dextrins.

UNIT III	CARBON-BASED NANOMATERIALS	9

Introduction - Carbon nanotubes yarns (CNY) - Electrochemical carbon based nanosensors - Carbon nanotubes - Carbon nanotube yarn and 3-D braid composites - Carbon nanofibers - Carbon nanotools as sorbents and sensors of nanosized objects - Carbon nanomaterials for nerve tissue stimulation and regeneration.

UNIT IV	NANOPARTICLES AND TEXTILE TECHNOLOGY	9

Introduction - Selected features of nanoparticles - Nanoparticles preparation - Nanoparticles application in the textile industry -

Cellulosic nanoparticles - Nano indentation - Nanocomposite Thin Films Deposited On Textiles: Towards Smart Bandages.		
UNIT V	**NANOCOMPOSITES**	**9**
Introduction - Nanocomposite TiO2 nanocomposite based polymeric membranes for photocatalytic degradation - Nanocomposites for textile effluent degradation - Barrier applications of polymer nanocomposites - Nanocomposite fibers for antibacterial fabrics - Preparation of nanocomposite films - Functional properties of 3D woven glass nanocomposites.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Summarize the principle of electro spinning.
CO2:	Summarize the nano particle preparation and characterization.
CO3:	Discuss the smart technology for textiles and clothing.
CO4:	Make use of intelligent polymers in biomedical applications.
CO5:	Discuss the current and future trends for wearable technology.
CO6:	Infer on nano and smart materials in Textiles.
TEXT BOOKS:	
1	Brown P J and Stevens K, "Nanofibres and Nanotechnology in Textiles", Woodhead Pub. Ltd., Cambridge, 2007.
2	Rajesh Mishra and Jiri Militky, Nanotechnology in Textiles - Theory and Application, 2019, Elsevier Ltd.
REFERENCES:	
1	X.M.Tao, ―Smart Fibres, Fabrics and Clothing: Fundamentals and Applications‖, Woodhead Publishing Ltd., England, 2001.
2	Jinlian Hu, ―Shape Memory Polymers and Textiles‖, 1st edition, CRC, USA, 2007.
3	Guazhong Cao, "Nanostructure and Nanomaterials", Imperial College Press, USA, 2006.

4	Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simons and Burkhard Raguse, "Nanotechnology- Basic Science and Emerging Technologies", Overseas Press, New Delhi, 2005.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	1	-	1	1	1	1	1	1	2	1	1
2	2	1	-	-	1	-	1	1	1	1	1	1	2	1	1
3	2	1	-	-	1	-	1	1	1	1	1	1	2	1	1
4	3	2	1	1	1	-	1	1	1	1	1	1	2	1	1
5	2	1	-	-	1	-	1	1	1	1	1	1	2	1	1
6	2	1	-	-	1	-	1	1	1	1	1	1	2	1	1
Overall Correlation	2	1	1	1	1	-	1	1	1	1	1	1	2	1	1

23FT048	PROTECTIVE TEXTILES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To introduce about basic elements required for protective garments.
- To impart the conceptual knowledge about the chemical finishes required for protective garments.
- To understand the different application areas of protective garments.
- To understand the implicit knowledge of protective garment construction.
- To analyse and evaluate the protective garments codes of standards.

UNIT I	FIBRES, YARNS AND FABRICS FOR PROTECTIVE GARMENTS	9

Selection of fibres-suitability and properties of fibres for various protective clothing, chemical composition and physical structure, characteristics and working of various fibres according to different end uses like thermal protection, ballistic protection, anti-microbial protection, Protection against cold. Yarn and fabric (knitted, woven and Non-woven) parameters, their methods of production, effect of structure on their performance; use of composite materials in yarn and fabric formation used for protective end uses.

UNIT II	CHEMICAL FINISHES FOR PROTECTIVE GARMENTS	9

Use of coated fabrics – different types of finishes like fire retardant finishes, water repellent finishes, anti-microbial finishes; chemical finishes against radiation and chemicals – method of application of those finishes; machines and techniques used for such applications; protective finishes for health care garments.

UNIT III	PROTECTIVE GARMENTS IN OTHER APPLICATIONS	9
Protective fabrics used in the medical field and in hygiene; military combat clothing; protective fabrics against biological and chemical warfare; textiles for high visibility.		
UNIT IV	**GARMENT CONSTRUCTION**	**9**
Garment construction - method of construction of garments according to various protective end uses like protection against thermal, water, cold, chemical, UV radiation, ballistic and antimicrobial protection; use of inter lining and composites.		
UNIT V	**EVALUATION OF PROTECTIVE GARMENTS**	**9**
Evaluation of protective fabrics - desirable properties of protective textiles, method of testing for thermal protective performance, water, cold, abrasion and wear resistance; evaluation of resistance in to mildew, ageing, sunlight, chemical, electrostatic and electrical resistivity, impact properties; evaluation of antiballistic, personal protective garments ASTM standards for protective garments.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Infer of the identification of fibres, yarn and fabric for protective garments.
CO2:	Select production method for protective garments.
CO3:	Explain the application of chemical finishes on protective garments.
CO4:	Explain the application of protective garments.
CO5:	Construct the planning on protective garments.
CO6:	Summarize the evaluation of protective garments.
TEXT BOOKS:	
1	Scott R.A.,"Textiles for protection", Woodhead Publishing Limited, Cambridge, UK 2005.

2	Shahid Ul Islam, Bhupendra Singh Butola, Advances in Functional and Protective Textiles, 2020. ISBN: 9780128202579
REFERENCES:	
1	Daniel (Xuedong) Li, Cut Protective Textiles, The Textile Institute Book Series, 2020 Elsevier Ltd. Stout EE, "Introduction to Textiles", John Wiley and Sons Inc.,.
2	Chellamani K.P. and Chattopadhyay D., "Yarns and Technical Textiles", SITRA, 1999.
3	Fan Q., "Chemical Testing of Textiles", Woodhead Publishing Limited, Cambridge, UK.
4	Long A.C., "Design and manufacture of Textile Composities", Woodhead Publishing Limited

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	1	1	-	1	1	1	-	1	2	1	1
2	3	2	1	1	1	1	-	1	1	1	-	1	2	1	1
3	2	1	-	-	1	1	-	1	1	1	-	1	2	1	1
4	2	1	-	-	1	1	-	1	1	1	-	1	2	1	1
5	2	1	-	-	1	1	-	1	1	1	-	1	2	1	1
6	2	1	-	-	1	1	-	1	1	1	-	1	2	1	1
Overall Correlation	3	2	1	1	1	1	-	1	1	1	-	1	2	1	1

23FT049	MEDICAL TEXTILES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students, understand the different types of biomaterials.
- To impart biomedical application of different textile structures.
- To acquire knowledge on implantable materials.
- To acquire knowledge on healthcare and hygiene materials.
- To acquaint the student with standards in medical textiles.

UNIT I	MATERIALS IN BIO MEDICAL APPLICATION	9

Metals, ceramics, polymers used for bio medical applications – manufacture, features and limitations; super absorbent polymers, cell- biomaterial interaction.

UNIT II	WOUND DRESSING BANDAGES AND NON IMPLANTABLES	9

Non-implantable materials: wound dressing- requirements of wound dressing, types, properties and applications; bandages - types, evaluation and applications; design and manufacture of wound dressings and bandages.

UNIT III	IMPLANTABLE TEXTILES	9

Implantable biomedical devices: vascular grafts, sutures - types, properties and applications; - extra corporeal devices; scaffolds for tissue engineering: development and characterization.

UNIT IV	HEALTH CARE AND HYGIENE TEXTILES	9

Healthcare and hygiene products: surgical gowns, masks, respirators, wipes, napkins, antibacterial, anti-odour textiles design and manufacture of above products.

UNIT V	STANDARDS IN MEDICAL TEXTILES	9

Standards; safety, legal and ethical issues involved in conducting trials with medical textile materials; disposal of medical textile

products. Smart clothing and wearable technology for the health and well-being market.	
TOTAL: 45 PERIODS	
COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Infer on the medical materials and its applications.
CO2:	Summarize the various manufacturing methods of medical textiles.
CO3:	Classify the non-implantable and its application.
CO4:	Classify the implantable and its application.
CO5:	Classify the healthcare and hygiene textiles.
CO6:	Explain the standards and evaluation methods of medical textiles products.
TEXT BOOKS:	
1	Joon B. Park., and Joseph D. Bronzino., "Biomaterials – Principles and Applications", CRCPress, Boca Raton London, New York, Washington, D.C. 2002, ISBN: 0849314917 | ISBN- 13: 9780849314919
2	Anand S., " Medical Textiles", Textile Institute, 1996, ISBN: 185573317X.
REFERENCES:	
1	Allison Mathews., and Martin Hardingham., "Medical and Hygiene Textile Production - A Hand Book", Intermediate Technology Publications, 1994, ISBN: 1853392111 | ISBN-13: 9781853392115.
2	Anand S.C., Kennedy J.F.,Miraftab M., and Rajendran S., "Medical Textiles and Biomaterials for Health Care", Wood head Publishing Ltd., 2006, ISBN: 0849317800 | ISBN-13: 9780849317804.
3	Bartel.V.T, "Handbook of medical textiles", Wood Head publishing, 2011.
4	Horrocks A.R. and Anand S.C., "Handbook of Technical Textiles", Woodhead Publishing Limited, Cambridge, UK.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	2	1	1	3	1	1	1	1	2	2	3
2	2	1	-	-	2	1	1	3	1	1	1	1	2	2	3
3	2	1	-	-	2	1	1	3	1	1	1	1	2	2	3
4	2	1	-	-	2	1	1	3	1	1	1	1	2	2	3
5	2	1	-	-	2	1	1	3	1	1	1	1	2	2	3
6	2	1	-	-	2	1	1	3	1	1	1	1	2	2	3
Overall Correlation	2	1	-	-	2	1	1	3	1	1	1	1	2	2	3

23FT050	SMART AND INTELLIGENT TEXTILES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To acquaint the students with various functional clothing.
- To impart the knowledge of the phase change textile materials.
- To explore the smart clothes in healthcare field.
- Relate the conductive textile and wearable electronics.
- Analyze the effectiveness of smart and intelligent textile materials.

UNIT I	INTRODUCTION	9

Introduction - intelligent textiles and clothing, need and development of intelligent systems for textiles and clothing Characteristics - structural, aesthetic and functional. Applications of intelligent textiles and clothing.

UNIT II	CONDUCTIVE TEXTILES	9

Conductive textiles – definition and purpose. Method of formation of electrical circuits in textile materials, multi-purpose sensors, micro-system technology. Conductive polymer fibres.

UNIT III	SMART CLOTHES	9

Smart clothes fundamentals and process - Healthcare monitoring, communications, device control and haptic technology. Clothes of special profession. Success factors of smart cloths.

UNIT IV	WEARABLE ELECTRONICS	9

Narrow width fabrics types, properties and applications - tapes, ribbon, elastic, laces, woven labels, braided structure. Weft knitted structures - Blister jacquard, plush, pile, velour and fleecy fabrics. Introduction, area of usage and scope. Components of wearable - data collection, data processing, data interpretation, data display. Impact of wearable electronics on health care textiles.

UNIT V	SMART TEXTILES AND OTHER APPLICATIONS	9
Basic concepts and application - Solar textiles, Heat storage textiles and clothing; Smart textile composites, Gas separation, Embroidery textiles, Snow clothing; Bio-processing and Work wear		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Identify the intelligent textiles material.
CO2:	Identify the Conductive textiles material.
CO3:	Classify the smart clothes.
CO4:	Classify the wearable electronics.
CO5:	Classify the smart textiles.
CO6:	Develop smart textiles as per various applications.

TEXT BOOKS:	
1	Tao X., "Smart Fibres, Fabric and Clothing", Textile Institute, Woodhead Publishing, Limited, Cambridge, UK 2016.
2	L. Ashok Kumar, C. Vigneswaran, "Electronics in Textiles and Clothing: Design, Products and Applications", CRS Press, 2015.

REFERENCES:	
1	Sanjay Gupta, "Smart Textiles – Their Production and Marketing Strategies", Bhumica Printers, New Delhi, 2000.
2	Y El Mogahzy, "Engineering Textiles", Woodhead Publishing, 2008..
3	T Dias, Electronic Textiles-Smart Fabrics and Wearable Technology, Elsevier Store, 2015.
4	Adanur S., "Wellington Sears Handbook of Industrial Textiles", Technomic Publishing Co. Inc., Lancaster Pennsylvania, 1995, ISBN 1-56676-340-1

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	1	1	1	1	1	1	1	1	3	1	1
2	3	2	1	1	1	1	1	1	1	1	1	1	2	1	1
3	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
4	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
5	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
6	3	2	1	1	1	1	1	1	1	1	1	1	2	1	1
Overall Correlation	3	2	1	1	1	1	1	1	1	1	1	1	2	1	1

23FT051	SPORTS TEXTILES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To impart knowledge on requirements of sports textiles
- To impart knowledge on designing the sportswear
- To explore the designing of sports related product.
- To explore the advent techniques in making of sportswear.
- To evaluate the sports textiles

UNIT I	SPORTSWEAR - PHYSIOLOGICAL COMFORT	9

Sportswear – introduction, types; textiles in sportswear; sportswear - comfort and protection from injury, functional requirements; wear comfort of sportswear, measurement of physiological comfort; heat exchange mechanism and heat balance, condensation problem in waterproof breathable fabrics for sportswear.

UNIT II	SPORTS GARMENT DESIGNING	9

Design of sports garments – selection of fibre, yarn and fabrics for different types of sports, construction of sports garments; advancements in textile materials for active wears.

UNIT III	OTHER SPORTS PRODUCTS DESIGNING	9

Design of sports foot wear, protective gears, glove – components, design features, selection of material, construction.

UNIT IV	ADVANCEMENT IN SPORTWEAR	9

Elastomeric fibers, yarns and fabrics in sportswear, application of elastomeric fiber and yarns in sportswear. Biomimetic textiles for sportswear, application of seamless technologies in sportswear.

UNIT V	EVALUATION OF SPORTS TEXTILES	9

Standards and test methods for sportswear, sports footwear, protective gears and gloves, testing of coated and laminated sportswear fabrics.

TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Choose the physiological comfort requirement of sports textile products.
CO2:	Choose the suitable design, construction and raw materials for sports garments.
CO3:	Develop designs for sports accessories.
CO4:	Select advanced textile materials for active wear.
CO5:	Make use of evaluation methods in sports textiles.
CO6:	Outline the development and application of coated and laminated textiles as sports textiles.
TEXT BOOKS:	
1	R.Shishoo, "Textiles for sportswear", Woodhead Publishing Series in Textiles, Cambridge, England, 2015
2	Ghosh. S. K., "Functional Coatings", Wiley-VCH Verlag, GmbH & Co. KGaA, Weinheim, 2006, ISBN:3-527-31296-X.
REFERENCES:	
1	Schindler W.D and Hauser P., "Chemical Finishing of Textiles"., Woodhead Publications, ISBN: 18557390545. Richard. A.Scott, Textiles for Protection, CRC press, Woodhead Publication, USA, 2005
2	A.K.Sen, Coated Textiles: Principal and Applications, Technomic Publication, Lancaster, Pennsylvania, USA, 2001.
3	A C Long, Design and Manufacture of Textile Composites, 2005. ISBN: 9781855737440
4	Yamini Jhanji, Sportswear: Acumen of Raw Materials, Designing, Innovative and Sustainable Concepts 2021, DOI: 10.5772/intechopen.99808.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	2	3	3	1	1	1	1	1	3	2	1
2	3	2	1	1	2	3	3	1	1	1	1	1	3	2	1
3	3	2	1	1	3	2	2	1	1	1	1	1	3	3	1
4	3	2	1	1	2	2	2	1	1	1	1	1	3	2	1
5	3	2	1	1	2	2	2	1	1	1	1	1	3	2	1
6	2	1	-	-	3	3	3	1	1	1	1	1	2	3	1
Overall Correlation	3	2	1	1	3	3	3	1	1	1	1	1	3	3	1

VERTICAL 4: SPECIALITY APPARELS

23FT052	CLOTHING SCIENCE, COMFORT AND FIT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Significance of clothing comfort and its types
- Evaluation and factors influencing thermo physiological and moisture comfort
- Evaluation and factors influencing sensorial/tactile and psychological comfort
- Elements of fit and factors which affect the clothing appearance and drape

UNIT I	INTRODUCTION TO COMFORT	9

Comfort –definition and importance; human clothing system, comfort perception and preferences. Types of clothing comfort - thermophysiological comfort, moisture comfort, sensorial/tactile comfort and psychological comfort – definition and their basic concepts.

UNIT II	THERMO-PHYSIOLOGICAL COMFORT	9

Thermo-physiological comfort – thermoregulatory mechanisms of the human body - thermoregulation through clothing system - thermal comfort of clothing - measurement of thermal transmission characteristics. Moisture regulations - liquid water transfer: wicking and water absorption - principles of moisture vapour transfer - condensation of moisture vapour - evaluation of moisture vapour transmission - moisture sensation in clothing.

UNIT III	SENSORIAL/TACTILE AND PSYCHOLOGICAL COMFORT	9

Fabric tactile and mechanical properties - human tactile responses, fabric parameters - fabric prickliness, itchiness, stiffness, softness, smoothness, roughness, and scratchiness. Effects of fibre, yarn and fabric properties, dyeing and finishing treatments on tactile comfort. Psychological comfort -introduction and factors

influencing psychological comfort. Neuro-physiological comfort - basis of sensory perceptions; measurement techniques - mechanical stimuli and thermal stimuli. Effects of - colour, surface texture, garment design, sizing and fit.		
UNIT IV	**CLOTHING FIT**	**9**
Fit-elements, importance, fit standards and influential factors. Human performance in clothing system-objective and subjective evaluation of fit. Testing methods for dimensional fit, subjective rating scales, subjective fitting guide, clothing waveform, and pressure evaluation of clothing fit and 3D modeling of pressure fit.		
UNIT V	**CLOTHING APPEARANCE AND GARMENT DRAPE**	**9**
Assessment of fabric surface smoothness, seam appearance, creases retention and appearance retention of finished garments. Objective evaluation of clothing appearance -wrinkling, fabric pilling, seam pucker and overall garment appearance. Fabric properties influencing clothing appearance and fit. Fabric drape and measurement, seamed fabric drape, static drape, dynamic fabric drape. Objective evaluation of overall garment appearance.		
		TOTAL: 45 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Outline the comfort of fabric and its types	
CO2:	Explain the thermo-physiological comfort requirements of human and the role of clothing	
CO3:	Choose factors influencing sensorial/tactile comfort	
CO4:	Choose factors influencing psychological comfort	
CO5:	Classify the objective and subjective evaluation of fit	
CO6:	Infer the process for evaluation of overall appearance and garment drape	

TEXT BOOKS:	
1	Laing R.M., and Sleivert G.G., Clothing, Textile and Human Performance Textile Progress 32:2, The Textile Institute, 2002, ISBN: 1870372514 | ISBN-13: 9781870372510.
2	Fan J, Yu W and Hunter L, "Clothing Appearance and Fit: Science and Technology", The Textile Institute, Wood head Publishing Limited, England, 2004.
3	Apurba Das., and Alagirusamy R., Science in clothing comfort, Wood head Publishing India Pvt. Ltd., India, 2010, ISBN: 1845697898 | ISBN-13: 9781845697891
REFERENCES:	
1	Li Y., The Science of Clothing Comfort, Textile Progress 31:1-2, Taylor and Francis, UK, 2001, ISBN: 1870372247 | ISBN-13: 9781870372244
2	Patty Brown and Janett Rice, "Ready-To-Wear Apparel Analysis", Prentice Hall, 2001.
3	Guowen Song., Improving comfort in clothing, Wood head Publishing Ltd., UK, 2011, ISBN: 1845695399 | ISBN-13: 9781845695392

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	2	-	-	-	-	-	-	3	2	2	1
2	2	1	-	-	2	-	-	-	-	-	-	3	2	2	1
3	3	2	1	1	2	-	-	-	-	-	-	3	2	2	1
4	3	2	1	1	2	-	-	-	-	-	-	3	2	2	1
5	2	1	-	-	2	-	-	-	-	-	-	3	2	2	1
6	2	1	-	-	2	-	-	-	-	-	-	3	2	2	1
Overall Correlation	3	2	1	1	2	-	-	-	-	-	-	3	2	2	1

23FT053	FUNCTIONAL APPARELS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To introduce the knowledge on functional requirements of clothing
- Design, prepare patterns and engineer clothing with various functionalities
- To give an overview on the factors influencing functional performance of clothing selecting the raw materials accordingly
- To design clothes with improved mobility

UNIT I	INTRODUCTION TO FUNCTIONAL CLOTHING	9

Functional clothing – Introduction and definition. Definition and purpose of functional clothing classifications– protective, medical, sportswear, vanity clothing, cross-functional clothing, clothing for special needs.

UNIT II	DESIGN AND ENGINEERING OF FUNCTIONAL CLOTHING	9

Introduction to apparel Design & its types – aesthetic, functional, Exploratory, Incremental. Requirements for clothing design - physiological, biomechanical, ergonomic, psychological requirements. Process of clothing design – material selection, choosing membranes and coatings, selection of accessories and trimmings, steps involved in clothing design and testing its functionality.

UNIT III	PATTERN ENGINEERING FOR FUNCTIONAL CLOTHING	9

Key components influencing pattern engineering process – body shape vs garment shape, garment fit, fabric properties, garment assembling techniques and end use. Manipulation of standard blocks for various applications – work wear, sportswear, bullet proof jacket, clothing for elderly.

UNIT IV	SELECTION OF RAW MATERIALS FOR FUNCTIONAL CLOTHING	9
Role of fiber, yarn and fabric parameters on different attributes - aesthetic, tactile and functional attributes. Selection of fibers- qualitative comparison of performance properties of textile fibers for apparels. Selection of yarn – yarn type, count and structural features and their expected characteristics. Selection and design of fabrics – fabric structures and their general characteristics. Structure of other materials used in apparel – films, foams and rigid materials.		
UNIT V	**MOBILITY TO BE PROVIDED IN FUNCTIONAL CLOTHING**	**9**
Describing the human body movement- sensory and mechanical aspect of movements, identifying the user needs for movement – anatomy, design and design strategies, notating and analyzing movement. Applying data on body movement in clothing design – behavior of skin and clothing during movement. Fabrics and clothing design to increase mobility in clothing		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1:	Classify functional clothing
CO2:	Make use of the various requirements to engineer functional clothing
CO3:	Plan the pattern engineering process to design functional clothing
CO4:	Choose the suitable fiber and yarn for various end uses of functional clothing
CO5:	Choose the suitable fabric and other materials for various end uses of functional clothing
CO6:	Identify the body movement and select suitable fabric and apparel design

TEXT BOOKS:	
1	Watkins, S. M., & Dunne, L. (2015). Functional clothing design: From sportswear to spacesuits. Bloomsbury Publishing USA.
2	Gupta, S., Majumdar, A., & Gupta, S. (2021). Functional Textiles and Clothing 2020. Springer.
REFERENCES:	
1	Gupta, D. (2011). Functional clothing—Definition and classification. Indian Journal of fibre & Textile research, Vol.36, (pp 321-326), nopr.niscpr.res.in
2	Anand, N. (2011). Pattern engineering and functional clothing. Indian Journal of fibre & Textile research, Vol.36, (pp 358-365), nopr.niscpr.res.in
3	Chattopadhyay, R. (2008). Design of Apparel Fabrics: Role of fibre, yarn and fabric parameters on its functional attributes. Journal of Textile Engineering, 54(6), 179-190.
4	Quintero-Rodriguez, C., Nasir, S., & Troynikov, O. (2017). Body mapping as a method for design and engineering of functional clothing. In Proceedings of the 10th Textile Bioengineering and Informatics Symposium (TBIS 2017) (pp. 364-369). Textile Bioengineering and Informatics Society (TBIS).

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	2	1	1	1	1	1	2	2	3	2	1
2	3	2	1	1	2	1	1	1	1	1	1	2	2	2	1
3	3	2	1	1	3	1	1	1	1	1	1	3	2	3	1
4	3	2	1	1	3	1	1	1	1	1	1	3	2	3	1
5	3	2	1	1	3	1	1	1	1	1	1	3	2	3	1
6	3	2	1	1	2	1	1	1	1	1	1	2	2	2	1
Overall Correlation	3	2	1	1	3	1	1	1	1	1	2	3	3	3	1

23FT054	MANUFACTURING OF FUNCTIONAL APPARELS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To acquaint students on manufacturing of functional apparels.
- To make the functional garments from design perspective to end use.
- To design, engineer and evaluate functional garments
- To understand the various applications of functional garments

UNIT I	PROTECTIVE WEAR	9

Materials selection, functions, requirements, designing, construction and layering - flame resistant protective clothing, chemical protective clothing, mechanical protective clothing – cut, slash, ballistic and blunt impact protection.

UNIT II	MEDICAL WEAR	9

Classification. materials selection, functions, requirements, designing and construction of health and hygiene apparels. Therapeutic and bio sensing garments – design and applications.

UNIT III	VANITY CLOTHING AND CLOTHING FOR PEOPLE WITH SPECIAL NEEDS	9

Materials used, requirements and functions of vanity clothing- body shaping, support and contouring for enhanced appearance. Materials used, requirements and functions of clothing for people with special needs- enabling clothing for elderly, infants and disabled.

UNIT IV	SPORTS WEAR	9

Sport wears – Classification and their clothing requirements, materials selection, designing and construction of sportswear. Developments of functional fibers, yarns and fabrics suitable for sportswear application and their properties; Clothing for footwear - fabric requirements, finishing adaptability and evaluation methods

UNIT V	CROSS FUNCTIONAL CLOTHING	9
Cross-functional clothing- Types, classifications, clothing requirements, materials used and assembling technologies for space suits, combat clothing and wearable electronics		
		TOTAL: 45 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Infer on the selection of materials for protective wear.	
CO2:	Develop apparels used as medical wear	
CO3:	Develop clothes used for vanity and for people with special needs	
CO4:	Develop suitable sportswear for the various sports	
CO5:	Choose suitable raw materials for developing sportswear and sports footwear	
CO6:	Choose and classify the various cross-functional clothing and raw materials	
TEXT BOOKS:		
1	N. Pan and G. Sun, Functional textiles for improved performance, protection and health, Woodhead Publishing Limited, 2011	
2	A R Horrocks and S C Anand, Handbook Of Technical Textiles, Woodhead Publishing Ltd 2000	
REFERENCES:		
1	J. McCann, D. Bryson, Smart Clothes and Wearable Technology, Woodhead Publishing Limited, 2009.	
2	Jelka Geršak, Design of Clothing Manufacturing Processes, Woodhead Publishing Limited, 2013.	
3	Subhankar Maity, Kunal Singha, Pintu Pandit, Functional and Technical Textiles, Woodhead Publishing Limited, 2023.	
4	Anand, S. C., Kennedy, J. F., Miraftab, M., & Rajendran, S. (Eds.). (2010). Medical and healthcare textiles. Elsevier.	

Cos	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	3	1	1	1	1	1	1	1	2	3	1
2	3	2	1	1	3	1	1	1	1	1	1	1	3	3	1
3	3	2	1	1	3	1	1	1	1	1	1	1	3	3	1
4	3	2	1	1	3	1	1	1	1	1	1	1	2	3	1
5	3	2	1	1	3	1	1	1	1	1	1	1	3	3	1
6	3	2	1	1	3	1	1	1	1	1	1	1	3	3	1
Overall Correlation	3	2	1	1	3	1	1	1	1	1	1	1	3	3	1

23FT055	INTIMATE APPARELS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To acquaint students on the design of intimate garments.
- To enable the knowledge about the material aspects of intimate garments.
- To make the pattern construction of intimate apparels.
- To acquaint students on the design of accessories for intimate apparels.
- To provide the knowledge about the sewing and value addition for intimate apparels.

UNIT I	RAW MATERIALS FOR INTIMATE APPAREL	9

Intimate apparels – definition, classification. Physical and physiological requirements of intimate apparels. Suitable raw materials and their innovations -fiber, yarns, fabric and finishes.

UNIT II	MEN'S INIMATE APPAREL	9

Design analysis, measurements, pattern drafting of men's intimate apparel – long johns, tank top, tanga, boy shorts, knickers, bikini underwear, thong, boxer briefs, boxer shorts and jock strap.

UNIT III	WOMEN'S INIMATE APPAREL	9

Design analysis, measurements, pattern drafting of women's intimate apparel – waist petticoats, panties, camisoles, tube top, shape wear, bikini and bra.

UNIT IV	ACCESSORIES FOR INTIMATE APPAREL	9

Intimate apparel accessories – Bra wire, hook and eye tape, ring and slider, buckle, plastic bone, elastics and sewing threads.

UNIT V	TECHNOLOGIES TO ASSEMBLE INTIMATE APPAREL	9

Sewing of intimate apparels – seams, stitches, machines; lamination; moulding and welding technique.

TOTAL: 45 PERIODS

COURSE OUTCOMES:	
	After completion of the course, the students will be able to:
CO1:	Select the suitable fibres and fabrics for the intimate apparel.
CO2:	Identify the physical and psychological requirements of intimate apparels.
CO3:	Infer pattern drafts and suitable materials for various men's intimate apparels.
CO4:	Infer pattern drafts and suitable materials for various women's intimate apparels.
CO5:	Choose the best suitable intimate apparel accessories as per the performance required.
CO6:	Select the right type of sewing technique suitable for constructing intimate apparels.
TEXT BOOKS:	
1	Ann Haggar, "Pattern Cutting for Lingerie, Beach Wear and Leisure Wear", Black Well Science Limited, France, 2001.
2	Winne Yu, "Advances in Women's Intimate Apparel Technology", Wood head Publishing Limited, 2016.
REFERENCES:	
1	Helen Joseph, Armstrong, "Patternmaking for Fashion Design", Pearson Education Pte. Ltd., 2005.
2	Winifred Aldrich, "Metric Pattern Cutting for Children's Wear and Baby Wear", Blackwell Publishing, 2004.
3	Winne Yu, J. Fan, S.C. Harlock, S.P. Ng., "Innovations and Technology of Women's Intimate Apparel", Wood head Publishing Limited, England 2006.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	2	2	2	2	2	2	2	2	3	2	2
2	3	2	1	1	2	2	2	2	2	2	2	2	3	2	2
3	2	1	-	-	3	2	2	2	2	2	2	2	2	3	2
4	2	1	-	-	3	2	2	2	2	2	2	2	2	3	2
5	3	2	1	1	3	2	2	2	2	2	2	2	3	3	2
6	3	2	1	1	3	2	2	2	2	2	2	2	3	3	2
Overall Correlation	3	2	1	1	3	2	2	2	2	2	2	2	3	3	2

23FT056	DENIM PROCESSING AND APPARELS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To provide basic knowledge about denim fabric production.
- To enable the knowledge about construction techniques for denim garments.
- To impart different techniques of denim washing.
- To create a good knowledge about denim garments and finishing.
- To enable the students about the application of denim garments.

UNIT I	DENIM FABRIC PRODUCTION	9

Denim fabric manufacture, fibre for denim manufacturing – cotton, viscose and other cellulose fibres, fibre properties, fibre processing, yarn recommendations, elastomeric yarn. Influence and importance for denim fabrics. Woven denim - Sizing, size recipes, yarns requirement, preparation of denim yarns, denim weaving techniques, machineries used, intelligent machines, manufacture of high-quality denims. Knitted denim - yarns requirement and preparation, knitting machine techniques.

UNIT II	PRETREATMENT, DYEING AND PRINTING	9

Pre-treatment – scouring, mercerizing, special treatments; dyes for denim dyeing, dyeing auxiliaries, dyeing techniques, machinery used, indigo dyeing, tinting / dyeing, garment dyeing process, dyeing machinery, combined dyeing processes, advances in garment dyeing, testing and quality. Printing techniques, functional and aesthetic finishing, operations involved, quality control

UNIT III	DENIM WASHING AND FINISHING	9

Different types of washing and its classification, common process parameters, machineries involved, factors affecting washing, effect of washing, enzymes for washing, sustainable developments in washing, fashionable denim washes, wash-down effect on sewing

thread. washing back staining and remedies. Challenges in denim fabric finishing, denim finishing process – dry and wet finishing, mechanical and chemical.		
UNIT IV	**CONSTRUCTION TECHNIQUES**	**9**
Denim garments – types, seams and stitches, sewing threads and types, needles and size. Sewing machineries – types of machine used, fabric feed and stitching, special attachments, automation and robotic functions, attaching fasteners. Denim garments – fabric faults, sewing faults and troubleshooting.		
UNIT V	**NOVEL APPLICATIONS**	**9**
Application of denim – based on the gender, age, environment and trend. Pseudo denim and generic denim, reverse denim, stretch denims, denim with blended fibres, biodegradable denims and their properties, denim effect, non-apparel products.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
	After completion of the course, the students will be able to:
CO1:	Summarize the denim preparatory process.
CO2:	Explain the denim fabric manufacturing methods.
CO3:	Make the garments relevant to denim.
CO4:	Apply the pre-treatment, dyeing and washing.
CO5:	Outline the finishing to the denim material.
CO6:	Infer on the applications of denim fabrics.

TEXT BOOKS:	
1	Roshan Paul, Denim: Manufacture, Finishing and Applications, 1st Edition, Woodhead Publishing 2015.
2	T.L. Vigo, Textile Processing and Properties - Preparation, Dyeing, Finishing and Performance, Woodhead Publishing 1994.

REFERENCES:	
1	Subramanian Senthilkannan Muthu, Sustainability in Denim (The Textile Institute Book Series), Woodhead Publishing; 1 edition 2017.

2	Venkatraman Praburaj, Apeagyei Phoebe, Dassanayake Ruchira, Durable Water Repellent Finishes for Denim Wear and Its Impact, LAP Lambert Academic Publishing, 2015.
3	A Cavaco-Paulo, G Gubitz, Textile Processing with Enzymes, Woodhead Publishing 2003.
4	Tyrone L. Vigo, Textile Processing and Properties: Preparation, Dyeing, Finishing and Performance: v.11 (Textile Science & Technology) 1 January 1997.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
2	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
3	3	2	1	1	1	1	1	1	1	1	1	1	3	1	1
4	3	2	1	1	1	1	1	1	1	1	1	1	3	1	1
5	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
6	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
Overall Correlation	3	2	1	1	1	1	1	1	1	1	1	1	3	1	1

23FT057	LEATHER GARMENT TECHNOLOGY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To know about the different types of leather and its treatments.
- To provide basic knowledge about the designing of leather garments.
- To acquaint students about the manufacturing of leather garments.
- To understand the production and inspection techniques of leather garments.
- To enable knowledge about the testing and inspection of leather garments

UNIT I	INTRODUCTION TO LEATHER AND LEATHER GARMENTS	9

Various types of hides/skins and their properties, preservative techniques, pre-tanning, tanning and post tanning processes, finishing techniques; types of leathers – fur, leather, suede; types of leather grades – top grain, full grain, split leather, bonded leather; grain leathers: aniline, semi aniline, pigmented. Classification of leather garments; leather gloves, factors influencing the selection of leather for different types of garment, quality and technical aspects of various types of trims and accessories used in leather garments – lining, zip, threads, glue, buttons, eyelets, rivets, embellishments. Quality characteristics - leather properties, garment properties, softness and suppleness. Quality control and standards.

UNIT II	DESIGNING OF LEATHER GARMENTS AND MARKET TRENDS	9

Analysing the trend and fashion, design development, choosing appropriate materials, measuring techniques, pattern making, sizing/grading, applications of CAD for designing and patterning. Costing and pricing for leather goods and garments. Analysis of

International market for leather garments – EU, USA & other markets. Social auditing of leather goods and garment units - occupational health and safety, ISO 9000 & 14000.		
UNIT III	**MANUFACTURING OF LEATHER GARMENTS**	**9**
Production planning - for various types of leather garments, process of manufacturing: nesting for effective utilization of material, cutting and clicking - hand & machine cutting, grindery and hardware, die cutting, knives & tools used, pre-assembly and assembly operations – skiving, splitting, folding, molding and pressing, sewing. Production planning - for various types of leather garments, process of manufacturing: nesting for effective utilization of material, cutting and clicking - hand & machine cutting, grindery and hardware, die cutting, knives & tools used, pre-assembly and assembly operations – skiving.		
UNIT IV	**MACHINERIES USED IN LEATHER GARMENT MANUFACTURING**	**9**
Machinery needs for leather goods and garments manufacture. Various types of sewing machines – flat bed, cylinder bed, post bed, hem turning machines and other special sewing machines – different feed mechanisms. Clicking, splitting, skiving, folding, strape cutting machines etc.		
UNIT V	**TESTING AND INSPECTION OF LEATHER GARMENTS**	**9**
Testing and quality standards of leather; functions of inspection – raw materials, in process, final, purchased parts; physical testing of leather garments – physical performance and durability, accelerated ageing, apparel testing, measurement of colour fastness, leather testing standards. Leather upholstery faults – causes and remedies.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Identify the various types of leather.
CO2:	Classify the leather garments.
CO3:	Infer on the leather garments.
CO4:	Develop the leather garments.
CO5:	Identify the usage of machineries.
CO6:	Analyze the quality of leather goods.
TEXT BOOKS:	
1	H. R. Procter, The Principles of Leather Manufacture, Read Books Ltd, 2017.
2	Leather garments making, NIMI publication, 2012.
REFERENCES:	
1	The Principles of Leather Manufacture, H. R. (Henry Richardson), Wentworth Press, 2016.
2	Leather and sports goods – Pattern and Template marker, NIMI Publications, 2011.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	2	2	2	2	2	2	2	2	3	2	2
2	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
3	2	1	-	-	1	1	1	1	1	1	1	1	2	1	1
4	3	2	1	1	1	1	1	1	1	1	1	1	3	1	1
5	3	2	1	1	1	1	1	1	1	1	1	1	3	1	1
6	3	3	2	2	1	1	1	1	1	1	1	1	3	1	1
Overall Correlation	3	2	1	1	2	2	2	2	2	2	2	2	3	2	2

23FT058	SMART WEARABLES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to understand the concept and construction of smart wearables.
- To provide the basic knowledge about the end-user-based design in smart clothing.
- To acquaint the knowledge about designing smart clothing.
- To understand about the production technologies.
- To enable the knowledge on standardization and evaluation.

UNIT I	INTRODUCTION TO SMART WEARABLES	9

Wearable computers, wearable electronics and intelligent clothing – Definition and differences with examples. Adaptive and responsive textile structures (ARTS) - introduction, textiles and computing: the symbiotic relationship, The Georgia Tech wearable motherboards -design and development framework, structure, production, contributions and potential applications.

UNIT II	END-USER BASED DESIGN OF INNOVATIVE SMART CLOTHING	9

Identification of design requirements – aesthetics of the design, culture of the user, demands of the body and activity. The technology layer: the impact of emerging smart technologies on the design process- enhancing the functionality- The culture of wearable technology, revisiting the demands of the body, enhancing the functionality. A new hybrid design process.

UNIT III	DESIGNING SMART CLOTHING	9

Introduction - anatomical, physiological and psychological considerations, human–garment interaction. Demands of the body and wearable technology- the necessity of a new design process for smart clothing- design needs for smart clothing- design process

model for smart clothing - development of smart photonic clothing - development case of bio-monitoring clothing prototypes.		
UNIT IV	**PRODUCTION TECHNOLOGIES FOR SMART CLOTHING**	**9**
Garment construction: cutting and placing of materials, developments in fabric joining for smart clothing- fusing, welding and bonding; digital embroidery techniques for smart clothing, developments in digital print technology for smart textiles, environmental and waste issues concerning the production of smart clothes and wearable technology. Smart clothing and wearable technology – health and well-being.		
UNIT V	**STANDARDIZATION AND EVALUATION**	**9**
Classification of products and technologies in smart clothing- principle factors for Standardization- establishing a standard for performance evaluation. Methods of evaluation for wearable computing - fixed in-the-laboratory studies, mobile in-the-laboratory studies, mobile in-the-wild studies.		
TOTAL: 45 PERIODS		
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Identify the smart wearables.	
CO2:	Infer on the application of smart wearables.	
CO3:	Summarize the innovation in smart clothing.	
CO4:	Explain the smart clothing.	
CO5:	Construct the smart clothing.	
CO6:	Outline the evaluation of smart clothing	
TEXT BOOKS:		
1	Cho G. Smart clothing: technology and applications. CRC press; 2009 Dec 23.	
2	Mc Cann J. and Bryson D., "Smart Clothes and Wearable Technology", Wood Head Publishing Series in Textiles, UK, 2010, ISBN-10: 1845693574.	

REFERENCES:	
1	Tao X.M., "Smart Fibres, Fabrics and Clothing Fundamentals and Application", Wood Head Publishing Ltd., October 2001, ISBN 1 855735466.
2	Mc Cann J. and Bryson D., "Smart Clothes and Wearable Technology", Wood Head Publishing Series in Textiles, UK, 2010, ISBN-10: 1845693574.
3	Langenhove L V, "Smart textiles for medicine and healthcare", Textile Institute & CRC press, Woodhead publishing ltd., England, 2007.
4	Xiaoming Tao, Hand book of smart textiles, Springer-Verlag, Singapur,2015.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	3	1	1	1	1	1	1	1	3	3	1
2	2	1	-	-	3	1	1	1	1	1	1	1	2	3	1
3	2	1	-	-	3	1	1	1	1	1	1	1	2	3	1
4	2	1	-	-	3	1	1	1	1	1	1	1	2	3	1
5	3	2	1	1	3	1	1	1	1	1	1	1	3	3	1
6	2	1	-	-	3	1	1	1	1	1	1	1	2	3	1
Overall Correlation	3	2	1	1	3	1	1	1	1	1	1	1	3	3	1

VERTICAL 5: APPAREL MARKETING AND RETAIL

23FT059	FASHION FORECASTING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To impart knowledge on principles of marketing.
- To gain knowledge on the domestic market.
- To gain knowledge on the international market.
- To impart knowledge on principles of marketing research.
- To acquaint the students with visual design of fashion.

UNIT I	FASHION FORECASTING	9

Fashion forecasting – definition, types: long term and short term, the direction of fashion change, types of forecasting methods: qualitative and quantitative, various factors influencing fashion change – social, cultural, military, royal, celebrity, professional, the role of fashion forecaster's steps in fashion forecasting process.

UNIT II	FASHION TREND	9

Fashion trend – definition, Trend chasers, visualization and forecasting, fashion trend forecasting –past, present and future, social medias and its influence for fashion trend forecasting, trend forecasting schedule, types of trends – fad, classic; trend influencers.

UNIT III	FASHION MARKET	9

Fashion marketing research – Purpose of research - research design & data sources – Sampling methods – data Collection – Forecasting Fashion – Market Segmentation - marketing mix.

UNIT IV	FASHION VISUAL DESIGN	9

Applied illusions – Physical effects- Overall height - over all weight – Covering body defects by design – Visual design in Dress in Australia - Brazil – Germany - India – Japan - Nigeria.

UNIT V	FASHION PRODUCTS	9

Fashion Products and its importance – Fashion Industry & new

Product Development – Fashion Designers role in apparel market – Branded Products – personal labels – stores that seek the merchandise.	
TOTAL: 45 PERIODS	
COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Explain the fashion market and marketing environment
CO2:	Summarize what is Fashion, Fad, style and its application
CO3:	Identify the applied illusions and its physical effects
CO4:	Analyse the fashion marketing research, fashion forecasting and marketing mix
CO5:	Infer on fashion products and its importance in Fashion Industry & new Product Development
CO6:	Extend the fashion designers role in apparel market
TEXT BOOKS:	
1	Gwyneth Holland, Rae Jones, Fashion Trend Forecasting, Laurence King Publishing, 2017
2	Evelyn L. Brannon & Lorynn R. Divita, Fashion forecasting, Fairchild books, 2015.
3	Mike Easey, "Fashion Marketing", Blackwell Science, 2002.
REFERENCES:	
1	Kathryn McKelvey, Janine Munslow, Fashion Forecasting, Wiley-Blackwell, A John Wiley & Sons, Ltd, Publication
2	Tsan-Ming Choi, Chi-Leung Hui & Yong YuK, Intelligent Fashion Forecasting Systems: Models, Springer, 2014.
3	Eundeok Kim & Ann Marie Fiore, Fashion Trends: Analysis and Forecasting, Berg publications, 2011.
4	Chelsea Rousso, Fashion Forward: A Guide to Fashion Forecasting, Bloomsbury academic, 2012.
5	Maurice J.Johnson & Evelyn C.moore, "Apparel Product Development", Prentice Hall Inc., 2001.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	2	2	-	2	2	2	2	2	2	2	2
2	2	1	-	-	2	2	-	2	2	2	2	2	2	2	2
3	3	2	1	1	2	2	-	2	2	2	2	2	3	2	2
4	3	3	2	2	2	2	-	2	2	2	2	2	3	2	2
5	2	1	-	-	2	2	-	2	2	2	2	2	2	2	2
6	2	1	-	-	2	2	-	2	2	2	2	2	2	2	2
Overall Correlation	3	2	1	1	2	2	-	2	2	2	2	2	3	2	2

23FT060	VISUAL MERCHANDISING	L	T	P	C
		2	1	0	3

COURSE OBJECTIVES:

- To define and appreciate the significance and role of visual merchandising in a retail environment, in order to effectively present the merchandise to the consumers.
- To acquaint the students with the fundamentals of visual merchandising.
- To acquaint the students with the elements of visual presentation.
- To define and appreciate the significance and role of visual merchandising in a retail environment, in order to effectively present the merchandise to the consumers
- To define and appreciate the significance and role of visual merchandising in a retail environment, in order to effectively present the merchandise to the consumer.

UNIT I	FUNDAMENTALS OF VISUAL MERCHANDISING	6+3

Visual Merchandising-definition, objectives and scope. Types of display and display settings. Retail stores and approaches of visual merchandising -Types of retail stores, store atmospherics, Approaches in Visual Merchandising in various stores-In house staffing, Department Store Approach, Small Store Approach. Role of Visual Merchandising in changing face of retailing.

UNIT II	ELEMENTS OF VISUAL PRESENTATION	6+3

Overview of the various elements – Color, lighting, line and composition, graphics and signage, store exteriors and interiors, sensory stimulants like scent, sound etc. Application of color schemes and color psychology to create mood in garment display.

UNIT III	MANNEQUINS AND FIXTURES	6+3

Mannequins and other human forms, alternatives to mannequins. Criteria for selection of fixtures, dressing fixtures, modular

fixtures. Store exterior – Signs, Marquees, Outdoor Lighting, Banners, Planters, Awnings, Windows in Storefront Design, store fronts.		
UNIT IV	**STORE INTERIORS AND POINTS OF DISPLAY**	**6+3**
Focal points, island displays, risers and platforms, the runway the catwalk, counters and display cases, museum cases, demonstration cubes, ledges, shadow boxes, enclosed displays, fascia, walls. Point of purchase display, industrial display, fashion shows, trade organizations and sources. Display techniques.		
UNIT V	**STORE PLANNING AND EXECUTION OF A VISUAL PRESENTATION**	**6+3**
Store layout planning-grid, racetrack, free form and their direction of flow. Floor plans and reading of floor plans – Plan-o-gram-definition, purpose and planning -theme, ensemble, racks, shelves, bins etc. Assortment planning- Assortment planning, optimize apparel assortments Display calendar and planning a display, scheduling the promotion, budgeting and safety factors in visual merchandising.		
		TOTAL: 45 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Classify various elements of Visual presentation and understand their significance in visually presenting a display	
CO2:	Analyze and identify the best suitable environment for merchandise including interior, exterior and point of displays	
CO3:	Infer on various techniques used in presenting merchandise	
CO4:	Infer on optimizing the merchandise and retail space to customers	
CO5:	Summarize the various features available in a computer controlled visual merchandising	

CO6:	Summarize budgeting and safety factors in visual merchandising
TEXT BOOKS:	
1	Pegler M.M., "Visual Merchandising and Display", IV Edition, Fair child Publications, NewYork,2001.
2	Diamond.E, Fashion Retailing–A Multichannel Approach,IIEdition, Prentice HallInc. NewJersey2006.
REFERENCES:	
1	RathP.M.,PetersonJ., Greensley.P, Gill.P, Introduction to Fashion Merchandising, Delmar PublishersInc., NewYork1994.
2	PhillipsP.M. Fashion Sales Promotion, IIEdition, Prentice HallInc, NewJersey,1996.
3	CurtisE, Fashion Retail, John Wiley and SonsLtd, England,2004.
4	Swati Bhalla, Anuraag S, Visual Merchandising, Tata McGraw-Hill Education, NewDelhi, 2010

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	-	-	-	-	-	2	-	-	2	-	-
2	3	3	2	2	-	-	-	-	-	2	-	-	3	-	-
3	2	1	-	-	-	-	-	-	-	2	-	-	2	-	-
4	2	1	-	-	-	-	-	-	-	2	-	-	2	-	-
5	2	1	-	-	-	-	-	-	-	2	-	-	2	-	-
6	2	1	-	-	-	-	-	-	-	2	-	-	2	-	-
Overall Correlation	2	2	1	1	-	-	-	-	-	2	-	-	2	-	-

23FT061	APPAREL RETAIL MANAGEMENT	L	T	P	C
		2	1	0	3

COURSE OBJECTIVES:

- To enable the students to understand the fundamentals of retailing.
- To acquaint the students for management of apparel retail.
- To enable the students to understand the importance of effective location for retailing.
- To enable the students to understand the importance of atmospherics and space management of retail outlets
- To acquaint the students for planning the retail environment according to the color psychology.

UNIT I	FASHION RETAIL	6+3

Introduction to retail management-characteristics and significance, Types of retailing-single channel and multi-channel, Relationship between retailers and suppliers, Changing trends in retailing. Retail structure and consumer interaction, Emerging forms of retailing.

UNIT II	STORE PLANNING AND RETAIL INFORMATION SYSTEM	6+3

Store planning - utility of planograms, Merchandise planning - line plan and range plan. Retail information system (RIS) -significance, Universal Product code (UPC), Electronic data interchange (EDI), Information gathering and data base management.

UNIT III	COLOUR ORDER SYSTEMS AND COLOUR MEASUREMENT	6+3

Factors influencing colour perception, Colourimeter and Lambert's-Beer's Law, colour scales, reflection, absorption and scattering of light, Kubelka munk theory, colour atlas, colour measurements, spectrophotometry, colour order system - Munsell colour order system, CIE colour system and tri-stimulus values.

UNIT IV	COLOUR MATCHING AND METAMERISM	6+3
Colour matching process, colour match prediction, reflectance and K/S value, relationship between dye concentrations, reflectance values and K/S values, computer colour matching systems and the calculation of colour recipes. Sources of metamerism – types, metamerism index, metamerism test; metamerism in textile and apparel industries. Assessment of colour difference, measuring metamerism standards of test. Metameric failure - cause, effect and resolution.		
UNIT V	**SELECTION OF COLOURS AND COLOR PSYCHOLOGY**	**6+3**
Colour families and colour harmony, colour preference, colour and mood, colour trends and forecasting, colour selection process, colour in fashion and accessories designing. Symbolism of colour, colours associated with religion, psychological effects of colours, use of colour in medicine and therapy, colors in world culture, creating colour schemes and importance of colour in the fashion market place.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Infer on Indian and global retailing
CO2:	Interpret the retail business formats and strategies
CO3:	Outline the importance of effective location for retailing
CO4:	Infer on management of merchandise
CO5:	Outline the benefits of E-commerce business and E marketing
CO6:	Explain about e-business models, design, develop and management and social networking

TEXT BOOKS:	
1	Gibson G. Vedamani., "Retail Management Functional Principles & Practices", Third Edition, Jaico Publishing House, 2003, ISBN -10:81-7992-151-4
2	Martin.M. Pegler., "Visual Merchandising and Display", (fifth edition), Fair Child Publications, 2011, ISBN 10: 1563674459
3	Harvey M.Deitel., Paul J.Deitel., and Kate Steinbuhler., "e-business and e-commerce for managers", Pearson, 2011, ISBN: 0130323640 | ISBN-13: 9780130323644
REFERENCES:	
1	Efraim Turban., Jae K. Lee., David King., Ting Peng Liang., and Deborrah Turban., "Electronic Commerce –A managerial perspective", Pearson Education Asia, 2012, ISBN: 0139752854 / ISBN: 978-0139752858
2	John Fernie, Suzanne Fernie and Christopher Moore, "Principles of Retailing", Reed Elsevier India Private Limited, New Delhi, 2007
3	"Principles of Retailing", Reed Elsevier India Private Limited, New Delhi
4	Ting Peng Liang., and Deborrah Turban, "Electronic Commerce –A managerial perspective", version II, Pearson

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	1	-	-	1	-	-	2	-	2	1	1
2	2	1	-	-	1	-	-	1	-	-	2	-	2	1	1
3	2	1	-	-	1	-	-	1	-	-	2	-	2	1	1
4	2	1	-	-	1	-	-	1	-	-	2	-	2	1	1
5	2	1	-	-	1	-	-	1	-	-	2	-	2	1	1
6	2	1	-	-	1	-	-	1	-	-	2	-	2	1	1
Overall Correlation	2	1	-	-	1	-	-	1	-	-	2	-	2	1	1

23FT062	APPAREL BRAND MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To introduce the concept of brand to the students.
- To enable the students to understand the concept of brand building.
- To introduce the concept of branding strategies to the students.
- To introduce the concept of legal issues in brand management to the students.
- To acquaint the students for building resilient brands.

UNIT I	OVERVIEW OF BRAND MANAGEMENT	9

Significance of branding - brand defined - difference between a Product and a Brand- rationale for building a brand- types of brands - Branding Challenges -Creating a brand- Strategic planning for the brand-Designing brand Identity -Measuring brand personality - Brand Image- Luxury Brands Organizational culture and brand performance - Brand Mantras and Internal branding for a successful brand - Case study.

UNIT II	UNDERSTANDING AND MEASURING BRAND EQUITY	9

Introduction- What is brand equity- Brand equity defined- Need for building brand equity-Steps in building a Brand-Researching for brand equity-Tracking a brand-The brand chain- Research Techniques-Quantitative research techniques applied to branding-Measuring brand equity-Need for measuring brand equity-Methods to measure brand equity-Case Study

UNIT III	UNDERSTANDING CONSUMERS AND MARKETS	9

Consumer behaviour and the role of branding- concept of perception- brand evaluation and perception by customers-Consumer attitude-the Indian Consumer- Model of consumer

decision making Factors affecting consumer behaviour- Brand loyalty and Brand commitment- Factors affecting brand loyalty- Concept of brand positioning- Positioning Defined-Positioning strategy- Guiding principles for positioning-Repositioning- Case Study.		
UNIT IV	**MANAGING BRANDS**	**9**
Branding and the marketing programme- Product Strategy-Pricing Strategy-Distribution Strategy E-branding, Building the brand online-E-business strategy-Marketing and the internet-Branding and marketing communications-Communication options, Personal selling, sales promotions, Events and campaign marketing, Direct Marketing, Publicity and PR, Word of mouth, Internet marketing, Case Study.		
UNIT V	**BUILDING RESILIENT BRANDS**	**9**
Defining branding strategy-Strategies for choosing a brand name-Line extension Category Extension- Brand Sketching- Launching a brand extension- Managing brand architecture- Brand roles in the brand portfolio-Brand relationship spectrum-Managing Brands over time- Brand challenges Reinforcing brands- Brand Revitalization-Brand turn around-Case Study.		
		TOTAL: 45 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Apply knowledge on product and sales	
CO2:	Outline the concept of brand and brand identity	
CO3:	Apply skills for brand building and advertising	
CO4:	Explain the branding strategies and Extension strategies	
CO5:	Summarize the global branding and legal issues	
CO6:	Interpret on challenges of brand reinforcement, revitalization and brand turn around	

TEXT BOOKS:	
1	Brad Van Auken, "Branding", Jaico Publishing House, Mumbai, India, 2010.
2	Mahim Sagar, Deepali Singh, Agrawal DP, Achintya Gupta, "Brand Management", Ane Books India Pvt. Ltd., India, 2009.
REFERENCES:	
1	Harsh V Verma, "Brand Management", Excel Books, New Delhi, India, 2004
2	Gordon T Kendall, "Fashion Brand Merchandising", Fairchild Publications, New York, 2009
3	Deepali Singh, Achintya Gupta, "Brand Management", India, 2010
4	Kevin Lane Keller, "Strategic Brand Management" published on 10 November 1997

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	2	-	-	-	-	-	-	-	3	2	-
2	2	1	-	-	2	-	-	-	-	-	-	-	3	2	-
3	3	2	1	1	2	-	-	-	-	-	-	-	3	2	-
4	2	1	-	-	2	-	-	-	-	-	-	-	3	2	-
5	2	1	-	-	2	-	-	-	-	-	-	-	3	2	-
6	2	1	-	-	2	-	-	-	-	-	-	-	3	2	-
Overall Correlation	3	2	1	1	2	-	-	-	-	-	-	-	3	2	-

23FT063	DIGITAL MARKETING AND E-BUSINESS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To introduce the concept of fashion online business to the students.
- To enable the students to understand fashion online.
- To acquaint the students with online enabling technologies.
- To enable the students to understand e-commerce.
- To introduce the E-Marketing in fashion to students.

UNIT I	INTRODUCTION	9

Fashion and marketing, evolution of digital fashion marketing, marketing channels, digital marketing strategy, building online, social media evolution, fashion marketing communication environment. History of e-commerce, e-commerce vs e-business, unique features of ecommerce technology, commercial use of the internet, growth of the internet mobile and web, e-commerce opportunities for industries.

UNIT II	FASHION ONLINE AND MARKETING	9

Website, search engine, email marketing, online advertising, search and display advertising, online branding, finding an audience, analytics, creating website, traditional approach to promotion, marketing communities. Marketing communities environment, fashion advertising and sales promotion, public relations, personal selling, visual marketing, new directions in marketing, various types of promotion and advertising, strategies

UNIT III	E-COMMERCE BUSINESS	9

Social networking and facebook, Types of e-commerce: business to consumer (B2C), Business to Business (B2B), Consumer to Consumer (C2C), Consumer to Business (C2B), Mobile E Commerce, Social E-Commerce, Local E-Commerce; e-commerce technology, concepts, approaches

UNIT IV	ENABLING TECHNOLOGIES	9
Internet, Mobile internet access, wireless internet, internet access, web, hypertext markups, emails, messaging, search engine, online forum, cookies, streaming media, online social networks, blogs, wikis, mobile applications. E-Security- Networks and website security, risks, site hack, security and e-mail, firewall concept, phishing, dimensions of good e-commerce security		
UNIT V	**ENABLING TECHNOLOGIES**	**9**
Uniqueness of web, satisfying the requirements of website visitors, e-marketing value chain, maintaining a website, online video store, online payment, online marketing, advertising, market research, customer relationship applications, effectiveness of e-advertising, elements of branding, marketing strategy on web		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
	After completion of the course, the students will be able to:
CO1:	Outline of digital fashion marketing evolution
CO2:	Summarize the features of E-commerce technology
CO3:	Explain the social media and digital marketing techniques
CO4:	Interpret E-commerce business and E-marketing
CO5:	Summarize strategic decision using online technology
CO6:	Outline the importance of online marketing and E-advertising

TEXT BOOKS:	
1	Kenneth C. Laudon, Carol Guercio Traver, E-Commerce 2016: Business, Technology, Society, Pearson; 12 edition, 2016
2	Clare Harris, The Fundamentals of Digital Fashion Marketing, Bloomsbury Visual Arts, 2017.

REFERENCES:	
1	David Whiteley, E - Commerce: Strategy, Technologies and Applications, McGraw Hill Education, 2017

2	Henry Chan (Author), Raymond Lee (Author), Tharam Dillon (Author), Elizabeth Chang, E Commerce: Fundamentals and Applications, Wiley; 1 edition 2007
3	Wendy K. Bendoni , Social Media for Fashion Marketing: Storytelling in a Digital World, Bloomsbury Visual Arts, 2017
4	Mike Easey, Fashion Marketing, Wiley; 3rd Edition edition, 2009

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	3	-	-	-	2	2	2	3	2	3	-
2	2	1	-	-	3	-	-	-	2	2	2	3	2	3	-
3	2	1	-	-	3	-	-	-	2	2	2	3	2	3	-
4	2	1	-	-	3	-	-	-	2	2	2	3	2	3	-
5	2	1	-	-	3	-	-	-	2	2	2	3	2	3	-
6	2	1	-	-	3	-	-	-	2	2	2	3	2	3	-
Overall Correlation	2	1	-	-	3	-	-	-	2	2	2	3	2	3	-

23FT064	FASHION PHOTOGRAPHY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To develop knowledge on photographic techniques.
- To enable the students to understand the theory of light.
- To enable the students to understand camera systems.
- To be able to exhibit the aesthetic appeal of fashion.
- To acquaint the students the sequence of fashion photography.

UNIT I	BASICS OF PHOTOGRAPHY	9

Introduction to photography, history, photographic careers, Black and White photography, colour Lighting photography, still and video photography. Composition - structure, balance, dynamics. Line - texture, shape, motion, perspective.

UNIT II	THEORY OF LIGHT	9

Theory of light, behaviour of light, light sources, intensity of light, different weather conditions. Methods and techniques of lighting. Indore lighting - types, techniques and flash lighting. Outdoor lighting - natural source and the sun. Studio photography. Exposure and it controls.

UNIT III	CAMERA SYSTEMS	9

Camera types - simple, compact, rangefinder, twin-lens reflex, single-lens reflex and technical cameras, special-purpose cameras, automatic cameras. Camera lenses - types, modern camera lances, wide-angle lenses, long-focus lenses, zoom and varifocal lenses. Camera accessories. Care and maintenance of camera.

UNIT IV	CAMERA FEATURES AND DIGITAL CAMERA	9

Shutter system, Aperture, focusing systems, ISO, camera shake and image stabilization, Exposure metering systems, flash synchronization, focal length, f-stop, angle of view and perspective, f-stop balancing, depth of field. Digital still cameras - types and architecture. Digital cameras features - imaging optics,

image sensor, shutter systems, speed and sensitivity colour capture, auto-exposure, autofocus control, noise, sharpness, resolution, displays, digital image file formats, image storage and archiving.		
UNIT V	**DIGITAL CAMERAS**	**9**
Model Portfolio Shoot digital colour reproduction, image compression. Scanners - types, characteristics. Digital printing and materials - Printing technologies, printing media, colour, resolution and output Effects images, Portraits photography - formal, fashion portrait gallery, location, capturing character, taking outdoors and indoor, black and white photos, theme and dramatic photos, photographing fashion sequences.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
	After completion of the course, the students will be able to:
CO1:	Interpret on digital marketing strategies and websites for advertising
CO2:	Explain the plan marketing through traditional approach and modern approach
CO3:	Outline the branding strategies
CO4:	Explain camera purpose in digital market
CO5:	Identify and choose the suitable camera type, lenses and lighting
CO6:	Develop image editing techniques

TEXT BOOKS:	
1	Bruce Smith, Fashion Photography: A Complete Guide to the Tools and Techniques of the Trade, Potter/Ten Speed/Harmony Publisher, 2018
2	Scott Kelby, The Digital Photography Book, Peachpit press, 2nd edition, 2013

REFERENCES:	
1	Daniel Lezano, — Photography Bible, Fw Media, 3rd edition, 2013

2	Simon Joinson, — Get the most from your Digital Camera, A David and Charles Book., United Kingdom, 2011
3	Elizabeth Allen, Sophie Triantaphillidou, The Manual of Photography, Tenth Edition, Elsevier, 2011.
4	Michael Freeman, Manual of Indoor Photography, Ziff Davis World, August 1983

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	3	1	-	-	-	-	-	-	2	3	-
2	2	1	-	-	3	1	-	-	-	-	-	-	2	3	-
3	2	1	-	-	3	1	-	-	-	-	-	-	2	3	-
4	2	1	-	-	3	1	-	-	-	-	-	-	2	3	-
5	3	2	1	1	3	1	-	-	-	-	-	-	3	3	-
6	3	2	1	1	3	1	-	-	-	-	-	-	3	3	-
Overall Correlation	3	2	1	1	3	1	-	-	-	-	-	-	3	3	-

23FT065	DIGITAL FASHION AND BRANDING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students to understand the target market for marketing.
- To realize the importance of media in promotion.
- To provide knowledge about various types of advertising.
- To acquaint the students on promotion and brand dynamics.
- To enable the students to understand the communication in advertising and marketing.

UNIT I	FUNDAMENTALS OF FASHION BRANDING	9

Brand – definition, characteristics, value and importance in marketing; Branding Concept- Building brand awareness, brand communication, brand personality, brand image and brand identity, brand equity, brand positioning, brand gap.

UNIT II	DEVELOPMENT OF BRAND AND BRAND PERCEPTION	9

Fashion branding Elements and its types– Brand name decision, Logo, Symbol, Abstract marks, Emblems, Dynamic marks, Characters; Co-branding, Corporate branding; Trends and Challenges in Fashion Branding; National Fashion Brands vs International Fashion Brands Fashion brand perception and target market - Local brand, Premium brand, Luxury brand; Range of International brands for different gender.

UNIT III	BRAND ADVERTISEMENT MODEL	9

Brand Advertisement - goals, AIDA model, DAGMAR model; Media strategy: advertising types of billboards, advertising campaigns, advertising photography and others; Importance of communication in Advertising.

UNIT IV	PROMOTION AND BRAND DYNAMICS	9

Promotion – types, segmentation and value proposition; Advertising message: message objectives, recall, attitude,

emotions and feelings; Fashion Brand Personality and Advertising Responses – Building Fashion Brand Personality via Advertisement.		
UNIT V	**COMMUNICATION IN ADVERTISING AND MARKETING**	**9**
Role of communication in Advertising and Marketing - Target Customers - Media Communication Strategy and Tactics; Preparing a Communication Plan – Types: Video, Audio, Print Media, Out-off Home Media, Search Engine Marketing, Sales Promotion, Media and Campaign Measurement.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Develop digital marketing strategies and websites for advertising
CO2:	Plan marketing through traditional approach and modern approach
CO3:	Choose the branding strategies
CO4:	Explain social media and digital marketing techniques
CO5:	Explain strategic decisions using online technology
CO6:	Outline the importance of online marketing and E advertising

TEXT BOOKS:	
1	Kenneth C. Laudon, Carol Guercio Traver, E-Commerce 2016: Business, Technology, Society, Pearson; 12 edition, 2016
2	Clare Harris, The Fundamentals of Digital Fashion Marketing, Bloomsbury Visual Arts, 2017.

REFERENCES:	
1	David Whiteley, E - Commerce: Strategy, Technologies and Applications, McGraw Hill Education, 2017

2	Henry Chan (Author), Raymond Lee (Author), Tharam Dillon (Author), Elizabeth Chang, E Commerce: Fundamentals and Applications, Wiley; 1 edition 2007
3	Wendy K. Bendoni , Social Media for Fashion Marketing: Storytelling in a Digital World, Bloomsbury Visual Arts, 2017
4	Mike Easey, Fashion Marketing, Wiley; 3rd Edition edition, 2009

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	3	-	-	-	2	2	2	3	2	3	-
2	3	2	1	1	3	-	-	-	2	2	2	3	2	3	-
3	2	1	-	-	3	-	-	-	2	2	2	3	2	3	-
4	2	1	-	-	3	-	-	-	2	2	2	3	2	3	-
5	2	1	-	-	3	-	-	-	2	2	2	3	2	3	-
6	2	1	-	-	3	-	-	-	2	2	2	3	2	3	-
Overall Correlation	3	2	1	1	3	-	-	-	2	2	2	3	2	3	-

VERTICAL 6: APPAREL MANUFACTURING

23FT066	COMPUTER APPLICATIONS IN APPAREL MANUFACTURING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the role and importance of computer in apparel industry.
- To provide the knowledge about the CAD in textile and apparel product design.
- To acquaint about the computer-controlled 3D garment design and modelling techniques.
- To enable the knowledge about the sizing and fabric drape.
- To acquire knowledge about the 3D technologies for virtual garmenting.

UNIT I	INTRODUCTION TO COMPUTER TECHNLOGIES	9

Introduction to terminology – CAM, CAD, CIM, EDI, CAA, block chain, artificial intelligence, expert system, E-proto typing, rapid prototyping; techniques for 3D garment design - sketch-based garment design, surface flattening for virtual garments; Online garment shopping system: problems and solutions.

UNIT II	COMPUTER AIDED TEXTILE DESIGN SOFTWARE	9

Features and modules of textile designing software – image editing, woven, knits, embroidery; digital printing technology for textiles and apparel; computerized colour matching.

UNIT III	COMPUTER AIDED GARMENT DESIGN AND MANUFACTURING SOFTWARE	9

Application of computers in each stage of apparel design - market research, fashion tend forecasting, fashion and garment designing-illustration software, pattern making, grading, marker making, laying & spreading, fabric defect checking, cutting, ticketing and

assembling, production planning, production systems, warehouse, ERP and MIS, retail and EXIM procedures.		
UNIT IV	**ADVANCEMENTS IN GARMENT SIZING AND FABRIC DRAPE**	**9**
Apparel sizing and garment fit - key issues, technological advancements in virtual fitting; digital body measurement techniques, virtual measurements, AI powered body measuring; 3D body scanning types- light based, laser based, sound wave and microwave-based systems; modelling fabric and garment drape- geometrical and physical, 2D and 3D garment drape modelling. Tools and features of virtual garmenting software used to evaluate clothing fit.		
UNIT V	**3D TECHNOLOGIES FOR VIRTUAL GARMENTING**	**9**
Model development, Simulation of garment appearance based on fabric construction, technologies of human body modelling in 3D, development of the body surface, animation, generic vs. individualized body models, applications of 3D human body modelling, virtual try on technologies in apparel Retailing.		
		TOTAL: 45 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Explain computer based systems and technologies used in apparel manufacturing.	
CO2:	Outline the features available in textile design software.	
CO3:	Outline the features available in garment design software.	
CO4:	Summarize the features available in garment manufacturing software.	
CO5:	Summarize technologies available for 3D body scanning technologies fabric drape and garment fit.	
CO6:	Explain 3D modelling and virtual garmenting features for apparel and human body modelling.	

TEXT BOOKS:	
1	Jinlian Hu, "Computer Technology for Textiles and Apparel", Woodhead Publishing, 2011.
2	M.Stott, "Pattern Cutting for Clothing using CAD", Woodhead Publishing, 2012.
REFERENCES:	
1	Inga Dabolina, AusmaVilumsone, "The Role of the Latest Clothing CAD/CAM SystemApplications in the Educational Process", Material Science. Textile and Clothing Technology, Vol.7, pp. 63-68, 2012.
2	Joyce AdwoaOppong, Eunice Antiaye and Vivian Biney-Aidoo, "Appraising the Use of Computer Technology in Garment Production Firms in Accra/Tema Metropolis", Arts and Design Studies, Vol.17, pp. 25 – 33, 2014.
3	Fan J, Yu W, and Hunter L., "Clothing Appearance and Fit: Science and Technology", Wood head Publishing Limited, 2004.
4	Edited by Catherine Fairhurst, "Advances in Apparel Production", Woodhead Publishing Ltd, 2008.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	3	-	-	1	2	-	2	2	2	3	1
2	2	1	-	-	3	-	-	1	2	-	2	2	2	3	1
3	2	1	-	-	3	-	-	1	2	-	2	2	2	3	1
4	2	1	-	-	3	-	-	1	2	-	2	2	2	3	1
5	2	1	-	-	3	-	-	1	2	-	2	2	2	3	1
6	2	1	-	-	3	-		1	2	-	2	2	2	3	1
Overall Correlation	2	1	-	-	3	-	-	1	2	-	2	2	2	3	1

23FT067	ADVANCED TECHNOLOGIES AND AUTOMATIONS FOR APPAREL INDUSTRY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To impart knowledge on automations in fabric inspection.
- To provide knowledge on spreading and cutting.
- To enable the students to understand the materialhandling.
- To acquire knowledge about the production systems automation.
- To enable the understanding about the applications of artificial intelligence in apparel industry.

UNIT I	INTRODUCTION TO AUTOMATIONS IN MANUFACTURING	9

Introduction to automations in manufacturing; global scenario of automation- requirements and fundamentals; various automation systems and technologies in apparel manufacturing; prerequisites for adopting automation in garment manufacturing; advantages and challenges faced during and after adoption of automation; Case studies.

UNIT II	ADVANCED ALTERNATIVE TECHNOLOGIES FOR SEWING GARMENTS	9

Seamless technologies: seamless techniques and seamless knitting machine, 3D seamless knitting, application of seamless garments; advancements in technologies for fabric joining, seam sealing, welding technology, bonding, methods of joining fabrics to accessories; applications, advantages and disadvantages.

UNIT III	AUTOMATIONS IN SEWING OPERATIONS	9

Automation and Robotics for sewing; 3D sewing operations using sewing automats; Sewing preparatory machines with automatic control system; applications of sewing automats for various garment constructions; challenges associated with sewing operations automation.

UNIT IV	AUTOMATIONS IN MATERIAL HANDLING AND PRODUCTION SYSTEMS	9
Automations in material handling; gripping technologies for textile material handling; conveyor systems and digital tracking - ETON systems. Automation in sewing machines – under bed trimmers, bobbin changers; automation in pressing and fusing; automation in garment inspection and packing.		
UNIT V	**APPLICATIONS OF ARTIFICAL INTELLIGENCE IN APPAREL INDUSTRY**	**9**
Introduction to artificial intelligence (AI) – neural networks (NN), fuzzy logic (FL), genetic algorithm (GA), evolution strategy (ES), artificial immune system (AIS) and multi-agent system (MAS); application of AI in garment designing, production planning, manufacturing, inspection, supply chain and retail. Challenges and future trends.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Summarize apparel industry and automations in manufacturing.
CO2:	Choose the right alternative technologies for sewing.
CO3:	Infer the automations in sewing operations.
CO4:	Summarize automations in material handling.
CO5:	Summarize the Automations in production systems.
CO6:	Summarize the applications of AI in apparel industry.

TEXT BOOKS:	
1	Rajkishore Nayak and Rajiv Padhye, "Automations in Apparel Manufacturing", Woodhead Publishing, 2018.
2	M.Stott, "Pattern Cutting for Clothing using CAD", Woodhead Publishing, 2012.

REFERENCES:	
1	Norsaadah Zakaria, "Digital Manufacturing Technology for Sustainable Anthropometric Apparel", The Textile Institute Book Series, 2022.
2	Spencer, D. J., Knitting technology: A comprehensive hand-book and practical guide (3rd Ed.). Cambridge, England; Lancaster, Pa.: Woodhead Publishing Limited, 2001.
3	Petrie, Edward M. Handbook of adhesives and sealants. McGraw-Hill Education, 2007.
4	Jones IA, Wise RJ. Novel joining methods applicable to textiles and smart garments. InWearable Futures Conference, University of Wales, Newport, Wales 2005 Sep (pp. 14- 16).

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	3	1	2	1	1	-	2	-	2	3	1
2	3	2	1	1	3	1	2	1	1	-	2	-	3	3	1
3	2	1	-	-	3	1	2	1	1	-	2	-	2	3	1
4	2	1	-	-	3	1	2	1	1	-	2	-	2	3	1
5	2	1	-	-	3	1	2	1	1	-	2	-	2	3	1
6	2	1	-	-	3	1	2	1	1	-	-	-	2	3	1
Overall Correlation	3	2	1	1	3	1	2	1	1	-	2	-	3	3	1

23FT068	LEAN MANUFACTURING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the knowledge of concepts and tools in lean manufacture.
- To acquaint about the application of lean concepts and tools in manufacturing process.
- To provide the knowledge about the Six Sigma concepts for product and process control.
- To acquire knowledge about the TQM tools and techniques.
- To enable the students to understand the concepts of JIT, TPM, 5S Concepts.

UNIT I	INTRODUCTION TO LEAN MANUFACTURING	9

Conventional manufacturing versus lean manufacturing – principles of lean manufacturing – basic elements of lean manufacturing – introduction to LM Tools. cellular manufacturing – types of layout, principles of cell layout, implementation.

UNIT II	JIT, TPM, 5S CONCEPTS	9

JIT – principles of JIT and implementation of Kanban. Application of KANBAN Cards for production planning and control for traceability and identification. continuous improvement – application of KAIZEN in reducing rejections. TPM – pillars of TPM, principles and implementation of TPM. 5S principles and implementation – value stream mapping – procedure and principles.

UNIT III	LEAN CONCEPTS IN INVENTORY CONTROL	9

Lean concepts applied in transparent flow of information and production between processes and customers. Takt time – calculation of time for producing exactly quantity required.

Reduction of inventory using simple Economic Order Quantity (EOQ) and Batch Production Models.		
UNIT IV	**TQM TOOLS AND TECHNIQUES**	**9**
The seven traditional tools of quality, New management tools, and Six sigma: concepts, methodology, applications to manufacturing, service sector including IT, bench marking, reason to bench mark, bench marking process, FMEA, stages and types. Quality circles, Quality Function Deployment (QFD), Taguchi quality loss function, concepts, improvement needs, cost of quality, performance measures.		
UNIT V	**SIX SIGMA**	**9**
Six Sigma – definition, statistical considerations, variability reduction, design of experiments – Six Sigma implementation.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
	After completion of the course, the students will be able to:
CO1:	Explain the principles and elements of lean manufacture.
CO2:	Apply JIT and TPM concepts in garment industry.
CO3:	Outline on the 5S concepts used in garment industry.
CO4:	Apply lean concepts and tools in inventory and production control.
CO5:	Infer the TQM tools and techniques.
CO6:	Apply Six Sigma concepts for manufacturing and process control.
TEXT BOOKS:	
1	Rajmanohar T P, "Lean Product Development: Concept and Models", ICFAI Press, 2009.
2	Desai, Aruna, "Lean manufacturing: Perspectives and Applications", ICFAI Press, 2008.
REFERENCES:	
1	Ronald G. Askin& Jeffrey B, "Design and Analysis of Lean Production Systems", Goldberg,John Wiley & Sons, 2003.

2	Gopalakrishnan N, "Simplified Lean Manufacture: Elements, Rules, Tools and Implementation",Prentice Hall of India Learning Pvt. Ltd., 2010.
3	Rother M. and Shook J, "Learning to See: Value Stream Mapping to Add Value and Eliminate Muda", Lean Enterprise Institute, Brookline, MA, 1999.
4	Dale H.Besterfiled, "Total Quality Management", Pearson Education Asia.

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	3	-	-	3	2	2	1	-	2	2	3
2	3	2	1	1	3	-	-	3	2	2	1	-	3	2	3
3	2	1	-	-	3	-	-	3	2	2	1	-	2	2	3
4	3	2	1	1	3	-	-	3	2	2	1	-	3	2	3
5	2	1	-	-	3	-	-	3	2	2	1	-	2	2	3
6	3	2	1	1	3	-	-	3	2	2	1	-	3	2	3
Overall Correlation	3	2	1	1	3	-	-	3	2	2	1	-	3	2	3

23FT069	SUPPLY CHAIN MANAGEMENT FOR APPAREL INDUSTRY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To provide an insight on the fundamentals of supply chain networks.
- To acquire knowledge about the tools and techniques used.
- To enable the knowledge about logistics in supply chain.
- To acquaint about the sourcing and coordination in supply chain.
- To provide knowledge about the supply chain and information technology.

UNIT I	INTRODUCTION	9

Role of logistics and supply chain management: scope and importance- evolution of supply chain–decision phases in supply chain - competitive and supply chain strategies–drivers of supply chain performance and obstacles.

UNIT II	SUPPLY CHAIN NETWORK DESIGN	9

Role of distribution in supply chain–factors influencing distribution network design–design options for distribution network distribution network in practice-role of network design in supply chain–framework for network decisions.

UNIT III	LOGISTICS IN SUPPLY CHAIN	9

Role of transportation in supply chain–factors affecting transportations decision–design option for transportation network–tailored transportation – routing and scheduling in transportation.

UNIT IV	SOURCING AND COORDINATION IN SUPPLY CHAIN	9

Role of sourcing supply chain supplier selection assessment and contracts- design collaboration- sourcing planning and analysis-

supply chain co-ordination-bull whip effect–effect of lack of co-ordination in supply chain and obstacles–building strategic partnerships and trust within a supply chain.		
UNIT V	**SUPPLY CHAIN AND INFORMATION TECHNOLOGY**	**9**
The role IT in supply chain-The supply chain IT frame work customer relationship management– internal supply chain management–supplier relationship management–future of IT in supply chain–E-business in supply chain.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Explain basics of logistics and supply chain Management.
CO2:	Outline the framework and scope of supply chain networks.
CO3:	Relate the importance of logistics in supply chain.
CO4:	Relate the role of sourcing in supply chain.
CO5:	Extend the role of coordination in supply chain.
CO6:	Outline the role of information technology in supply chain.

TEXT BOOKS:	
1	Sunil Chopra, Peter Meindl and Kalra, "Supply Chain Management, Strategy, Planning, and operation", Pearson Education, 2010.
2	David Simchi-Levi., Philip Kaminsky., and Edith Simchi-Levi., "Designing and Managing the Supply Chain: Concepts, Strategies, and Cases", 3rd Edition, Tata McGraw-Hill, 2012, ISBN: 0073341525 / ISBN: 978-0073341521.

REFERENCES:	
1	David J.Bloomberg , Stephen Lemay and Joe B.Hanna, "Logistics", PHI 2002.
2	James B.Ayers, "Handbook of Supply chain management", St.Lucle press, 2000.
3	Jeremy F.Shapiro, "Modeling the supply chain", Thomson Duxbury, 2002.

4	Srinivasan G.S, "Quantitative models in Operations and Supply Chain Management", PHI, 2010.

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	2	3	3	2	2	3	1	1	2	2	2
2	2	1	-	-	2	3	3	2	2	3	1	1	2	2	2
3	2	1	-	-	2	3	3	2	2	3	1	1	2	2	2
4	2	1	-	-	2	3	3	2	2	3	1	1	2	2	2
5	2	1	-	-	2	3	3	2	2	3	1	1	2	2	2
6	2	1	-	-	2	3	3	2	2	3	1	1	2	2	2
Overall Correlation	2	1	-	-	2	3	3	2	2	3	1	1	2	2	2

23FT070	SOCIAL COMPLIANCES AND QUALITY ASSURANCE IN APPAREL INDUSTRY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To impart knowledge on the concepts of social compliance.
- To provide insight on compliance norms for apparel manufacture and industry.
- To impart knowledge on concepts of ethical trading and international compliance for apparel Business.
- To enable insight on health and environment compliance.
- To provide knowledge on wage compliance.

UNIT I	SCOPE AND NEED OF SOCIAL COMPLIANCE	9

Social compliance - concept, need, benefits for industry, workers, society. Social accountability and corporate social responsibility - scope and need. Social compliance in supply chain management.

UNIT II	GENERAL NORMS ON LABOUR AND SAFETY	9

Conventions on discrimination, forced labour, child labour-direction and risk in the supply chain. ILO convention on child labour, worst Form of child labour, hazardous child labour, environment and climate, health and safety–safety norms and measures to been forced for safe working environment., working hours-norms, remuneration-minimum wages conventions on Acquired Immune Deficiency Syndrome (AIDS) and gender.

UNIT III	HEALTH AND ENVIRONMENT COMPLIANCE	9

Minimum age Convention, freedom of association, collective bargaining, corruption and bribery– effect and risk in the supply chain. Global Reporting Initiatives (GRI) sustainability reporting guide line. Organization for Economics Co-operation and Development (OECD) guide lines for multinational discrimination.

UNIT IV	**WAGE COMPLIANCE**	**9**
Freedom of association, collective bargaining agreements-C87,C98–ILO compensation–norms applicable in India. Working hours–code of conduct.		
UNIT V	**ETHICAL TRADING AND INTERNATIONAL COMPLIANCE**	**9**
Ethical Trading Initiative (ETI). Basic code of labour practice. Worldwide Responsible Apparel Production (WRAP) purposes, WRAP principle, certification process, SA8000. National and international regulating organizations – OSHA, WRAP, GOTS, OEKO TEX. Corporate Social Responsibility (CSR) – mandatory requirements – benefits to company, labour and society.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Explain the concepts of social compliance and its importance in the apparel industry.
CO2:	Interpret the general norms on labour and safety.
CO3:	Interpret health and environment compliance in apparel industry.
CO4:	Infer wage compliance norms for the industry.
CO5:	Relate and practice concepts of ethical trading in apparel business.
CO6:	Relate the international compliance required for apparel business.

TEXT BOOKS:	
1	RajeshChhabara, "Social Accountability", AvasoftechPvt.Ltd.,2005.
2	Rebocak Leifziger, "SA 8000: The first decade", Greech Leaf Publishers, May2009.

REFERENCES:	
1	Venkatesh Selvaraj, "Handbook for social compliance audit: a step by step approach", Kindle Store, 2021.
2	Muhammad Azizul Islam, "Social Compliance Accounting", Springer

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3
2	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3
3	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3
4	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3
5	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3
6	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3
Overall Correlation	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3

23FT071	ERP AND MIS IN APPAREL INDUSTRY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To provide clear insights about ERP and MIS packages.
- To understand the importance of information system in textile/apparel.
- To impart insight on implementation process of ERP.
- To provide basic knowledge about the benefits and latest developments.
- To enable the understanding about information system.

UNIT I	INTRODUCTION TO ERP	9

Enterprise Resource Planning (ERP) - needs and benefits of ERP, life cycle of ERP, growth of ERP, technology behind ERP, software design and development, desktop based ERP and web based ERP, security in ERP, functioning of ERP, workflow and notifications, ERP related.

UNIT II	MODULES IN ERP FOR APPAREL INDUSTRY	9

Process flow in an apparel company, technical and commercial modules in ERP, workflow in ERP for apparel, process flow in ERP for apparel industry; ERP system: Introduction, finance, plant maintenance, quality management, materials management, human resource, resource management, sales and distribution.

UNIT III	IMPLEMENTING ERP	9

Selecting right ERP - Process of evaluation and selection, choosing various vendors for evaluation, comparing and shortlisting solutions, solution selection and negotiation, business process study, implementation, post implementation.

UNIT IV	BENEFITS AND LATEST DEVELOPMENTS	9

Benefits of textile and apparel sector using ERP, reports in ERP, workflow and notification in ERP, maximum utilization of ERP;

latest developments in ERP: ERP II - functions of ERP II, Customer Relationship Management-Enterprise Resource Planning (CRM-ERP) integration, business intelligence-Enterprise Resource Planning (BI-ERP) integration, Supply chain management-Enterprise Resource Planning (SCM-ERP) integration, Product life cycle management- Enterprise Resource Planning (PLM-ERP) integration.		
UNIT V	**INFORMATION SYSTEM AND ITS APPLICATION IN BUSINESS**	**9**
Introduction to Management Information System (MIS), framework for MIS, information need and its economics, system approach, definition and objectives of MIS, approaches of MIS development, computer based MIS, information systems planning and development, implementing information systems, information security management.		
		TOTAL: 45 PERIODS
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Outline an overview on the ERP.	
CO2:	Interpret the workflow and process flow of an apparel industry.	
CO3:	Choose the modules required in an ERP for an apparel industry(K3).	
CO4:	Outline the implementation process of an ERP.	
CO5:	Summarize the latest developments in ERP.	
CO6:	Outline the importance of information systems for business.	
TEXT BOOKS:		
1	R. Surjit, R. Rathinamoorthy, K. J. Vishnu Vardhini, ERP for Textiles and Apparel Industry (Woodhead Publishing India in Textiles), WPI Publishing; 1 edition, 2016.	
2	A. K Gupta, Management Information System, IBH Publishing, 2012.	

REFERENCES:	
1	Tsan-Ming Jason Choi Professor , Information Systems for the Fashion and Apparel Industry (Woodhead Publishing Series in Textiles), Woodhead Publishing, 2016.
2	Girdhar Joshi, Management Information Systems 1st Edition, Oxford University Press, 2013.
3	Paul Bocij, Andrew Greasley, Simon Hickie, Business Information Systems, Technology, Development and Management for the E-Business, Pearson; 5th edition, 2014.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3
2	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3
3	3	2	1	1	-	3	3	3	1	2	2	3	3	-	3
4	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3
5	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3
6	2	1	-	-	-	3	3	3	1	2	2	3	2	-	3
Overall Correlation	3	2	1	1	-	3	3	3	1	2	2	3	3	-	3

23FT072	OPERATION RESEARCH IN APPAREL INDUSTRY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To gain knowledge about the research operation in the apparel industry
- To enable knowledge about implementation of research operation in the apparel industry.
- To impart insight on the inventory control.
- To gain knowledge about the export documentation.
- To provide the insights on the policy and institutional framework for exports.

UNIT I	OPERATIONS RESEARCH	9

Origin of operation research, historical standpoint, methodology, different phases, characteristics, scope and application of operations Research. Linear programming problem: introduction, requirement of LP, basic assumptions, formulation of LP, general statement of LP, solution techniques of LP: graphical methods, analytical methods.

UNIT II	INVENTORY CONTROL	9

Inventory classification, different cost associated to inventory, economic order quantity, ABC analysis. Models of inventory, operation of inventory system, quantity discount. Replacement, replacement models: equipment that deteriorate with time, equipment that fails with time.

UNIT III	EXPORT DOCUMENTATION	9

Importance of export/import documentation, terms of payment: letter of credit - documentary collection - open account. Terms of shipments- inco terms - essential elements of an export contract, freight forwarders power of attorney, shippers letter of instructions, different types of invoices, bills of lading, VOC and NVOCCs, packing list, inspection certificates, dock and warehouse

receipts, letters of credit, electronic export information, air cargo security and C-TPAT, negotiation of documents - action in the event of discrepancies. Online documentation.		
UNIT IV	**EXPORT-IMPORT PROCEDURE**	**9**
Steps in export procedure- export contract - forward cover -export finance -institutional framework for export finance- excise clearance - pre-shipment inspection - methods of pre shipment inspection - marine insurance - role of clearing and forwarding agents - shipping and customs formalities - customs EDI system - negotiation of documents.		
UNIT V	**POLICY AND INSTITUTIONAL FRAMEWORK FOR EXPORTS**	**9**
Foreign trade policy - highlights - special focus initiatives - duty drawback - deemed exports - ASIDE - MAI & MDA - EPCG Scheme - incentives for exporters. Apparel export promotion councils and their role - commodity boards - FIEO - IIFT - EOUs - SEZs - ITPO - ECGC - EXIM bank.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Summarize the scope and application of operations research and their linear programming.
CO2:	Apply the concepts of inventory in the apparel industry.
CO3:	Explain the concepts of merchandising and new product development.
CO4:	Explain the steps in the export procedure role of clearing and their following agents.
CO5:	Explain the export documentation and policies.
CO6:	Outline the methods and foreign trade policy.

TEXT BOOKS:	
1	Gibson G. Vedamani, "Retail Management Functional Principles and Practices", Jaico Publishing House, Second Edition,2002.
2	Ruth E. Glock, Grace I. Kunz "Apparel Manufacturing Sewn Product Analysis" Fourth Edition, Pearson Prentice Hall, NJ, 2005, ISBN: 81-7758-076-0.
REFERENCES:	
1	Hamdy A Taha, Operations Research: An Introduction, Pearson Education/PHI, 8/E, 2007.
2	F S Hillier and G J Lieberman, Introduction to Operations Research, TMH, 8/E, 2006.
3	M. I. Mahajan, Export Policy, Procedures and Documentation, Snow-white Publishers, Mumbai, 2007.
4	Nair Suja.R, "Retail Management", Himalaya Publishing House, 2008.

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-
2	3	2	1	1	1	-	-	-	-	1	-	1	3	1	-
3	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-
4	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-
5	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-
6	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-
Overall Correlation	3	2	1	1	1	-	-	-	-	1	-	1	3	1	-

VERTICAL 7: APPAREL BUSINESS MANAGEMENT

23FT073	ENTREPRENEURSHIP IN APPAREL MANUFACTURE	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- The course provides an understanding of the scope of entrepreneurship in apparel.
- To explore business legal frame work
- To understand customers and driving success.
- To facilitate financial planning
- To impart sustainability on entire processing.

UNIT I	HISTORICAL PERCEPTION OF THE FASHION INDUSTRY	9

Fashion and fashion industry, growth of ready to wear, SCM and globalization, fast fashion, ecommerce and Corporate Social Responsibility, the entrepreneurial profile, a time for fashion entrepreneurs, fashion trends to entrepreneurial opportunities. Business planning, planning for success, inspiration and ingenuity, strategic sourcing, pricing the product, commerce checklist, business cards and websites.

UNIT II	BUSINESS AND LEGAL FRAMEWORK	9

Business organization, ownerships - sole proprietorships, partnerships, corporation, limited liability companies, terms associated with company expansion and diversification, entrepreneurship - starting own business, forms of competition, laws affecting companies in the fashion industries, things to be considered while starting a new business.

UNIT III	REACHING CUSTOMERS AND DRIVING SUCCESS	9

Developing a business plan, market research, service, branding, strategies to start up a new business; apparel entrepreneur - factors influencing growth, apparel exports, retails stores, boutiques, job orders designing house, buying house. Marketing strategy, trade

tools, sales period, order, shipping, customer care, advertising, publicity, budget, business plan connection, the management team, building organizational culture, motivating employees, organizational structure, hiring the right employees and advisory team.		
UNIT IV	**FACILITIES AND FINANCIAL PLANNING**	**9**
Importance of finance, financial outcomes, expenses, financial statements, financial planning, accessing capital, analyze the finance, cash flow, operations and facility - space, staff, hours of operation, utilizes and maintenance, security, salary, payroll, operations and vendors		
UNIT V	**SUSTAINABILITY**	**9**
Garment standards, supplier standards, manufacturer standards, material standard, garment lifecycle plan, recyclable standards, logistics plan, packing and presentation of apparel products and product care.		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Summarize the history of fashion and fashion industry.
CO2:	Discuss the importance of planning in business.
CO3:	Develop a business firm considering all the aspect of legal framework.
CO4:	Interpret on reaching customers and driving school.
CO5:	Identify the facilities and financial planning.
CO6:	Infer on sustainability in promoting entrepreneurship.
TEXT BOOKS:	
1	Leslie Davis Burns, Kathy K. Mullet, Nancy O. Bryant, The Business of Fashion: Designing, Manufacturing, and Marketing, Fairchild Books; 5 edition, 2016.
2	Michele Granger, Tina Sterling, Fashion Entrepreneurship: Retail Business Planning, Fairchild Books; 2 edition, 2011

REFERENCES:	
1	Melissa G. Carr, Lisa Hopkins Newell, Guide to Fashion Entrepreneurship - The Plan, the Product, the Process, Fairchild Books, 2014
2	Kacey Phoenix, How to Start a Clothing Line: Make Money with Apparel Kindle Edition, White Owl Publishing, 2015
3	Ana Kristiansson (Author), Klas Kristiansson (Author), Apparel Entrepreneurship: How to Start & Run a Successful Apparel Brand, Sportswear & Co Scandinavia AB, 2018
4	Subramanian Senthilkannan Muthu, Circular Economy in Textiles and Apparel Processing, Manufacturing, and Design 2018 , ISBN: 9780081026304

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	1	-	-	-	2	-	-	-	2	1	-
2	2	1	-	-	2	2	-	2	2	-	-	-	2	2	2
3	3	2	1	1	1	1	2	2	-	-	-	-	3	1	2
4	2	1	-	-	1	1	-	2	-	-	-	-	2	1	2
5	3	2	1	1	1	-	1	3	3	-	-	-	3	1	3
6	2	1	-	-	1	1	1	1	1	-	-	-	2	1	1
Overall Correlation	3	2	1	1	2	1	1	2	2	-	-	-	3	2	2

23FT074	SUSTAINABLE APPAREL BUSINESS MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To introduce sustainability management in textile and apparel organization.
- To focus on corporate sustainability strategy
- To implement strategic planning for sustainable operating system.
- To protect environment by sustainable practices.
- To audit sustainable reports.

UNIT I	INTRODUCTION TO SUSTAINABILITY MANAGEMENT	9

Meaning, definition, dimensions of sustainability, value of sustainability, framework for business sustainability, transformation process model, leadership and sustainable management: Top management strategies for sustainable management.

UNIT II	SUSTAINABILITY OPERATING SYSTEM IN AN ORGANIZATION	9

SOS basics, critical elements of an SOS, structural elements support SOS, SOS standards, sustainability-related management system for apparel industries, SOS process schedule.

UNIT III	STRATEGIC PLANNING FOR A SUSTAINABILITY OPERATING SYSTEM	9

Purpose and benefits of strategic planning by functional groups, general process for sustainability planning in garment industry, pre-planning information and processes, techniques for reaching consensus on priorities, strategic planning formats for apparel divisions: The balanced scorecard and alignment tools, tactical plan.

UNIT IV	ENVIRONMENTAL POLICY AND SUSTAINABILITY MANAGEMENT	9
Framework for understanding environmental policy- values dimension, political dimension, science and technology dimension in apparel industries, policy design dimension and implementation in apparel firm, green supply chain management for apparel products.		
UNIT V	**SUSTAINABILITY REPORTING**	**9**
Sustainability reporting, radical transparency, reasons for transparent reporting, internal reporting, public report. Corporate annual sustainability report, sustainability reporting process frameworks & guidelines: GRIG4, AA1000 SES, greenhouse gas accounting reporting, ISO related reporting.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
	After completion of the course, the students will be able to:
CO1:	Infer on sustainability management.
CO2:	Outline the sustainability operating system.
CO3:	Interpret the purpose and benefits of strategic planning.
CO4:	Discuss the strategic planning formats for apparel divisions.
CO5:	Infer on environmental policy.
CO6:	Explain the sustainability reporting in apparel business.

TEXT BOOKS:	
1	Claudia E. Henninger, Kirsi Niinimäki, Marta Blazquez, Celina Jones "Sustainable Fashion Management" routledge taylor and francis group first edition 2022
2	Fashion Management" routledge taylor and francis group first edition 2022

REFERENCES:	
1	Tsan-Ming Choi (Editor), T. C. Edwin Cheng Sustainable Fashion Supply Chain Management: From Sourcing to Retailing: Springer; Softcover reprint of the origina1st ed.

	2015 edition Stout EE, "Introduction to Textiles", John Wiley and Sons Inc.,.
2	William R. Blackburn The Sustainability Handbook: The Complete Management Guide to Achieving Social, Economic and Environmental Responsibility Routledge; 1st edition (21 December 2015)
3	Subramanian Senthilkannan Muthu, Circular Economy in Textiles and Apparel Processing, Manufacturing, and Design 2018 , ISBN: 9780081026304
4	Richard Blackburn, Sustainable Apparel Production, Processing and Recycling 2015, ISBN: 9781782423393

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	3	3	3	3	-	-	-	-	2	3	3
2	2	1	-	-	3	3	3	3	-	-	-	-	2	3	3
3	2	1	-	-	3	3	3	3	-	-	-	-	2	3	3
4	2	1	-	-	3	3	3	3	-	-	-	-	2	3	3
5	2	1	-	-	3	3	3	3	-	-	-	-	2	3	3
6	2	1	-	-	3	3	3	3	-	-	-	-	2	3	3
Overall Correlation	3	1	-	-	3	3	3	3	-	-	-	-	2	3	3

23FT075	INTERNATIONAL TEXTILE AND APPAREL BUSINESS MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To give the students an exposure on the international market
- To impart knowledge of exports of home textile products.
- To explore the regulations with respect to export and import of textiles.
- To explore international marketing strategy.
- To impart knowledge on EXIM policy.

UNIT I	INTRODUCTION OF EXPORT AND IMPORT	9

International markets for yarns, fabrics; international market for cotton, silk, jute, wool and other fibres; yarns and fabrics; export and import of textiles by India – current status, promotional activities.

UNIT II	EXPORT OF HOME TEXTILE	9

International markets for carpets and home textiles – product types, market potential and statistics, India - status and promotional activities, role of export promotion councils.

UNIT III	INTERNATIONAL RESOURCE	9

International markets for woven piece goods, knitted garments, leather garments; statistics of international apparel market and trade; export incentives, role of AEPC, CII, FIEO, textile committee.

UNIT IV	MARKETING STRATEGY	9

Marketing – strategies, global brand building; logistics & SCM; role of export finances & EXIM banking, Letter of credit, ECGC, Indian council of arbitration, FERA; impact of foreign trade on Indian economy; foreign exchange – Regulation, risk management.

UNIT V	EXIM POLICY	9
Exim policy - customs act, acts relating to export/import of textile and apparel; Indian customs formalities - export documentation for excisable goods, import documentation, clearance of import goods; concepts - 100% exports-oriented units, export processing zones, special economic zones; duty drawback procedure; import/export incentives; licenses; case study		
		TOTAL: 45 PERIODS

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Explain the international market for fibre, yarn and woven fabric
CO2:	Explain the international market for carpets and home textiles.
CO3:	Outline the international markets for woven, knitted and leather garments.
CO4:	Outline the statistics of international apparel market.
CO5:	Infer on marketing strategy.
CO6:	Explain the EXIM policy in textile and apparel business management.

TEXT BOOKS:	
1	Kapoor D.C., "Export Management", Vikas Publishing House Pvt. Ltd., 2009, ISBN: 8125909397 / ISBN: 978-8125909392 .
2	Govindan N.S., "Indirect Taxes Made Easy", C. Sitaraman& Co., 2014, ASIN: B00HYVS32K

REFERENCES:	
1	Charles W.I. Hill., and Arun Kumar Jain., "International Business", 10th Edition, Tata McGraw Hill, 2014, ISBN: 007811277X / ISBN: 978-0078112775.
2	John D. Daniels., and Lee H. Radebaugh., "International Business", 15th Edition, Pearson Education Asia, New Delhi, 2014, ISBN: 0133457230 / ISBN: 978-0133457230.

3	Aswathappa K., "International Business", 6th Edition, Tata McGraw Hill, 2015, ISBN: 933922258X / ISBN: 978-9339222581.
4	Michael R. Czinkota., Ilkka A. Ronkainen., and Michael H.,Moffet, "International Business",8th Edition, Wiley, 2010, ISBN: 0470530650 / ISBN: 978-0470530658

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-
2	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-
3	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-
4	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-
5	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-
6	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-
Overall Correlation	2	1	-	-	1	-	-	-	-	1	-	1	2	1	-

23FT076	ENERGY MANAGEMENT IN APPAREL INDUSTRY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students, understand the importance of saving energy, auditing, Consumption analysis
- To promote energy efficient technologies and alternate energy sources.
- To impart energy management audit process.
- To know the energy development technologies.
- To explore the non-conventional energy resources.

UNIT I	ENERGY MANAGEMENT AND CONSERVATION	9

Concept of energy management - need for energy conservation - Demand - Supply Management. Global Energy Concerns: Global energy conservation scenario – energy conservation measures in India. United Nations Framework on sustainable development, Kyoto Protocol.

UNIT II	ENERGY MANAGEMENT AND AUDIT	9

Hours definition of energy audit, need and types of energy audit, energy audit instruments. Understanding energy costs, benchmarking energy performance, matching energy use to requirement, basic principles for optimizing the input energy requirements. Energy management department - Top management support, managerial function, roles and responsibilities of energy manager, accountability. Energy monitoring and control: Cumulative Sum of Differences (CUSUM) of energy production and consumption, Energy production and consumption monitoring and control, elements for monitoring, data analysis and control.

UNIT III	ENERGY CONSUMPTION ANALYSIS	9

Methods for energy consumption analysis. Analysis for apparel manufacturing machineries and finishing equipments. Cost of energy Vs sales value of apparel product. Energy conservation in

factory: energy saving opportunities with energy efficient motors. Factors affecting the electrical energy performance and energy saving opportunities. Factors affecting refrigeration and air conditioning system performance and saving opportunities. Lighting system - Light source, choice of lighting, luminance requirements, and energy conservation avenues. Diesel generating system - Factors affecting selection, diesel energy conservation avenues. Waste heat recovery - classification of waste heat. Source of waste heat in apparel industry. Commercially viable waste heat recovery devices, saving potential.		
UNIT IV	**DEVELOPMENTS IN ENERGY EFFICIENT TECHNOLOGIES**	**9**
Maximum demand controllers, automatic power factor controllers, energy efficient motors, soft starters with energy saver, variable speed drives, energy efficient transformers, electronic ballast, and energy efficient lighting controls.		
UNIT V	**APPLICATION OF NON-CONVENTIONAL ENERGY SOURCES**	**9**
Scope of application of non-conventional energy - Solar energy: different types of collectors – photovoltaic cells. Wind energy, Bio energy, environmental impact on energy and co-generation by using different techniques.		
TOTAL: 45 PERIODS		
COURSE OUTCOMES:		
After completion of the course, the students will be able to:		
CO1:	Summarize the energy management and conservation.	
CO2:	Outline the energy management and audit.	
CO3:	Infer on various methods for energy consumption	
CO4:	Explain the factors influencing energy consumption.	
CO5:	Interpret on the various developments in energy efficient technologies.	
CO6:	Outline the various means of non-conventional energy sources.	

TEXT BOOKS:	
1	Kalyanaraman. A.R, "Energy Conservation in Textile Industries", SITRA 1995 (Revised)
2	Palaniappan. C et al, "Renewable Energy Applications to Industries", Narose Publishing House, New Delhi, 1998.
REFERENCES:	
1	Proceedings of the Seminar, "Strategies for Sustainability of Energy Efficient and Environmental Friendly Technologies in Small and Medium Scale Sector", PSG College of Technology, November 24, 2000.
2	Proceedings of International Seminar cum Exhibition ASIA Energy Vision 2020 – Sustainable Energy Supply, November 15-17, 1996
3	"Energy Management" PCRA Monograph
4	Mirjana Radovanovic, Sustainable Energy Management Planning, Implementation, Control, and Security 2022, ISBN: 9780128210864

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	2	-	-	3	-	1	-	1	2	2	3
2	2	1	-	-	2	-	-	3	-	1	-	1	2	2	3
3	2	1	-	-	2	-	-	3	-	1	-	1	2	2	3
4	2	1	-	-	2	-	-	3	-	1	-	1	2	2	3
5	2	1	-	-	2	-	-	3	-	1	-	1	2	2	3
6	2	1	-	-	2	-	-	3	-	1	-	1	2	2	3
Overall Correlation	2	1	-	-	2	-	-	3	-	1	-	1	2	2	3

23FT077	HUMAN RESOURCE MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the students, understand various aspects of human resources management
- To explore the different acts related to personnel management
- To evaluate the performance appraisal.
- To analyze the job and job evaluation
- To motivate the employee by moral.

UNIT I	INTRODUCTION	9

Human Resource Management (HRM)-Features of HRM-Objectives of HRM-Scope of HRM- Role of HRM- Functions of HRM- Limitations of HRM- Personnel Management-HRM & Personnel Management-Challenges to Personnel Management-Organisation of personnel department personnel department in line, functional and line & staff organization- Role of personnel manager.

UNIT II	PROCUREMENT	9

Job analysis-Need of job analysis-steps in job analysis- Methods of data collection- Job description- Job specification- Job design-Methods of job design- Human resource planning. Types of manpower planning- Recruitment- Process of recruitment-Sources of recruitment. Selection- Steps in selection process- tests and interviews-placement and orientation-transfer, promotion and separations

UNIT III	DEVELOPMENT	9

Performance Appraisal (PA)- Objectives, benefits & methods of PA-Essentials of Effective appraisal system-training and development-training methods-Steps in systematic training plan executive development- methods of executive development-career planning and development individuals vs. organization career planning-career counselling

UNIT IV	COMPENSATION	9
Job evaluation- Difference between job evaluation and performance appraisal- objectives and methods of job evaluation- employee remuneration- remuneration package- wage and salary administration-methods of wage system- wage policy and various acts-pay structure- bonus incentives- types of incentive plans- profit sharing- non-financial incentives.		
UNIT V	**INTEGRATION**	**9**
Morale- Morale vs. productivity-Building high morale- absenteeism- causes and effects of absenteeism-labour turnover- methods to calculate labour turnover- Causes and effect of labour turnover- Steps to control labour turnover- motivation-importance of motivation-techniques to increase motivation- theories of motivation (Maslow , Herzberg, theory X and theory Y and vroom's expectancy theory)		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Explain the role of HR managers and HRD system in India.
CO2:	Analysis job analysis, managing organized labour and international labour.
CO3:	Outline the recruitment in textile industry.
CO4:	Infer on appraisal and development systems.
CO5:	Explain the compensation and wage policy.
CO6:	Explain the theories of motivation.

TEXT BOOKS:	
1	Decenzo.and Robbins.,"Human Resource Wiley,2010,ISBN:0470169680/ISBN:978-0470169681 Management", 10thEdition,
2	Dessler ., andGary.,"Human Resource Management", Pearson Education Limited,2007, ISBN:0134235452| ISBN-13:9780134235455

REFERENCES:	
1	Bernadin, Human Resource Management, Tata Mc graw Hill ,8th edition 2012
2	Wayne Cascio, Managing Human Resource, McGraw Hill, 2007.
3	Decenzo and Robbins, Human Resource Management, Wiley, 8th Edition, 2007.
4	MamoriaC.B.,"Personnel Management", Himalaya Publishing Company, 2007, ISBN:8184888082/ISBN:978-8184888089

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	2	-	-	3	3	2	2	-	2	2	3
2	3	2	1	1	2	-	-	3	3	2	2	-	3	2	3
3	2	1	-	-	2	-	-	3	3	2	2	-	2	2	3
4	2	1	-	-	2	-	-	3	3	2	2	-	2	2	3
5	2	1	-	-	2	-	-	3	3	2	2	-	2	2	3
6	2	1	-	-	2	-	-	3	3	2	2	-	2	2	3
Overall Correlation	3	2	1	1	2	-	-	3	3	2	2	-	3	2	3

23FT078	BOUTIQUE MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To develop the basic knowledge on boutique management.
- To develop the business plan and business model.
- To facilitate infra structure for visual merchandising.
- To learn about marketing promotion tools.
- To learn about financial operation management.

UNIT I	INTRODUCTION TO BOUTIQUE	9

Boutique – definition – management skills required to set up a boutique – identifying target market and customer – selection of boutique name – types of boutique – low- end and high- end boutiques.

UNIT II	BUSINESS PLAN & BUSINESS MODEL	9

Scope for boutiques – creation of business plan for starting a boutique- parts of a business plan – components of a business plan – types of business plans – competitive analysis & case study analysis -assessment of feasibility (Technical, Financial & Marketing) - finding the right plan.

UNIT III	INFRASTRUCTURE AND VISUAL MERCHANDISING	9

Choice of location and space management – infrastructure requirement – fashion accessories in boutique – boutique interior – visual merchandising – store layout – types of display – exterior display – interior display – tools for visual merchandising – signage – props – mannequins – fixtures and lightings.

UNIT IV	MARKETING, PROMOTION AND TOOLS	9

Boutique marketing tools and promotional kit – material sourcing – bookkeeping for boutique and maintaining stock, new marketing strategies – loyalty programs -sales promotion through advertising, public relations, direct marketing, personal selling,

promotion mix; digital marketing, social media leverage – email & influencer marketing – future trends.		
UNIT V	**FINANCIAL & OPERATION MANAGEMENT**	**9**
Project finance – cash control and cash flow analysis – managing and start up the boutique business – boutique visit – boutique project report. Business model – online & offline - store design, customer service, budgeting & accounting, money and credit handling, shoplifting prevention, premises maintenance, systems & staff management, inventory optimization and management, administration and supply chain management.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Outline a plan to set up a boutique.
CO2:	Outline the business model for boutique.
CO3:	Extend the boutique infrastructure and visual merchandising.
CO4:	Choose new strategies for marketing and promotion.
CO5:	Summarize the procedure for financial planning and startup formalities.
CO6:	Infer on operation management in boutique business.

TEXT BOOKS:	
1	Briana Stewart, (2014). How to Open a Boutique, The Simple Guide to Boutique Success, New York: Create Independent Publishing Platform. Print.
2	Debbra Mikaelsen, (2005). FabJob Guide to become a Boutique Owner, Fabjob publisher. Print. Dr. S.S.Khanka, (2013).

REFERENCES:	
1	Stewart B., "Opening Boutique Guide", Bull City Publishing, 2016.
2	Wright C, "Business Boutique", Ramsey Press, Tennessee, 2017.

3	Entrepreneurial Development, New Delhi: Sultan Chand and Company Pvt. Ltd. Print. Y.K. Bhushan, (2013).
4	MamoriaC.B.,"Personnel Management", Himalaya Publishing Company, 2007, ISBN:8184888082/ISBN:978-8184888089

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	1	-	-	2	3	2	2	-	2	1	3
2	2	1	-	-	1	-	-	2	3	2	2	-	2	1	3
3	2	1	-	-	1	-	-	2	3	2	2	-	2	1	3
4	2	1	-	-	1	-	-	2	3	2	2	-	2	1	3
5	2	1	-	-	1	-	-	2	3	2	2	-	2	1	3
6	2	1	-	-	1	-	-	2	3	2	2	-	2	1	3
Overall Correlation	2	1	-	-	1	-	-	2	3	2	2	-	2	1	3

23FT079	E -COMMERCE BUSINESS MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To enable the student, to understand various aspects of E-commerce business management.
- To explore e- marketing and e- security.
- To explore gate payments.
- To understand portal and laws.
- To know more about MIS and technologies.

UNIT I	INTRODUCTION	9

History of e-commerce, e-commerce vs e-business, social networking, types of e-commerce: Business to Consumer (B2C), Business to Business (B2B), Consumer to Consumer (C2C), Consumer to Business (C2B), Mobile E-Commerce, Social E-Commerce, Local E-Commerce; e-commerce technology, concepts, approaches; growth of the internet mobile and web, e-commerce opportunities for industries.

UNIT II	E – MARKETING AND E – SECURITY	9

E-marketing value chain, maintaining a website, online marketing, advertising, market research, customer relationship applications, effectiveness of e-advertising, elements of branding, marketing strategy on web. Networks and website security, risks, site hack, security and e-mail, firewall concept, phishing, dimensions of good e-commerce security, public safety and criminal uses of the internet, credit card fraud/theft, spam, mobile platform security issues.

UNIT III	E-PAYMENT	9

E-banking, online payments, benefits to buyers and sellers, payment through credit card and debit card, encryption, mobile payments, smart card cash payments, types of electronic money, web-based money, digital wallet, data protection, managing information privacy, secured e-payment process.

UNIT IV	PORTAL AND LAWS	9
Portals for e-business: different types of portals, features, benefits, analyzing website structure, target audiences, hosting service, growth for ERP market and advantages; Laws: IT Act, jurisdiction on internet, terms of service agreements, advertising regulation.		
UNIT V	**ENABLING TECHNOLOGIES**	**9**
Internet, mobile internet access, wireless internet, internet access, web, hypertext markups, emails, messaging, search engine, online forum, cookies, streaming media, online social networks, blogs, wikis and mobile applications.		
TOTAL: 45 PERIODS		

COURSE OUTCOMES:	
After completion of the course, the students will be able to:	
CO1:	Outline on e-commerce business.
CO2:	Infer the effectiveness of e-marketing.
CO3:	Interpret on E-security process and methods.
CO4:	Choose the payment system which is secured and manage the information.
CO5:	Outline the portal and laws for service provided.
CO6:	Summarizes the enabling technologies in e-commerce.

TEXT BOOKS:	
1	P.T. Joseph , E-Commerce: An Indian Perspective, PHI Learning, 2015
2	Kenneth C. Laudon, Carol Guercio Traver, E-Commerce 2016: Business, Technology, Society, Pearson; 12 edition, 2016

REFERENCES:	
1	David Whiteley, E - Commerce: Strategy, Technologies and Applications, McGraw Hill Education, 2017 2.
2	Henry Chan (Author), Raymond Lee (Author), Tharam Dillon (Author), Elizabeth Chang, E-Commerce: Fundamentals and Applications, Wiley; 1 edition 2007 5.

3	Bernadin, Human Resource Management, Tata Mc graw Hill ,8th edition 2012.
4	A. K Gupta, Management Information System, IBH Publishing, 2012

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	1	-	-	2	-	-	2	3	2	2	-	2	2	2
2	2	1	-	-	2	-	-	2	3	2	2	-	2	2	2
3	2	1	-	-	2	-	-	2	3	2	2	-	2	2	2
4	2	1	-	-	2	-	-	2	3	2	2	-	2	2	2
5	2	1	-	-	2	-	-	2	3	2	2	-	2	2	2
6	2	1	-	-	2	-	-	2	3	2	2	-	2	2	2
Overall Correlation	2	1	1	1	2	-	-	2	3	2	2	-	2	2	2