M.D. UNIVERSITY, ROHTAK

(NAAC Accredited 'A+' Grade)

SCHEME OF STUDIES AND EXAMINATION

B.TECH (Fashion and Apparel Engineering)

SEMESTER 5th AND 6th

Scheme effective from 2020-21

COURSE CODE AND DEFINITIONS:

Course Code	Definitions
L	Lecture
T	Tutorial
P	Practical
BSC	Basic Science Courses
ESC	Engineering Science Courses
HSMC	Humanities and Social Sciences including Management courses
PCC	Professional Core Courses
LC	Laboratory Courses
MC	Mandatory Courses
PT	Practical Training
S	Seminar
TH	Theory
Pr	Practical

General Notes:

1. Mandatory courses are non credit courses in which students will be required passing marks in internal assessments.
2. Students will be allowed to use non programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.
3. Students will be permitted to opt for any elective course run by the department. However, the department shall offer those electives for which they have expertise. The choice of the students for any elective shall not be binding for the department to offer, if the department does not have expertise. To run the elective course a minimum of 1/3rd students of the class should opt for it.

Scheme of Studies and Examination
B.TECH (Fashion and Apparel Engineering) – 5th Semester
w.e.f. 2020-21

Sr No.	Course Code	Course Title	Hours per week			Total Contact hrs/week	Credit	Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P			Internal Assessment	External Examination	Practical	Total	
1	PCC-FAE-301G	Industrial Engineering in Apparel Industries	3	0	0	3	3	25	75		100	3
2	PCC-FAE-302G	Garment Production Machine & equipment	3	0	0	3	3	25	75		100	3
3	PCC-TT/TC/FAE-303G	Textile Testing	3	0	0	3	3	25	75		100	3
4	-	Elective-I	3	0	0	3	3	25	75		100	3
5	-	Open Elective-I	3	0	0	3	3	25	75		100	3
6	-	Open Elective-II	3	0	0	3	3	25	75		100	3
7	LC-FAE-301G	Woven and Knit Design Lab	0	0	2	2	1	25		25	50	3
8	LC-FAE-302G	Pattern Making and Apparel Construction Lab-I	0	0	2	2	1	25		25	50	3
9	LC-TT/TC/FAE-303G	Textile Testing Practical	0	0	2	2	1	25		25	50	3
10	LC-FAE-304G	Apparel Design Lab	0	0	2	2	1	25		25	50	3
Total							**22**				**800**	

Note:

1. Choose any one from Elective-I
2. Choose any one from Open Elective-I
3. Choose any one from Open Elective-II

ELECTIVE-I

Sr. No.	Course Category	Course Code	Course Title
1	Professional Elective Course (PEC-I)	PEC-FAE-301G	Digital Fabric design and development
2	Professional Elective Course (PEC-I)	PEC-FAE-302G	Woven and Knit Design
3	Professional Elective Course (PEC-I)	PEC-FAE-303G	Textile Coloration Techniques

OPEN ELECTIVE-I

Sr. No.	Course Category	Course Code	Course Title
1	Open Elective Course (OEC-I)	OEC-FAE-301G	Knitting & Knitwear Technology
2	Open Elective Course (OEC-I)	OEC-FAE-302G	Soft Skill and Interpersonal Communication
3	Open Elective Course (OEC-I)	OEC-FAE-303G	Organizational Behavior & HRM

OPEN ELECTIVE-II

Sr. No.	Course Category	Course Code	Course Title
1	Open Elective Course (OEC-II)	OEC-FAE-304G	Textile & Garment Design by Surface Ornamentation
2	Open Elective Course (OEC-II)	OEC-FAE-305G	Introduction to Fashion and Apparel Industries
3	Open Elective Course (OEC-II)	OEC-FAE-306G	Evolution of Clothing and Fashion

Scheme of Studies and Examination
B.TECH (Fashion and Apparel Engineering) – 6th Semester
w.e.f. 2020-21

Sr No.	Course Code	Course Title	Hours per week			Total Contact hrs/week	Credit	Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P			Internal Assessment	External Examination	Practical	Total	
1	PCC-FAE-303G	Apparel Production-III	3	0	0	3	3	25	75		100	3
2	PCC-FAE-304G	Automation in Garment Industry	3	0	0	3	3	25	75		100	3
3	-	Elective-II	3	0	0	3	3	25	75		100	3
4	-	Open Elective-III	3	0	0	3	3	25	75		100	3
5	-	Open Elective-IV	3	0	0	5	3	25	75		100	3
6	HSMC-TT/TC/FAE-301G	Merchandising and Export Management	3	0	0	3	3	25	75		100	3
7	LC-FAE-305G	Apparel Draping and Grading Lab	0	0	2	2	1	25		25	50	3
8	LC-FAE-306G	Textile Chemical Processing Lab	0	0	2	2	1	25		25	50	3
9	LC-FAE-307G	Apparel Designing by CAD Lab	0	0	2	2	1	25		25	50	3
10	LC-FAE-308G	Pattern Making and Apparel Construction Lab-II	0	0	2	2	1	25		25	50	3
Total							22				800	

NOTE:

1. At the end of 6th semester each student has to undergo Practical Training of 6 weeks in an Industry/Export/ Professional Organization and submit typed report along with a certificate from the organization & its evaluation shall be carried out in the 7th Semester under the course 'Garment Industry Practice' (Course Code PROJ-FAE-401G).
2. Choose any one from Elective-II
3. Choose any one from Open Elective-III
4. Choose any one from Open Elective-IV

ELECTIVE-II

Sr. No.	Course Category	Course Code	Course Title
1	Professional Elective Course (PEC-II)	PEC-FAE-304G	Preparatory Wet Processing and Dyeing
2	Professional Elective Course (PEC-II)	PEC-FAE-305G	Visual Merchandising
3	Professional Elective Course (PEC-II)	PEC-FAE-306G	Material Studies

OPEN ELECTIVE-III

Sr. No.	Course Category	Course Code	Course Title
1	Open Elective Course (OEC-III)	OEC-FAE-307G	Indian Colored Textile Heritage
2	Open Elective Course (OEC-III)	OEC-FAE-308G	Fabric Structure and Analysis
3	Open Elective Course (OEC-III)	OEC-FAE-309G	Specialty Yarns and Texturing

OPEN ELECTIVE-IV

Sr. No.	Course Category	Course Code	Course Title
1	Open Elective Course (OEC-IV)	OEC-FAE-310G	Fashion Accessories
2	Open Elective Course (OEC-IV)	OEC-FAE-311G	Jewellry Design & Development
3	Open Elective Course (OEC-IV)	OEC-FAE-312G	Structure and Properties of Textiles

PCC-FAE-301G Industrial Engineering in Apparel Industries

Course Code	**PCC-FAE-301G**				
Category	Professional Core Course				
Course Title	Industrial Engineering in Apparel Industries				
Scheme and Credits	L	T	P	Credits	Semester – V
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

PEC-FAE-301G Industrial Engineering in Apparel Industries

Pre–requisites: Apparel Production-I and Apparel Production-II

Course Objectives:

- To understand concept of production planning and control in an apparel industry using work study.
- To familiarize motion study, quick response and various production systems involve in an apparel industry
- To understand and operate different sewing data analysis software (GSD techniques).
- To know the handling of garments between different processes in the apparel industry.
- To understand Industrial Engineering and its application in Apparel Industries

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

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

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. Plant Layout and Line Balancing.

UNIT -III

Motion & Time study: Definition & scope of motion & time study, Data for sewing work study, improvement of production efficiency, Production analysis (qualitative & quantitative). Ergonomics: Importance and work place design and fatigue, Applications of Ergonomics. GSD and SAM, SMV calculations in Garment Industries

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 systems. Lean Management, Six Sigma, TQM, Quality Circle, SA8000, ISO, Statistical process Control, AQL, Control Charts, Process Capability, Application of SPSS.

Suggested Reading List:

Title	**Author**
Introduction to clothing production management	A.J. Chutter
Production management in apparel industry	Rajesh Bheda
Industrial Engineering and Management	Op Khanna and A Swarup
Time Study manual for Textile and Garment Industries	NL Enrick

Course Outcomes:

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

- Implement concept of production planning and control in an apparel industry using work study.
- Analyse motion study , quick response and various production systems involve in an apparel industry
- Operate different sewing data analysis software (GSD techniques).
- Implement Industrial Engineering in Apparel Industries

PCC-FAE-302G Garment Production Machines & Equipment

Course Code	**PCC-FAE-302G**				
Category	Professional Core Course				
Course Title	Garment Production Machines & Equipment				
Scheme and Credits	L	T	P	Credits	Semester - V
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Fabric Formation; Apparel Production-I and Apparel Production-II

Course objectives-

- To introduce the basics of garment production machinery and equipment.
- To develop an understanding of processes involved in the garment making right from cutting upto pressing.
- To learn the principles of sewing dynamics.
- To equip with the basics of latest manufacturing practices in the apparel making.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

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 embroidery machines.

.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 apparel industry

Suggested Reading List:

Title	**Author**
Garment Manufacturing Technology	Nayak & Padhey
The Technology of Clothing Manufacture	Carr & Latham
Apparel manufacturing analysis	Jacob Solinger
Apparel manufacturing Handbook: Analysis, Principles & PRACTICES	Jacob Solinger
Industrial Engineering in Apparel Production	V Ramesh Babu
Apparel Manufacturing Technology	Karthik, Ganeshan, Goplakrishnan

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

- Implement the advance cutting processes in Garment Industries
- Implement the concepts of various garment assembly processes
- Analysis sewing dynamics
- Handle various types of garments between different processes in the apparel industry

PCC-TT/TC/FAE-303G Textile Testing

<table>
<tr><td>Course code</td><td colspan="5">PCC-TT/TC/FAE-303G</td></tr>
<tr><td>Category</td><td colspan="5">Professional Core Course</td></tr>
<tr><td>Course Title</td><td colspan="5">Textile Testing</td></tr>
<tr><td rowspan="2">Scheme and Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td rowspan="2">Semester–V</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>3</td></tr>
<tr><td>Branch</td><td colspan="5">Textile Technology, Textile Chemistry, Fashion and Apparel Engg.</td></tr>
<tr><td>Class work</td><td colspan="5">25 Marks</td></tr>
<tr><td>Exam</td><td colspan="5">75 Marks</td></tr>
<tr><td>Total</td><td colspan="5">100 Marks</td></tr>
<tr><td>Duration of Exam</td><td colspan="5">03 Hours</td></tr>
</table>

Pre–requisites: Basic knowledge of textile fibres, yarns and fabrics.

Course Objectives:

- To familiarize the students about the importance, concept and techniques of sampling
- To familiarize the students about important fibre, yarn and fabric dimensions and characteristics and their measurement techniques
- Comprehending the mechanical behavior of textile materials and its evaluation methods
- To familiarize the students about the evaluation methods of colour fastness
- To familiarize the students about common types of garment testing

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT-I

Introduction to textile testing - aim and scope. Sampling and Sampling techniques: General requirements; fibre, yarn and fabric sampling techniques.

Measurement of fibre dimensions and characteristics, viz. length, fineness, cotton maturity, neps and trash including principle and operation of equipment in common use.

Relation between R.H. and moisture regain of textile materials; equilibrium regain, hysteresis. Measurement of moisture regain. Official regain and concept of correct invoice weight.

UNIT-II

Measurement of yarn dimensions and characteristics: yarn count/diameter, twist and hairiness including principle and operation of equipment in common use.

Yarn evenness: Terms and definitions, nature of irregularities. Principles and methods of evenness testing, variance-length curves and their interpretation.

Test methods for fabric dimensional and other physical properties like, thickness, weight, crimp, bending and drape including principle and operation of equipment in common use.

UNIT-III

Mechanical behaviour of textiles: Terms and definitions, expression of results, quantities and units. Experimental methods: Principle of CRL, CRT and CRE type tensile testing machines. Fibre strength testing – single fibre strength and bundle strength. Yarn strength testing – single yarn strength and lea strength. Fabric strength testing - tensile, tearing and bursting strength tests. Principle and operation of equipment in common use.

Measurement of fabric abrasion resistance and evaluation of results; measurement of fabric pilling and crease recovery.

UNIT-IV

Measurement of fabric air permeability and water vapour permeability. Introduction to fabric handle.

Introduction to fastness properties of dyed and printed textiles - evaluation methods of colour fastness to Laundering, Crocking, Sunlight, Perspiration, Dry-cleaning and Hot Pressing.

Garment Testing: Testing of Seam Strength, Seam Slippage, Seam Puckering, Button Strength and Zipper or Closer Strength.

Suggested Reading List:

Title	**Author**
Principles of Textile Testing	J. E. Booth
Physical Testing of Textiles	B. P. Saville
Fabric Testing	Jinlian Hu
Physical Properties of Textile Fibres	W. E. Morton & J. W. S. Hearle
Textile Fibres, Yarns and Fabrics	E. R. Kaswell

Course Outcomes:

After completion of the course, students will be:

- able to understand the concept of sampling and sampling techniques for testing of textile materials.
- familiar with the important fibre, yarn and fabric dimensions and characteristics and their measurement techniques.
- familiar with the mechanical behavior of textile materials, different related terms and principles, and its evaluation methods.
- familiar with the evaluation methods of colour fastness
- familiar with the common types of garment testing

PEC–FAE–301G Digital Fabric design and development

Course code	PEC–FAE–301G				
Category	Programme Elective Course (PEC-I)				
Course Title	Digital Fabric design and development				
Scheme and Credits	L	T	P	Credits	Semester–V
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Computer aided textile designing, Colour & Design Concepts, Fabric Formation

Course Objectives:-

- To understand woven and knit textile design process
- To impart knowledge for textile computerized embroidery technology
- To understand basic vector graphic tools for motif designing
- To understand digital fashion illustration techniques

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Introduction to computer aided design for woven and knit design development, Different principles, modules and options desirable in basic CAD software for textile designing, Latest trends in fabric design and development system employed in industries, Realization of different color and weave design effects using computer, Desirable skill requirements of textile designers, Cost incurred in using CAD systems

UNIT - II

Introduction to machine embroidery: basic embroidery machine and physical components, machine setting and electronic control, Brief about different types of embroidery machines used in different segments of apparel industry, Classifications of Design Stitch type, Common types and formats of available designs in computerized embroidery machine software.

UNIT - III

Introduction to use of computers in fabric print design and development, Introduction to Adobe-illustrator while covering Main Toolbox, Selection tools, editing of multiple objects,

drawing and editing tools, vector lines and colour, creative lines , Geometric transformation tool for print design development

UNIT - IV

Brief overview of print and embroidery motifs used in traditional as well as contemporary fashion segments. Design generation using elements of motif design. Digital development in suitable graphic software for geometrical floral motif, cross-stitch effect, engineered prints, block repeat with offset filters, half drop repeats, all over patterns, Gingham patterns, creating stripe and plaid patterns, diamond patterns, complex colour blends. Filters for different effects depicting common textile effects like silk screen, leather etc

Suggested Reading List:

Title	**Author**
Fashion Illustration: Inspiration and Technique	Anna Kiper
How to develop a professional portfolio	Allyn & Bacon
Design Process	A. Karl
Basics Fashion Design -Research and Design	S Simon
Encyclopedia of Machine Embroidery	Val Holmes
Creative Machine Embroidery	Linda Mille
Machine Stitch: Perspectives	*A Kettle and Jane McKeating*

Course Outcomes:

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

- Develop different design parameters for woven and knit fabric
- Develop Practical skills to relate surface ornamentation by machine embroidery
- Develop Practical skills in vector graphic software for print development
- Relate Engineered print of common design styles

PEC-FAE- 302G Woven and Knit Design

Course code	PEC-FAE-302G				
Category	Professional Elective Course (PEC-I)				
Course Title	Woven and Knit Design				
Scheme and Credits	L	T	P	Credits	Semester–V
	3	0	0	3	
Branch	Fashion & Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Fabric formation, Colour & Design Concepts and Computer Aided Textile Designing

Course Objectives:

- To understand concept of elements of design and its importance in Textile and Apparel design.
- To familiarize concept of principles of design and its importance in Woven and Knit design.
- To understand Woven design and see the effect of colour and surface ornamentation on woven products.
- To know Print design and visualize the effect of colour and surface ornamentation on knitted products

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT-I

Elements of Design: Dots, Lines, Shapes, Forms, Colour and Textures. Impact and Application of Elements of design on the woven and knit designs. Type of Motifs and the distribution of motifs.

UNIT-II

Principles of Design: Balance, Proportion, Harmony, Rhythm, Emphasis, Symmetry. Impact and Application of Principles of design on the woven and knit designs. Importance of Elements and Principles designs on woven and knitted garments.

UNIT-III

Basic Woven designs, Simple Weaves: Plain Twill, Satin/Sateen and their derivatives Complex and Compound Weaves: Diamond, Huck-a-back, Mock-Leno, Bedford cord and Pique, Backed and Double Cloth, Towelling and other types of woven products. Surface ornamentation of Woven fabrics.

UNIT-IV

Basic knit designs: Single Jersey, Rib, Interlock, Purl and their derivatives. Complex and Compound Knit designs. Effect of colours on knit designs. Surface ornamentation of knitted fabrics.

Suggested Reading List:

Title	**Author**
Handbook of Weaving	S Adanur
Woven Fabric Production – I & II	NCUTE Publications
Inside Fashion Design	Sharon Lee Tate
Fashion: From Concept to Consumers	Gini Stephon Frings
Knitting Technology	Spencer
Fabric Structure	Watson
Watson's Advanced woven structure	Grosiciki
Knitting Fundamentals	SC Ray

Course Outcomes:

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

- relate the concept of EOD and POD on woven and knit design.
- comprehend the design development of woven products
- comprehend the design and development of knitted products
- construct colour and weave effects, stripe effects of woven and knit fabrics

PEC-FAE- 303G Textile Coloration Techniques

Course code	PEC-FAE-303G				
Category	Professional Elective Course (PEC-I)				
Course Title	Textile Coloration Techniques				
Scheme and Credits	L	T	P	Credits	Semester–V
	3	0	0	3	
Branch	Fashion & Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Textile Raw Materials, Yarn Formation, Fabric Formation, Colour & Design Concepts

Course Objectives:

- To understand the elementary knowledge and process line for pre-treatment.
- To learn the concept of dyeing of cellulosic, protein and synthetic textiles.
- To gain knowledge of dyeing and processing machinery.
- To develop skills for application of dyes on fabric and garments.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Elementary knowledge and Process line for pretreatment, Dyeing of textiles, Natural and added impurities in greige cotton fabrics. Overview of sizing, desizing, scouring operations with their objective, principal and mechanism, machinery used, general recipe, drawbacks and advantages. General introduction to bleaching and mercerisation with their objectives, mechanism, machinaries used, drawbacks and advantages.

UNIT-II

General concept of dyeing. Brief about Dye-fibre interaction, dye uptake, shade percentage. General methods of dyeing by important classes of dyes on natural cellulosic (cotton), regenerated cellulose (Viscose, Polynosic, modal, Lyocel), e.g. direct, vat, azoic, sulphur, reactive dyes.

UNIT-III

Pretreatment of wool and silk textiles. Dyeing of protein by acid and basic dyes and man-made (Polyester, Nylon, Acrylic and etc.), yarns, fabrics and garments, by acid, basic and disperse dyes etc., pigment dyeing. Introductory idea of dyeing of fibre, yarn and fabric on different dyeing machines.

UNIT-IV

Dyeing of denim using Indigo dye. Garment dyeing and processing: concept and machine used. Laundering, dry cleaning and Stain removals of textile. Rectifying and Stripping of dyes from substrate. Introduction of CCM and its applications in textile and garment industries

Suggested Reading List:

Title **Author**

"Textile Science", CBS Publishers
Gohl E P G and Vilensky LD

"Fundamental and practices in colouration of textiles", Woodhead Publishing,
Chakarverty J N,

Textile Scouring and Bleaching", Griffin, 1968.
Trotman E R

Technology of Bleaching & Mercerising", Sevak Pub., Mumbai
Shenai VA

"Chemical Processing of Silk"
Gulrajani M L

Technology of Dyeing", Sevak Pub., Mumbai
Shenai VA

Dyeing and Chemical Technology of Textile Fibres", B.I.Publications Pvt. Ltd
Trotman E R

Chemical testing of textiles: a laboratory manual, Dept of Textile Engineering, AuburnUniversity, 1981 Hall David M,

Course Outcomes:

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

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

OEC-FAE- 301G Knitting and Knitwear Technology

Course code	OEC-FAE-301G				
Category	Open Elective Course (OEC-I)				
Course Title	Knitting and Knitwear Technology				
Scheme and Credits	L	T	P	Credits	Semester–V
	3	0	0	3	
Branch	Fashion & Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Fabric Formation; Knitting Technology

Course Objectives:

- To gain knowledge of knitted fabrics & knitted garments and their properties.
- To familiar with knitting machinery and mechanisms.
- To have adequate exposure of knitted fabric and knitwear manufacturing techniques as well as ornamentation.
- To understand the knitting techniques, knitting elements and knitting machines.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Definition of knitting, Type of Knitted fabrics and their characteristics, End-uses of knitted fabrics. Fundamental Stitches and their uses. Stitch diagrams. Knitting cycles of Needles. Basic weft knitted structures and their properties. Ornamentation of knitted fabrics. Derivatives of basic structures like La-coste, Accordian, Half and Full Cardigan, Milano Rib, French Rib, Swiss Rib, Single Pique, Taxi Pique, Pin Tuck.

UNIT - II

Classification of warp and weft knitting machines. Classifications of warp knitting machines. Description of Raschel and Tricot machines. Characteristics of Raschel 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, etc. Cut stitch shaped, Shaping of various garments, etc., 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 commonly used fashion details- Necklines, sleeves, etc

UNIT - IV

Integral 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, etc , Sewing of knits,Linking machine and Cup seamer, Quality control of knitted garments.

Suggested Reading List:

Title	**Author**
Knitting Technology	Wignal
Knitting Technology	Azgaonkar
Knitting Technology	Spencer
Knitting fundamentals and advancement	S C Ray
Knitted Clothing Technology	Brackenburry

Course Outcomes:

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

- Analyse knitted fabrics and knitted garments, their properties, manufacturing techniques
- Implement the concepts of fully fashioned garments
- Classify warp and weft knitting machines and Knitted garments machineries
- Implement the quality control of various knitting processes.

OEC–FAE–302G Soft Skill and Interpersonal Communication

<table>
<tr><td>Course code</td><td colspan="5">OEC–FAE–302G</td></tr>
<tr><td>Category</td><td colspan="5">Open Elective Course (OEC-I)</td></tr>
<tr><td>Course Title</td><td colspan="5">Soft Skill and Interpersonal Communication</td></tr>
<tr><td rowspan="2">Scheme and Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td rowspan="2">Semester–V</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>3</td></tr>
<tr><td>Branch</td><td colspan="5">Fashion and Apparel Engineering</td></tr>
<tr><td>Class work</td><td colspan="5">25 Marks</td></tr>
<tr><td>Exam</td><td colspan="5">75 Marks</td></tr>
<tr><td>Total</td><td colspan="5">100 Marks</td></tr>
<tr><td>Duration of Exam</td><td colspan="5">03 Hours</td></tr>
</table>

Pre–requisites: English and Computer basics

Course Objectives:

- To understand and aware about importance, role and contents of soft skills through instructions, knowledge acquisition, demonstration and practice.
- To possess knowledge of the concept of Self-awareness and Self Development.
- To help the students in building interpersonal skills.
- To develop skill to communicate clearly.
- To learn active listening and responding skills.
- To develop students overall personality.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT-I

Introduction to Soft skills, Knowing yourself, Self Assessment, Self Awareness, Thoughtfulness and responsible approach, Self Development: Etiquette & Manners, Emotion, Ego. Handling stress and Failures

UNIT-II

Values and Belief Systems, Positive Attitude and Self Confidence, Art of listening-Art of reading-Art of speaking-Art of writing,

UNIT-III

Communication and Its Interpretation: Definition, Types, Importance, Barriers, Overcoming barriers, Communication skills, Body Language, Interpersonal Skills/ Understanding Others Developing interpersonal relationship-

UNIT-IV

Time Management, Identifying one's strength and failures, Importance of First Impression, Priority Management, Team building-group dynamics-Net working, Improved work relationship, Responsibilities, Prioritize Your Work, Smart Work, Decision Making, Empowering and delegation, Motivating others

Suggested Reading List:

Title	**Author**
A Book on Development of Soft Skills (Soft Skills : A Road Map to Success), Meena.K and V.Ayothi (2013), P.R. Publishers & Distributors,	
Soft Skills – Know Yourself & Know the World, S.Chand & Company LTD, Ram Nagar, New Delhi	Alex K.,
Developing the leader within you	John c Maxwell
Good to Great	Jim Collins
The seven habits of highly effective people	Stephen Covey
Emotional Intelligence	Daniel Goleman
You can win	Shiv Khera
Principle centred leadership	Stephen Covey
Communication Skills and Pushpa Lata, Oxford University Press.	Sanjay Kumar
Developing Communication Skill Mohan, Meera Banerji, McMillan India Ltd.	Krishna
Thinks and Grow Rich Hill, Ebury Publishing	Napoleon
Awaken the Giant Within Harper Collins Publishers,	Tony Robbins
Change Your Thoughts; Change Your Life Hay House India,	Wayne Dyer,
The Power of Your Subconscious Mind Murphy Maanu Graphics	Dr Joseph
The new Leaders Coleman Sphere Books Ltd ,	Daniel
Personality Development and Group Discussions Mitra, Oxford University Press.	Barun K.

Course Outcomes:

At the end of the course, student will be able to

- Make use of techniques for self-awareness and self-development.
- Develop right attitudinal and behavioural change , Apply business etiquette skills effectively.
- Improve communication, interaction and presentation of ideas.
- Apply the conceptual understanding of communication into everyday practice.
- Implement teamwork and group discussions skills
- Develop time management and stress management.

OEC–FAE–303G Organizational Behavior & HRM

Course code	OEC–FAE–303G				
Category	Open Elective Course (OEC-I)				
Course Title	Organizational Behavior & HRM				
Scheme and Credits	L	T	P	Credits	Semester–V
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Entrepreneurship and Industrial Engineering**,** Textile Raw Materials, Yarn and Fabric Formation, Apparel Production

Course Objectives:

- To impart knowledge of Organisational Behaviour & HRM
- To introduce the professional ethics and human values in present competitive business environment and competition.
- To learn the different aspect of corporate communication and Leadership
- To develop the techniques of induction programs in corporate environment.
- To familiarize the students with various wages and incentives planning

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Understanding Organisational Behaviour: Definition, Goals of Organisational behaviour. Key forces affecting Organisational Behaviour. Fundamental Concepts of Organisational Behaviour. Motivation: Meaning, Objectives and importance of motivation. Theories of Motivation, Maslow's theory, Mc Greger's Theory Herzberg's theory. Morale: Meaning; Factors affecting morale, types of morale morale and productivity, Evaluation of morale, improving morale.

UNIT - II

Communication: Definition & importance of Communcation; Formal & informal communication, Barriers in communication.
Leadership: Definition & importance, Nature of leadership various approaches to leadership styles.

UNIT - III

Importance of human resources in industry, Definition of human resource management, mechanical approach towards personnel, Paternalism, Social system approach. Need for human resource planning, process of human resource planning, Methods of recruitment,

Psychological tests and interviewing, Meaning and importance of placement, Meaning and techniques of induction. Training and development : Concepts of training and development, Importance of training and development, Management development its nature, purpose and method.

UNIT - IV

Significant factors affecting compensation, Methods of wage payment, Wage differentials, Causes of difference in Wages, Types of wage differentials, Wage incentives, Meaning, Objectives, types of incentive plans.

Suggested Reading List:

Title **Author**

Human Resource and Personnel Management K. Aswathappa–TMH Publ Company Ltd.
Personnel Management
C.B. Mamoria, Himalaya Publishing House.
Organisational Behaviour
Dr. L.M. Prasad (Sultan Chand & Sons).
Personnel Management & Industrial Relations Dr. T.N. Bhagoliwal: Sahitya Bhawan Agra.
Personnel Management
V.G. Karnik, Jaico Publishing House.
Personnel management & Industrial Relation
Tripathi: Sultan Chand & Sons.
Personnel Management Arun Monappa & Mirza Saiyadain –TMH Publishing Co. Ltd.
Principles of Personnel Management
Edwin B. Flippo (McGraw Hill).
Organisational Behaviour
K. Adwathappa.
Organizational Behaviour John W. Newsstorn & Keith Davis, TMH, New Delhi.

Course Outcomes:
At the end of the course student will be able to:-

- Relate Organisational Behaviour in fashion Industry.
- Analyze corporate communication and Leadership
- Develop the skills, techniques and tools of HRM
- Perform incentive Planning process.

OEC–FAE–304G Textile & Garment Design by Surface Ornamentation

Course code	OEC–FAE–304G				
Category	Open Elective Course (OEC-II)				
Course Title	Textile & Garment Design by Surface Ornamentation				
Scheme and Credits	L	T	P	Credits	Semester–V
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Fabric formation, Colour & Design Concepts, Computer Aided Textile Designing, Apparel Production, Traditional Textiles

Course Objectives:

- To understand the basic design concepts
- To familiarize concept of Surface Ornamentation.
- To identify fabric characteristics required for effective ornamentation
- To understand techniques of surface ornamentation
- To design textiles, apparels & accessories using various techniques of surface ornamentation.
- To understand application of ornamentation in textiles and garments.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT- I

Brief Introduction to basic design concepts and elements of design. Introduction to surface ornamentation of textiles and garments. Significance of surface ornamentation on textiles for value addition. Design enhancement by surface ornamentation. Motif, design and theme selection for surface ornamentation. Designer's inspiration for embellishment. Introduction to designers and brands using different surface ornamentation techniques.

UNIT - II

Classification and styles of surface ornamentation with reference to geographical factors and techniques employed. Factors affecting selection of different surface ornamentation techniques. Introduction to regional embroidery techniques - Phulkari, Kantha, Kasuti, Chikankari etc.

Other techniques of surface ornamentation like crocheting, tatting, smocking, ribbon work, fabric painting, eyelet work, cut work, drawn thread work, applique, fabric manipulation, trim sewing lace work, bead work, zardosi, resist dyeing – tie and dye, shibori, battick, rust dyeing, eco dyeing.

Printing- block, transfer, screen, stencil, digital and inkjet printing techniques as a means for surface ornamentation and value addition.

UNIT - III

Tools, equipment and materials required for surface ornamentation. Materials required for surface ornamentation – textile and non-textile materials, different trims and notions, gimps, braid, passementerie, tassels, sequins etc.

UNIT - IV

Modern techniques of textile and garment surface ornamentation. Intervention of CAD for surface ornamentation. Application of textile and surface ornamentation in home textiles, apparels and accessories. Rendering, sketching and designing of apparels and accessories using surface ornamentation techniques.

Suggested Reading List

Title	**Author**
Apparel Manufacturing Technology	T. Karthik, P. Ganesan, D. Gopalakrishnan
Know your Fashion Accessories	Celia Stall-Meadows
Embroidery Design	Nirmala C Mistry
Traditional Indian Textiles	John Gillow

Course Outcomes:

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

- Relate significance and techniques of Surface Ornamentation.
- Apply surface ornamentation techniques in textiles and garments.
- Design textiles, apparels & accessories using various techniques of surface ornamentation.

OEC–FAE–305G Introduction to Fashion and Apparel Industries

Course code	OEC–FAE–305G				
Category	Open Elective Course (OEC-II)				
Course Title	Introduction to Fashion and Apparel Industries				
Scheme and Credits	L	T	P	Credits	Semester–V
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Textile Raw Materials, Yarn and Fabric Formation, Apparel Production, Colour & Design Concepts

Course Objectives:

- To understand the elementary knowledge of Indian and global apparel industries.
- To learn the concept of fashion, components o fashion, fashion cycle, fashion theories.
- To gain knowledge of fashion centres , fashion brands.
- To develop skills for application of fashion promotion, information services and communications

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Introduction to Apparel Industry, Indian Apparel industry scenario and its SWOT Analysis, Status of Structure and working flowchart of various departments of a garment production house. Apparel manufacturing countries: their features, level of technology, product mix. Indian apparel industry- challenges & global scenario.

UNIT - II

Fashion terminology, components of fashion, fashion cycle – its phases, Style classification based on fashion cycle - fad/classic, recurring & interrupted cycles, Consumer identification with fashion cycles- leaders, innovators, followers, victims & laggards. Motives of consumer buying & factors affecting fashion growth & declination. Fashion adaptation theories.

UNIT - III

Major fashion centers of the world: Brief introduction to world fashion centers – Millan, Italy, Paris, Rome, American, European, Japanese. Who's who of fashion world- national & international designers , their private labels, Luxury brands of apparels & accessories.

General introduction to careers & future opportunities in fashion & apparel sector- export & buying houses, design houses etc.

UNIT - IV

Fashion information services, trend forecasting and auxiliary services. Importance of fashion seasons & fashion calendar in apparel industry.
Introduction to fashion forecasting – significance, purpose of forecasting trends, forecasting tools & techniques and role of fashion forecasters. Fashion promotion and communications- Trade fairs, Fashion shows, exhibitions & promotional events

Suggested Reading List:

Title

Author

The theory of Fashion ",
John Wiley & Sons, 1965.
"Fundamentals of Men's Fashion Design ", Fairchilds publications, 1976.
Kawashima, Masazki,
"The clothing Factory ", The Clothing Institute, Blackwell London, 1972.
Carr, H.C.,
"Inside the Fashion Business ", JWS, 2nd edition, 1974.
Jarnow, J.A., and Judelle B.,
"Advertising Handbook ", Prentice Ha ll Inc, 1956.
Barton, Roger,
"Merchandising of Fashion ", Ronald press, 1942.

Swinney, John B,

Garment Manufacturing Technology

Nayak & Padhey

The Technology of Clothing Manufacture
Carr & Latham
Apparel manufacturing analysis
Jacob Solinger
Apparel manufacturing Handbook: Analysis, Principles and Practices
Jacob Solinger
Apparel Manufacturing Technology
Karthik, Ganeshan, Goplakrishnan

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

- Understand the fundamentals of fashion and apparel industries.
- Analyse the fashion cycles, fad and different styles and fashion theories.
- Apply the work of fashion leaders and brands into practice
- Develop fashion promotion and communication skills .

OEC–FAE–306G Evolution of Clothing and Fashion

Course code	OEC–FAE–306G				
Category	Open Elective Course (OEC-II)				
Course Title	Evolution of Clothing and Fashion				
Scheme and Credits	L	T	P	Credits	Semester–V
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Apparel Production-I, Apparel Production-II and Introduction to Fashion

Course Objectives:

- To understand concepts of clothing and costumes.
- To familiarize with fashion capitals, fashion designers, fashion markets and fashion weeks.
- To understand Indian history of costumes.
- To know the Global history of costumes.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

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. Fashion and its meaning, Classification of fashion, Fashion product Life cycles. Sources of Fashion Inspiration.

UNIT- II

Fashion terminology, Effect of various factors on fashion movement- accelerating, retarding and recurring factors such as technology, designers, economy, sports etc. on fashion movement. Fashion leadership theories- traditional, reverse and across theory. Important global 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 pre-historic and medieval period, Study of Costumes, jewellery, footwear, hairstyles etc. in India in different periods as – Vedic & 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, French 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.

Suggested Reading List:

Title	**Author**
The guide to historic costumes	Karen Baclaw Ski
Inside Fashion Business	Kitty G.Dickerson
Inside Fashion Design	Sharon Lee Tate
Fashion: From Concept to Consumers	Gini Stephon Frings

Course Outcomes:

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

- Relate significance of clothing and fashion.
- Apply indian costumes in textile and garment designing.
- Design textiles, apparels & accessories using western costume.

LC–FAE–301G Woven & Knit Design Lab

Course code	LC-FAE-301G				
Category	Laboratory Course (Professional Core Course)				
Course Title	Woven & Knit Design Lab				
Scheme and Credits	L	T	P	Credits	Semester–V
	0	0	2	1	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Basic knowledge of Weaving and Knitting.

Course Objectives:

- To impart first-hand experience of the procedures of making warp sheet, drawing-in and denting of warp yarns through heald shafts and dents of the reed as per drafting and denting plan and developing woven fabric samples.
- To learn fabric analysis skills .
- To impart first-hand experience of developing basic knit designs on weft knitting machines and analysis.
- To serve as a bridge between theory and practice.

List of Experiments:

1. Study of Warp Patterning through Sectional Warping mechanism
2. Study of Weft Patterning through Drop Box mechanism
3. Study of woven designing through Electronic Dobby or Jacquard mechanism
4. To Produce woven fabric samples of basic weaves (Plain, Twill and Sateen weaves) on desk looms/sample looms
5. To Produce woven fabric samples of basic weave derivatives (Rib. Matt, Pointed twill, herring bone, etc.) on desk looms/sample looms
6. To Produce woven fabric samples of decorative weaves (Mock Leno, Honey comb, Diamond, Crepe, Mock Leno, etc.) on desk looms/sample looms
7. To produce different fabrics on flat double bed weft knitting machine and study their properties
8. To produce knitted fabric samples by combination of knit, tuck and float designs.
9. To analyse woven fabric samples and study their properties and end uses
10. To analyse Knitted fabric samples and study their properties and end uses.

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

• Correlate between theory and practice of the concept of Sectional warping machines and looms
• Visualise the mechanisms of Sectional Warping and shuttle weaving machines and comprehend their settings
• Correlate between theory and practice of the concept of woven and knitting machines
• Visualise the mechanisms of knitting machines and comprehend their settings

- Develop practical skills relevant to industrial practice

LC–FAE–302G Pattern making & Apparel Construction Lab-I

Course code	LC-FAE-302G				
Category	Laboratory Course (Professional Core Course)				
Course Title	Pattern making & Apparel Construction Lab-I				
Scheme and Credits	L	T	P	Credits	Semester–V
	0	0	2	1	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Basic knowledge of Apparel Production, Garment Manufacturing

Course Objectives:

- To impart first-hand experience of the procedures of making basic patterns for creating garments.
- To learn working with tools and equipment required for pattern making
- To impart first-hand experience of working of different utility/sewing machines and preparation of samples on all the utility machines .
- To serve as a bridge between theory and practice.

List of Experiments (Pattern making):

1. Learning the basics of pattern making techniques.
2. Learning and working with tools and equipment required for pattern making.
3. Learning and using body measurements, garment measurements and specification sheet data for flat pattern making.
4. Learning the fundamentals of fabric calculations according to the flat pattern information.
5. Construction of basic bodice blocks (kids) (front, back, sleeves and trouser).
6. Construction of basic bodice blocks (Adult) (front, back & sleeves with fitting and fashion details).
7. Adaptation of basic blocks into finished pattern (Kids A-line frock etc.)
8. Adaptation of basic blocks into finished pattern (Kids trousers, bottoms etc.)
9. Adaptation of basic blocks into finished garments (Adult kurta, blouse, shirt etc.)
10. Pattern making of fashion details of basic collar, styles of sleeves and basic neckline.

List of Experiments (Apparel construction):

1. Learning the working of different utility machines. Preparation of samples on all the utility machines.
2. Sample preparation of placket types.
3. Sample preparation of pocket types.

4. Sample preparation of techniques to control fabric fullness (pleats, gathers and tucks).
5. Construction of atleast one complete kid's garments.
6. Construction of different types of collars, sleeves and necklines.

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

- Understand practically the concepts of basic blocks and developing blocks
- Prepare patterns for kid's garment construction.
- Construct the fashion details for a variety of kid's garments.

LC-TT/TC/FAE-303G Textile Testing Practical

Course code	LC-TT/TC/FAE-303G				
Category	Laboratory Course (Professional Core Course)				
Course Title	Textile Testing Practical				
Scheme and Credits	L	T	P	Credits	Semester–V
	0	0	2	1	
Branch	Textile Technology, Textile Chemistry, Fashion and Apparel Engg.				
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Basic knowledge of textile fibres, yarns and fabrics, Textile Testing.

Course Objectives:

- To impart first-hand experience of the procedures of basic testing of fiber, yarn, fabric and garment.
- To learn presentation of test results in a suitable manner.
- To impart first-hand experience of test result analysis.
- To serve as a bridge between theory and practice.

List of Experiments:

1. Measurement of trash content in raw cotton
2. Measurement of fiber fineness by whole fiber method
3. Measurement of fiber fineness by airflow method
4. Measurement of fiber length parameters by Baer Sorter
5. Determination of fiber bundle strength using Pressley fiber bundle strength tester
6. Determination of fiber bundle strength using Stelometer
7. Measurement of yarn twist
8. Measurement of linear density of sliver, roving and yarn
9. Measurement of C.S.P value of yarn
10. Measurement of fabric tensile properties
11. Measurement of fabric tearing strength
12. Evaluation of washing and rubbing fastness properties of dyed fabrics
13. Evaluation of seam properties (Seam strength and Seam Slippage)

Course Outcomes:

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

- correlate between theory and practice of the concept of textile testing.
- conduct basic testing of fiber, yarn, fabric and garment.
- present the results in graphical and tabular manner.
- analyze the results from the tests.
- develop practical skills relevant to industrial practice.

LC–FAE–304G Apparel Design Lab

Course code	LC-FAE-304G				
Category	Laboratory Course (Professional Core Course)				
Course Title	Apparel Design Lab				
Scheme and Credits	L	T	P	Credits	Semester–V
	0	0	2	1	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Basic knowledge of Apparel Production, Garment Manufacturing, Apparel design

Course Objectives:

- To impart first-hand experience of the procedures of garment design techniques via dart manipulation method
- To learn style variations of dart manipulation
- To impart first-hand experience of Commercial paper patterns, symbols used in commercial patterns, guide sheet and other relevant information
- To serve as a bridge between theory and practice.

List of Experiments:

1. Principle of dart manipulation by (i) Slash and spread method / Pivotal transfer method
2. Style variations of dart manipulation for
    - Single dart
    - Double dart
    - Dart Cluster of dart equivalents
    - Radiating darts
    - Graduated darts
    - Asymmetric darts
    - Intersecting darts
3. Dart manipulation to other fashion details like shirring and gathers etc.
4. Commercial paper patterns envelopes for pattern prepared via using above manipulations and adaptations

Course Outcomes:

After completion of the course, students will be able to

- Understand practically the concepts of darts in adults bodice block
- Make darts and manipulation of darts.

- Adapt existing design patterns to new styles

PCC-FAE-303G Apparel Production -III

Course Code	**PCC-FAE-303G**				
Category	Professional Core Course				
Course Title	Apparel Production –III				
Scheme and Credits	L	T	P	Credits	Semester - VI
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Fabric Formation, Apparel Production-I and Apparel Production-II

Course Objectives:

- To gain knowledge of commercial sewing machines & associated work aids, etc.
- To familiar with computerised pattern making, 3-D simulation, fabric selection, etc.
- To have adequate exposure of Trims, notions, zippers, Velcro, etc.
- To understand the alternative joining of materials, fusing, pressing, etc..

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Drawbacks of SNLS machine and highlighting need for other commercial sewing machines. Comparison of feed mechanism and components of SNLS machine with other commercial sewing machines – their relative merits and demerits. An introduction to post sewing operations. Description of processes, their objectives and requirements. An introduction to pressing and finishing of garments. Description of different commercial pressing equipment used in garment industries.

UNIT - II

Alternative methods of joining material – fusing, welding, moulding. Description of methods, requirements and equipments employed for fusing. An introduction and classification of trims and notions – the materials, selection criteria and methods of attachment to garments. Designing garments using different trims and notions. An introduction of care labelling instructions for garments. Packing: different types of packing, packing materials, labels and tags.

UNIT- III

Classification and styles of apparels with reference to fabric types, age groups, genders, occasion and application areas. Fabric selection based on classification and styles. Characteristics & desirable properties of Apparel fabrics. Principle of fitting- ease, line, grain, set, balance. Significance of draping for different garment styles. Style adaptation of apparels by various fabric manipulation techniques. Different techniques & their types - like pleats, darts, gathers, shirring, elasticizes shirring, smocking, ruffles etc. Designing different apparel styles using the various fabric manipulation techniques.

UNIT - IV

An introduction to forecasting tools, techniques and importance. Different luxury, high end brands for apparels and concept of fast fashion.

The role of fashion season and fashion calendars in meeting deadlines and reducing lead times in apparel supply chain. Impact of fast fashion on apparel supply chain. Concept and significance of sustainable approach in apparel production.

Suggested Reading List:

Title	**Author**
Garment Manufacturing Technology	Nayak & Padhey
The Technology of Clothing Manufacture	Carr & Latham
Apparel manufacturing analysis	Jacob Solinger
Apparel manufacturing Handbook:Analysis, Principles & Practices	Jacob Solinger
Industrial Engineering in Apparel Production	V Ramesh Babu
Apparel Manufacturing Technology	Karthik, Ganeshan, Goplakrishnan

Course Outcomes:

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

- Compare merits and demerits of SNLS over latest commercial sewing machines
- Implement the concepts of computerized patterns, 3-D scanners and making garments
- Classify Notions, trims, zippers and other Textile and Non-textile items
- Implement alternative methods of joining fabrics, fusing, etc..

PCC-FAE-304G Automation in Garment Industry

Course Code	**PCC-FAE-304G**				
Category	Professional Core Course				
Course Title	Automation in Garment Industry				
Scheme and Credits	L	T	P	Credits	Semester - VI
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Apparel Production-I , Apparel Production-II, GPME

Course Objectives:

- To gain knowledge of basics of Automation for textile and apparel Industry.
- To introduce the application of automation in different sectors of textile and apparel Industry.
- To learn advanced concepts of process and retail automation.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Basics of Automation- Definitions, concept, components of automation, relationship between various automation components, need of automation, levels of automation, strategies of automation, types of automation. Process control- Industrial process controls- continuous & discrete, open loop & closed loop systems; computerized process control; NC & CNC technologies- concept, features and components.

Automation in apparel designing processes- Body scanning, PDS, marker planning, plotting, digital design presentation and Virtual reality. Automation in Operations- Fabric inspection, Spreading, Cutting, Sewing and Pressing.

UNIT - II

Quick Response Technology: Concept, need, strategies, Components of QRT in Textile Industry, Apparel production & Apparel retailing segments. Advantages and Limitations. Latest software solutions as QRT. Computer integrated Manufacturing- Concept, Definitions, Scope of CIM in apparel Industry, Components of CIM, Areas of application of CIM in apparel Industry, Advantages and Limitations.

UNIT- III

Flexible Manufacturing System: Concept, Definitions, Brief history, Need, Objectives, Benefits offered, Types of FMS, Components of FMS, Limitations. Utility Sewing machines- Concept, Need and features of latest apparel sewing utility and artwork Machines.

Automation in Material Handling: Concept, Need, components, Strategies followed to control handing apparels at manufacturing level, Latest techniques to automate material handling in apparel production & retailing.

UNIT - IV

Automation in Apparel Retail: Definitions, concept, need, aspects, areas of application of apparel retail automation. Robotics & PLCs- Definitions, detailed components, classification of robots w.r.t manipulators & controllers, latest applications of robots in apparel production & retailing. PLCs- concept, components, advantages over conventional control systems, applications in textile & apparel Industry. Use of computers at various levels of apparel Supply chain- POS tracking back up to the manufacturing.

Suggested Reading List:

Title	**Author**
Garment Manufacturing Technology	Nayak & Padhey
The Technology of Clothing Manufacture	Carr & Latham
Apparel manufacturing analysis	Jacob Solinger
Apparel manufacturing Handbook:Analysis, Principles & Practices	Jacob Solinger
Industrial Engineering in Apparel Production	V Ramesh Babu
Apparel Manufacturing Technology	Karthik, Ganeshan, Goplakrishnan
Automation, Production Systems and CIM	Mikell P. Groover
Transforming Clothing production into a Demand-Driven , Knowledge- Based, High Tech Industry	Walter & Carsolo
Advance in apparel production	Catherine Fairhurst

Course Outcomes:

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

- Introduce the concepts of automation for textile and apparel Industry
- Implement the application of automation in different sectors of textile and apparel Industry
- Introduce the Flexible Manufacturing systems
- Implement the robotics and PLC's for textile and apparel Industry

PEC-FAE- 304G Preparatory Wet Processing and Dyeing

Course code	PEC-FAE-304G				
Category	Professional Elective Course (PEC-II)				
Course Title	Preparatory Wet Processing and Dyeing				
Scheme and Credits	L	T	P	Credits	Semester–VI
	3	0	0	3	
Branch	Fashion & Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Textile raw materials, yarn and fabric formation, woven and knitted fabrics, colour science

Course Objectives:

- To understand preparatory wet processing and concept of Pre-treatments with relevant machines and procedure.
- To understand dyes, pigments and other auxiliaries used in Textiles and apparels
- To know application procedures of pretreatment and dyeing with various dyes
- To know the dyeing of animal fibres and denim fabrics.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Greige Fabric checking, Preparation of process chart, Elementary knowledge and Process line for pretreatment, Dyeing, printing and finishing of textiles, Natural and added impurities in greige cotton fabrics. 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. Overview of singeing, desizing, scouring operations with their objective, principle and mechanism, general recipe, drawbacks and advantages. Introductory idea of machines used in preparatory wet processing.

UNIT - II

Introduction to different processes (Desizing, Scouring, bleaching, mercerising, milling, etc.) involved for the above and the machinery used Heat and steam setting of synthetic fibres / yarns/ fabrics (polyester, nylon, acrylic, polypropylene, spandex fibre etc.). Physical principles involved in detergency, condition for efficient detergency. Commercial detergents. Dry cleaning, Stain removals. Modern developments in pre-treatments. Continuous processing machinery. Auxiliaries used in Desizing, scouring, bleaching and mercerizing.

UNIT - III

General methods of dyeing. Important classes of dyes. e.g. direct, acid, basic, vat, azoic, sulphur, reactive and disperse dyes etc., Application of dyes on natural, regenerated (Viscose,

Polynosic, modal, Lyocell) fibres Application of dyes on Man Made fibres (Polyester, Nylon, Acrylic and etc.), yarns, fabrics and garments. Chemical auxiliaries used in dyeing. Colour measurement and fastness (light, washing, perspiration, sublimation, chlorine, etc.) properties.

UNIT - IV

Dyeing of blends, P/C, P/W, P/V etc. Mass colouration. Pigment dyeing. Dyeing of denim using Indigo dye, Pigment dyeing technology, factors affecting dyes build-up on cellulosic material, continuous Indigo dyeing range, new Indigo vetting and dyeing techniques. Rectifying and Stripping of dyes from substrate, Dyeing concept of textile materials based on protein fibres. Dyeing concept of synthetic textile materials such as Polyester, Nylon, etc (overview). Dyeing of denim using Indigo dye. Garment dyeing and processing: concept and machine used.

Suggested Reading List:

Title
Author

Textile Chemistry RH Peters

Mercerising JT Marsh

Fundamental and practices in colouration of textiles J N Chakraborty

Textile Scouring and Bleaching
Trotman E R

Technology of Bleaching & Mercerising
Shenai VA

Technology of Dyeing
Shenai VA

Dyeing and Chemical Technology of Textile Fibres
Trotman E R

Chemical Processing of Silk ML Gulrajni

A glimpse of the Chemical Technology of Textile Fibres. R R Chakraverty

Textile processing N N Mahapatra

"Textile Science", CBS Publishers.
Gohl E P G and Vilensky LD

Chemical testing of textiles: a laboratory manual, Dept of Textile Engineering
Hall David M

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

- Have an idea of preparatory wet processes and equipment used for wet processing of textile and apparel products
- Utilise the concept of Pre-treatments with relevant machines and procedure.
- Apply dyes, pigments and other auxiliaries in Textiles and apparels
- Utilise knowledge for application procedures of pretreatment and dyeing with various dyes

PEC-FAE- 305G Visual Merchandising

Course code	PEC-FAE-305G				
Category	Professional Elective Course (PEC-II)				
Course Title	Visual Merchandising				
Scheme and Credits	L	T	P	Credits	Semester–VI
	3	0	0	3	
Branch	Fashion & Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Woven & Knitted Fabrics, Colour & Design Concepts, Apparel Merchandising

Course Objectives:

- To understand the elementary knowledge of visual merchandising .
- To learn the concept of merchandising mix .
- To gain knowledge of store management .
- To develop skills for store design and display of products.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Introduction to Visual Merchandising- Introduction, Objectives, concept and scope of visual merchandising, VM as a support for retail positioning strategy, prospects and challenges in VM, Techniques to overcome the VM challenges.

UNIT - II

Merchandise Mix: Introduction, Objectives, concept of Merchandise Mix, Merchandise line, assortment, assortment planning, strategies, Role of merchandiser in apparel retail.

Store management: Introduction, Objectives, Types of retail stores, location of a retail store, types of retail locations, planning of a store layout, various types of store layouts- grid, forced path, free form, boutique and combined. Store space allocation.

UNIT - III

Store design and display: Introduction, Objectives, concept of store designs, significance of display planning, display settings, tore designs, Exterior and Interior of a store, Window displays, Merchandise presentation strategies, physical materials used to support the display, Fixtures, shelves, Gondolas, racks, planogramming, replenishes.

UNIT - IV

Store image: Introduction, Objectives, concept of store image, elements of Image mix-merchandise, fixtures, sound/noise, odour, visuals, Employees, elements that levy negative impact on shoppers. Change & strengthening of retail image.

Non-store merchandising- Introduction, Objectives, non-store retail merchandising, Television retailing/ home shopping, e-retailing, e-catalogues, product presentation in non-store retail merchandising.

Suggested Reading List:

Title	**Author**
Garment Manufacturing Technology	Nayak & Padhey
The Technology of Clothing Manufacture	Carr & Latham
Apparel manufacturing analysis	Jacob Solinger
Apparel manufacturing Handbook:Analysis, Principles & Practices	Jacob Solinger
Industrial Engineering in Apparel Production	V Ramesh Babu
Apparel Manufacturing Technology	Karthik, Ganeshan, Goplakrishnan

Course Outcomes:

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

- Relate knowledge of visual merchandising .
- Apply merchandising mix in Stores .
- Use knowledge of visual merchandising in store management .
- Utilise skills for store design and display of products.

PEC-FAE- 306G Material Studies

Course code	PEC-FAE-306G				
Category	Professional Elective Course (PEC-II)				
Course Title	Material Studies				
Scheme and Credits	L	T	P	Credits	Semester–VI
	3	0	0	3	
Branch	Fashion & Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Textile raw materials, yarn formation, woven & Knitted Fabrics, Colour & Design Concepts, Apparel Merchandising

Course Objectives:

- To understand the elementary knowledge of different raw materials, high performance fibres, fancy yarns
- To learn the concept of different types of fabrics used for apparels.
- To gain knowledge of narrow fabrics, braids, laces, nets, lining and interlinings nonwoven fabrics.
- To understand Non-Textile materials like leather, fur, metal, glass, plastics, etc.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Introduction to high performance fibres, advantages, limitations, applications in functional clothing. Fancy Yarns: Concept, applications, general properties, Types of fancy yarns-structures, sub-types, their applications in fashion clothing and apparels.

UNIT - II

Fabrics- Characteristics of Apparel fabrics, Production process, structure, properties and end uses of fabrics as Poplin, Muslin, georgettes, crepe, voile, denim, drill, satin, brocades, tussar, organdie, Bedford cord, velvet/velveteen, gauge & leno, gabardine, organdie, organza, jean.

UNIT - III

Narrow Fabrics: Types of narrow fabrics- Tapes, Ropes, Braids, Laces, Ribbons, Elastics, Belts and their application in garments and fashion accessories.
Lining & Inter lining fabrics: Different types, structure, end uses and application techniques of linings and interlinings. Non-woven fabrics: Manufacturing techniques and applications in the apparel and accessories.

UNIT - IV

Non-textile materials- Leather: Different types of leathers, their properties and end uses. Fur: Different types and their uses. Introduction to nature of miscellaneous materials like metals, glass, shells, plastic and their applications in fashion entities.

Suggested Reading List:

Title	Author
Textile Ropes and Cordages	R Chattopadhyay
Textile Design	Watson
High performance fibre	Preston & Lewin
Non-woven fabrics	N.N.Banerjee
The Technology of Clothing	Carr & Latham

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

- Create work in the field of high performance fibres, fancy yarns for fashion & apparel industries.
- Analyze the plan and develop different types of fabrics to be used for different types of apparels.
- Evaluate and Promote narrow fabrics, nonwovens, braids, laces in the field of Fashion & Apparel industries.
- Analyze Plan and execute the uses of non-textile material like leather, fur, metals etc for fashion and apparel industry.

OEC–FAE–307G Indian Colored Textile Heritage

Course code	OEC–FAE–307G				
Category	Open Elective Course (OEC-III)				
Course Title	Indian Colored Textile Heritage				
Scheme and Credits	L	T	P	Credits	Semester–VI
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Traditional Indian Textile & Embroideries, Colour & Design Concepts

Course Objectives:

- To familiarize different textile design inspirations in Indian heritage
- To understand design and development process of kalamkari textiles
- To familiarize design and development process of shibori and batik
- Introduction to traditional textile printing techniques

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT-I

Fashion inspirations: Basic principles of aesthetics, the specific aesthetics of different art styles e.g. shapes and forms in sculpture, roots and impulses of traditional painting and dyeing techniques. Introduction to shibori, fabrics and colour-combination techniques, dyeing techniques, Folding and clamping resist: accordion, squares, triangle, cones, hollow and solid circles, solid squares, varied clamp and marks, Concept of Arashi via random and planned wrapping and over dyeing. Bound –resist by wrapping and bound objects, stitching and gathering techniques, introduction to shibori knits

UNIT-II

Introduction, synopsis of temple, folk idiom and historic perspective of kalamkari, Natural dyeing: principle, colour combination, colours from nature, different available modrant and treatments, Introduction to hand painted and block –printed styles of kalamkari their major areas and styles, Future trends of kalamkari

UNIT-III

Basic principle for batik, Factors like fabric selection, pre-treatments, brushes, waxes and recipes, canting, colour and design combinations, dyes and dyeing methods followed during batik printing. Reactive, vat, acid and basic dyeing methods, steaming and fixation trends for batik. Latest trends in batik textiles

UNIT-IV

Detailed technique of printing followed commercially in traditional Ajrakh, **Dabu and Bagru,** Mendh ki chhapai **printing.** Synopsis about areas, common motifs, colors and technique for Madhubani, Phadas ,Pichhavai , Bagh, Mural, Pattachitra Kalighaat , **Varak gold and silver leaf printing, Khari gold and silver textile print**ing

Suggested Reading List:

Title	**Author**
Kalamkari and Traditional Design Heritage of India	Shakuntala Ramani
Kalamkari: Figures and Designs	K. Prakash
Homage to Kalamkari	Mulk Raj Anand
Batik : The Art and Craft	Ila Keller
Stitched Shibori: Technique, Innovation, Pattern, Design	Jane Callender
Indian Textiles	John Gillow

Course Outcomes:

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

- Understand major design inspirations in Indian heritage
- Design and develop new styles of kalamkari textiles
- Relate batik and shibori from traditional inspiration
- Design and develop of commercial textile printing system

OEC–FAE–308G Fabric Structure and Analysis

Course code	OEC–FAE–308G				
Category	Open Elective Course (OEC-III)				
Course Title	Fabric Structure and Analysis				
Scheme and Credits	L	T	P	Credits	Semester–VI
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Yarn and Fabric Formation, and Colour & Design Concepts

Course Objectives:

- To understand the basic concepts of fabrics, classification of fabrics.
- To learn the Simple weaves like Plain, Twill and Sateen weaves.
- To gain knowledge of Mock leno, Honeycomb, Huck-a-back weaves
- To develop skills for analysis of fabrics

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Basic Concepts: Importance of fabric structure, Classification of fabrics, Notation of Weave, drafting plan, peg plan and denting. Simple Weaves: plain weave and its derivatives, ornamentation

UNIT - II

Twill weave and its derivatives, ornamentation, effect of twist on prominence of twill lines, Sateen and Satin and their extensions. Crepe weave, diamond

UNIT -III

Mockleno, Cork-screw, honey comb, huck-a-back, bedford cords, welt and pique fabrics.

UNIT -IV..

Decorative Weaves: Extra warp and weft figuring, Backed cloth, Double cloth, treble and multiply belting structures. Draft, peg plan and denting plan for all simple and decorative weaves, Particulars of common varieties of these fabrics. Fabric Analysis

Suggested Reading List:

Title	Author
Textile Design and Color	William Watson
Watson's Advanced Textile Design	William Watson
Grammer of Textile Design	H Nisbeth
Fabric structure and design	Gokarneshan N

Course Outcomes:

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

- Utilise basic concepts of fabric structure, interlacement of warp and weft.
- Implement various types of weaves, drafting, lifting and denting plan in making fabrics.
- Produce weaves like plain, twill, satin and other decorative weaves.
- Analyse different types of weave structures, etc.

OEC–FAE–309G Specialty Yarn and Texturing

Course code	OEC–FAE–309G				
Category	Open Elective Course (OEC-III)				
Course Title	Specialty Yarn and Texturing				
Scheme and Credits	L	T	P	Credits	Semester–VI
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Textile Raw Materials, Yarn Formation, and Colour & Design Concepts

Course Objectives:

- To understand the various types of specialty yarns.
- To learn the concept of sewing threads.
- To gain knowledge of different types of texturising.
- To develop skills for application of novelty and textured yarns.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Types of Specialty yarns:- Novelty yarns, Grindle yarns, core-spun yarns, Chennile yarns, Corded yarns, Bulky yarns and other types of specialty yarns. Methods of production of novelty yarns, their properties and applications

UNIT - II

Sewing threads: Their manufacturing techniques, special finishes, properties and end-uses

UNIT - III

Different types of texturising – Twist texturing, Air-jet texturising, edge crimping stuffer box crimping, gear crimping, knit-de-knit etc. Detailed discussion on False Twist. texturising process, machine,. Material, process and machine variables – their effect on properties of yarn. Recent developments.

UNIT - IV

Air-jet texturising – detailed discussion of process. Different types of variables and their effect on properties of yarn. Recent developments of airjet texturising machine, jets and process. Methods of assessing and evaluation of textured yarns. Hi-bulk yarns – especially acrylic. Chemical texturising.

Suggested Reading List:

Title	Author
Spun Yarn technology	A Venkatasubramani
Air-jet Texturing	Allan Fellingham
Yarn Texturing technology	J Hearle, L Hollick and D Wilson
Knitting with novelty yarn	ALaura J Bryant
Synthetic Filament Yarn:Texturing technology	Ali Demir

Course Outcomes:

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

i) understand the various types of specialty yarns, novelty and fancy yarns .
ii) learn sewing threads, their types and finishes
iii) know various types of Texturising Processes
iv) understand Air-jet Texturising and its applications

OEC–FAE–310G Fashion Accessories

Course code	OEC–FAE–310G				
Category	Open Elective Course (OEC-IV)				
Course Title	Fashion Accessories				
Scheme and Credits	L	T	P	Credits	Semester–VI
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: AP- I, II and III, Textile Raw materials, Yarn formation, Fabric formation, Fashion Selecion

Course Objectives:

- To impart knowledge of fashion accessories and different aspects involved.
- To understand the art of accessory designing so that they can complement their garment designs with appropriate accessories.
- To develop the skills and techniques of accessory designing and appreciate its commercial values.
- To familiarize the students with various materials used in making jewellery

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

Fashion Accessories – definition and classification – wearable, drape able. Different textile and non textile raw materials used - fancy yarns, woven and knitted fabrics, narrow fabrics, leather, fur, beads, metal. Various notion and trims used in fashion accessories – zippers, Velcro, snap fasteners, eyelets, frog closures etc. Product life cycle of fashion accessories. Forecasting & trend analysis for accessories, Major accessory brands and retail outlets.

UNIT - II

Footwear designing – textile and non textile raw materials, trims & notions used for footwear construction. Parts of shoe, brief shoe designing – as last, development last, designer last, pattern making, die-manufacturing, cutting, fitting, assemblage of remaining components, bottoming and finishing. Caring of footwear. Styles of men's and women footwear – oxford, moccasin, wingtip, ballerinas, stilettoes. Major footwear brands.

UNIT - III

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

UNIT - IV

Knitted accessories – pantyhose, socks, gloves, stockings & mittens: Designing, materials, Construction, styles and care. Hats: Designing, construction, styles & care of hats. Drape able accessories- Stoles & scarves: Designing, construction, styles& care.

Suggested Reading List:

Title **Author**

"Fashion Sketch Book", Om Publication. Bina Abling

" Fashion from Concept to Consumer 7th Edition", Pearson. Frings,

Inside Fashion Design, Tate

Know your Fashion Accessories, Fairchild books, 2003. Dorling Kindersley, Meadows Celia Stall,

"Carr and Latham's Technology of Clothing Manufacturing" Blackwell, Scientific Publications, 1988. Tyler,

Fashion Apparel & Accessories and Home Furnishing, Pearsons Prentice Hall, NJ, 2007. Diamond Ellen and Diamond Jay,

Course Outcomes:

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

- Develop the skills of accessory illustration and visual merchandising.
- Create new accessory designs
- Make the design according to the garments.

OEC–FAE–311G Jewellry Design & Development

Course code	OEC–FAE–311G				
Category	Open Elective Course (OEC-IV)				
Course Title	Jewellry Design & Development				
Scheme and Credits	L	T	P	Credits	Semester–VI
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: AP- I, II and III, Fashion Selecion

Course Objectives:

- To impart knowledge of Jewellry Design and different aspects involved.
- To understand the art of jewellery designing so that they can complement their garment designs with appropriate accessories.
- To develop the skills and techniques of jewellery designing and appreciate its commercial values.
- To familiarize the students with various materials used in making jewellery

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT I

Historical overview of jewelry. An overview of Jewelry types – fine, vintage, estate, costume, bridge, classification, styles and materials. Cultural, emotional and economical factors associated with jewelry selection and buying.Sources of inspiration, theme, color & material selection criteria.

Market analysis, trend analysis and forecasting trends for jewelry design and development.Niche Indian & international market for Jewellry.Major jewelry brands and outlets.

UNIT II

Fundamentals of jewellery design and gemology, drawing & rendering metal forms and gemstones, theme based designing, cost based designing, historical designing. Designing jewellery using textile and non-textile components. Orthographic view, market oriented designing, diamond grading & sorting, men's and youth's jewelry. CAD/CAM technology deployed in jewelry designing.

UNIT III

Different jewellery styles and designing as rings, bracelets, necklaces, tiara etc. Fine jewelry-vintage and estate jewelry, jewelry styles- necklace, necklace length, earings, earing fastening, earrings styles, bracelets, brooches, pins and clips, rings and head pieces

Textile & non –textile materials, trims and notions for jewelry designing. An introduction to metals and stones – plated metals, plated and filled metals, gemstones- precious stones, semi

precious stones, faux stones and gems, birthstones. Brief production techniques as fusing, soldering, cutting and stone settings.

UNIT IV

Retailing, online and offline marketing, branding**.** Merchandising trends and techniques- store retailing, internet retailing, catalog retailing for costume and bridge jewelry. Visual merchandising & window display of jewelry. Careers in jewelry design & development

Suggested Reading List:

Title	**Author**
Design Ideas and accessories	RituBhargav
Accessory Design	Aneta Genova
Fashion Design Course: Accessories	Thames & Hudson
Drawing fashion accessories	Steven Thomas Miller

Course Outcomes:

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

- Develop the skills of jewellery illustration and visual merchandising.
- Create new Jewellery designs
- Make the design according to the garments.

OEC–FAE–312G Structure and Properties of Textiles

Course code	OEC–FAE–312G				
Category	Open Elective Course (OEC-IV)				
Course Title	Structure and Properties of Textiles				
Scheme and Credits	L	T	P	Credits	Semester–VI
	3	0	0	3	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Textile Raw Materials, Yarn Formation,

Course Objective:

- To gain knowledge of structure and properties of Ring, Rotor, DREF yarns.
- To understand the various types of cloth setting theories
- To understand Tensile, bending, shear properties of textile material.
- To gain knowledge of Comfort properties of fabrics.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set up by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT - I

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 of jamming.

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 of fabrics

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 air through textile material, Factors affecting thermal insulation, moisture propagation and air permeability of fabrics. Drapability of fabrics, Drape testing, drape parameters and factors affecting drape behaviour. Introduction to the term Tailorability and Formability for apparel fabrics. Handle of fabrics. Objective evaluation of fabric handle. Constituent properties of handle.

Suggested Reading List:

Title	Author
Textile Yarns-Technology, Structure and Applications	Goswami, etal
Structural Mechanics of Fibres, Yarns and Fabrics	Hearle etal

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

- Use the knowledge of structure and properties of different types of material for textile and apparel products.
- Estimate Maximum sett of fabrics using different types of cloth setting teories .
- Evaluate tensile, bending and shearing properties of fabrics.
- Analyze comfort and hand properties of fabrics .

HSMC-TT/TC/FAE-301G Merchandising and Export Management

<table>
<tr><td>Course code</td><td colspan="5">HSMC-TT/TC/FAE-301G</td></tr>
<tr><td>Category</td><td colspan="5">Humanities and Social Sciences including Management Courses</td></tr>
<tr><td>Course Title</td><td colspan="5">Merchandising and Export Management</td></tr>
<tr><td rowspan="2">Scheme and Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td rowspan="2">Semester–VI</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>3</td></tr>
<tr><td>Branch</td><td colspan="5">Textile Technology, Textile Chemistry, Fashion and Apparel Engg.</td></tr>
<tr><td>Class work</td><td colspan="5">25 Marks</td></tr>
<tr><td>Exam</td><td colspan="5">75 Marks</td></tr>
<tr><td>Total</td><td colspan="5">100 Marks</td></tr>
<tr><td>Duration of Exam</td><td colspan="5">03 Hours</td></tr>
</table>

Pre–requisites: Basic concept of management

Course Objectives:

- To make the students acquainted with various concepts of marketing and different aspects pertaining to marketing which include market segmentation, product life cycle, various stages involved in new product development.
- To make them understand the various pricing strategy and functions of distribution channel.
- To make them understand the importance of export.
- To familiarize them on export procedure, export terms of payment and final assistance provided by government.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 06 parts of 2.5 marks from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT-I

Fundamental idea and basic terms and definition in marketing. Definition of marketing. Explanation of various concept of marketing with examples. Types of Marketing: Target marketing and Mass Marketing. Market segmentation. Classification of market based on size. Various stages of new product development and product life cycle.

UNIT-II

Concept and definition of Marketing mix. Variables of market mix: 4Ps Product, Price, Promotion and Place. Distribution channels and various functions performed by the distribution channel. Logistics and its relevance. Promotion mix: various kinds of promotion mix; their scope of applications and their relative merits and demerits. Various factors need to be considered while deciding the price. Pricing decision and strategy.

UNIT-III

Export Management–importance of export. Risk involved in export and remedial measures. Various kind of terms of payment and their relative merits and demerits. Various kinds of document to be prepared and maintained for export. Various steps involved in Export Assistance given for export. Pre shipment and post shipment finance. Common incoterms.

UNIT-IV

Concept and definition of Merchandising. Utility and obsolescence factors in merchandising. Essential qualification criteria of a merchandiser. Types of merchandising. Roles of a merchandiser in an apparel industry. Various activities involved in merchandising: Line Planning, Line Development and Line presentation. Different types of sampling and their importance. Visual Merchandising. Elements of interior, exterior window display, store planning and layout-fixtures, location. Different types of sampling and their importance in merchandising. Brand building: Introduction, strategies, brand expansion, global trends. Introduction to customer relationship.

Suggested Reading List:

Title	**Author**
Marketing Management	Phillip Kotlar
Nabhi's Publication on Export	Govt. Handbook
International Marketing	Hess and Cateora
Export Management	B. S. Rathore

Course Outcomes:

After completion of the course, students will understand:

- the concept of marketing and marketing mix
- the importance and functions of distribution channel
- the use of different promotional tools and their scope of applications
- the various documents required for commercial and legal purpose
- financial assistance provided by government to the exporters and different modes of terms of payment in export business.

Also, the students will be exposed to different components of fashion merchandising and activities involved in product line planning, development and presentation and use of different types of samples during merchandising.

LC–FAE–305G Apparel Draping and Grading Lab

<table>
<tr><td>Course code</td><td colspan="5">LC-FAE-305G</td></tr>
<tr><td>Category</td><td colspan="5">Laboratory Course (Professional Core Course)</td></tr>
<tr><td>Course Title</td><td colspan="5">Apparel Draping and Grading Lab</td></tr>
<tr><td rowspan="2">Scheme and Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td rowspan="2">Semester–VI</td></tr>
<tr><td>0</td><td>0</td><td>2</td><td>1</td></tr>
<tr><td>Branch</td><td colspan="5">Fashion and Apparel Engineering</td></tr>
<tr><td>Class work</td><td colspan="5">25 Marks</td></tr>
<tr><td>Exam</td><td colspan="5">25 Marks</td></tr>
<tr><td>Total</td><td colspan="5">50 Marks</td></tr>
<tr><td>Duration of Exam</td><td colspan="5">03 Hours</td></tr>
</table>

Pre–requisites: Basic knowledge of Apparel Production, Garment Manufacturing, pattern making, drafting

Course Objectives:

- To impart first-hand experience of the procedures of draping, mechanism of draping and grading and their related calculations
  - To give hands on training to students on apparel construction techniques-basic block, dart manipulation.
  - To acquire the knowledge and skills for construction of various garment parts with draping.
  - To appreciate and develop different garment components like types of collars and sleeves.

  List of experiments:
  - Introduction to draping and dress forms. Preparation of fabric.
  - Draping Terminology – Apex, Balance, Plumb line, Trueing, Blocking, Blending, Princess line, Clipping and marking.
  - Draping of Bodice Front, Bodice Back and variation.
  - Draping of Basic skirt and skirt variations.
  - Draping of neckline –Cowl
  - Design and construct a final garment applying draping techniques.
  - Design Analysis and the three major pattern making principles
    Dart Manipulation – Using Slash and Spread technique and Pivotal Transfer technique (Single dart series – Mid shoulder dart, Center front dart, French dart, mid armhole dart and bust dart.
    Double dart series:
    Slash and Spread Method- Waist & Side Dart, Mid Shoulder& Waist Dart, Mid Armhole& Waist Dart
    Pivotal Method- Shoulder Tip& Waist, Center Front & Waist Dart.
  - Introduction about Pattern Grading. Methods of pattern Grading . Advantages and Disadvantages of pattern grading. Grading bodice and sleeve block to various sizes.

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.

LC–FAE–306G Textile Chemical Processing Lab

Course code	LC-FAE-306G				
Category	Laboratory Course (Professional Core Course)				
Course Title	Textile Chemical Processing Lab				
Scheme and Credits	L	T	P	Credits	Semester–VI
	0	0	2	1	
Branch	Fashion and Apparel Engineering				
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Pre–requisites: Basic knowledge of preparatory wet processing, scouring, desizing, mercerizing, bleaching

Course Objectives:

- To impart first-hand experience of the procedures of desizing, scouring, bleaching and mercerising
  - To give hands on training to students on dyeing techniques.
  - To acquire the knowledge and skills for dyeing of cotton fabrics by Direct, Reactive, Sulphur, Vat and Azoic dyes.
  - To appreciate and develop dyed wool and silk fabrics .

List of experiments:

1. Desizing of cotton by various methods and determination of desizing efficiency.
2. Scouring and determination of scouring efficiency.
3. Bleaching of cotton using hydrogen peroxide.
4. Mercerization of cotton.
5. Scouring and bleaching of wool.
6. Degumming and bleaching of silk.
7. Dyeing of cellulosic textiles by direct, reactive, sulphur and vat.
8. Dyeing of protein textiles by acid and basic dyes.
9. Dyeing of Polyester with disperse dye.
10. Dyeing of cotton/polyester blend.
11. Tie& dyeing.
12. Computer colour matching: Familiarization with the principles and working of computer colour matching instrument with preparing of database of dyes, shade matching, colour difference and measurement.

Course outcomes:

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

- Apply the practical exposure of textile processing techniques in clothing material.
- Use knowledge of dyes on cellulosic, protein and synthetic fabrics.
- Able to create different fabric samples with different dyes
- Evaluate different wet preparatory and dyeing processes of: wool, cotton and silk.
- Analyze the dyeing affinity with textile fabrics.

LC–FAE–307G Apparel Designing by CAD Lab

<table>
<tr><td>Course code</td><td colspan="5">LC-FAE-307G</td></tr>
<tr><td>Category</td><td colspan="5">Laboratory Course (Professional Core Course)</td></tr>
<tr><td>Course Title</td><td colspan="5">Apparel Designing by CAD Lab</td></tr>
<tr><td rowspan="2">Scheme and Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td rowspan="2">Semester–VI</td></tr>
<tr><td>0</td><td>0</td><td>2</td><td>1</td></tr>
<tr><td>Branch</td><td colspan="5">Fashion and Apparel Engineering</td></tr>
<tr><td>Class work</td><td colspan="5">25 Marks</td></tr>
<tr><td>Exam</td><td colspan="5">25 Marks</td></tr>
<tr><td>Total</td><td colspan="5">50 Marks</td></tr>
<tr><td>Duration of Exam</td><td colspan="5">03 Hours</td></tr>
</table>

Pre–requisites: Basic knowledge of Apparel Production, CATD, pattern making, drafting

Course Objectives:

- To impart first-hand experience of the procedures of Computer Aided designing in Textile and Apparel products
  - To give hands on training to students on designing various motifs based on different themes.
  - To acquire the knowledge and skills for developing colour palette and shade card.
  - To appreciate and develop moodboard, storyboard, fashion show logos and various textures .

List of experiments to be performed:

- To design motif based on different themes
- To develop Colour palette and shade card as per season and theme.
- To create different textile textures and effects namely denim, batik, water colour etc.
- To design apparel illustration using different themes.
- To create different fashion accessories namely purses, hats, footwear as per the theme
- To create mood board according to different themes.
- To develop storyboard consisting of different graphics prepared in above experiments.
- To design fashion show logo, invitation or brochures

Course Outcomes:

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

- Apply tools and techniques in creating textile prints and patterns.
- Realisation of garment sketch or drawings using CAD software
- Realisation of numerous design variation using CAD software
- Appreciate and acquire skills of graphic software in Fashion.

LC–FAE–308G Pattern Making and Apparel Construction Lab-II

<table>
<tr><td>Course code</td><td colspan="5">LC-FAE-308G</td></tr>
<tr><td>Category</td><td colspan="5">Laboratory Course (Professional Core Course)</td></tr>
<tr><td>Course Title</td><td colspan="5">Pattern Making and Apparel Construction Lab-II</td></tr>
<tr><td rowspan="2">Scheme and Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td rowspan="2">Semester–VI</td></tr>
<tr><td>0</td><td>0</td><td>2</td><td>1</td></tr>
<tr><td>Branch</td><td colspan="5">Fashion and Apparel Engineering</td></tr>
<tr><td>Class work</td><td colspan="5">25 Marks</td></tr>
<tr><td>Exam</td><td colspan="5">25 Marks</td></tr>
<tr><td>Total</td><td colspan="5">50 Marks</td></tr>
<tr><td>Duration of Exam</td><td colspan="5">03 Hours</td></tr>
</table>

Pre–requisites: Basic knowledge of Apparel Production, Garment Manufacturing, pattern making, drafting

Course Objectives: This Lab course is designed to:

- impart first-hand experience of utility of machines for gathers, shirring, picoting etc. as used in garments.
- Developing different garment patterns mainly developing adult garment designs.
- Drafting, Pattern making, marking of patterns on fabrics with the basic and fashion details.
- Learning cutting, sewing, washing, pressing and packaging of garments.

List of experiments: (Pattern making)

1. Construction of basic bodice blocks (Adult) (front, back & sleeves with fitting and fashion details).
2. Adaptation of basic blocks into finished patterns (Adult kurta, blouse, shirt etc.)
3. Construction of basic bodice blocks (Adult) (types of lowers/bottoms – plazzo, harem, night suit lower, trouser etc.)
4. Adaptation of basic blocks into finished patterns (Adult lowers etc.)
5. Pattern making adult casual jackets (simple, reversible etc.)
6. Pattern making adult casual/formal shirt (Men's & Women's)

List of experiments: (Apparel construction)

1. Construction of Adult upper garments (with special consideration of style, fabric and trim selection, costing of garments etc.)
2. Construction of Adult lower garments.
3. Construction of Adult casual jackets (simple, reversible etc.)
4. Construction of Adult casual/formal shirts (Men's & Women's)

Course outcomes: Students will be able to:

- Construction patterns for the adult garments (Men's wear & women's wear).
- Construction of garments for the adult garments (Men's wear & women's wear).
- Adaptation and manipulation of fashionable garments from the basic garments.