DEPARTMENTAL OVERVIEW: FASHION AND APPAREL ENGINEERING (FAE)

Fashion and Apparel Engineering (FAE) is a dynamic fusion of creativity, technical expertise, and innovation. Our program prepares students to excel in all aspects of the fashion industry, combining cutting-edge design with advanced production techniques. With a focus on sustainable practices and industry-leading technology, FAE equips graduates with the skills to become leaders in the fashion world. Explore the core departments within FAE and the exciting career opportunities they offer:

1. Fashion Design & Development

Scope: Delve into the art and science of fashion design. Here, you'll master the skills to create innovative clothing and accessories while learning about textiles, patterns, and the latest trends.
Career Opportunities: Fashion Designer, Fashion Stylist, Product Developer, Costume Designer.

2. Textile Engineering

Scope: Understand the science behind fabrics. Study fibers, textiles, and their properties, while exploring fabric production and finishing techniques to create sustainable and high-performance materials.
Career Opportunities: Textile Designer, Fabric Technologist, Textile Engineer, Sustainable Fashion Specialist.

3. Garment Manufacturing & Production Management

Scope: Gain hands-on experience in garment production, from quality control to production planning and inventory management. Learn how to optimize production processes and ensure efficiency.
Career Opportunities: Apparel Production Manager, Quality Control Specialist, Production Planner, Manufacturing Engineer.

4. Fashion Technology & Innovation

Scope: Immerse yourself in the future of fashion with a focus on technology. Study innovations like 3D printing, smart textiles, and automated production systems, preparing you to drive technological advancements in fashion.
Career Opportunities: Fashion Technologist, Apparel Engineer, Product Development Manager, Textile Innovator.

5. Fashion Marketing, Merchandising, and Retail Management

Scope: Learn to create compelling marketing strategies, manage retail operations, and understand market trends. This department blends business expertise with an in-depth understanding of the fashion industry to create impactful retail experiences.
Career Opportunities: Retail Buyer, Fashion Marketer, Visual Merchandiser, Retail Manager.

6. Sustainability and Ethical Fashion

Scope: Focus on the future of fashion with a commitment to sustainability. Learn how to reduce the environmental impact of fashion, using eco-friendly materials and ethical production methods to drive change in the industry.
Career Opportunities: Sustainable Fashion Specialist, Fashion Entrepreneur, Environmental Consultant.

7. Fashion Business & Entrepreneurship

Scope: Develop the business acumen necessary to succeed in the fashion industry. Learn about brand management, financial planning, and market trends while preparing to start and grow your own fashion business.
Career Opportunities: Fashion Entrepreneur, Brand Manager, Fashion Consultant, Fashion Business Analyst.

8. Fashion Education and Research

Scope: Dive into academic pursuits and research in fashion. Whether you're interested in teaching the next generation or contributing to groundbreaking fashion innovations, this department offers opportunities for growth and exploration.
Career Opportunities: Fashion Educator, Fashion Researcher, Curriculum Developer.

Conclusion

Fashion and Apparel Engineering (FAE) offers a multifaceted and innovative approach to fashion education, combining design creativity with technical proficiency and sustainability. Our program prepares students for diverse and exciting careers in design, production, marketing, sustainability, entrepreneurship, and education. With the fashion industry evolving rapidly, FAE graduates are equipped to meet its challenges and lead the way with creativity, innovation, and responsibility. Join us and turn your passion for fashion into a rewarding career!

----------Or----------

Fashion and Apparel Engineering (FAE) at our institute is a dynamic and innovative program that blends creativity with technical expertise, preparing students to excel in every aspect of the fashion industry. Our curriculum integrates cutting-edge design with advanced production techniques, while also focusing on sustainability and technological innovation. Students gain hands-on experience and in-depth knowledge across key areas, including **Fashion Design & Development**, where they learn to create innovative clothing and accessories; **Textile Engineering**, which focuses on the science behind fabrics and sustainable material production; and **Garment Manufacturing & Production Management**, where they master the art of production planning and quality control. Additionally, the **Fashion Technology & Innovation** department immerses students in the future of fashion, exploring

advancements like 3D printing and smart textiles, while **Fashion Marketing, Merchandising, and Retail Management** prepares them to shape impactful retail experiences and understand market trends. The program also emphasizes **Sustainability and Ethical Fashion**, encouraging students to implement eco-friendly materials and ethical practices, and offers expertise in **Fashion Business & Entrepreneurship**, where they learn to build and manage successful fashion ventures. Finally, the **Fashion Education and Research** department opens doors for academic exploration, curriculum development, and innovative research in the fashion industry. With a focus on creativity, business acumen, and sustainability, our FAE program equips graduates with the skills and knowledge needed to lead in the evolving fashion world.

NGF COLLEGE OF ENGINEERING AND TECHNOLOGY

Established in 2008, Under the NEW GREEN FIELD EDUCATIONAL SOCIETY

Mission and Vision of the Fashion and Apparel Engineering Department

Vision: Aligned with the overarching vision of NGF College of Engineering and Technology, the Fashion and Apparel Engineering Department aspires to be a globally acclaimed leader in fashion education. We envision a future where innovation, creativity, and sustainability drive transformative solutions for the fashion industry. Our goal is to cultivate a dynamic and inclusive environment that inspires students to push boundaries, embrace technological advancements, and design for a better tomorrow. We seek to empower our graduates to become trailblazers, blending artistry with engineering, and contributing to economic growth, cultural enrichment, and environmental consciousness on both national and international platforms.

Mission:

In line with NGF College of Engineering and Technology's mission to provide value-based education and promote continuous learning, the Fashion and Apparel Engineering Department is committed to:

1. Providing a dynamic learning environment that integrates theoretical knowledge and practical skills in fashion and apparel engineering.
2. Advancing interdisciplinary research and technological innovations in fashion and textile sciences.
3. Developing industry-ready graduates by collaborating with leading fashion industries and research institutions.
4. Instilling ethical values, social responsibility, and leadership qualities in students, encouraging them to become entrepreneurs and technocrats.
5. Promoting sustainable practices and innovative design thinking to address the evolving challenges of the fashion and apparel sector.
6. Supporting continuous learning and skill development through workshops, internships, and industry interactions, ensuring holistic development and lifelong growth.

Program Educational Objectives (PEO'S)

PEO-1:

A fundamental knowledge of the basic and engineering sciences and develop analytical skills required for fashion & apparel engineering.

PEO-2:

Graduates to be equipped with practical skills and experimental practices related to core and applied areas of fashion & apparel engineering to expand their knowledge horizon beyond books. This will prepare the students to take-up career in industries or to pursue higher studies in fashion apparel and interdisciplinary programs.

PEO-3:

Graduates will have improved team building, team working and leadership skills with high regard for ethical values and social responsibilities.

PEO-4:

Fashion apparel Graduates will explore and create innovations in various aspects of engineering.

PROGRAMME OUTCOMES (PO'S) B.TECH. FASHION & APPAREL ENGINERING

Engineering Graduates will be able to:

1) **Engineering knowledge:** Apply knowledge of mathematics, science, engineering fundamentals, and fashion apparel engineering to the solution of engineering problems.

2) **Problem analysis:** Identify, formulate, review literature and analyse fashion apparel engineering problems to design, conduct experiments, analyse data and interpret data.

3) **Design /development of solutions:** Design solution for fashion apparel engineering problems and design system component of processes that meet the desired needs with appropriate consideration for the public health and safety, and the cultural, societal and the environmental considerations.

4) Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions in fashion apparel engineering.

4) **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to fashion apparel engineering activities with an understanding of the limitations.

5) **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to fashion apparel engineering practice.

6) **Environment and sustainability:** Understand the impact of the fashion apparel engineering solutions in societal and environmental contexts and demonstrate the knowledge and need for sustainable development.

7) **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the fashion apparel engineering practice.

8) **Individual and teamwork:** Function affectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings in fashion apparel engineering.

9) **Communication:** Communicate effectively on complex engineering activities with the engineering committee and with society at large, such as, being able to comprehend and write affective reports and design documentation, make effective presentations in fashion apparel engineering.

10) **Project Management and finance:** Demonstrate knowledge & understanding of the fashion apparel engineering principles and management principles and apply these to one's own work, as member and leader in a team, to manage projects and in multidisciplinary environments in fashion apparel engineering.

11) **Life-long learning:** Recognize the need for, and the preparation and ability to engage in independent research and lifelong learning in the broadest contest of technological changes in fashion apparel engineering.

SCHEME & SYLLABUS

OF

UNDER G RADUATE DEGREE COURSE
in

FASHION & APPAREL ENGINEERING
2020-2021

(B.Tech. IYr admitted 2020-21 and B.Tech. LEET admitted 2020-21)

J.C BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY, YMCA

FARIDABAD

J.C BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY, YMCA

VISION

YMCA University of Science and Technology aspires to be a nationally and internationally acclaimed leader in technical and higher education in all spheres which transforms the life of students through integration of teaching, research and characterbuilding.

MISSION

- To contribute to the development of science and technology by synthesizing teaching, research and creative activities.
- To provide an enviable research environment and state-of-the-art technological exposure to its scholars.
- To develop human potential to its fullest extent and make them emerge as world class leaders in their professions and enthuse them towards their social responsibilities.

Program Educational Objectives (PEO'S)

PEO-1:

A fundamental knowledge of the basic and engineering sciences and develop analytical skills required for fashion & apparel engineering.

PEO-2:

Graduates to be equipped with practical skills and experimental practices related to core and applied areas of fashion & apparel engineering to expand their knowledge horizon beyond books. This will prepare the students totake-up career in industries or to pursue higher studies in fashion apparel and interdisciplinary programs.

PEO-3:

Graduates will have improved team building, team working and leadership skills with high regard for ethical values and social responsibilities.

PEO-4:

Fashion apparel Graduates will explore and create innovations in various aspects of engineering.

PROGRAMME OUTCOMES (PO'S) B.TECH. FASHION & APPAREL ENGINERING

Engineering Graduates will be able to:

1) **Engineering knowledge:** Apply knowledge of mathematics, science, engineering fundamentals, and fashion apparel engineering to the solution of engineering problems.

2) **Problem analysis:** Identify, formulate, review literature and analyze fashion apparel engineering problems to design, conduct experiments, analyze data and interpret data.

3) **Design /development of solutions:** Design solution for fashion apparel engineering problems and design system component of processes that meet the desired needs with appropriate consideration for the public health and safety, and the cultural, societal and the environmental considerations.

4) Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions in fashion apparel engineering.

4) **Modern tool usage:** Create, select, and apply appropriate techniques, resources, andmodern engineering and IT tools including prediction and modeling to fashion apparel engineering activities with an understanding of the limitations.

5) **The engineer and society:** Apply reasoning informed by the contextual knowledge toassess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to fashion apparel engineering practice.

6) **Environment and sustainability:** Understand the impact of the fashion apparel engineering solutions in societal and environmental contexts , and demonstrate the knowledge and need for sustainable development.

7) **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the fashion apparel engineering practice.

8) **Individual and teamwork:** Function affectively as an individual, and as a member or leader in diverse teams, and in multi disciplinary settings in fashion apparel engineering.

9) **Communication:** Communicate effectively on complex engineering activities withthe engineering committee and with society at large, such as, being able to comprehendand write affective reports and design documentation, make effective presentations in fashion apparel engineering.

10) **Project Management and finance:** Demonstrate knowledge & understanding of the fashion apparel engineering principles and management principles and apply these toone's own work, asamember and leader in a team, to manage projects and in multidisciplinary environments in fashion apparel engineering.

11) **Life-long learning:** Recognize the need for, and the preparation and ability to engage in independent research and life long learning in the broadest contest of technological changes in fashion apparel engineering.

PROGRAM SPECIFIC OUTCOMES (PSOs):

1) To apply practical skills, knowledge of engineering fundamentals and fashion apparel engineering engineering, to industries and institutions.

2) To explore, create and develop innovations in various aspects of engineering. The student will be ready to take-up career or to pursue higher studies with high regard to ethical values and social responsibilities.

Undergraduate Degree Coursesin Engineering &Technology

FASHION & APPAREL ENGINEERING

(As per guidelines of All India Council for Technical Education Model Curriculum)

General, Course structure &Theme & Semester-wise credit distribution Definition of Credit:

1Hr. Lecture (L) per week	1credit
1Hr. Tutorial (T) per week	1credit
1Hr.Practical (P) per week 2 Hours Practical (Lab) perweek	0.5credits 1credit

Credits - 172 for a student to be eligible to get Undergraduate degree in Engineering.

Structure of Under graduate Engineering program*:*

S.No.	Category	Breakup of Credits (Total172)
1	Humanities and Social Sciences including Management Courses	09
2	Basic Science Courses	25
3	Engineering Science courses including workshop, drawing, basics of electrical/ mechanical/ computer etc.	28
4	Professional core courses	54
5	Professional Elective courses relevant to chosen specialization / branch	21
6	Open subjects –Electives from other technical and / or emerging subjects	03
7	Projectwork, seminar and internship in industry or Appropriate workplace/ academic and research institutions in India/ abroad	20
8	Mandatory Courses [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)
	Total	**160+ 12***

*03 credit each year through MOOC in First and Second Year.

*03credit each year of open elective through MOOC in 3rd and 4thYear.

*****Refer implementation of Credit Transfer/Mobility Policy of online courses, 17th meeting of Academic Council (11.6.2019) for details, regarding MOOC credits. Minimum credit to beearnedis 12 (**03 each year)** through MOOC for all B.Tech. students in this scheme.

Course Code and Definition:

Coursecode	Definitions
BSC	Basic Science Courses
ESC	Engineering Science Courses
HSMC	Humanities and Social Sciences including Management courses
PCC-FA	Professional core courses
PEC-FA	Professional Elective courses
OEC-FA	Open Elective courses
LC-FA	Laboratory course
MC	Mandatory courses
PROJ-FA	Project

Project / Industrial training

1.	Project	24 pd / week	12 Credit	VI &VII
2.	Industrial Training	One semester	08 Credit	VIII
	Total		**20 Credit**	

PROFESSIONAL ELECTIVE COURSE (PEC): Total 08 in number

PROFESSIONAL ELECTIVE COURSE-I (PEC-I) (Semester-IV)

S.No.	Name of Course	Contact Hours	Credits
1	Engineering Ergonomics	3	3
2.	Introduction to fashion retail	3	3
3.	Supply chain management	3	3

Note: Students will have to select any one out of the list.

PROFESSIONAL ELECTIVE COURSE-II (PEC-II) (Semester-IV)

S.No.	Name of Course	Contact Hours	Credits
1.	Structure & properties of textiles	3	3
2.	Preprative wet process	3	3
3.	Principles of managment	3	3

Note: Students will have to select any one out of the list.

PROFESSIONAL ELECTIVE COURSE-III (PEC-III) (Semester-V)

S.No.	Name of Course	Contact Hours	Credits
1	Computer aided designing	3	3
2.	Indian business environment	3	3

Note: Students will have to select any one out of the list.

PROFESSIONAL ELECTIVE COURSE-IV(PEC-IV)(Semester-V)

S.No.	NameofCourse	Contact Hours	Credits
1.	Apparel merchandising	3	3
2.	Non woven technology	3	3

Note: Students will haveto select anyoneout of the list.

Note: PEC FAEL -302-2Apparel Merchandising: indicates that in the 5th sem. Scheme subject code is PEC FAEL-302 and No.2 is chosen in this semester.

PROFESSIONAL ELECTIVE COURSE-V(PEC-V) (Semester-VI)

S.No.	Name of Course	Contact Hours	Credits
1	Advance Apparel construction techniques	3	3
2.	Entrepreneurship Development in Fashion And Apparel	3	3

Note: Students will haveto select anyone out of the list.

PROFESSIONAL ELECTIVE COURSE-VI (PEC-VI) (Semester-VI)

S.No.	Name of Course	Contact Hours	Credits
1	Project Writing	3	3
2.	Automation in Garment Industry	3	3

Note: Students will have to select any one out of the list.

PROFESSIONAL ELECTIVE COURSE-VII (PEC-VII) (Semester-VII)

S.No.	Name of Course	Contact Hours	Credits
1	Elements of fashion	3	3
2.	Fashion Accessories	3	3

Note: Students will haveto select anyoneout of the list.

PROFESSIONAL ELECTIVE COURSE-VIII (PEC-VIII) (Semester-VII)

S.No.	Name of Course	Contact Hours	Credits
1	Home & industrial textile product	3	3
2.	Technical & speciality textile & apparel	3	3

Note: Students will have to select any one out of the list.

OPEN ELECTIVE COURSES (OEC):

Note: Students must select one open Elective Courses from the given list:

OPEN ELECTIVE COURSE: Civil OEC3

Civil OEC3-OE1	Research and IPR	3 L	3 credits
Civil OEC3-OE2	Energy Studies	3 L	3 credits
Civil OEC3-OE3	Life Science	3 L	3 credits
Civil OEC3-OE5	Safety Engineering	3 L	3 credits
OEC-21	Introduction to HRM	3 L	3 credits
OEC-23	Marketing Management	3 L	3 credits
OEC-24	Entrepreneur Development	3 L	3 credits

***Imp.: In addition 02 open elective course through MOOC.**

J.C BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY, YMCA FARIDABAD

SCHEME OF STUDIES & EXAMINATIONS

B.TECH 2nd YEAR (SEMESTER – III) FASHION & APPAREL ENGINEERING

(2020-21)

Course No.	CourseTitle	Teaching Schedule				Marks for Sessional	Marks for End Term Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
ESC201	Basic Electronics	3	-	-	3	25	75	-	100	3
BSC01	Biology	2	1	-	3	25	75	-	100	3
ESC-FA201	Textile raw Materials & Yarn formation	4	-	-	4	25	75	-	100	4
PCC-FA201	Traditional embroidery & textile	4	-	-	4	25	75	-	100	4
PCC-FA202	Apparel production	3	-	-	3	25	75	-	100	3
PCC-FA203	Fashion sketching, design idea & fashion illustration lab	-	-	2	2	15	-	35	50	1
PCC-FA204	Fibres identification & yarn formation lab	-	-	2	2	15	-	35	50	1
PCC-FA205	Elementary garment manufacturing & Pattern making lab	-	-	2	2	15	-	35	50	1
PRFA-1P	Project-1	0	0	4	4	15		35	50	2
	Total	15	2	10	27	235	525	140	900	22

J.C.BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY, YMCA FARIDABAD

B. TECH 2nd YEAR (SEMESTER – IV) FASHION & APPAREL ENGINEERING (2020-21)

Course No.	Course Title	Teaching Schedule				Marks for Sessional	Marks for End Term Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
BSC-FA201	Applied statistics & operations research	2	1	-	3	25	75	-	100	3
PCC-FA206	Apparel production planning and scheduling	2		-	2	25	75	-	100	2
PCC-FA207	Fabric formation	2	1	-	3	25	75	-	100	3
HSMC01	Effective Technical Communication	3	0		3	25	75	-	100	3
HSMC-FA202	Evolution of clothing&fashion	3		-	3	25	75	-	100	3
PEC-FAEL201	PROFESSIONAL Elective Course-I	3	-	-	3	25	75	-	100	3
PEC-FAEL202	PROFESSIONAL Elective Course-II	3	-	-	3	25	75	-	100	3
MC04	Audit Course-1: **Bhagwat Gita**	1	-	-	1	25	75	-	-	-
PCC-FA208	Fabric formation & analyzing lab	-	-	2	2	15	-	35	50	1
PCC-FA209	Apparel construction lab-I	-	-	2	2	15	-	35	50	1
PRFA-2P	Project-2	0	0	4	4	15		35	50	2
	Total	21	2	8	29	220	525	105	850	24

J.C BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY, YMCA FARIDABAD

SCHEME OF STUDIES & EXAMINATIONS

B.TECH 3rd YEAR (SEMESTER – V) FASHION & APPAREL ENGINEERING (2020-21)

Course No.	CourseTitle	Teaching Schedule				Marks For Sessionals	MarksforEnd Term Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
ESC-FA301	Knit&garmentt echnology	3	1	-	4	25	75	-	100	4
PCC-FA301	Colouration ofTextile&Appar elproducts	4	-	-	4	25	75	-	100	4
PCC-FA302	Garmentproduction machines& equipment	4		-	4	25	75	-	100	4
PEC-FAEL301	PROFESSIONAL ElectiveCourse-III	3	-	-	3	25	75	-	100	3
PEC-FAEL302	PROFESSIONAL ElectiveCourse-IV	3	-	-	3	25	75	-	100	3
MC01	Audit Course-II :IndianConstitution	3	-	-	3	25	75	-	-	-
ESC-FA302	Knitdesign&dev elopmentlab	-	-	2	2	15	-	35	50	1
PCC-FA303	Colourationof Textile&apparell ab	-	-	2	2	15	-	35	50	1
PCC-FA304	Apparel constructionlab II	-	-	2	2	15	-	35	50	1
PRFA-3P	Project-3	0	0	4	4	15		35	50	2
	Total	17	1	9	29	185	375	140	700	23

PEC- FAEL302-1 Apparel merchandising: indicates that Program electiveCOURSE(PEC) schemesubjectcode isPEC FAEL-302andS.No.1ischoseninthissemester.

J.C BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY, YMCA FARIDABAD

SCHEME OF STUDIES & EXAMINATIONS

B.TECH 3rd YEAR (SEMESTER –VI) FASHION & APPAREL ENGINEERING (2020-21)

Course No.	Course Title	Teaching Schedule				Marks For	Marks for End Term Examination		Total Marks	Credits
		L	T	P	Total	Sessionals	Theory	Practical		
PCC-FA305	Colouranddesignconcept	4	-	-	4	25	75	-	100	4
PCC-FA306	Textile&apparelproducttesting	4			4	25	75	-	100	4
PCC-FA307	Textiles&Apparelprinting	4	-	-	4	25	75	-	100	4
PEC-FAEL303	PROFESSIONAL ElectiveCourse-V	3	-	-	3	25	75	-	100	3
PEC-FAEL304	PROFESSIONAL Elective Course-VI	3	-	-	3	25	75	-	100	3
PCC-FA308	CADlab	-	-	2	2	15	-	35	50	1
PCC-FA309	Textile&Apparel Printinglab	-	-	2	2	15	-	35	50	1
PCC-FA310	ColourandDesign Lab	-	-	2	2	15	-	35	50	1
PCC-FA311	Testinglab	-	-	2	2	15	-	35	50	1
PRFA-4P	Project-4	0	0	4	4	15		35	50	2
	Total	15		12	27	175	300	175	650	24

J.C BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY, YMCA FARIDABAD

SCHEME OF STUDIES & EXAMINATIONS

B.TECH 4th YEAR (SEMESTER – VII) FASHION & APPARELENGINEERING (2020-21)

CourseNo.	Course Title	Teaching Schedule				Marks for Sessional	Marks for End Term Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
PCC-FA401	Textile&Apparelfinishing	3		-	3	25	75	-	100	3
PCC-FA402	Textile & Apparel Costing	3		-	3	25	75	-	100	3
PCC-FA403	Quality assurance in apparel industry	3		-	3	25	75	-	100	3
PEC-FAEL401	PROFESSIONAL Elective Course-VII	3	-	-	3	25	75	-	100	3
PEC-FAEL402	Professional Elective Course-VIII	3	-	-	3	25	75	-	100	3
CivilOEC3	Open ElectiveCourse-III:Anyone from list of OE1-OE5	3	-	-	3	25	75	-	100	3
PCC-FA404	Apparel draping & grading lab	-	-	2	2	15	-	35	50	1
PRFA-5P	Project-5	0	0	4	4	15		35	50	2
	Total	18	0	6	24	215	525	70	810	21

J.C BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY, YMCA FARIDABAD

SCHEME OF STUDIES & EXAMINATIONS
B.TECH.4thYEAR(SEMESTER–VIII) FASHION & APPAREL ENGINEERING (2020-21)

Semester VIII (Fourth year)

Sl. No.	CourseTitle	Code	Hoursper week			Sessional	EndSemester	Total	Credits
			L	T	P				
1	Industrial Training with projects	PRFA-6P	0	0	30	150	350	500	10 (including 02credit or 20%weigtagefor project)

Detailed Syllabus

ESC-201 BASICE LECTRONICS ENGINEERING

B. Tech III Semester

No.of Credits:3
LTP Total
30 0 3

Sessional: 25 Marks
Theory: 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Pre-Requisite: Physics

Successive: Mechatronics, Automation in Manufacturing

Course Objectives:

To provide an overview of electronic device components to Mechanical engineering students.

Course Contents:

Semiconductor Devices and Applications: Introduction to P-N junction Diode and V-I characteristics, Halfwave and Full-wave rectifiers, capacitor filter. Zener diode and its characteristics, Zener diode as voltage regulator. Regulated power supply IC based on 78XX and 79XX series, Introduction to BJT, its input-output and transfer characteristics, BJT as asingle stageCE amplifier, frequency response and bandwidth.

Operational amplifier and its applications: Introduction to operational amplifiers, Op-ampinput modes and parameters, Op-amp in open loop configuration, op-amp with negative feedback, study of practicalop-ampIC741, inverting andnon-inverting amplifier applications : summing and difference amplifier,unitygainbuffer,comparator,integratoranddifferentiator.

Timing Circuits and Oscillators: RC-timing circuits, IC 555 and its applications as astable andmono-stablemulti-vibrators, positivefeedback, Barkhausen'scriteriaforoscillation, R-C phaseshiftandWein bridgeoscillator.

Digital Electronics Fundamentals: Difference between analog and digital signals, Boolean algebra, Basic and Universal Gates, Symbols, Truthtables, logic expressions, Logic simplification using K-map, LogicICs, halfandfulladder/subtractor, multiplexers, de-multiplexers, flip-flops, shiftregisters, counters, Block diagram of microprocessor/microcontroller andtheirapplications.

Electronic Communication Systems: The elements of communication system, IEEE frequency spectrum, Transmissionmedia: wired and wireless, need of modulation, AM andFM modulation schemes, Mobile communication systems: cellular concept and block diagram ofGSM system.

CourseOutcomes:

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

1. Understand the principles of semiconductor devices and their applications.

2. Design an application using Operational amplifier.

3. Understand the working of timing circuits and oscillators.

4. Understand logicgates, flip flop as a building block of digital systems.

5. Learn the basics of electronic communication system.

Text/ReferenceBooks:

1. Floyd, "Electronic Devices" Pearson Education 9th edition,2012.

2. R.P. Jain, "ModernDigitalElectronics", Tata Mc GrawHill,3rdEdition,2007.

3. Frenzel, "Communication Electronics: Principles and Applications", Tata McGraw Hill, 3rd Edition,2001

BSC01	Biology	2L:1T:	3 credits

Module 1. *(2 hours)-Introduction*

Purpose: To convey that Biology isasimportanta scientific discipline as Mathematics, Physics and Chemistry Bring out the fundamental differences between science and engineering by drawing a comparison between eye andcamera, Bird flying and aircraft. Mention the most exciting aspect of biology asan independent scientific discipline. Why we need to study biology? Discusshow biological observations of 18^{th}Century that lead to major discoveries. Examples from Brownian motion and the origin of thermosdynamics by referring to the original observation of Robert Brown and Julius Mayor. These examples will highlight the fundamental importance of observations in any scientific inquiry.

Module2. *(3hours)-Classification*

Purpose: To convey that classification *perse* is not what biology is all about. The under lying criterion, such as morphological,biochemical orecological be highlighted. Hierarchy of life forms at phenomeno logical level. A common thread weaves this hierarchy Classification. Discuss classification based on (a) cellularity-Unicellular or multicellular (b) ultrastructure-prokaryotes or eucaryotes. (c) energy and Carbon Utilization-Autotrophs,heterotrophs, lithotropes (d) Ammonia excretion–amino telic, uricoteliec, ureotelic (e) Habitata- acquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. A given organism can come under different category based on classification. Model organisms for the study of biology come from different groups. E.coli, S.cerevisiae, D. Melanogaster,
C.elegance, A.Thaliana, M.musculus

Module 3. *(4hours)- Genetics*

Purpose: To convey that "Genetics is to biology what Newton's laws are to Physical Sciences" Mendel' slaws, Concept of segregation and independent assortment. Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis betaught as a part of genetics. Emphasis to be give not to the mechanics of cell divisionnor the phases but how genetic material passes from parent to off spring. Concepts of recessiveness and dominance. Concept of mapping of phenotype togenes. Discuss about the single gene disorders in humans. Discuss the concept of complementation using human genetics.

Module 4. *(4hours)-Biomolecules*

Purpose: To convey that all forms of life has the same building blocks and yet the manifestations areas diverse as one can imagine
Molecules of life. In this context discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids.

Module5.*(4Hours). Enzymes*

Purpose: To convey that without catalysis life would not have existed on earth Enzymology: How to monitor enzyme catalyzed reactions. How does anenzy mecatalyze reactions. Enzyme classification. Mechanism of enzyme action. Discuss at least two examples. Enzyme kinetics and kinetic parameters. Why should we know these parameters to underst and biology? RNA catalysis.

Module6.*(4hours)-Information Transfer*

Purpose: The molecular basis of coding and decoding genetic information isuniversal Molecular basis of information transfer. DNA asagenetic material. Hierarchy of DNA structure- from single stranded to double helix tonucleosomes. Concept of genetic code. Universality and degeneracy of geneticcode. Define genein terms ofcomplementation and recombination.

Module7.*(5hours). Macro molecular analysis*

Purpose: How to analyses biological processes at the reductionistic level Proteins- structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structureal elements.

Module8.*(4hours)-Metabolism*

Purpose: The fundamental principles of energy transactions are the same in physical and biological world. Thermo dynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergo increactions. Concept of K_{eq} and its relation to standard freeenergy. Spontaneity. ATP asanenergy currency. This should include the breakdown of glucose to $CO_2 + H_2O$ (Glycolysis and Krebs cycle) and synthesis of glucose from CO_2 and H_2O (Photosynthesis). Energy yielding and energy consuming reactions. Concept of Energycharge

Module9. *(3 hours)-Microbiology*

Concept of single celled organisms. Concept of species and strains. Identificationand classification of microorganisms. Microscopy. Ecological aspects of single cell edorganisms. Sterilization and media compositions. Growth kinetics.

References:

1) Biology: A global approach: Campbell,N. A.;Reece,J. B.;Urry, Lisa;Cain, M,L.;Wasserman,S. A.;Minorsky,P.V.; Jackson,R.B. PearsonEducationLtd
2) Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wileyand Sons
3) Principles of Bio chemistry (VEdition), By Nelson,D. L.; andCox,M. M. W. H. Freeman and Company
4) Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freemanand company, Distributed by Satish Kumar Jain for CBS Publisher
5) Microbiology, Prescott, L.MJ.P. Harleyand C. A. Klein 1995.2 nd edition Wm,C. Brown Publishers.

Course Outcomes

After studying the course, the student will be able to:

- Describe how biological observations of 18th Century that lead to majordiscoveries.
- Convey that classification per se is not what biology is all about but highlight the underlying criteria, such as morphological, biochemical and ecological
- Highlight the concepts of recessiveness and dominance during the passage of genetic material from parent to off spring
- Convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine
- Classify enzymes and distinguish between different mechanisms of enzymeaction.
- Identify DNA as a genetic material in the molecular basis of information transfer.
- Analyse biological processes at thereductionisticlevel
- Apply thermodynamic principles tobiologicalsystems.
- Identify and classify microorganisms.

Upon successful completion of the course, student will have:

¬ Ability to apply mathematics, science, and engineering

¬ Ability to design and conduct experiments, as well as to analyze and interpret data

¬ Ability to identify, formulate, and solve engineering problems

¬ Ability to apply modern engineering tools, techniques and resources to solve complex mechanical engineering activities with an understanding of thelimitations.

¬ Ability to comprehend the thermodynamics and their corresponding processes that influence the behaviour and response of structural components

ESC-FA201 Fibre Textile raw material & Yarn formation
B.Tech (FASHION & APPAREL ENGINEERING) lll Semester

No. of Credits:4	**Sessional: 25 Marks**
LT PTotal	**Theory: 75 Marks**
3 1 0 4	**Total: 100 Marks**
	Duration of Exam: 3 Hours

UNIT I General definitions and important terminologies related to textiles; Classification offibres; Essential and desirable properties of textile fibres and their role in final products; Advantages and disadvantages of natural and manmade fibres.
Cotton: structure and properties (physical and chemical); Different Varieties including organicas well as Bt cotton and their properties; Applications.
Bast and leaf fibres such as jute, hemp, sisal and ramie etc: Geographical distribution, extraction, properties and their uses.

UNIT II
Varieties of natural silk, rearing of silk worm, properties and uses of various types of silk; silk reeling,Varieties, sorting and grading of wool, chemical and physical properties of wool, processes involved in the removal of impurities from raw wool; numbering systems of woollen and worsted yarns.
Brief outline of the manufacturing processes of important man-made fibres, viz. rayons (Viscose and Acetate), polynosic, tencel, nylons, polyester, acrylics, polypropylene, like spandex/lycraetc (only flow charts); their Important physical and chemical properties and applications.

UNITIII
Introduction to objectives of processes like ginning, mixing and blending. Introduction to various preparatory processes involved in the production of yarn viz. opening and cleaning (blow room and card), drawing (draw frame), combing (comber) and rove formation (speed frame) with the objectives of each process
Concept of yarn quality and its importance, Yarn numbering systems and calculations pertaining to conversions.

UNITIV
Introduction to different processes involved in the production of yarn viz. conventional (ring spinning) and unconventional (rotor, air-jet and friction spinning etc) with the objectives of each. Properties and end uses of different types of yarns such as ring spun, rotor spun, friction spun and air-jet spun etc. Objectives of plying and twisting of spun and filament yarns.

Course Outcomes:

- To understand general morphological structure, physical and chemical properties of various natural and synthetic textile fibres
- To understand the cultivation and harvesting processes of various natural and synthetic textile fibres.
- To underst and the manufacturing processes of various synthetic textile fibres.
- Understand the concept of yarn quality and its importance.

Text Books &Reference Books:	**Author:**
Handbook of Textile Fibres	J Gordon Cook
Textile Fibres	HVS Murthy
Manmade Fibres	RW Moncrieff
Manufactured Fibre Technology	VB Gupta & VK
Kothari Spun Yarn Technology	EricOxtoby
Textile Science	Corbmann
Short Staple Spinning Series	W. Klein

PCC-FA-201 Traditional Embroidery & Textile
B.Tech (FASHION & APPAREL ENGINEERING) lll Semester

No.ofCredits:3	**Sessional: 25Marks**
LT PTotal	**Theory: 75Marks**
4 0 0 4	**Total: 100**
	Marks Duration of Exam: 3Hours

UNIT I

Basic know-how embroidery techniques: Requirements of embroidery. Tools and Equipment required for embroidery.

UNIT II

Sample preparation with basic embroidery stitches and their derivatives like chainstitch; stem stitch, darning stitch, Herring-bone, open chain, satin, button-hole, bullion knot, Lasy daisy stitch.

UNIT III

Working withIndian Traditional Embroidery with specialreference to fabric, embroidery threads, colors, colors, stitches, and motifs Chickankari – Lucknow, Phulkari –Punjab, Kanthas – Bengal, Applique work– Orissa and Gujarat Working with Asia Traditional Embroidery with special reference to fabric, embroidery threads, colors, colors, stitches, and motifs suzani Embroidery of Uzbekistan, Traditional Embroidery vitnam, Traditional gold Embroidery of malaysia, Philippine Embroidery

UNIT IV

Sampling and Sourcing of Traditional Indian Textiles with the special reference of materials, colors, motifs and production processes– Ikat and Patola, Kalamkari, Chanderi , Kota, Brocades, Bandhani , Block Printed Textiles Preparation of atleast two samples with machine embroidery techniques.

CourseOutcomes:

- To understand the basics of embroidery techniques, tools, equipments and their need.
- To understand different types of stitches by their unique sample preparation.
- To understand various traditional embroideries with related to fabricused.
- To understand the various sampling and sourcing of traditional textile material related to their colour, motif and production process.

Text Books & Reference Books:	**Author:**
Complete Guide to Needle work	Readers Digest
The Dictionary of Needle work	Sophia Cauteild and Blanche Saward
Ethnic embroidery of India	Usha Shrikant Vandana
Embroidery	Arora’s

PCC-FA-202 Apparel production

B.Tech (FASHION & APPAREL ENGINEERING) lll Semester

No. of Credits: 3		**Sessional:**	**25Marks**
LT P	**Total**	**Theory:**	**75Marks**
30 0	**3**	**Total:**	**100Marks**
		Durationof Exam:3Hours	

UNIT I Global Textiles and Apparel industry: History and evolution. Indian Textiles and Apparel Industry: History and Evolution. Indian Garment industry vis-à-vis leading countries. Apparel manufacturing countries: their features level of technology, product mix.

UNITII

Cutting: Objectives and methods of cutting; the planning, drawing, and reproduction of the marker, requirement of marker planning, marker plan efficiency, methods of marker planning and use. Aids and Tool equipment for cutting- Band knife, clamp, clickpress, electrical cloth notcher, Straight knife cutter, Circular knife, portable rotary knife cutter, Cutting Board, Cutting Table, Drill, Pattern perforator, razor blade, Scissors, Shears, Faceto face spreader, Manual spreader, one way spreader, Tubular knit spreader.

UNIT III

Understanding of various fabrics and its effect on spreading and cutting techniques in relation to quality and productivity, the spreading of fabric to form a lay, requirement of spreading and different spreading method. Tracing and marking Terminology-Chalked marking, chalked thread, colorcoding, pinmarking, tailorstacks, thread tracing.

UNIT IV Types of pattern – Commercial pattern, Drafted pattern, Draped pattern, Graded pattern, Production pattern, Trade back pattern Pattern Lay-out – Border design fabric, checkfabric, Diagonal design fabric/ Diagonal print fabric, Diagonal weave fabric, Irregular designfabric, Knit fabric, Large print fabric, Light reflecting fabric, Napped fabric, Balanced plaid, pilefabric, unbalancedplaid, unevenplaid, plastic fabric, Evenstripe, Unevenstripe.

CourseOutcomes:

- To gain the knowledge of global textile and apparel industry by their history andevolutionof various apparel marketstrategies.
- To understand garment manufacturing processes by means of spreading, marker planning, and cutting with different types of spreading techniques and marker planning processes.
- To understand various types of cutting devices, types of patterns, tracing and marking terminologies.
- To understand different types of pattern layouts techniques.

Text Books & Reference Books:	**Author:**
Clothing Technology	Carrand Latham
Apparel Industry Magazine	WorldClothing

PCC-FA203 Fashion sketching, Design Idea & Fashion Illustration Lab

B.Tech (FASHION & APPAREL ENGINEERING) lll Semester

No.of Credits:1			**Sessional:**	**15Marks**
LT	**P**	**Total**	**Practical:**	**35Marks**
00	**2**	**2**	**Total:**	**50Marks**
			Duration of Exam:2Hours	

1. Usage of different dry and wet colour mediums in sketching e.g. shading, filling etc. Normal figure proportions, Grid theory for formation of fashion figure. Fashion Figure proportions, Fashion figure in different views, as Front View,3/4th View, Back View, Side View. Flashing of the fashion figure in different views. Movement figures - principles to form a movement figure, sketching of the movement figures in various postures/body positions. Variations of body parts-Arms, Hands ,legs, Feet.Facial figure proportions-Features, Hairstyles. Developing Silhouettes–draping, fold lines, prints etc. Photo analysis, Fabric rendering, Simple illustration on fashion figures.
2. Developing fabric textureslike velvet, tie and dye, batik, denim, fur, leather,net,satin,organdie,etc.
3. Illusion in garments: line, print, color and silhouette Designing of various garments from the following categories: Children wear, Ladies' wear, Men's wear, Evening wear, Night wear, Kitchen wear, summer wear, winter wear and party wear,etc.
4. Advanceddesigning of the garments based upon innovative/ motivational designing e.g. electronics, sports, jewelry, modules, camouflage, etc.

Course Outcomes:

- To familiarize students with different sketching mediums, body figures, movements of figures and various fashion silhouette techniques.
- To give practical training to students in understanding the designing of basic fashion details, develop basic fabric textures on different fabrics, illusion of garments ondifferent types of garments and advanced designing on garments based upon different technical garments.
- Designing and sketching of different types of fashion details: necklines, sleeves, collars, pockets, yokes, skirts, waistlines, pleats, tucks and plackets.

Text Books & Reference Books:

1. MaiteLafuente "Fashion Illustration techniques", Om Publication.
2. Fernandez, "Illustration for Fashion Design 12 Steps to the Fashion Figure", Pearson.
3. Perpard, Prakashan, B Abling, "Antomy And Drawing", Fairchild.
4. Ireland, "Fashion Design Drawing and Presentation", Butstord.
5. Anne allen, "Fashion Drawing: the basic principle", Om Publication.
6. Mckelvey, Fashion Design, Blackwell.

PCC-FA204 Fibres Identification & Yarn Formation Lab

B. Tech (FASHION & APPAREL ENGINEERING) lll Semester

No.of Credits:1			**Sessional:**	**15Marks**
LT	**P**	**Total**	**Practical:**	**35Marks**
00	**2**	**2**	**Total:**	**50Marks**
			Duration of Exam:2Hours	

UNIT I

Principle of microscopy, Microscopic identification of fibres, preparation and mounting of specimen for longitudinal view, Cross-section cutting. Microtomy - cork method, metal plate method, Hardy's Microtome, Mountants and reagents for fibre microscopy; Identification of fibre by burning as well as solubility tests. Standard scheme of analysis of homogenous fibre blends by physical and chemical methods, Qualitative and quantitative determination of components. Preparation of reagents used for chemical analysis.

UNIT II

Discussion and demonstration of the various machines and of manufacturing processes involved in converting fibres to yarn viz. mixing, blending, opening, cleaning, carding, drawing, combing, rove formation, spinning, doubling etc.; Introduction to unconventional spinning machines/processes; Rotor spinning, Air-jet spinning and Friction spinning etc.; Simple Calculations pertaining to these machines/ processes

Course Outcomes:

- To illustrate various fibres on microscopic and chemical and burningtest.
- To familiarize the students with various machinery and process involve in conventional fibres to yarnmanufacturing.

Text Books & Reference Books:

1. "Identification of Textile Materials", Textile Institute, Manchester.
2. Gohl EPG. "Textile Science: An explanation of fibre properties", CBS Publishers, Delhi,
3. Heny A.N.J," Fiber Microscopy", A hand book of laboratory manual.
4. Meredith R & Hearle J.W.S." Physical Methods of Investigating Textiles".
5. § David M. Hall," Practical Fiber Identification",
6. ", Auburn Al, 1976
7. Cook Gordon J, "Hand Book of textile fibre", Vol. I and II, Woodhead Fibre Science Series.
8. UK. 1984.
9. Sara J. Kadolph, "Textiles". Prentice Hall, 10" edition 2007
10. Bernard P. Corbman, "Textile Fibres to Fabric" MeGrawhill Publications, 6" Edition 1983

PCC-FA205 Elementary Garment Manufacturing & Pattern Making Lab

B.Tech (FASHION & APPAREL ENGINEERING) lll Semester

No.of Credits:1			**Sessional:**	**15Marks**
LT	**P**	**Total**	**Practical:**	**35Marks**
00	**2**	**2**	**Total:**	**50Marks**
			Duration of Exam:2Hours	

1. Selection for different types of needle according to stitchingcomponents.
2. Selection procedure for different types of sewing and embroidery threads. Utility of different Aids and tools for Garment Construction, Basting Operation.Study of sewing machineries, Different tools and Work aids, Application of different trims and components. Study of Fusing and pressing machineprocedure
3. Introduction to the tools and material used for drafting. Drafting of child's basic and adults bodiceblocks.
4. Drafting of different commonly used sleeves as set-in, puff, raglan, flared, leg'o'mutton,etc.
5. Drafting of different collars as peter-pan, sailor, mendarin and shirt collarsetc.

Course Outcomes:
1.To understand basic tools, thread types, needle types, trims andcomponents and fusing and pressingmachineries.
2. To analyse different aids, tools and equipments for cutting and their applications as well.
3. To understand different types of pattern and patternlayout
4. To understand equipments for drafting and to develop basic bock construction and prepare different sleeves andcollars.

Text Books & Reference Books:

1. Carr, H.C., "The clothing Factory ", The Clothing Institute, London, 1972.
2. Jacob Solinger., "Apparel Manufacturing Handbook ", VanNostrand Reinhold Company.1980.
3. Irland, Encyclopedia of Fashion Details, Batsford

BSC-FA-201Applied Statistics & Operations Research

B.Tech (FASHION & APPAREL ENGINEERING) IV Semester

No.of Credits:4	**Sessional: 25Marks**
LT P Total	**Theory: 75Marks**
31 0 4	**Total: 100 Marks**
	Duration of Exam:3Hours

UNIT I

Measures of Dispersion: Range, quartile deviation, standard deviation, moments, skewness and Kurtosis (definition, properties and associated numerical only) Regression and Correlation: Karl Pearson's coefficient of correlation, rank correlation and line'sofregression, curvefitting (linear, parabolic, andexponential).

UNIT II

Theory of Probability: The concept of probability, additive and multiplicative lawsof probability (Statements and associated numerical only) Probability Distributions: Random variate, mathematical expectation, the oremson expectation, discrete and continuous probability distributions (definition and problems only). Univariate Binomial, Poisson and Normal distribution (properties and applications)

UNIT III

Sampling Theory: Population and sample, types of sampling, sampling distribution of means and proportions (definitiononly)Tests of Hypothesis and Significance: Definition of statistical hypothesis, null hypothesis, type I and type II errors and level of significance. Tests of significance for large and small samples (discussion) problem based on X2 test for goodness of fit, t-test, F-test and Analysis of variance (one way and two way classifications)

UNIT IV

Operations Research: Linear programming problem (formulation and solution bygraphical approach only). Transportation problem including time minimizing problems, Basic Assignment problem, sequencing problems (njobs,2 machines and n jobs, mmachine problems) Project scheduling by PERT/CPM: Definition of network, critical path, floats, finding of critical path and floats.

Course Outcomes:

- To familiarize studentswith basic statistics and their applications in apparel sector.
- To understand sampling Theory: Population and sample, types of sampling, sampling distribution of means and proportions.
- To underst and theory of probability.
- To underst and project scheduling by PERT/CPM.

Text Books & Reference Books:	**Author**
1. Mathematical Statistics	Rayand Sharma
2. Business Statistics	Guptaand Gupta
3. Operation Research	P.K.Gupta,Manmohan
4. Operations Research forManagement	Gupta and Sharma
5. Higher Engineering Mathematics	B.S.Grewal

PCC-FA206 Apparel Production Planning and Scheduling

B. Tech (FASHION & APPAREL ENGINEERING) lV Semester

No.of Credits: 3		Sessional: 25Marks	
L T P	**Total**	**Theory:**	**75Marks**
2 0 0	**2**	**Total:**	**100Marks**
		Duration of Exam: 3Hours	

UNIT I

Introduction to production, Operations, Concept of production, Productivity components of production, Production planning & control, its Objective, function & organization of various departments in apparel industry.

UNIT II

Production planning order preparation, material planning, process planning, loading & scheduling in apparel industry. Work measurement: Uses of work measurement, data, and basic procedure of work measurement.

UNIT III

Motion& Time study: Definition & scope of motion & time study, Data for sewing work study, improvement of production efficiency, Production analysis (qualitative & quantitative).

UNIT IV

Co-ordination of activities: Layering & marker planning , Cutting room planning, planning of sewing room, Material management in clothing production Quick response in apparel manufacturing . Different production system.

Course Outcomes:

- To understand concept of production planning and control in an apparel industry using work study.
- To analyse motion study , quick response and various production systems involve in an apparel industry
- To understand and operate different sewing data analysis software (GSD techniques).

TEXT BOOKS:

1. Introduction to clothing production management--A.J.Chutter
2. Production management in apparel industry--RajeshBheda

PCC-FA207 Fabric Formation

B. Tech (FASHION & APPAREL ENGINEERING) lV Semester

No.of Credits: 4

		Sessional:	**25 Marks**
L T P	**Total**	**Theory:**	**75 Marks**
2 1 0	**3**	**Total:**	**100 Marks**
		Duration of Exam: 3 Hours	

UNIT I

Introduction to warp and weft preparatory processes in relation to production of fabrics with flow charts. Winding : Objectives of winding, Flow of material through a winding machine, brief introduction of variousparts Warping: Objectives of warping, types of warping Types of creel. Sizing: Objectives of sizing. Brief introduction to Types of sizing viz aqueous and solvent slasher sizing machine, foam sizing, sinter roller sizing, hot melt sizing and single end sizing, Sizing ingredients: adhesives and different categories of additives.

UNIT II

Pirn winding and Drawing-in: Objectives and flow of material through these operations. Shuttle Looms: Definition of handloom, plain loom, and automatic loom. Introduction to various mechanisms of a loom viz. primary, secondary and auxiliary motion Shuttleless looms: Classification, Their advantages over shuttle looms. Brief description of Sulzer projectile loom, rapier looms, air-jet looms, water jet looms and their salient features. Fabric Analysis: Simple calculations for fabric weight per unit area, linear weight, cover and cover factors.

UNIT III

Basic Concepts: Importance of fabric structure, Classification of fabrics, Notation of Weave, drafting plan, peg plan anddenting. Weaves: plain weave and its derivatives, ornamentation, Twill weave and its derivatives, ornamentation, Sateen and Satin and their extensions

UNIT IV

Crepe weave, diamond, mockleno, Cork-screw, honey comb, huck-a-back, bedford cords, welt and pique fabrics. Decorative Weaves: Extra warp and weft figuring, Backed cloth, Double cloth, treble and multiply belting structures.

Course Outcomes:

- To understand fabric manufacturing technology and different devices used forwinding machine.
- To familiarize students among various types of warping process and sizing machines involvein fabric manufacturing.
- To gain the knowledge of students of different types of looms (Handmade andautomaticloom) involve in fabric manufacturing.
- To understand the concept of new advanced types of looms incorporate and alsofabric analysis technique.
- To analyse differen ttypes of decorative terry pile weave.

TextBooks&ReferenceBooks:

1. Principles of Weaving -- Marks & Robinson
2. TextileDesignandColor--Watson
3. Watson'sAdvancedTextileDesign --WWatson
4. GrammerofTextileDesign--HNisbet

HSMC01	EffectiveTechnical Communication	3L:0T:0P	3credits

Module 1: Information Design and Development- Different kinds of technical documents, Information development life cycle, Organization structures, factors affecting information and document design, Strategies for organization, Information design and writing for print and for onlinemedia.

Module 2: Technical Writing, Grammar and Editing- Technical writing process, forms of discourse, Writing drafts and revising, Collaborative writing, creating indexes, technical writing style and language. Basics of grammar, study of advanced grammar, editing strategies to achieve appropriate technical style. Introduction to advanced technical communication, Usability, Hunan factors, Managing technical communication projects, time estimation, Single sourcing, Localization.

Module 3: Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, Self-esteem. Managing Time; Personal memory, Rapid reading, Taking notes; Complex problem solving; Creativity

Module 4: Communication and Technical Writing- Public speaking, Group discussion, Oral; presentation, Interviews, Graphic presentation, Presentation aids, Personality Development. Writing reports, project proposals, brochures, newsletters, technical articles, manuals, official notes, business letters, memos, progress reports, minutes of meetings, eventreport.

Module 5: Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes, Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Personal memory, Rapid reading, Taking notes, Complex problem solving, Creativity.

Course Outcomes:

- To develop communication and technicalwriting.
- To develop the habit of Self assessment, Awareness, Perception andvalues.
- To gain the knowledge of Engineering ethics, Managing time, Role and responsibility of engineer.
- To understand different types of technical documents.

Text/ReferenceBooks:

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey.New York,2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003.(ISBN0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, NewYork,2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London,2004.
5. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN:07828357-4)
6. Sharma,R.and Mohan,K. Business Correspondence and Report Writing,

HSMC-FA202 Evolution of Clothing & Fashion

B.Tech (FASHION & APPAREL ENGINEERING) lVSemester

No. of Credits: 3

			Sessional:	**25Marks**
LT	**P**	**Total**	**Theory:**	**75Marks**
3	**0 0**	**3**	**Total:**	**100Marks**
			Duration of Exam: 3Hours	

UNIT I

Origin of clothing. Objectives of clothing and costumes, Main archetypes of costumes, Principles of history of fashion. Theories of clothing-Protection, adornment, modesty and combined need theory etc.Fashion and its meaning, Principles and history of fashion, Classification of fashion.Fashion product Life cycles. Sources of Fashion, Factors affecting fashion movement like cultural, socio-pychological, etc.

UNIT II

Effect of various factors such as communication, industry, economy, sports etc on fashion. Fashion leadership theories. Important fashion capitals, National and International fashion designers, National and International fashion markets and fashion weeks.

UNIT III

Indian history of costumes: Concept and comparison of costumes of all stages of prehistpric and medieval period, Study of Costumes, jewellary, footwear, hairstyles etc. in India in different periods as – Vedic and post vedic period, Maurian Period, Gupta period Kushan and Kanishka period.

UNIT IV

Global history of costumes: Concepts and history of classical costumes in Greek civilization and Roman civilization. History of costumes in Egyptian and Byzantine civilization. History of costumes in the western world starting from the origin up to the Reign of Charles and Louis with the emphasis on famous fashion centers and famous fashion designers.Important national and international fashion designers.

Course Outcomes:

- To understand the evolution of clothing and fashion since old civilised to modern civilisation through various archetypes, fashion lifecycles, sources offashion.
- To analyse various fashion leaders theories, national and international designers and also fashion week and fashioncalendars.
- To understand the various fashion centre capitals and factors affecting fashion industry.

TEXT BOOKS:

1. The guide to historic costumes -- Karen Baclaw Ski
2. Inside Fashion Business -- KittyG.Dickerson
3. Inside Fashion Design -- Sharon LeeTate.

MC-04 MESSAGE OF BHAGWAT GITA
B. Tech (FASHION & APPAREL ENGINEERING) IV Semester

L	T	P	Total
1	0	0	1

Sessional: 25 marks
Theory: 75 marks
Total: 100 marks
Duration of Exam: 3 hours

Course Objectives:
To enable the students to create an awareness on message of Bhagwat Gita.
To instil moral, social values and to appreciate the Karma Yoga.

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

CO1	Realize the relevance of Bhagavad Gita today.
CO2	Relate Yoga to Devotion
CO3	Realize the duties and Responsibilities in the Society.

Course Contents:

UNIT I:
Introduction: Relevance of Bhagavad Gita Today- Background of Mahabharata. Arjuna Vishada Yoga: Arjuna's Anguish and Confusion- Symbolism of Arjuna's Chariot. Sankhya Yoga: Importance of Self- knowledge- Deathlessness: Indestructibility of Counciousness Being Established in Wisdom- Qualities of Sthita- Prajna.

UNIT II:
Karma Yoga: Yoga of Action- Living in the Present- Dedicated Action without Anxiety over Results- Concept of Swadharma.
Dhyana Yoga: Tuning the Mind- Quantity, Quality and Direction of Thoughts- Reaching Inner Silence.

UNIT III:
Bhakti Yoga: Yoga of Devotion- Form and Formless Aspects of the Divine- Inner Qualities of a True Devotee **Gunatraya Vibhaga Yoga:** Dynamics of the Three Gunas: Tamas, Rajas, Sattava- Going Beyond the Three Gunas- Description of the Gunatheetha.

References Books

1. Swami Chinmayananda, "The Holy Geeta", Central Chinmaya Mission Trust.
2. Swami Chinmayananda, "A Manual of Self Unfoldment", Central Chinmaya Mission Trust

PCC-FA208 Fabric Formation & Analyzing Lab

B. Tech (FASHION & APPAREL ENGINEERING) IV Semester

No.of Credits: 1

				Sessional:	**15Marks**
L	**T**	**P**	**Total**	**Practical:**	**35Marks**
00	**2**		**2**	**Total:**	**50Marks**
				Duration of Exam:	**2Hours**

Basic principles of woven fabric analysis: estimation of data for cloth reproduction, Identification of yarns and materials used in their construction.
Weave analysis, Sett, Cover factor, Count and weight calculations for simple and compound woven structures, Specifications of standard woven fabric.
Discussion and Demonstration of various machines and of manufacturing processes involved in converting yarns to fabric winding, warping, sizing, Drawing-in, weaving by Hand looms, Plain Looms.
Automatic Shuttle Looms, Shuttleless Looms and Knitting, Passage of material through them and brief study of their essential components and mechanisms.
Simple production and efficiency calculations pertaining to these processes.

Course Outcomes:

- To understand the fabric formation onlooms
- The understand mechanism involved and as well as developing creativity in designing unique fabric structures along with fabricanalysis.
- To analyse manufacturing processes involved in converting yarns to fabricwinding.

Suggested Text Books & References:

1. Navneet Kaur, Comdex Fashion Design; Fashion Concepts: Vol -1, Dreamtech press, 2010
2. Gokareshan N.. Fabrie structure and design, New Age Publishers
3. Groscicki Z J, Watson Textile Design and Colour", Newnes Buttersworth.
4. Nisb: H. "Grammer of Textile Design", , D 13 Tarapore Wala sons and Co.

PCC-FA209 Apparel ConstructionLab–I

B.Tech (FASHION & APPAREL ENGINEERING) IV Semester

No.of Credits:1

			Sessional:	**15 Marks**
L	**T**	**P**	**Total**	**Practical:**	**35 Marks**
0	**0**	**2**	**2**	**Total:**	**50 Marks**
				Duration of Exam: 2 Hours	

Developing the basic blocks, marking information on blocks. Adaptations of the basic blocks, principle of dart manipulation by (i) slash and spread method (ii) pivotal transfer method.

Style variations of dart manipulation – pleats, tucks, gathers, dart clusters, radiating darts, terminating darts.

Fitting problems and their identification. Commercial paper pattern – symbols used in commercial patterns, envelopes for commercial paper patterns, guide sheet and other relevant information.

Flat pattern technique – drafting, developing paper pattern, designing and construction of garments of children, men and women using different construction and decorative features.

Course Outcomes:

- Understanding the basic block information, ,dart manipulation and drafting techniques.
- To analyse style variations of dartmanipulation
- To understand designing and construction of garments of children, men and women using different construction and decorativefeatures.

Suggested Text Books & References:

1. Armstrong, Pattern Making for Fashion Design, Dorling Kindersleypublication.
2. Aldrich, Metric Pattern Cutting Men's wear 4th Ed., Blackwellpublication.
3. Aldrich, Metric Pattern Cutting for Children wear & baby wear, Blackwell publication.
4. Aldrich, Pattern Cutting for Women tailored Jacket, Blackwellpublication.
5. Holman, Pattern Cutting Made Easy, Batsfordpublication.
6. Cooklin, Pattern Grading Men's cloth, Blackwellpublication
7. Cooklin, Pattern Grading Women's cloth, Blackwellpublication

PCC-FA301 Colouration of Textile & Apparel Products

B.Tech (FASHION & APPAREL ENGINEERING) V Semester

No.of Credits:4	**Sessional: 25Marks**
LT P Total	**Theory: 75Marks**
3 1 0 4	**Total: 100Marks**
	Duration of Exam:3Hours

Course Objectives:

- To introduce students with preparatory wet processing and concept of dyeing withrelevant machines and procedure..

Unit1:

Elementary knowledge and Process line for preparatory wet processing, Natural and added impurities in greige cotton fabrics. Overview of singeing, desizing, scouring operations with their objective, principal and mechanism, general recipe, drawbacks and advantages. Introductory idea of machines used in preparatory wetprocessing.

Unit 2:

General introduction to bleaching and mercerisation with their objectives, mechanism, machine used, drawbacks and advantages. Introduction to heat setting: objectives and mechanism. Pretreatment processing of wool and silk textile., General concept of dyeing i.e. dye-fibre interaction, dye uptake, shade percentage. Introductory idea of dyeing of fibre, yarn and fabric on different dyeing machines.

Unit 3:

Introductory idea of dyeing of cellulosic fibres with direct, acid, basic, reactive, vat, metal complex, sulphur, azoic and pigments (overview).

Unit 4:

Dyeing concept of synthetictextile materials such as Polyester, Nylon (disperse), etc . Dyeing of denim using Indigo dye. Chemical auxiliaries used in dyeing. Colour measurement and fastness (light, washing, perspiration, sublimation, chlorine, etc.) properties, Garment dyeing and processing: concept and machine used.

Course Outcomes:

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

- Understand the fundamentals of textile colouration and pre-treatenents.
- Analyse the textile dyes and techniques for different fibres.
- Apply dyes on fabric and garments.
- Develop the sample of denim using indigo dye.

Text Book & Reference Books:

1. GohlEP Gand Vilensky LD,“Textile Science”, CBS Publishers.
2. Chakarverty J N, “Fundamental and practices in colouration of textiles”,Wood head Publishing India PvtLtd,2008
3. Trotman E R,“Textile Scouring and Bleaching”, Griffin,1968.
4. Shenai V A,“Technology of Bleaching & Mercerising”,Sevak Pub.,Mumbai.

ESC-FA301 Knit & Garment Technology
B.Tech (FASHION & APPAREL ENGINEERING) V Semester

No.of Credits:4	**Sessional: 25Marks**
LT P Total	**Theory: 75Marks**
31 0 4	**Total: 100 Marks**
	Duration of Exam:3Hours

UNIT I

Definition of knitting, Type of Knitted fabrics and their characteristics, End-uses of knitted fabrics. Fundamental Stitches : Knit, Tuck and float stitches and their uses. Stitch diagrams. Knitting cycles of Latch, Beard and Compound Needles. Basic weft knitted structures (Plain, Rib, Interlock and Purl) and their properties, description of machine for production of these. Design and timings of their cams.

UNIT II

Patterning devices in weft knitting like multi-cam track, swing cam, pattern wheel jacquard and electronic jacquard, their mechanisms of operation. Development of knit structures on Circular and Flat Knitting Machine. Quality control of various knitting processes Ornamentation of knitted fabrics. Derivatives of basic structures like Le-coste, Accordian, Half and Full Cardigan, Milano Rib, French Rib, Swiss Rib, Single Pique, Taxi Pique, Pin Tuck. Classification of warp and weft knitting machines. Classifications of warp knitting machines.Description of Raschal and tricot machines. Characteristics of Raschal and Tricot structures Calculations for Tightness factor, fabric cover, stitch density, areal density and knitting machine production

UNIT III

Introduction to Knitted Garments- types and flowchart including the steps of production. Fully Cut garments – spreading – hand and machine spreading, types of lays. Marking – manual and computerized marking Cutting devices as die-cutter. Hand shears, laser cutting, etc. Cut stitch shaped – Fitting blocks as easy fitting and close fitting blocks. Consideration of visual stretch, stretch in action, etc. Shaping of various garments, e.g., in body sleeve angles, etc., Cutting in case of cut stitch shaped garmentsIntegral garments – Basic techniques as course shaping Wales shaping, tubular knitting, running-on, change of stitch type, casting -off, etc. Machine knitted integral garments as berets,, half hose, upper and lower bodice garments as Jacket, Wagnall garment, Tubular garment,etc

UNIT IV

Fully fashioned garments – Concepts of use of basic forms i.e., circle, bell, and balloon, triangle, overlays in the generation of a garment shape. Broader classification of integral garments. Fashioning for shaping, fashion frequency. Most used fashion details- Necklines, sleeves, etc. Application of each in Linking and Mock Linking.Linking machine and Cup seamer. Quality control of knitted garments.

Course Outcomes:

- To analyse knitted fabrics, their properties, manufacturing techniquesas well as ornamentation.
- To understand the concepts of fully fashioned garments
- Understand the classification of warp and weft knitting machines
- To understand the quality control of various knitting processes.

Text Books & Reference Books:	**Author:**
1. Knitting Technology	Wignal
2. Knitting Technology	Azgaonkar

PCC-FA302 Garment Production Machines & Equipment
B.Tech (FASHION & APPAREL ENGINEERING) V Semester

No.of Credits:3	**Sessional: 25Marks**
LT PTotal	**Theory: 75Marks**
30 0 3	**Total: 100 Marks**
	Duration of Exam: 3 Hours

UNIT I

Overview of the Garment Manufacturing processes, Introduction to the latest advancements in the Garment manufacturing processes. Fabric cutting Process: Pre-requisites for the fabric cutting. Tools and equipment needed for the cutting process. Advancements in the fabric cutting technology.

UNIT II

Garment assembly processes: Basics of sewing, Functional parts of sewing machines (SNLS): Feed mechanisms, Run-in-ratio, Effect of sewing process on the sewing thread strength. Principle, mechanism and utility of following machines: Interlock machine, Overlock machine, Double needle Lock stitch and chain stitch sewing machines, Bar- tacking machine, Feed off the arm, Button attaching and buttonhole making machine and computerized embroiderymachines.

UNIT III

Study of sewing needle temperature: Factors affecting and remedial measures, Methods for the needle temperature measurement.Study of the measurement of the sewing forces and pressure during sewing. Study of the measurement techniques of the sewing thread tension on the sewing machine: SNLS and overlock machines. Applications of Programmable logic circuits (PLC) in the Garment manufacturing processes. Robotics: Basic analogy, its applications, scope and limitations in the Garment Industry.

UNIT IV

Pressing and Fusing process and equipment. Handling of garments between different processes in the apparelindustry

Course Outcomes:

- To understand garment manufacturing process , sewing machineries , sewing needle etc.
- To understand sewing machine and computerized embroiderymachines.
- To analyse the handling of garments between different processes in the apparel industry.
- To understand the applications of Programmable logic circuits (PLC) in the Garment manufacturing processes.

Text Books & Reference Books:

1. Knitted Clothing Technology-Brackenburry
2. The Technology of Clothing Manufacture-Harold Carr,
3. Barbara Latham Introduction to Clothing Manufacture-GerryCooklin
4. Apparel Production-Jacob Solinger Robotics
5. Automation in the Textile Industry-M.G.Mahadevan
6. Fashion Production Terms-Debbie Ann Giocllo & Berle.

PCC-FA303 Colouration of Textile & Apparel Lab

B.Tech (FASHION & APPAREL ENGINEERING) V Semester

No.of Credits:1			**Sessional:**	**15Marks**
LT	**P**	**Total**	**Theory:**	**35Marks**
00	**2**	**2**	**Total:**	**50Marks**
			Duration of Exam:	**2Hours**

Desizing of cotton by various methods and determination of desizing efficiency. Scouring and determination of scouring efficiency, Bleaching of cotton using hydrogen peroxide. Assessment of bleached goods. Mercerization of cotton, Scouring and bleaching of wool. Deguming and bleaching of silk.

Dyeing of Cotton, by direct, reactive, sulfur, vat, azoic dyes. Dyeing of Wool and Silk by acid, metal complex dyes, Nylon with acid dyes, Carrier, HTHP, Thermosoling dyeing of PET, Dyeing of Acrylic with basic dyes, Dyeing of Cotton/Polyester and Polyester/Viscose blend. After treatment of direct dyes, Rectification and Stripping of dyes. Measurement of fastness properties, Perspiration, light, washing, rubbing, etc, Computer colourmatching

Course Outcomes:

- To understand various preparatory wetprocessing.
- To analyse dyeing applications on various type of fabrics.
- To understand dyeing of Wool and Silk by acid anddyes.

Suggested text books & references:

1. Gohl EP G and Vilensky LD, "Textile Science",
", CBS Publishers.
2. Chakarverty J N, "Fundamental and practices in colouration of textiles", Woodhead Publishing India Pvt Ltd, 2008
3. Trotman E R, "Textile Scouring and Bleaching", Griffin, 1968.
4. ShenaiVA, "Technology of Bleaching & Mercerising", Sevak Pub., Mumbai.
5. Gulrajani M L, "Chemical Processing of Silk".
Shenai V A,"Technology of Dyeing", Sevak Pub., Mumbai.
7. Trotman E R, "Dyeing and Chemical Technology of Textile Fibres", B.I. Publications Pvt. Ltd.
8. Hall David M, Chemical tesha of texiles: a laboratory manuglept of Texil Engineering, AuburnUniversity, 1981

PCC-FA304 Apparel Construction-II

B.Tech (FASHION & APPAREL ENGINEERING) V Semester

No.of Credits:1	**Sessional:**	**15Marks**
LT PTotal	**Practical:**	**35Marks**
0 0 2 2	**Total:**	**50 Marks**
	Duration of Exam:	**2Hours**

Principle of dart manipulation by (i) Slash and spread method (ii) Pivotal transfer methodStyle variations of dart manipulation – pleats, tucks, gathers, dart clusters, radiating darts, terminating dartsCommercial paper patterns-symbols used in commercial patterns , envelopes for commercial paper patterns,guide sheetand other relevantin formation.

CourseOutcomes:

- To understand the basic dart manipulation.
- To analyse different types of patterns involve in Designing of garments

Suggested Text Books & References:

1. Chuter. Introduction to Clothing Production Management, Blackwell.
2. S. Armstrong, Pattern Making for Fashion Design, Dorling Kindersley publication.

ESC-FA302 Knit Design & Development Lab

B.Tech (FASHION & APPAREL ENGINEERING) V Semester

No.of Credits:1		**Sessional:**	**15Marks**
LT PTotal		**Practical:**	**35Marks**
00 2 2		**Total:**	**50 Marks**
		Duration of Exam:2Hours	

Study of warp patterning through sectional warping. Study of weft patterning through drop box motion.Study of weft patterning though electronic dobby and jacquard. To prepare fabric samples on desk looms/hand looms with basic weaves like plain, twill, satin, sateen, matt and some decorative weaves like honey comb, mock-leno, crepe, screw etc. To study single jersey, rib, interlock circular weft knitting m/cs. Practice of fabric sample preparations on these m/cs. To study flat bed weft knitting m/cs. Practice of fabric sample preparations on these m/cs. To prepare different knitted fabric design by combination of knit tuck and float using pattern wheel jacquard in circular m/c. Study of different types of fabrics and their specifications according to their enduse.

Course Outcomes:

- To impart knowledge among students with basics of differentwoven
- To analyse knitted fabricsstructures
- Design samples on handloom, power loom and knittedmachineries.

Suggested Text Books & References:

1. Azgaonkar, "Knitting Technology", Universal Publishing Corporation, 1998.
2. Spencer, Knitting Technology, Pergamon Press.
3. Wignal H, Hosiery Technology, Plainfield, N.J.: Textile Book Service, 1968.
4. Irfan Ahmed sheikh, Pocket Knitting Expert, Irfan publisher
5. Terry, Knitted Clothing Technology, Blackwell

PCC-FA305 Colour and Design Concept

B.Tech (FASHION & APPAREL ENGINEERING) VI Semester

No.of Credits:3		**Sessional:**	**25Marks**
LT P	**Total**	**Theory:**	**75Marks**
3 0 0	**3**	**Total:**	**100Marks**
		Duration of Exam:	**3Hours**

UNIT I COLOUR – Concept and specifications of colour, Light and colour phenomenon, Additive and Subtractive combinations, Colour theories as light theory, pigment/ Brewster colour theory. Colour wheel – primary, secondary, sub-secondary and tertiary colours, Rainbow colours. Colour combination techniques in fabric and garments. Psychological effects of colour, Warm and Cool colours. Colour harmony. Definition of Colour as per C.I.E., Tristimulus value, Hue and Chroma; Colorgamut

UNIT II Colour combination techniques in fabric and garments.Colour contrast in fabric and garments. Application of colour combination and harmony in designing of clothing/fabric. Modification of colours as formation of tint, shades and coloured grays etc. Colour intensity charts. Outline for the movement of colours in fashion with the factors affecting the choice of colour. Elements of design of a motif : line, dot, curve, colour and texture. Different Types and their applications.

UNIT III Composition of designs Geometric ornamentation, conventional treatment of natural and artificial forms, adoption and reproduction of earlier designs. Construction of symmetrical figures, Reversing inclined figures. Arrangement of figures - unit-repeating design, the drop device, drops reverse designs, sateen system of distribution (with reference to half drop, diamond base, ogee base, rectangular base lines). Construction of designs from incomplete repeat.

UNIT IV Study of Pattern:– historical precedents. Symmetry – principle concepts, perspectives and its application, classification of motifs, border patterns, all over patterns, Counterchange motifs, border patterns and allover patterns.

Course Outcomes:

Upon successful completion of the course, the students will be able :

- To understand various terminology and theories ofcolours.
- Design ideas concepts and their role and application in apparelconstruction
- To understand the composition of designs and geometricornamentation
- To understand colour combination and intensitycharts.

Text Books & ReferenceBooks:	**Author**
1. Watson'sTextile Design and colour	Watson
2. Colour mixing Bible	Watson–Guptill Publication
3. Colour:right from the start	Watson –Guptill Publication

PCC-FA306 Textile & Apparel Product Testing

B.Tech (FASHION & APPAREL ENGINEERING) VI Semester

No.of Credits:3		**Sessional:**	**25Marks**
LT PTotal		**Theory:**	**75Marks**
30 0 3		**Total:**	**100 Marks**
		Duration of Exam:3 Hours	

UNITI Introduction to testing and its importance, Standard atmospheric conditions for testing and its effect on test results. Testing of yarn strength, elongation, twist, evenness and hairiness. Fabric dimensions measurement–length, width, thickness, weight/area, thread/length and crimp.

UNIT II Tensile strength and elongation: Definition of different units, tensile strength andelongation, work of rupture, tearing strength, bursting strength. Serviceability: Snagging test, Pilling test, Abrasion resistance.

UNIT III Comfort: Water vapour repellency, Wicking properties, Air permeability, Thermal insulation and wettability. Fabric handle: Bending length, Crease recovery, Drape, Low stress mechanica properties. FAST, KawabattaEvaluation System.

UNIT IV Garment Testing: Dimensions, Seam strength, Seam slippage, Adhesion between interlining and fabric, shrinkage, zippers, buttons, snap fasteners and other general garment properties. Needle Cutting/Yarn severance.

CourseOutcomes:

- To understand methods of testing relevant to fibres, yarn and fabrics with brief description of relevant equipment.
- To understand garment Testing
- To underst and testing and its importance.
- To understand adhesion between interlining and fabric, shrinkage, zippers, buttons, snap fasteners and other general garment properties

TextBooks&ReferenceBooks:	**Author:**
1. PrinciplesofTextiletesting	J.E Booth
2. TextileTesting	V.K.Kothari
3. ApparelqualityControl	V.K.Mehta
4. PhysicalTestingofTextile	Saville

PCC-FA307 Textiles & Apparel Printing

B.Tech (FASHION & APPAREL ENGINEERING) VI Semester

No.of Credits:3		**Sessional:**	**25Marks**
L T P	**Total**	**Theory:**	**75Marks**
3 0 0	**3**	**Total:**	**100Marks**
		Duration of Exam:	**3Hours**

UNIT I

Different methods and styles of printing of natural and synthetic fabrics, machinery involved: Block, Roller, Rotary & Screen, Transfer Printing.

UNIT II

Design making and screen exposing - Table, Flat-bed, Rotary screen. Ink-jet printing, Xerographic printing, Lithographic printing, etc.

UNITIII

Printing with reactive dye sand pigments. Special effects like–Batik, Tie and dye.

UNIT IV

Some special printing: Wax prints, Java prints, Fancy prints, Bleeder style, Crimpstyle.

Course Outcomes:

- To understand fundamentals of printing, various methods and styles of printing.
- To understand applications of printing procedure
- To understand detail chemistry of dyes and printing auxiliaries.
- To analyse some special printing process.

Text Books & Reference Books: **Author**

1. Technology of printing — V A Shenai
2. Textile Printing Second annual Symposium — R B Chavan

PCC-FA310 Colour and Design Lab

B.Tech (FASHION & APPAREL ENGINEERING) VI Semester

No.of Credits:1	**Sessional:**	**15Marks**
LT PTotal	**Theory:**	**35Marks**
0 0 2 2	**Total:**	**50 Marks**
	Duration of Exam:	**2Hours**

Specification of color with hue, value and chroma, color combinations according to pigmenttheory of colour. Arrangement of the primary, secondary and intermediate colours in theBrewster's theory. Colour illusions , warm and cool colour effects, Modification of pigment colour with formation of tint, shades and coloured grays etc, Colour and gray intensity charts.Types of lines, dots and curves and their effects, To produce floral, geometrical, abstract andborder designs. Enlargement and reduction of designs. Simple Weave and colour effects. Compound colour and weave effects – stripe colour and weave effect, Check colour andweave effect, Special colour and weave effect, figured colour and weave effect. Placement offiguresandmotifs–halfdrop, double½drop, diamond base, ogee base, rectangular, horizontal, vertical etc.

CourseOutcomes:

- To analyse construction of motif or design and furtherapplication.
- To understand water colours to fill.
- To understand arrangement of the primary, secondary and intermediate colours in the Brewster'stheory.

Suggested Text Books & References:

1. Groscicki Z J, "Watsons Textile Design and Colour", Newnes Buttersworth, 1988.
2. Gohl EP G and Vilensky I.D, "Textile Science", CBS Publishers, Delhi, 1983.
3. Hideaki Chijliwa, Color Harmony - A guide to creative color combinations, 1994 edition.
4. Davis. Marian L.. Visual Design in Dress, Prentice-Hall Inc., 1996.
5. Elizabeth Rouse, Understanding Fashion, BSP Professional Books, 198°.

PCC-FA401 Textile & Apparel Finishing

B.Tech (FASHION & APPAREL ENGINEERING) VII Semester

No.of Credits:3		**Sessional:**	**25Marks**
LT P	**Total**	**Theory:**	**75Marks**
30 0	**3**	**Total:**	**100Marks**
		DurationofExam:	**3Hours**

CourseObjectives:

- To introduce various mechanical and chemical finishes, their application in textile and garment industries.

UNIT I

Introduction to textile finishing. Aim and scope. Classification of finishes. Concept of permanent and temporary finishes. Various finishes in industrial practices such as raising andshearing, drying. Calendering - its types, construction and function of various calendaring m/cs.

UNITII

Mechanism of shrinking and pre-shrunk fabric. Sanforizing–method and mechanism. Brief concept of finishing of wool: Crabbing, decatising, milling, shrink finishing, etc . General chemical finishes likes oftening, stiffening, delustering of rayon, polyester. Organdy finish. Silky finish of polyester. Weighting of silk

UNIT III

Introduction and preliminary concepts of specialty finishes such as durable press textile and garments, anti-crease finish. Water repellent and water proof finish, Flame-proof and flame-retardant finish.

UNIT IV

Introduction and preliminary concepts of specialty finishes such as Soil and oilrepellent finish, anti-static finish, antimicrobial finish. Introduction of enzymes and their applications in finishing of textiles and garments. Finishing of denim: stone wash, enzymewash, etc. enzyme wash and some other specialty finishes. Brief introduction to garment finishing machines.

CourseOutcomes:

Upon successful completion of the course, the students will be able:

- To develop water repellent and water proof finish, flame-proof and flame-retardant finish.
- To understand mechanism of shrinking and pre-shrunkf abric.
- To understand finishing of denim: stone wash, enzyme wash,etc.enzyme washand

Some other specialty finishes.

Text Books & References:

1. Gohl E P Gand Vilensky L D ,“ Textile Science ”,CBS Publishers
2. JT Marsh, An Introduction to Textile Finishing, Chapman and Hall, 2nd Ed, London,1966.
3. Shenai V A, Textile Finishing, Sevak Pub.,Mumbai.
4. J N Chakarverty, “Fundamental and practices in colouration of textiles”, Wood Head Publication, India,2008.

PCC-FA402 Textile & Apparel Costing

B.Tech (FASHION & APPAREL ENGINEERING) VII Semester

No.of Credits:3		**Sessional:**	**25Marks**
LT P	**Total**	**Theory:**	**75Marks**
30 0	**3**	**Total:**	**100Marks**
		Duration of Exam:	**3Hours**

Course Objectives:

To familiarise students with different costing techniques of yarn, fabricandgarment.

UNIT I General Cost Concept: Classification of cost (Fixed, Variable, Semi-variable and Total Cost), Cost elements (direct, indirect), planning and storage of materials, pricing and control of materials, computation and control of labour cost, Remuneration and incentives to labour. Over head costs: Classification and accumulation, allocating service department costs, distribution and absorption, marketing and administration, depreciation and miscellaneous**.**

UNIT II Methods of costing: Single or output costing, job order cost system, introduction to other methods of costing. Cost control techniques: standard costing, variance analysis (Materials and labour, overheads, sales and marketing). Cost control and cost reduction.

UNIT III Costing in textile industry: Cost structure, raw material cost, labour cost and other expenses. Yarn realization, determination of cost per kg of yarn, per meter of fabric. Cost of dyeing/printing per meter fabric. Value loss, selling price decision of fabric.Costing in apparel industry: Raw material cost, labour cost and other expenses. Cost analysis of different garments withexample.

UNIT IV Dollar Planning and control: Introduction, Responsibilities for a dollar plan, Requirements of a dollar plan, Approach to a dollar plan, Elements of the dollar plan (planned sales, Planned Stock – Stock turnover, Stock/Sales ratio. The relationship between stock turnover and stock/sales ratio). Retail inventory method- Advantages, Applications, The dollar plan in action. Control system, Controls and Fashionconsideration.

Course Outcomes:

Upon successful completion of the course, the students will be able :

- To develop water repellent , water proof finish, flame-proof and flame-retardant finish.
- To understand methods ofcosting.
- To understand cost analysis of different garments with example.
- To understand finishing of denim: stone wash, enzyme wash, etc. enzyme wash and some other specialtyfinishes.
- To analyse the dollar plan in action, control system, and fashion consideration in practices.

Text Books & References:

1. Sidney Packard,“Fashion Buying & Merchandising”,Fairchild.
2. B.M.L. Nigam, G.L. Sharma ,“Advanced cost accounting”, Himalaya Publishing House,Delhi,2007.
3. Harold Carr/John Pomeror,“Fashion Design & Product Development”,Wiely India.
4. Michael Jeffry,“Costingofapparel”.
5. Dodge,R.,Foundationof Business Accounting,Chapman and Hall,1993.
6. Drury,C.,Costing,An Introduction,Chapmanand Hall,1998.
7. Holmes, G. and Sugden, A., Interpreting Company Reports and Accounts, Wood head-Faulkner,1999.
8. Horngren,C.T.,Introduction to Management Accounting, Prentice Hall,1996..

PCC-FA403 Quality assurance in apparel industry

B.Tech (FASHION & APPAREL ENGINEERING) VII Semester

No.of Credits:3		**Sessional:**	**25Marks**
LT P	**Total**	**Theory:**	**75Marks**
30 0	**3**	**Total:**	**100Marks**
		Duration of Exam:	**3Hours**

Course Objectives:

To introduce students with various aspects of quality and theirmanagement.

UNIT I Definition& importance of Quality, Tools of quality control.

UNIT II Quality Control – Principles of Quality Control, total quality control, statistical qualitycontrol, quality circle, quality and profitability, Quality control in fusing.

UNIT III Inspection – Definition, inspection, loop, raw material inspection, in-process inspection, final inspection, comparability checks.

UNIT IV ISO-9000 series of standards. Quality assurance, TQM, Six Sigma. Care labeling of apparel and textiles – American care labeling system, British care labeling system, Japanese care labelingsystem.

Course Outcomes:

Upon successful completion of the course, the students will be able :

- To understand Tools of qualitycontrol.
- Tounderstand Principles of quality control, total quality control, statistical quality control .
- To understand ISO-9000 series of standards. Quality assurance, TQM, Six .
- To analyse the various care labelingsystem.

Text Books & References:

1. An Introduction to Quality Control for the apparel Pradip VMehta.
2. Managing Quality in the Apparel Industry SatishBhardwaj& VMehta
3. The Technology of Clothing Manufacture Harold Care & BarbaraLatham

PCC-FA404 Apparel draping & grading lab

B.Tech (FASHION & APPAREL ENGINEERING) VII Semester

No. of Credits:		**Sessional:**	**15Marks**
1LT P Total		**Practical:**	**35Marks**
0 0 2 2		**Total:**	**50 Marks**
		Duration of Exam:2Hours	

Course Objectives:

- To give training on students with different techniques of draping and grading of bodice block to the dress form.

Illustration for the techniques of draping to get the fault free draped pattern. Practice of draping of basic bodice to the dress-form. Variations in bodices as per the designing details. Drapingof basic skirt and hence skirt variations.

Fundamentals & techniques for Grading with the use of size-charts etc. Grading of basic bodices by z-track and 3-track method. Computerized grading on Lectra software. Practice on soft ware available for draping and grading.

Course Outcomes:

At the end of course student will be able to:

• Analyze different pattern making and grading techniques.
• Evaluate different dart manipulation method and able to apply them.
• Create different type of sleeves, collars with draping.
• Create yokes and neckline with draping.

Suggested Text Books & References:

1. Armstrong, Pattern Making for Fashion Design, Dorling Kindersley publication.
2. Aldrich, Metric Pattern Cutting Men's wear 4 Ed., Blackwell publication.
3. Aldrich, Metric Pattem Cutting for Children wear & baby wear, Blackwell publication.
4. Aldrich, Pattem Cutting for Women tailored Jacket, Blackwell publication.
5. Holman, Pattern Cutting Made Easy, Batsford publication.
6. Cooklin, Patter Grading Men's cloth, Blackwell publication.
7. Cooklin, Pattern Grading Women's cloth, Blackwell publication.

PROFESSIONAL ELECTIVE COURSE (PEC)

PROFESSIONAL ELECTIVE COURSE –I (SEMESTER-IV)

Supply chain management

B.Tech (FASHION & APPAREL ENGINEERING) lV Semester

No.of Credits:3	**Sessional: 25Marks**
LT P Total	**Theory: 75Marks**
3 0 3	**Total: 100 Marks**
	Duration of Exam:3Hours

Unit-1:

Introduction of Supply Chain, Supply Chain Concepts: flow of materials, flow ofInformation, Supply Chain Drivers.

Unit-2:

Objective of supply chain, decision phases in a supply chain, process view of supplychain- cycle view and push/pull view, importance of supply chain flows.

Unit-3:

Safety Inventory, cyclic inventory, role of sourcing in a supply chain – supplier scoringand assessment, supplier selection, design collaboration, procurement process, sourcing planning and analysis, procurement process, making sourcing decisions in practice.

Unit-4:

Reverse supply chain (RSC), difference with forward supply chain, cost considerations involved , industries participation , factors leading to application of concept of RSC in specific industries and its restricted application, benefits, cost effectiveness of RSC compared to forward supply chain. Overview on critical path management, the role of IT in supply chain.

Course Objectives:

- To gain the basic idea about supply chain by means of flow and various drivers involve in supply chain management.
- To understand various supply chain management decision techniques.
- To understand the concept of inventory management.
- To understand the importance of reverse supply chain and forward supply chain and their application.

Suggested Text Books & References:

1. Martin Christopher, “Logistics & supply Chain Management: Strategies for Reducing Cost and Improving service”, 2nd Edition, Pitman Publishing,1998.

2. Sunil Chopra and Peter Meindl, “Supply Chain Management : Strategy, Planning and Operation”, Prentice Hall Inc.,2001

3. Douglas Macbeth and Ferguson N., “Partnership Sourcing: An Integrated Supply Chain Management Approach”, Financial Times Management,1994.

PROFESSIONAL ELECTIVE COURSE -I (SEMESTER-IV)

Engineering Ergonomics

B.Tech (FASHION & APPAREL ENGINEERING) lV Semester

No.of Credits:3	**Sessional: 25Marks**
LTPTotal	**Theory: 75Marks**
3 0 3	**Total: 100Marks**
	Duration of Exam: 3Hours

UNIT I

Definition of Economics - various definitions, Nature of Economic problem, Production possibility curve Economic laws and their nature. Relation between Science, Engineering, Technology and Economics. Concepts and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility - its practical application and importance.

UNIT II

Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve, Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & applications of the concept of elasticity of demand. Meaning of production and factors of production; Law of variable proportions, Returns to scale, Internal and External economics and diseconomies of scale.

UNIT III

Various concepts of cost - Fixed cost, variable cost, average cost, marginal cost, money cost, real cost opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run. Meaning of Market, Types of Market - Perfect Competition, Monopoly, Oligoply, Monoplistic Competition (Main features of thesemarkets)

UNIT IV

Supply and Law of Supply, Role of Demand & Supply in Price Determinition and effectof changes in demand and supply on prices. Nature and characteristics of Indian economy (brief and elementary introduction), Privatization - meaning, merits and demerits. Globalisation of Indian economy - merits and demerits. Elementary Concepts of VAT, WTO, GATT & TRIPS agreement.

Course Outcomes:

- To understand brief idea about ergonomics by their practical utility andimportance.
- To understand the concept of market demand and their practical application.
- To gain the knowledge of various types of cost accountingtechniques.
- To understand the role of supply and demand, globalisation of Indian economy by their meritrs and demerits with affect the international marketscenario.

TEXT BOOKS & REFERENCE BOOKS:

1. Principles of Economics -- P.N. Chopra (KalyaniPublishers).
2. Modern Economic Theory – K.K. Dewett(S.Chand)
3. A Text Book of Economic Theory Stonier and Hague (Longman'sLandon)
4. Micro Economic Theory -- M.L. Jhingan(S.Chand)
5. Micro Economic Theory -- H.L. Ahuja(S.Chand)
6. Modern Micro Economics --S.K. Mishra (PragatiPublications)
7. Economic Theory - A.B.N. Kulkarni& A.B. Kalkundrikar (R.Chand&Co.)

PROFESSIONAL ELECTIVE COURSE –I (SEMESTER-IV)

IntroductionTo Fashion Retail

B.Tech (FASHION & APPAREL ENGINEERING) lV Semester

No.of Credits:3	**Sessional: 25Marks**
LTP Total	**Theory: 75Marks**
3 0 3	**Total: 100Marks**
	Duration of Exam: 3Hours

Unit 1:

Retail, fashion retailing - types of retail formats, retail formats operating fashion inIndia-franchised retail, chain store retailing, specialty stores, factory outlets, discount retailing, non store retailing like online retailing, level of service offered, franchising systemcharacteristics, retail marketing decisions.

Unit 2:

Wholesalers-difference between retailers and wholesalers, types of wholesalers, majorfunctions and services provided by wholesalers, product line of wholesalers, modes of physical distribution, marketing logistics, inventory management

Unit 3:

Retail marketing –nature, concept and importance, objectives of retail marketing, retail marketing mix, mix planning and composition, key elements of retail mix, retail marketing planning and its types, retail buying sequence and communication. Various modes of fashion retail promotions. Influence of promotion on the business, limitations.

Unit 4:

Changing dimensions of fashion retailing - growth of private labels: retailers into manufacturing, concentration of retail power, globalization of retailing, relationship marketing, partnerships, logistics and distribution.

Course Outcomes:

- To gain the importance of fashion retail sector by means of various fashion stores.
- To understand the concept idea behind retailer and wholesaler.
- To gain the knowledge of concept of retail marketing, retail mix and various promotion mix comes underretailing.
- To understand the dimension of retailingsector.

Text Books & References:

1. Kitty G.Dickerson, Inside the Fashion Bussiness, 7th Edition, Pearson Education, India Philipkotler and Kevin Keller, Marketing Management,13thEd, Prentice Hall

PROFESSIONAL ELECTIVE COURSE –II (SEMESTER-IV)

Structure & Properties of Textiles

B.Tech (FASHION & APPAREL ENGINEERING) IV Semester

No.of Credits:3	Sessional: 25Marks
L T P Total	Theory: 75Marks
30 0 3	Total: 100Marks
	Duration of Exam: 3Hours

Course Objectives:

- To impart knowledge, importance and structure and properties relevant to fibres, yarn and fabrics with brief descriptionof relevantequipment.

UNITI

Structure and Properties of Ring, Rotor, DREF spun yarns, multifilament and textured yarns. Importance of Yarn structure in relation to different mechanical properties of Apparel Fabrics. Cloth setting theories: Ashenhurst's, Armitage's, Law's, Brierley's and Peirce's theory: its basic seven equations and idea ofjamming

UNIT II

Tensile property of fabrics: tensile curve for fabrics and geometrical changes during tensile deformation, factors affecting tensile strength of fabrics, Bending property of fabrics: Different bending stiffness parameters by cantilever testing, Bending hysteresis testing and different parameters measured by it, Bending hysteresis curve, Factors affecting bending stiffness offabrics

UNIT III

Shear stiffness of fabrics: problems during shear testing and their remedies. Shear hysteresis curve, Spring- friction block model of shear behaviour. Creasing of fabrics: Mechanism of creasing, different motions within fabric structure while creasing. Factor affecting crease resistance and crease recovery of fabrics.

UNIT IV

Comfort of fabrics, different constituents of comfort. Flow of heat, moisture and airthrough textile material, Factors affecting thermal insulation, moisture propagation and airpermeability of fabrics. Drapability of fabrics, Drape testing, drape parameters and factorsaffecting drape behaviour. Introduction to the term Tailorability and Formability for apparel fabrics. Handle of fabrics. Objective evaluation of fabric handle. Constituent properties ofhandle.

Course Outcomes:

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

- Relate the importance, objectives and fundamentals of textile testing.
- Perform proper sampling techniques and procedures for testing.
- Evaluate the influence of fibre and yar properties influence fabric/garment quality.
- Use analytical skills to assess different quality aspects.
- Develop insight into innovative quality product.

TextBooks&ReferenceBooks: **Author:**

1. TextileYarns-Technology, Structure and Applications Goswamietal
2. Structural Mechanics of Fibres,Yarns and Fabrics Hearleetal

PROFESSIONAL ELECTIVE COURSE –II (SEMESTER-V)

B. Tech (FASHION & APPAREL ENGINEERING) lV Semester

Preparative wet process

		Sessional:	**25Marks**
L T P	**Total**	**Theory:**	**75Marks**
3 0 0	**3**	**Total:**	**100Marks**
		Duration of Exam:3Hours	

Unit I

Greige Fabric checking, Preparation of process chart. Elementary knowledge of processing department, identification of impurities in greige, cotton, wool, silk and synthetics. Identification of size materials on fabric. Recipes, conditions and machinery use for removing impurities from griege fabric, yarn and fibres.

Unit II

Introduction to different processes (Desizing, Scouring, bleaching, mercerising, milling, etc.) involved for the above and the machinery used.

Unit III

Heat and steam setting of synthetic fibres / fabrics / yarns (polyester, nylon, acrylic, polypropylene, spandex fibre etc.). Physical principles involved in detergency, condition for efficient detergency. Commercial detergents. Dry cleaning, Stain removals

Unit IV

Modern developments in pre-treatments. Continuous processing machinery. Auxiliaries used in Desizing, scouring, bleaching and mercerizing.

Course Outcomes:

Upon successful completion of the course, the students will be able :

- To understand the elementary pre-treatment processes of various natural and synthetic textilematerials.
- To know how various recipes and machineries involved for removing impurities in greigefabric.
- To understand knowledge of various modern textile pre treatment processes involved in textile wet processingsector.
- To gain the knowledge of various auxiliaries suitable of wet processing.

Text Books & Reference Books:

1. Textile Chemistry RHPeters
2. Mercerising JT Marsh
3. Textile Scouring and Bleaching E RTrotman
4. Technology of Bleaching &Mercerising VAShenai
5. Chemical Processing of Silk MLGulrajni

PROFESSIONAL ELECTIVE COURSE –II (SEMESTER-V)

Principles Of Management

B.Tech (FASHION & APPAREL ENGINEERING) V Semester

No.of Credits:3		**Sessional:**	**25Marks**
LT P	**Total**	**Theory:**	**75Marks**
30 0	**3**	**Total:**	**100Marks**
		Duration of Exam:	**3Hours**

CourseObjectives:

- To stimulate managerial skills to upcoming technocrats so they can deal and manage futurechallenges.

UNIT I: Introduction to management: Science as well as Art, Management and Administration –brief out lines of Management Thoughts, Process of Management- Planning: Nature and Purpose-Steps involved in Planning- Objectives- Setting Objectives- Process of Managing by Objectives- Strategies, Policies and Planning Premises- Forecasting – Decision making

UNIT II Nature and Purpose, types of organisation structure, Organising: departmentationbydifference, Line and Staff authority, Benefits and Limitations, DeCentralization and Delegation of Authority, Staffing – nature and process, brief concept and role of HRD.

UNIT III Directing: Scope - Human Factors - Creativity and Innovation - Leadership-Types ofLeadership, styles and qualities of leadership, Motivation: meaning, types, significance and motivational theories

UNIT IV Controlling: Management control- concept and process, overview of controltechniques (traditional and modern), managing ethics and social responsibility. The Global Environment - Globalisation and Liberalisation, Introduction to RTI act.

Course Outcomes:

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

- Implement the process of Managment planning.
- Implement Organising in a enterprise.
- Implement the process of Directing controlling.
- Analiyze the Global Environment with ideas of Globalisation and Liberalisation.

Text Books & References:

1. Robbins, S.P. and Decenzo, D. A., Fundamentals of Management, pearson Education Asia, NewDelhi.
2. Harold Kooritz and Heinz Weihrich, Essentials of Management, TataMcGraw-Hill, New Delhi,1998
3. Joseph L. Massie, Essentials of Management, Prentice Hall of India, Pearson Fourth Edition, New Delhi,2003.
4. Tripathy P.C. and Reddy P.N., Principles of Management, Tata McGraw-Hill, New Delhi,1999.
5. Decenzo David and Robbins Stephen A.,

PROFESSIONAL ELECTIVE COURSE –III (SEMESTER-V)

PECFAEL301-1: Computer Aided Designing

B.Tech (FASHION & APPAREL ENGINEERING) V Semester

No.of Credits:3 **Sessional: 25Marks**

L T P	Total	Theory:	75Marks
3 00	3	Total:	100Marks
		Duration of Exam:	3Hours

Course Objectives:

To introduce and give hand on training on computer software and hardware, basic tools and designing techniques which help in apparelsector.

UNIT I Fundamentals of CAD: Definition, History , Hardware and Software requirements of CAD, Design Process, Application, Use, Creating the manufacturing Data base and benefits ofCAD.

UNIT II Hardware in CAD: Introduction, Design workstation, Graphics terminal, input and output devices, central processing unit and secondary storage.

UNIT III Introduction to Computer Graphics – What is Computer Graphics, Computer graphics applications, Computer Graphics Hardware and Software. Two dimensional graphics primitives – Point and Lines, Line drawing algorithms: DDA, Bresenham's; Circle drawing algorithms: midpoint circle drawing algorithm, Bresenham's circle drawing algorithm.

UNIT IV Introduction to Software Packages: Introduction to Auto-CAD: Features, Basic Drawing Techniques: Drawing Line, Circle, Rectangle, Arc, Polyline, Ellipse, Elliptical Arc, Polygons, Donuts, Corner rounding, Chamfering, Displacing, Duplicating, Removing Objects. Introduction to Corel Draw – Features and basic drawing techniques.Introduction to Photoshop – Features and basic drawingtechniques.

Course Objective:

- To impart an understanding about the fundamentals, principles and application of CAD.
- To give hands on training to students on Corel Draw software's and their use in Fashion Designing field.
- To learn in erin development, logo designing, making fashion illustration and designing with the help of softwares.
- To be familiar with various graphics approaches using design software.
- To have adequate exposure of photoshop software for designing and modification in designs

TextBooks&ReferenceBooks:	**Author**
1. ComputerAidedDesign&Manufacturing	MikcleP Groover, EmoryW.ZimmersJr
2. ComputerGraphicsPrinciples&Practices	JamesDFoley,Andeies
3. SecondEdition	VanDaShvanKFeiner. JohnFHughes
4. ComputerGraphics	DonaldMearn&MPauline,Baker
5. MasteringAUTOCAD2004&	
6. AUTOCADLT2004	GeorgeOmur

PROFESSIONAL ELECTIVE COURSE –III (SEMESTER-V)

Indian Business Environment

B.Tech (FASHION & APPAREL ENGINEERING) V Semester

No.of Credits:3	**Sessional: 25Marks**
LT P Total	**Theory: 75Marks**
3 0 0 3	**Total: 100Marks**
	Duration of Exam: 3 Hours

Course Objectives:

To familiarise students with Indian and global business environment and theirpolicies**.**

UNIT I

Nature, Components and Determinants of Indian Business environment. General concept: GNP, GDP, BOT, BOP, Fiscal Policy, Monetary Policy, Fiscal Deficit, etc.

UNIT II

New economic policy, EXIM Policy, Economic Reforms – Liberalization, Privatization, Globalization., Public enterprise reforms and Disinvestmentsprogrammes.

UNIT III

Financial Institutions and their role.Concept of Stock exchanges and Role of SEBI.World Bank and IMF and their impact on Indian BusinessEnvironment.

UNIT IV

WTO – Genesis, Agreement, Rounds, Impact on Indian Business Environment, Indian Business Scenario.National textile policy and Role of BIFR.

TextBooks&ReferenceBooks:	**Author**
1. Indian Economy	T R Jain
2. Economic Environment of Indian Business	Mishra & Puri
3. Business Environment	Francis Cherunilam
4. International Marketing	Cateora
5. International Marketing	Onk visit & Shaw

PROFESSIONAL ELECTIVECOURSE – IV (SEMESTER-V)

PECFAEL-302-1 Apparel Merchandising

B.Tech (FASHION & APPAREL ENGINEERING) V Semester

No.of Credits:4		**Sessional:**	**25Marks**
LT P	**Total**	**Theory:**	**75Marks**
3 1 0	**4**	**Total:**	**100Marks**
		DurationofExam:	**3Hours**

Course Objectives:

To familiarise the students with merchandising, retailing, wholesaling and their functions, marketsegmentation, product development and budgeting etc

UNIT I: Merchandising: Concept and definition. Uniqueness of apparel merchandising. Different components and activities of merchandising–line, planning, line development and line presentation Fashion forecasting and its importance. Factors influencing fashion, Role of a merchandiser in an apparel industry, Essential qualifications of a merchandiser.

UNIT II Concept of retailing and wholesaling. Classification of retailer and wholesaler. Function performed by distribution channel members. Decision making in retailing. Pricing consideration and pricing strategy. Factors affecting pricing strategy. Setting up and changing of price. Terms and definitions used in pricing. Pricing strategy commonly adopted by an apparel merchandiser. Mode of disposition of unsold merchandise.

UNIT III Product line planning. Importance of planning, Different steps involved in product line planning. Different approaches of merchandise planning: Top -Down and Bottom –up, Approach and contemporary line planning. Relative merits and demerits of different approach. Concept and definition of assortment planning. Objective of assortment planning.Importance of balanced assortment.Product line development. Various ways of product line development. Line presentation and its importance in retailing. Visual merchandising.

UNIT IV Budgeting –concept and definition. Importance of budgeting. Various steps involved in budgeting. Dollar And unit control system. Integrating dollar and unit concept. Planning of inventory and reorder point. Cost associated with inventory. Economic order quantity.

Course Outcomes:

1. After completion of the course, students will be able to learn:
2. Marketing and management functions in fashion sector the knowledge about product development and product life cycle.

Text Books & References: **Author:**

1. Apparel Merchandising — Martin Kunj
2. Fashion Merchandising and Marketing — Cynthia R. Easterling and Marian H.Jernigan
3. Fashion:From Concept to Consumer — Gini Stephens Fring
4. Fashion Buying — Helen Goworek
5. Fashion Marketing — Tony Hines

PROFESSIONAL ELECTIVE COURSE –IV (SEMESTER-V)

Non wovenTechnology

B.Tech (FASHION & APPAREL ENGINEERING) V Semester

No.of Credits: 3		**Sessional:**	**25Marks**
LT P	**Total**	**Theory:**	**75Marks**
30 0	**3**	**Total :**	**100 Marks**
		Duration of Exam:	**3 Hours**

Course Objectives:

To introduced detailed description about nonwoven and their classification, techniques, finishing andapplication.

UNIT I Introduction to Nonwovens, Historical Development, Definitions of nonwovens, classification of Non-Woven fabrics, Development of nonwoven industry & future perspective, Raw materials: Natural and synthetic fibres, bonding agents, Types of bonding agent

UNIT II Web formation techniques: fibre preparation, brief introduction to dry laying, wet laying, parallel laying, cross laying and random laying methods, spun laying, melt blowing, SM, SMS fabrics. Mechanical bonding: Needle punching technology, needle punching machine, felting needles, needle classification and their specifications, factors affecting the properties of needle punched fabrics.

UNIT III Brief introduction to spunlacing technology, factors affecting the spunlaced fabric, stitch bonding techniques. Chemical bonding: Adhesive bonding, methods of bonding agent application, drying by convection, conduction, radiation, infrared and high frequency driers. Thermal bonding: Thermal bonding techniques, Area bonding, point bonding & their properties

UNIT IV Finishing of nonwoven fabrics: shrinkage, calendaring, pressing, splitting, grinding, washing, dyeing, printing, softening, coating andlaminating. Applications: Medical and hygiene, apparel, household & home textiles, geotextiles, filtration, automotive textiles, agriculture, leather industry, Brief introduction to methods of testing nonwovenfabrics.

Course Outcomes:

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

- Analyze the basic concepts of nonwoven formation.
- Develop the skills of selecting suitable raw material, process perameires as per the end application.
- Evaluate nonwoven inaterials and apply the appropnate technological suff In nonnoven industry.
- Apply the knowledge in product development in nonwoven industry.

TextBooks&ReferenceBooks:	**Author:**
Non-woven fabrics	N. N. Banerjee

PROFESSIONAL ELECTIVE COURSE –V (SEMESTER-VI)

ADVANCE APPAREL CONSTRUCTION TECHNIQUES

B.Tech (FASHION & APPAREL ENGINEERING) VI Semester

No.of Credits:3		**Sessional:**	**25Marks**
L T P	**Total**	**Theory:**	**75Marks**
3 0 0	**3**	**Total:**	**100Marks**
		Duration of Exam:	**3Hours**

CourseObjectives:

To impart knowledge of advanced apparel construction techniques by means of presentation on flat sketches, mood board , story board and fashionportfolio.

UNIT I Production Scheduling, Patterning and cutting procedures, Garment assembly.

UNIT II Pattern making and construction techniques of shirts, pants/trousers and Jackets/Coats, Swimwear, sportswear/Actionwear, Capes or hoods.

UNIT III Development of Men's Ready-to-wear, Design and production procedures of Men's tailoredclothing.

UNIT IV Presentation techniques – Flat sketches, Mood board, Storyboard, Portfolio.

Course Outcomes:

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

- have the knowledge of sewing machines, sewing needles and sewing threads.
- be able to identify seams and stitches and their appearance, applications and properties.
- Able to make garments in various category.
- Able to present his design.

TextBooks&ReferenceBooks:	**Author**
1. Inside the Fashion Business	K G Dickerson
2. Fashion from Concept to Consumer	GS Frings
3. Pattern-making for Fashion Design	H J Armstrong

PROFESSIONAL ELECTIVE COURSE –V (SEMESTER-VI)

Entrepreneurship Development apparel and fashion industry

B.Tech (FASHION & APPAREL ENGINEERING) VI Semester

No.of Credits:3	Sessional: 25Marks
LTP Total	Theory: 75Marks
30 0 3	Total: 100Marks
	Duration of Exam: 3Hours

CourseObjectives:

To introduced entrepreneurship and their development in fashion and apparel industry

UNIT I Introduction entrepreneurship, development of entrepreneurship, role of entrepreneurs in development of apparel and fashion industry, entrepreneurship with reference to fashion and apparel industry inIndia.

UNIT II Entrepreneurial support by state, central financial institutions, organizations, Government policies with references to textile and apparel industry.Business planningStarting a new venture related to apparel industry, essentials of a successful center.

UNIT III Location & plant layout-factors influencing plant location, building, structure, lighting, ventilation, material handling, availability of labour, material management and transportation.

UNIT IV Industrial sickness and remedies, tax planning, VAT, Patent Rules, Factory Act, Minimum wages, knowledge of exemptions &deductions. Environmental considerations and social responsibilities

Course Outcomes:

- After completion of the course, students will be able to:
- Evaluate and analyze the various Personal and industrial challenges industry and develop entrepreneur skills to overcome constraints...
- Develop the skills of systematic planning and managing a business enterprise develop and strengthen entreprencurial quality and motivation
- Analyze the challenges of a fashion entrepreneur in different areas.

Text Books & Reference Books:

- New Initiatives in Entrepreneurship Education & Training Jain GR & Gupta
- Fashion Entrepreneurship Retail Business planning. D, Michele Gananagar

PROFESSIONAL ELECTIVECOURSE –VI (SEMESTER-VI)

AUTOMATION IN GARMENT INDUSTRY

B.Tech (FASHION & APPAREL ENGINEERING)VI Semester

No.of Credits:3	Sessional: 25Marks
LTP Total	Theory: 75Marks
30 0 3	Total: 100Marks
	Duration of Exam:3Hours

Course Objectives

know about the advancement in apparel industry their advancement.

Section-A

Automation in the apparel Industry.Automation in the retail industry. Computer integrated manufacturing in the textile industries.

Section-B

Automated material handling. Robotics. Requirement for automation in today's textile manufacturing environment.

Section-C

Quick response & Technology, Evolution of computer integrated manufacturing systems. Emerging technologies.

Section-D

Nature of trade & future of the apparel industry.

Course Outcomes:

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

- Identify the fundamentals of automation in apparel industry.
- Analysis the samples developed with and without attachments in terms of quality, time consumption, costs and overall performance.
- Explain industrial terminology and operate equipment in appropriate way.
- Analyse the stitching techniques, stitches, machine and production processes.
- Implement the concept and types of automation.
- Assess the degree and level of automation.
- Use various components of autornation like sensors, acnuators, PL.C.

TEXTBOOKS:

1. Automation in the textile industry--G.A. Berkstresser, D.R.Buchanan,P. Grady
2. From fibres to apparel --D.R. Buchanan,G.A.Berkstresser , P.Grady

PROFESSIONAL ELECTIVE COURSE –VI (SEMESTER-VI)

PROJECTWRITING

No. of Credits:3		**Sessional:**	**25Marks**
LT P	**Total**	**Theory:**	**75Marks**
30 0	**3**	**Total:**	**100Marks**
		Duration of Exam:	**3Hours**

Course Objective

Know about project writting method. Learn how towrite paper in format.

Unit 1:
Planning and preparation, word order,Breaking up long sentences, structuring paragraphs and sentences ,Being concise and removing redundancy.

Unit2:
Clarifying who did what highlighting your finding, Hanging and Criticizing ,paraphrasing and plagiarism ,Section of a paper, Abstract,Introduction.

Unit3:
Review of the Literature, Methods, Results ,Discuss, Conclusions ,The final check.

Unit4:
Key skills are needed when writing a Title, Abstract, Introduction, literature, Methods ,Result, Discussion,Conclusion.

COURSE OUTCOME:

- Learn to write research with effective results.
- Knows about project methods.
- Knows about rules and regulation used in writing project.

Suggested Studies:

(1)Goldbort R(2006)writing for science, Yale University press (available on Google books).

2) Day R (2006) how to write and publish a scientific paper ,Cambridge University press.

(3)Highman N(1998) handbook of writing for the mathematical science, SIAM highman's book .

4) Adrian wallwork ,English for writing research paper Springer new work New York detached.

PROFESSIONAL ELECTIVE COURSE VII
Fashion Accessories

B.Tech (FASHION & APPAREL ENGINEERING) VII Semester

No.of Credits:3			**Sessional:**	**25Marks**
LT	**P**	**Total**	**Theory:**	**75Marks**
30	**0**	**3**	**Total:**	**100Marks**
			Duration of Exam:	**3Hours**

Course Objectives

To introduce different types of apparel accessories range, their raw materials, briefmanufacturing details andapplications.

UNIT I

Fashion Accessories – definition and classification. Usage of different raw materials as leather, fur, beads, metal etc. Various notion and trims used in fashion accessories.

UNIT II

Leather Accessories: Brief idea about processing of leather, fashion leather terminology, care of leather. Leather Garments: Pattern making, needle and sewing thread specifications and finishing of garments. Leather Footwear: Parts of shoe, brief shoe designing – as last, development last, pattern making, die-manufacturing, cutting, fitting, assemblage of remaining components, bottoming, finishing, caring of footwear. Handbags and belts: Construction and style ofeach.

UNIT III

Jewellery Designing: Different metals and stones, faceted cuts used for jewellery designing. Brief production tech as fusing, soldering, cutting etc, stone settings, Different jewellery styles as rings, bracelets, necklaces, tiara etc. Different stone setting as buttercup, inlay etc.

UNIT IV

Other accessories: Glove: Material used, component part of glove, glove construction, care of glove. Hosiery: Materials, Construction, Sizes and Care. Hats: Construction, care of hats. Scarves: Construction, Care and styles.

Course Outcomes:

1. After completion of the course, students will be able to:
2. Develop the skills of accessory illustration and visual merchandising.
3. Create new accessory designs

TextBooks&References:

1. Know your Fashion Accessories Meadows
2. Fashion Apparel & Accessories Diamond, Jay & Ellen

PROFESSIONAL ELECTIVE COURSE VII

ELEMENTS OF FASHION

B.Tech (FASHION & APPAREL ENGINEERING) VII Semester

No.of Credits:3		**Sessional:**	**25Marks**
LT P	**Total**	**Theory:**	**75Marks**
30 0	**3**	**Total:**	**100Marks**
		Duration of Exam:	**3Hours**

Section-A

Origin of fashion, Origin of clothing, Fashion language, Philosophy of design, Nature of fashion .Elements of fashion, Terminology of fashion: style, design, taste, classic, fad.

Section-B

Component of fashion: Silhouette, Texture, Details. Study of leading fashion designers; French, Italian, American, Indian.Costumes of ancient civilization; Egypt, Roman, French.Fashion trends.

Section-C

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

Section-D

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

Course Outcomes:

- After completion of the course, students will be able to:
- understand the basic concepts of design and Mood Boards.
- 2 concepts of elements of design and principles of design on apparels: figure design analysis.
- understand the concepts of difierent Men dress sty le and Women dress style.

Suggested Text Books & References:

1. Anderson and Anderson," Costume design", Harcourt Brace 2nd Ed, 1999.
2. Laver J, "Costume and Fashion", Thames & Hudson, 1995.
3. Lee Sharon, "Inside Fashion Design", Tate, 1977.
4. Brockman, H.L," The theory of Fashion", John Wiley & Sons, 1965.

PROFESSIONAL ELECTIVE COURSE VIII

Home & Industrial Textile Product

B.Tech (FASHION & APPAREL ENGINEERING) VII Semester

No.of Credits:3			**Sessional:**	**25Marks**
LT	**P**	**Total**	**Theory:**	**75Marks**
30	**0**	**3**	**Total:**	**100Marks**
			Duration of Exam:	**3Hours**

Course Objectives: To impart knowledge on various home fashion and industrial textile products range, their properties,designing aspect and applications.

UNIT I

Introduction to Home Fashion, Present scenario of Home Fashion/Textile market in the domestic and international market.

UNIT II

Selection of raw material and the essential characteristics of Home Textile materials.Different home fashion fabrics – Table Linens, Bedspreads, Curtains, other draperies.

UNIT III

Advanced fabric structures for Home Textile materials – Brocade, Damask, Gauze, Leno, Upholstery fabrics. Floor Coverings – Carpets (domestic and machine made and rugs).

UNIT IV

Design criteria of Home Fashion/Textile material Presentation techniques – Flat sketches, Mood board, Storyboard, Portfolio.

Course outcome:

- To understand various types of home textile.
- To understand raw material of home fashion fabrics.
- To explore various presentation techniques of home fashion.

Text Books &ReferenceBooks:

1. Watson‘s Advanced Textile Design Z JGrosicki
2. Textile Fabrics and their Selection,7thEd Isabel B.Wongate
3. Fashion & Furnishing Intenrational Inside the Fashion Business K G Dickerson
4. Fashion from Concept to Consumer G SFrings
5. Pattern-making for Fashion Design H J Armstrong
6. Sewing Readers Digest.

PROFESSIONAL ELECTIVE COURSE –VIII(SEMESTER-VII)
Technical & Speciality Textile & Apparel
B. Tech (FASHION & APPAREL ENGINEERING) VII Semester

No.ofCredits:3		**Sessional:**	**25Marks**
LT P	**Total**	**Theory:**	**75Marks**
30 0	**3**	**Total:**	**100Marks**
		DurationofExam:	**3Hours**

Course Objectives:

- To give overview and brief knowledge on the advancement in technology andits tremendous impact in various spheres of life including electronics, sports, medical, defence by bringing functionality in apparels.

UNIT I

High Tech Garments – Definition and different types. Brief idea about properties and uses of Specialty fibers like Nomex, Kevlar, Glass fiber, components as conductive yarns, shapememory materials, phase change material used in high techgarments.

UNIT II

Protective clothing: General requirement of protective clothing. Chemical protective clothing (CPC) – Areas of use, CPC items for air-born, liquid hazard. Different chemicals used, parts of CPC, Performance evaluation – Permeation, Solubility and diffusion theory, Barrier effectiveness, structural integrity.Thermal Protective Clothing - Combustion mechanism, fire governing parameters, Requirements, designing of TPC, Construction, various parameters affecting flame retardency, Performanceevaluation. Pesticide Protective Clothing – Requirements of protective clothing, different areas, different parts of PPC, Performance evaluation of PPC. Antimicrobial clothing – Requirement, microbiology of skin clothing interface, approach toproduce antimicrobial fabrics, performance evaluation. Ballistic Protective clothing – Requirements, principle of mechanism, different fibers and fabrics, soft and hard armor, Factors influencing performance.

UNIT III

Medical Responsive Garments – Definition, requirements, fibres, classification, working of artificial tandem and alignments, kidney, heart, surgical product, cardiovascular graft,sterilization, wound care. Smart Electronic Clothing – Requirement, different sensor, processing of conductive yarn,implementation level of SOT, superhuman wardrobe, application in defense. Sportswear – Requirement, different fibers used, approaches for manufacture.

UNIT IV

Breathable apparel – Introduction, principle, classification and use.Moisture management fabric, polar technology, power dryetc. High visibility apparels – Introduction, requirements, material, different classifications, design features. Smart Colourants – Definition different types and application.. Different parts of space suit.Different parts of space suits. Different textiles used as packaging material-types and properties.

Course outcome:

- 1. Understanding the principles and processes of technical textile production.
- 2. Gaining knowledge of specialized textile materials, such as smart textiles, geo-textiles, and

medical textiles.

- 3. Developing skills in designing and manufacturing specialty textiles and apparel.
- 4. Learning about the properties and applications of advanced textile technologies, nanotechnology.
- 5. Acquiring knowledge of quality control and testing methods used in the textile and apparel industry.

Text Books & References:

1. The Super modern Wardrobe Bolten,Andrew
2. Smart Fibres, Fabrics & Clothing Tao, Xiaoming
3. Protective Clothing System & Material Raheel,Masturaed

Syllabus for Open Elective Subjects (OEC)
OPEN ELECTIVE COURSE: Civil OEC3

Civil OEC3-OE1	**Research and IPR**	**3L**	**3 credits**

Theory=75 , Sessionals=25 , Total=100 Duration ofexam.=3hours

Syllabus Contents:

Unit 1: Meaning of research problem, Sources of research problem, Criteria Characteristics of a goodresearch problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations.

Unit2: Effective literature studies approaches, analysis Plagiarism, and Research ethics.

Unit 3: Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation , patenting, development. International Scenario: International cooperationon Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit 4: Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

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

1. Understand research problem formulation.
2. Analyze research related in formation.
3. Follow research ethics.
4. Understanding that when IPR would take such important place in growth of individuals & nation, itis needless to emphasis the need of information about Intellectual Property Right to be promotedamongstudents ingeneral & engineering in particular.

References:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction forscience &engineeringstudents'"
2. Wayne Goddard and Stuart Melville, "ResearchMethodology:AnIntroduction"
3. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide forbeginners"
4. Halbert,"ResistingIntellectualProperty",Taylor &FrancisLtd,2007.

Civil OEC3-OE2	Energy Studies	3L	3 credits

Theory=75 , Sessionals=25,Total=100 Duration of exam.=3hours

Module 1: Introduction to Energy Science: Scientific principles and historical interpretation to place energy use in the context of pressing societal, environmental and climate issues; Introduction to energy systems and resources; Introduction to Energy, sustainability & the environment

Module 2: Energy Sources: Overview of energy systems, sources, transformations, efficiency, and storage. Fossil fuels (coal, oil, oil-bearing shale and sands, coal gasification) - past, present & future, Remedies & alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sustainability and environmental trade-offs of different energy systems; possibilities for energy storage or regeneration, high efficiency batteries.

Module 3: Energy & Environment: Energy efficiency and conservation; introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; introduction to the economics of energy; How the economic system determines production and consumption; linkages between economic and environmental outcomes; How future energy use can be influenced by economic, environmental, trade, and research policy.

Module 4: Engineering Projects connected with the Energy Sources: Coal mining technologies, Oil exploration offshore platforms, Underground and under-sea oil pipelines, solar chimney project, wave energy caissons, coastal installations for tidal power, wind mill towers; hydro power stations above-ground and underground along with associated dams; Nuclear reactor containment buildings and associated buildings, Spent Nuclear fuel storage and disposal systems.

Module 5: Engineering for Energy conservation: Concept of Green Building and Green Architecture; Identification of energy related enterprises that represent the breath of the industry and prioritizing these as candidates; Embodied energy analysis and use as a tool for measuring sustainability. Energy Audit of Facilities and optimization of energy consumption

Text/ReferenceBooks:

1. Boyle, Godfrey (2004), Renewable Energy (2nd edition). Oxford University Press
2. Boyle, Godfrey, Bob Everett, and Janet Ramage (Eds.) (2004), Energy Systems and Sustainability: Power for a Sustainable Future. Oxford University Press
3. Schaeffer, John (2007), Real Goods Solar Living Sourcebook: The Complete Guide to Renewable Energy Technologies and Sustainable Living, Gaiam
4. Jean-Philippe; Zaccour, Georges (Eds.), (2005), Energy and Environment Set: Mathematics of Decision Making, Loulou, Richard; Waaub, XVIII,
5. Ristinen, Robert A. Kraushaar, Jack J. AKraushaar, Jack P. Ristinen, Robert A. (2006) Energy and the Environment, 2nd Edition, John Wiley
6. UNDP (2000), Energy and the Challenge of Sustainability, World Energy assessment
7. E H Thorndike (1976), Energy & Environment: A Primer for Scientists and Engineers, Addison-Wesley Publishing Company.

Upon successful lcompletion of the course, the students will be able to:

a) Understand effect of using these sources on the environment and climate
b) Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the impact on the environment.
c) List and describe the primary renewable energy resources and technologies.
d) To quantify energy demands and make comparisons among energy uses, resources, and technologies.
e) Collect and organize information on renewable energy technologies as a basis for further analysis and evaluation.

CivilOEC3-OE3	LifeScience	3L	3credits

Theory=75 , Sessionals=25, Total=100 Duration of exam.=3hours

Module 1A: Plant Physiology covering, Transpiration; Mineral nutrition (3 Lectures)
Module 1B: Ecology covering, Ecosystems- Components, types, flow of matter and energy in an ecosystem; Community ecology- Characteristics, frequency, life forms, and biological spectrum; Ecosystem structure- Biotic and a-biotic factors, food chain, food web, ecological pyramids; (3 Lectures)
Module 2A: Population Dynamics covering, Population ecology- Population characteristics, ecotypes; Population genetics- Concept of gene pool and genetic diversity in populations, polymorphism and heterogeneity; (3 Lectures)
Module 2B: Environmental Management covering, Principles: Perspectives, concerns and management strategies; Policies and legal aspects- Environment Protection Acts and modification, International Treaties; Environmental Impact Assessment- Case studies (International Airport, thermal power plant); (3 Lectures)
Module 3A: Biotechnology covering, Basic concepts: Totipotency and Cell manipulation; Plant & Animal tissue culture- Methods and uses in agriculture, medicine and health.
Module 4A: Biostatistics covering, Introduction to Biostatistics:-Terms used, types of data; Measures of Central Tendencies- Mean, Median, Mode, Normal and Skewed distributions; Analysis of Data- Hypothesis testing and ANNOVA (single factor)

Text/Reference Books:

1. Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd
2. Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H. John Wiley and Sons
3. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
4. Molecular Genetics (Second edition), Stent, G. S.; and Calender, R. W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
5. Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers.

CivilOEC3-OE5	*SAFETY ENGINEERING*	3L	3credits

Theory=75 , Sessionals=25 , Total=100 Duration of exam.= 3hours

Module 1

Introduction-Safety-Goals of safety engineering. Need for safety. Safety and productivity Definitions: Accident, Injury, Unsafe act, Unsafe Condition, Dangerous Occurrence, Reportable accidents. History of safety movement . Theories of accident causation, Safety organization- objectives, types, functions, Role of management, supervisors, workmen, unions, government and voluntary agencies in safety. Safetypolicy. Safety Officer responsibilities, authority. Safety committee-need,types,advantages

Module 2

Accident prevention Methods- Engineering, Education and Enforcement, Safety Education & Training - Importance, Various training methods, Effectiveness of training, Behavior oriented training. Communication-purpose, barrier to communication. Housekeeping: Responsibility of management and employees. Advantages of good housekeeping. 5 s of housekeeping. Work permit system-objectives, hot work and cold work permits. Typical industrial models and methodology. Entry into confined spaces.

Module 3

Monitoring Safety Performance: Frequency rate, severityrate, incidencerate, activityrate .Cost of accidents Computation of Costs- Utility of Cost data. Plant safety inspection, types, inspection procedure. Safety sampling techniques. Job safety analysis(JSA), Safetysurveys,Safetyaudits. SafetyInventoryTechnique.

Module 4

Accident investigation -Why? When? Where? Who? & How? . Basics- Man- Environment & Systems. Process of Investigation -Tools-Data Collection-Handling witnesses- Case study. Accident analysis - Analytical Techniques-System, Safety-Change Analysis-MORT-Multi Events Sequencing-TOR.

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

- Understand overview of safety systems .
- Analyse safety techiques.
- Apply housekeeping techiques and 5 s of housekeeping.
- Understand basics of accident prevention.

Text Books :

1) N.V. Krishnan, Safety Management in Industry, Jaico Publishing House, 1997
2) Ronald P. Blake, Industrial Safety:, Prentice Hall, New Delhi, 1973
3) David L. Goetsch, Occupational Safety and health, PrenticeHall
4) Ted S. Ferry, Modern Accident Investigation and Analysis, John Wiley &Sons

Reference :

1) Willie Hammer, Occupational Safety ManagementandEngineering, PrenticeHall
2) Alan Waring, Safety Management System, Chapman &Hall
3) JohnV. Grimaldi andRollinH.Simonds, SafetyManagement, All India Traveller Book Seller.

(OEC-21)	INTRODUCTION TO HRM	**3L**	**3credits**

Theory=75 , Sessionals=25 , Total=100 Durationofexam.=3hours

UNIT I :

Human Resource Management: concept and scope; Roles, responsibilities and competencies of HR manager; Challenges to HR professionals; Human Resource Planning & Forecasting: significance and process.

UNIT II :

HR Sourcing: Recruitment, Selection and Induction. Job Analysis: job Description and job Specification; Job Design: concept and methods; Job Evaluation-concept &methods; Performance appraisal and counselling.

UNIT III :

Training: training process and methods; Career planning and Development; Succession planning; Employee Compensation: basic concepts & determinants;

UNIT IV:

Industrial Relations and Grievance Handling; Employee welfare; Dispute Resolution; International Human Resource Management; Contemporary Issues in HRM. HR Audit &Accounting, ethics & corporate social responsibility.

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

1. Understand the basics of human resource management and its relevance in present scenario.

2. Develop critical understanding of contemporary developments in human resource management.

3. Comprehend the essentials of employing, maintaining, and promoting a motivated workforce in an organization.

4. Demonstrate the necessary skill sets for integrate the knowledge of HR concepts to make correct business decisions

Suggested Readings:

1. K.Aswathapa Human resource Management: Text and cases, 6th edition, Tata McGraw Hill, New Delhi,2012

2. Uday Kumar Haldar&JuthikaSarkar(2012) Human resource Management New Delhi, Oxford UniversityPress.

3. De Cenvo, Da & Robbins S.P.(2010) Fundamentals of Human Resource Management, 9th edition, New York, John Wiley &Sons.

4. Gary Dessler (2008) Human Resource Management, 11th edition New Delhi: Pearson PrenticeHall.

5. TanujaAgarwala, Strategic Human resource Management, Oxford University Press 2007.

(OEC-24)	Entrepreneur Development	**3L**	**3credits**

Theory=75 , Sessionals=25 , Total=100 Duration of exam.=3hours

UNIT I :

Concept of Entrepreneur, Characteristics, qualities and pre-requisites of entrepreneur, entrepreneurship and intrapreneur, Entrepreneur vs. Manager; Economic, social and psychological need for entrepreneurship;

UNIT II :

Environmental Factors affecting success of a new business, Formulation of business plan, Contents and significance of business plan.

UNIT III:

Feasibility Understand -Preparation of Feasibility Reports: Economic, Technical, Financial and Managerial Feasibility of Project, Methods and procedures to start and expand one's own business

UNIT IV:

Role of Government and Promotional agencies in entrepreneurship development, Entrepreneurship Development Programmes.

Course Outcomes: After completing the course, the student will be able to:

1. It will help students to prepare business plan

2. Students will be able to check the feasibility of starting new projects

3. They will be able to know the support available from Govt. to start a new venture

4. Students will be aware about the concepts of entrepreneurship development and significance in of entrepreneurship in economic development.

Reference Books:

- Khanka S.S., ―Entrepreneurship Development‖.S.Chand.
- Desai, A N. "Entrepreneur & Environment". 1990. Ashish, NewDelhi.
- Drucker, Peter. "Innovation and Entrepreneurship". 1985. Heinemann,London.
- Jain Rajiv. "Planning a Small Scale Industry: A Guide to Entrepreneurs". 1984. S.S. Books,Delhi.
- Kumar, S A. "Entrepreneurship in Small Industry". 1990, Discovery, NewDelhi.
- McClelland, D C and Winter, W G. "Motivating Economic Achievement". 1969. Free Press, NewYork.
- Pareek, Udai and Venkateswara Rao, T. "Developing Entrepreneurship -A Handbook on Learning Systems". 1978, Learning Systems, Delhi.

(OEC-23)	Marketing Management	**3L**	**3credits**

Theory=75 , Sessionals =25 , Total=100 Duration of exam.=3hours

UNIT-I:

Nature and scope of marketing; Philosophies of marketing management; marketing environment; marketing research and marketing information system; Ethical issues in marketing

UNIT-II:

Understanding consumer behaviour; factors influencing consumer buying behaviour and organizational buying behaviour; market segmentation, targeting and positioning; marketing strategies in the different stage of the product life cycle; new product developmentprocess

UNIT-III:

Introduction to Product mix and product line decisions; branding and packaging decisions; Pricing strategies and practices; factors affecting selection of marketing channels; Introduction to wholesaling and retailing; Introduction to Promotion Mix: Advertising, sales promotion, public relations, personal selling

UNIT-IV:

Sales Forecasting Methods; Introduction: Green Marketing; Event Marketing; Direct marketing; Network Marketing; Holistic Marketing; Permission Marketing; Social Marketing.

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

1. Understand the basic concepts of marketing and the changing dynamics of marketing environment.

2. Gain insights in consumers' decision-making process and their buying behaviour.

3. Understand needs of the consumer's and design & develop strategies for new products.

4. Understand strategies related to 4 P's of marketing.

Suggested Readings:

1. Kotler and Armstrong,Principles of Marketing; PHI, NewDelhi

2. Kotler, Philip, Kevin Keller, A. Koshy and M. Jha, Marketing Management in South Asian Perspective , Pearson Education, NewDelhi

3 .Kerin, Hartley, Berkowtz and Rudelius, Marketing, TMH, New Delhi

4. Etzel, Michael J, Marketing: Concepts and Cases, TMH, New Delhi

5. Kumar,Arun and Meenakshi,N. ,Marketing Management, VikasPublication

MC01:IndianConstitution

The Constitution of India is the supreme law of India. Parliament ofIndiacan notmakeanylawwhichviolatestheFundamentalRightsenumerated under the Part III of the Constitution. The Parliament ofIndia has been empoweredto amend the Constitution under Article368, however, it cannot use this power to change the "basic structure"of theconstitution, which has been ruled and explainedbythe SupremeCourtofIndiainits historicaljudgments.TheConstitutionofIndiareflectstheideaof"Constituti onalism"– amodernandprogressiveconcepthistoricallydevelopedbythethinkersof"l iberalism"–anideology which has been recognized as one of the most popular politicalideologyandresultofhistoricalstrugglesagainstarbitraryuseofsov ereign power by state. The historic revolutions in France, England,AmericaandparticularlyEuropeanRenaissanceandReformation movement have resulted into progressive legal reforms in the form of"constitutionalism" in many countries. The Constitution of India wasmadebyborrowingmodelsandprinciplesfrommanycountriesincludin gUnitedKingdomandAmerica.

The Constitution of India is not only a legal document but it alsoreflects social, political and economic perspectives of the IndianSociety. It reflects India's legacy of "diversity". It has been said thatIndian constitution reflects ideals of its freedom movement, however,fewcriticshaveargued thatit doesnot trulyincorporateourown

ancient legal heritage and cultural values. No law can be "static" andtherefore the Constitution of India has also been amended more thanonehundredtimes.Theseamendmentsreflectpolitical,socialandecon omic developments since the year 1950. The Indian judiciary andparticularly the Supreme Court ofIndia has played an historic role asthe guardian ofpeople. It has been protectingnot only basic ideals ofthe Constitution but also strengthened the same through progressiveinterpretations of the text of the Constitution. The judicial activism oftheSupremeCourtofIndiaanditshistoriccontributionshasbeenrecogniz ed throughout the world and itgraduallymade it "as one of thestrongestcourtin the world".

Coursecontent

1. Meaningoftheconstitutionlawandconstitutionalism
2. HistoricalperspectiveoftheConstitutionofIndia
3. SalientfeaturesandcharacteristicsoftheConstitutionofIndia
4. Schemeofthefundamentalrights
5. TheschemeoftheFundamentalDutiesanditslegalstatus
6. The Directive Principles of State Policy – Its importanceandimplementation
7. Federalstructureanddistributionoflegislativeandfinancial

powersbetweentheUnionandtheStates

8. Parliamentary Form of Government in India – Theconstitutionpowersandstatusofthe PresidentofIndia
9. AmendmentoftheConstitutionalPowersandProcedure
10. Thehistoricalperspectivesoftheconstitutionalamendments inIndia
11. Emergency Provisions : National Emergency, PresidentRule,FinancialEmergency
12. LocalSelfGovernment–ConstitutionalSchemeinIndia
13. SchemeoftheFundamentalRighttoEquality
14. SchemeoftheFundamentalRighttocertainFreedomunderArticle19
15. ScopeoftheRighttoLifeandPersonalLiberty underArticle21

MAPPING OF THE COURSES WITH THE FOLLOWING

S.N.	COURSE NAME	Course code	Employ Ability Skill	Development	Entrepreneurship
1	BasicElectronics	ESC201	√		
2	Biology	BSC01	√		
3	Textileraw materials&Yarnformation	ESC-FA201	√		
4	Traditional embroidery&textile	PCC-FA201	√		
5	Apparelproduction	PCC-FA202		√	
6	Fashionsketching,design idea &fashionillustrationlab	PCC-FA203		√	
7	Fibresidentification&yarnformation lab	PCC-FA204		√	
8	Elementarygarmentmanufacturing&Patternmaking lab	PCC-FA205		√	
9	Project-1	PRFA-1P			√
10	Applied statistics &operationsresearch	BSC-FA201	√		
11	Apparelproduction planning andscheduling	PCC-FA206	√		
12	Fabric formation	PCC- FA207	√		
13	EffectiveTechnicalCommunication	HSMC01	√		
14	Evolution of clothing&fashion	HSMC-FA202	√		
15	EngineeringErgonomics	PEC-FAEL201-A	√		
16	Introductiontofashionretail	PEC-FAEL201-B	√		
17	Supplychain management	PEC-FAEL201-C	√		
18	Structure&properties oftextiles	PEC- FAEL202-A	√		
19	Prepprativewetprocess	PEC- FAEL202-B	√		
20	Principles of managment	PEC- FAEL202-C	√		
21	Audit Course-1:Bhagwat Gita	MC04	√		
22	Fabricformation& analyzinglab	PCC-FA208		√	
23	ApparelconstructionlabI	PCC-FA209		√	
24	Project-2	PRFA-2P			√
25	Knit&garmenttechnology	ESC-FA301	√		
26	Colouration ofTextile&Apparelproducts	PCC-FA301	√		
27	Garmentproduction machines&equipment	PCC-FA302	√		
28	Computeraideddesigning	PEC-FAEL301-A	√		
29	Indianbusinessenvironment	PEC-FAEL301-B	√		
30	Fashionselection	PEC-FAEL301-C	√		
31	Apparelmerchandising	PEC-FAEL302-A	√		
32	Nonwoventechnology	PEC-FAEL301-B	√		
33	Audit Course-II :IndianConstitution	MC01	√		
34	Knitdesign&developmentlab	ESC-FA302		√	
35	Colourationof Textile&apparellab	PCC-FA303		√	
36	Apparel constructionlab II	PCC- FA304		√	
37	Project-3	PRFA-3P			√
38	Colouranddesignconcept	PCC-FA305	√		
39	Textile&apparelproducttesting	PCC-FA306	√		
40	Textiles&Apparelprinting	PCC-FA307	√		
41	AdvanceApparelconstructiontechniques	PEC-FAEL303-A	√		
42	EntrepreneurshipDevelopment inFashion andApparel	PEC-FAEL303-B	√		
43	ProjectWriting	PEC-FAEL304-A	√		
44	AutomationinGarmentIndustry	PEC-FAEL304-B	√		
45	CADlab	PCC-FA308		√	

46	Textile& Apparel Printinglab	PCC- FA309		√	
47	ColourandDesign Lab	PCC- FA310		√	
48	Testinglab	PCC-FA311		√	
49	Project-4	PRFA-4P			√
50	Textile&Apparelfinishing	PCC-FA401	√		
51	Textile&ApparelCosting	PCC-FA402	√		
52	Qualityassuranceinapparelindustry	PCC-FA403	√		
53	Elementsoffashion	PEC-FAEL401-A	√		
54	FashionAccessories	PEC-FAEL401-B	√		
55	Home & industrial textile product	PEC-FAEL402-A	√		
56	Technical &speciality textile & apparel	PEC-FAEL402-B	√		
57	ResearchandIPR	Civil OEC3-OE1	√		
58	EnergyStudies	Civil OEC3-OE2	√		
59	LifeScience	Civil OEC3-OE3	√		
60	SafetyEngineering	Civil OEC3-OE5	√		
61	Introduction to HRM	CivilOEC-21	√		
62	Marketing Management	CivilOEC-23	√		
63	Entrepreneur Development	CivilOEC-24	√		
64	Appareldraping&gradinglab	PCC-FA404		√	
65	Project-5	PRFA-5P			√
66	IndustrialTraining withprojects	PRFA-6P			√

CAREER SCOPE OF FASHION AND APPAREL ENGINEERING (FAE)

The career scope of **Fashion and Apparel Engineering (FAE)** is vast and diverse, offering opportunities in various sectors of the fashion industry. With an FAE degree, graduates can explore careers that combine creativity with technical skills. Here are some of the key career paths:

- **Fashion Designer**: Create innovative clothing collections and design trends.
- **Textile Engineer**: Develop and enhance fabrics and materials used in clothing.
- **Product Development Manager**: Oversee the development of apparel from concept to finished product.
- **Pattern Maker**: Create precise patterns for garment production.
- **Fashion Technologist**: Work on the technological aspects of garment production, improving manufacturing processes.
- **Apparel Production Manager**: Manage the production line and ensure the efficient manufacturing of garments.
- **Retail Buyer**: Select and purchase clothing and fashion items for retail stores.
- **Merchandiser**: Plan and execute fashion product strategies for retail outlets.
- **Fashion Entrepreneur**: Start and run your own fashion brand or business.
- **Sustainable Fashion Specialist**: Focus on creating eco-friendly fashion solutions and sustainable practices.
- **Quality Control Expert**: Ensure that fashion products meet industry standards and quality benchmarks.
- **Fashion Consultant**: Provide expert advice on fashion trends, marketing, and design.
- **Costume Designer**: Design costumes for film, theater, or television productions.
- **Fashion Marketing & PR**: Promote fashion brands, create campaigns, and manage public relations.
- **Fashion Educator**: Teach future fashion professionals in academic or training institutions.

With a combination of technical knowledge and creativity, FAE graduates can find opportunities across fashion houses, garment manufacturing, retail companies, sustainable fashion firms, and even in media and entertainment sectors. The industry's growing focus on sustainability, technology, and innovation continues to expand career opportunities for FAE professionals.