Estd. 1962
NAAC 'A' Grade
MHRD-NIRF- 28th Rank

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दुरध्वनी (ईपीएबीएक्स) २६०९००० (अभ्यास मंडळे विभाग– २६०९०९४)
फॅक्स : ००९१-०२३१-२६९१५३३ व २६९२३३३.e-mail:bos@unishivaji.ac.in

SU/BOS/Sci & Tech/7281 **Date: 19/07/2018**

To,

The Principal,
D.K.T.E.
Textile & Engineering Institute,
Ichalkaranji.

Subject: Regarding syllabi of Final Year B.Text TT/MMTT/TPE/TC/FT under the Faculty of Science & Technology

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the revised Final year B.Text TT/MMTT/TPE/TC/FT under syllabi, Nature of question paper and equivalence under the Faculty of Science & Technology.

This syllabus and equivalence shall be implemented from the academic year 2018-2019 (i.e. from June 2018) onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in. (Online Syllabus)

The question papers on the pre-revised syllabi of above mentioned course will be set for the examinations to be held in October /November 2018 & March/April 2019. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully,

Dy Registrar

Copy to:

1	The Dean, Faculty of Science & Technology	7	Computer Centre
2	The Chairman, Respective Board of Studies	8	Affiliation Section (T.1)
3	Director, Examination and Evaluation	9	Affiliation Section (T.2)
4	Eligibility Section	10	P.G.Admission Section
5	O.E. – 4	11	P.G Seminar Section
6	Appointment Section	12	Meeting Section

NEW STRUCTURE W.E.F. :- JULY 2018

FINAL YEAR B.TEXT. (TT) SEMESTER-I

SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
7.1	TT/MMTT	NONWOVEN TECHNOLOGY	3	---	---	3	100	50	---	---	150
7.2	TT	GARMENT TECHNOLOGY	3	---	---	2	100	50	---	---	150
7.3	TT	FABRIC SCIENCE	3	---	---	3	100	25	---	50	175
7.4	TT/MMTT/TPE	TEXTILE MILL PLANNING AND ORGANISATION	4	---	---	---	100	25	---	---	125
7.5	TT/MMTT	TEXTILE UTILITIES	4	---	---	---	100	---	---	---	100
7.6	TT	ELECTIVE-I	3	---	---	---	100	---	---	---	100
7.7	TT/MMTT/TPE/TC/FT	SEMINAR-I	2	---	---	---	---	50	---	---	50
7.8	TT/MMTT/TPE/TC/FT	INPLANT TRAINING-II	---	---	---	---	---	50	---	---	50
			22	---	---	8	600	250	0	50	900

L =LECTURES
T =TUTORIALS
DR=DRAWING
PR=PRACTICALS

TP=THEORY PAPER
TW=TERM WORK
OE=ORAL EXAMINATION
PE=PRACTICAL EXAMINATION

LIST OF ELECTIVE-I

1. DENIM MANUFACTURING AND FINISHING
2. TOTAL QUALITY MANAGEMENT
3. TEXTILE PRODUCT ENGINEERING
4. ECONOMICS AND INDUSTRIAL LAWS
5. FIBER REINFORCED COMPOSITES

NEW STRUCTURE W.E.F. :- JULY 2018

FINAL YEAR B.TEXT. (TT) SEMESTER-II

SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
8.1	TT/MMTT	PROCESS MANAGEMENT IN YARN FORMING	3	---	---	3	100	50	---	50	200
8.2	TT/MMTT	PROCESS MANAGEMENT IN FABRIC FORMING	3	---	---	3	100	50	---	50	200
8.3	TT/MMTT/TPE/TC	TEXTILE MILL MANAGEMENT	3	---	---	---	100	---	---	---	100
8.4	TT/MMTT	TECHNICAL TEXTILES	4	---	---	---	100	---	---	---	100
8.5	TT	ELECTIVE -II	3	---	---	---	100	---	---	---	100
8.6	TT/MMTT/TPE/TC/FT	SEMINAR - II	2	---	---	---	---	50	---	---	50
8.7	TT/MMTT/TPE/TC/FT	DISSERTATION	---	---	---	6	---	50	100	---	150
			18	---	---	12	500	200	100	100	900

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LIST OF ELECTIVE-II

1. INFORMATION TECHNOLOGY IN TEXTILES
2. HOME TEXTILES AND TERRY TOWEL MANUFACTURING
3. ENTERPRENEURSHIP
4. MAINTENANCE MANAGEMENT IN TEXTILE
5. ORGANIZATIONAL BEHAVIOUR AND HUMANITIES

NEW STRUCTURE W.E.F. : JULY 2018

FINAL YEAR B.TEXT. (MMTT) SEMESTER-I

SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
7.1	TT/MMTT	NONWOVEN TECHNOLOGY	3	---	---	3	100	50	---	---	150
7.2	MMTT	KNITTING TECHNOLOGY	3	---	---	3	100	50	---	---	150
7.3	MMTT	YARN AND FABRIC SCIENCE	3	---	---	2	100	25	---	50	175
7.4	TT/MMTT/TPE	TEXTILE MILL PLANNING AND ORGANISATION	4	---	---	---	100	25	---	---	125
7.5	TT/MMTT	TEXTILE UTILITIES	4	---	---	---	100	---	---	---	100
7.6	MMTT	ELECTIVE -I	3	---	---	---	100	---	---	---	100
7.7	TT/MMTT/TPE/TC/FT	SEMINAR-I	2	---	---	---	---	50	---	---	50
7.8	TT/MMTT/TPE/TC/FT	INPLANT TRAINING-II	---	---	---	---	---	50	---	---	50
			22	---	---	8	600	250	0	50	900

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LIST OF ELECTIVE-I

1. FIBRE REINFORCED COMPOSITES
2. GARMENT TECHNOLOGY
3. TEXTILE PRODUCT ENGINEERING
4. TOTAL QUALITY MANAGEMENT
5. ECONOMICS AND INDUSTRIAL LAWS

NEW STRUCTURE W.E.F. : JULY 2018

FINAL YEAR B.TEXT. (MMTT) SEMESTER-II

SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
8.1	TT/MMTT	PROCESS MANAGEMENT IN YARN FORMING	3	---	---	3	100	50	---	50	200
8.2	TT/MMTT	PROCESS MANAGEMENT IN FABRIC FORMING	3	---	---	3	100	50	---	50	200
8.3	TT/MMTT/TPE/TC	TEXTILE MILL MANAGEMENT	3	---	---	---	100	---	---	---	100
8.4	TT/MMTT	TECHNICAL TEXTILES	4	---	---	---	100	---	---	---	100
8.5	MMTT	ELECTIVE -II	3	---	---	---	100	---	---	---	100
8.6	TT/MMTT/TPE/TC/FT	SEMINAR - II	2	---	---	---	---	50	---	---	50
8.7	TT/MMTT/TPE/TC/FT	DISSERTATION	---	---	---	6	---	50	100	---	150
			18	---	---	12	500	200	100	100	900

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LIST OF ELECTIVE-II

1. SPECIALITY FIBRES
2. NANO FIBRES TECHNOLOGY
3. ENTERPRENEURSHIP
4. INFORMATION TECHNOLOGY IN TEXTILES
5. ORGANIZATIONAL BEHAVIOUR AND HUMANITIES

NEW STRUCTURE W.E.F. : - JULY 2018

FINAL YEAR B.TEXT. (TPE) SEMESTER-I

SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
7.1	TPE	ENGINEERING DESIGN OF TEXTILE MACHINES-II	3	---	---	3	100	25	50	---	175
7.2	TPE	THEORY OF TEXTILE MACHINES-II	3	---	---	3	100	25	---	---	125
7.3	TPE	MAINTENANCE OF TEXTILE MACHINES	3	---	---	3	100	25	---	50	175
7.4	TT/MMTT/TPE	TEXTILE MILL PLANNING AND ORGANISATION	4	---	---	---	100	25	---	---	125
7.5	TPE	AIR CONDITIONING AND HUMIDIFICATION IN TEXTILES	3	---	---	---	100	---	---	---	100
7.6	TPE	ELECTIVE -I	3	---	---	---	100	---	---	---	100
7.7	TT/MMTT/TPE/TC/FT	SEMINAR-I	2	---	---	---	---	50	---	---	50
7.8	TT/MMTT/TPE/TC/FT	INPLANT TRAINING-II	---	---	---	---	---	50	---	---	50
			21	---	---	9	600	200	50	50	900

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LIST OF ELECTIVE-I

1. MECHATRONICS
2. ECONOMICS AND INDUSTRIAL LAWS
3. GARMENT TECHNOLOGY
4. NONWOVEN TECHNOLOGY
5. PROCESS CONTROL IN SPINNING

NEW STRUCTURE W.E.F. : - JULY 2018

FINAL YEAR B.TEXT. (TPE) SEMESTER-II

SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
8.1	TPE	FLUID FLOW SYSTEMS AND CONTROLS	3	---	---	3	100	50	---	50	200
8.2	TPE	INSTRUMENTATION AND METROLOGY	3	---	---	3	100	50	---	50	200
8.3	TT/MMTT/TPE/TC	TEXTILE MILL MANAGEMENT	3	---	---	---	100	---	---	---	100
8.4	TPE	MAINTENANCE MANAGEMENT	4	---	---	---	100	---	---	---	100
8.5	TPE	ELECTIVE -II	3	---	---	---	100	---	---	---	100
8.6	TT/MMTT/TPE/TC/FT	SEMINAR - II	2	---	---	---	---	50	---	---	50
8.7	TT/MMTT/TPE/TC/FT	DISSERTATION	---	---	---	6	---	50	100	---	150
			18	---	---	12	500	200	100	100	900

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LIST OF ELECTIVE-II

1. CONDTION BASED MONITORING TECHNIQUES
2. PROCESS CONTROL IN WEAVING
3. ENERGY CONSERVATION IN TEXTILES
4. INFORMATION TECHNOLOGY IN TEXTILES
5. ORGANIZATIONAL BEHAVIOUR AND HUMANITIES

NEW STRUCTURE W.E.F. :- JULY 2018

FINAL YEAR B.TEXT. (TC) SEMESTER-I

R. No	COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
7.1	TC	PROCESS PLANNING IN TEXTILES	4	---	---	---	100	50	---	---	150
7.2	TC	FLUID MECHANICS AND HEAT OPERATIONS	3	---	---	3	100	50	---	---	150
7.3	TC	TESTING AND ANALYSIS OF TEXTILES	3	---	---	3	100	50	---	50	200
7.4	TC	MANUFACTURING ASPECTS OF TECHNICAL TEXTILES	3	---	---	---	100	---	---	---	100
7.5	TC	TEXTILE PROCESSING MACHINERY	3	---	---	---	100	---	---	---	100
7.6	TC	ELECTIVE -I	3	---	---	---	100	---	---	---	100
7.7	TT/MMTT/TPE/TC/FT	SEMINAR-I	2	---	---	---	---	50	---	---	50
7.8	TT/MMTT/TPE/TC/FT	INPLANT TRAINING-II	---	---	---	---	---	50	---	---	50
			21	---	---	6	600	250	0	50	900

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LIST OF ELECTIVE-I

1. TOTAL QUALITY MANAGEMENT
2. ENERGY MANAGEMENT IN CHEMICAL PROCESSING
3. POLYMERS AND COMPOSITES
4. ECONOMICS AND INDUSTRIAL LAWS

NEW STRUCTURE W.E.F. :- JULY 2018

FINAL YEAR B.TEXT. (TC) SEMESTER-II

R. No	COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
8.1	TC	GARMENT MANUFACTURING AND PROCESSING	4	---	---	3	100	50	---	50	200
8.2	TC	QUALITY CONTROL IN CHEMICAL PROCESSING	3	---	---	---	100	50	---		150
8.3	TT/MMTT/TPE/TC	TEXTILE MILL MANAGEMENT	3	---	---	---	100	---	---	---	100
8.4	TC	THEORY OF DYEING AND COLOUR MEASUREMENTS	3	---	---	3	100	50	---	---	150
8.5	TC	ELECTIVE -II	3	---	---	---	100	---	---	---	100
8.6	TT/MMTT/TPE/TC/FT	SEMINAR - II	2	---	---	---	---	50	---	---	50
8.7	TT/MMTT/TPE/TC/FT	DISSERTATION	---	---	---	6	---	50	100	---	150
			18	---	---	12	500	250	100	50	900

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LIST OF ELECTIVE-II

1. ADVANCED CHEMICAL PROCESSING
2. INFORMATION TECHNOLOGY IN TEXTILES
3. ORGANIZATIONAL BEHAVIOUR AND HUMANITIES
4. MERCHANDISING

NEW STRUCTURE W.E.F. : - JULY 2018

FINAL YEAR B.TEXT. (FT) SEMESTER-I

SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
7.1	FT	GARMENT PROJECT PLANNING AND IMPLEMENTATION	4	---	---	---	100	50	---	---	150
7.2	FT	ECONOMICS AND COSTING IN APPAREL INDUSTRY	4	---	---	---	100	---	---	----	100
7.3	FT	ADVANCED GARMENT CONSTRUCTION	4	---	---	3	100	50	---	50	200
7.4	FT	FASHION COORDINATION	3	---	---	---	100	----	---	---	100
7.5	FT	APPAREL PRODUCTION PLANNING AND CONTROL	4	---	---	3	100	50	---	---	150
7.6	FT	ELECTIVE-I	3	---	---	---	100	---	---	---	100
7.7	TT/MMTT/TPE/TC/FT	SEMINAR-I	2	---	---	---	---	50	---	---	50
7.8	TT/MMTT/TPE/TC/FT	INPLANT TRAINNING - II	---	---	---	---	---	50	---	---	50
			24	---	---	6	600	250	---	50	900

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LIST OF ELECTIVE-I

1. FASHION ACCESSORIES
2. APPAREL AND FASHION BUSINESS MANAGEMENT
3. HOME TEXTILES IN FASHION
4. APPAREL PRODUCT ENGINEERING

REVISED SYLLABUS W.E.F.01ST JULY, 2018

FINAL YEAR B.TEXT. (FT) SEMESTER-II

SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
8.1	FT	APPAREL FINISHING AND CARE	4	---	---	3	100	50	---	50	200
8.2	FT	APPAREL EXPORT MANAGEMENT	4	---	---	---	100	50	---	--	150
8.3	FT	FASHION RETAIL MANAGEMENT	4	---	---	---	100	---	---	---	100
8.4	FT	SMART TEXTILES AND SPECIALITY GARMENTS	4	---	---	---	100	50	---	---	150
8.5	FT	ELECTIVE -II	3	---	---	---	100	---	---	---	100
8.6	TT/MMTT/TPE/TC/FT	SEMINAR-II	2	---	---	---	---	50	---	---	50
8.7	TT/MMTT/TPE/TC/FT	DISSERTATION	---	---	---	6	---	50	100	---	150
			21	---	---	9	500	250	100	50	900

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LIST OF ELECTIVE-II

1. FASHION PHOTOGRAPHY
2. CONSUMER BEHAVIOUR IN FASHION INDUSTRY
3. OPERATIONAL RESEARCH
4. CAPM FOR MEN'S AND WOMEN'S WEAR

FINAL YEAR B. TEXT - SEMESTER-I

7.1 NON WOVEN TECHNOLOGY (TT/MMTT)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Termwork	:	50 Marks
Subject Total	:	150 Marks

Course Objective:

1. To understand the concept of Nonwoven Textiles
2. To define Nonwoven and Geo Textiles
3. To classify Nonwoven and Geo Textiles
4. To analyze and identify the Nonwoven and Geo textile products and to apply knowledge of Nonwoven and Geo textiles in testing and product development

Unit I:

Historical background of nonwovens, non woven definition, stages in Non-woven manufacturing

Web Forming Techniques: carding, Garnetting, air laid, wet process, polymer extrusion.

Classification of nonwoven – On the basis of use, on the basis of manufacturing process, on the basis of web formation, on the basis of bonding.

Unit II:

Dry laid webs – fibre selection, fibre preparation, web formation, layering, Wet laid nonwoven – Raw materials, production process, special features of the wet laid process and its product. Spun laced webs

Mechanically bonded webs – needle punched nonwovens, Application of needle punching, stitch bonded nonwovens, applications.

Hydro entangled nonwovens – Bonding process, water system, filtration system, web drying, properties of spun laced webs, applications.

Unit III:

Chemically bonded nonwoven – Latex binder, other types of nonwoven binders, formulation, order of formulation, bonding technology – saturation, foam bonding, spray bonding, print bonding, powder bonding, application of chemical bonded nonwovens.

Thermally bonded nonwovens – binder, binding fibres, binding powder, binding webs, methods of thermal bonding – Hot calendaring, belt calendaring, oven bonding, ultrasonic bonding, radiant heat bonding.

Melt blown nonwovens

Unit IV:

Overview of geo textiles, types of geo textile, development of Geo textiles, functions of Geo textiles.

Raw materials used fibre properties for geo textiles, production of Geo textiles. Such as wovens, non-wovens, knitted, grids, mats, ties, cellular Geo textiles, webs, stripes, bio degradable geo textiles, and their properties for different functions and test methods.

Types of soils, their characteristics, testing of soil.

Unit V:

Filtration and erosion control application. Principles, Erosion control for inland waterways, coastal erosion protection, scour protection, rain fall erosion control.

Drainage application: structural drainage, fin drains, land drainage etc.

Separation application: Unpaved Road, Paved road, Railways.

Unit VI:

Soil Reinforcement application. Steep faced embankment, slope stabilization, Retaining walls, Geo Textiles pile capping.

Growth of Geo textiles, potential of geo textiles in India.

Durability and creep: Soil induced degradation, chemical pollution, Temperature resistance, sunlight degradation, stress relaxation.

List of Experiments

1. To Study Flow Charts for Non Woven Production
2. To study Blow Room Line for Non woven
3. To Study Carding Process for Non Wovens
4. To Identify Non Woven Fabrics
5. To Test Raw Material Required for Non Wovens
6. To Study Testing Instruments for Non Woven Testing
7. To collect Samples of Different Non Wovens
8. To Study Needle Loom for Non Wovens
9. To Study Production of Non Wovens with other methods like Spun Bond etc.

Reference Books

1. Nonwoven Process Performance & Testing – Turbak
2. Nonwoven Fabric Construction Synthetic Fibres – Jan-Mar 2007.
3. Proceedings of the Seminar - Nonwoven Technology Market & Product Potential, IIT, New Delhi December 2006.
4. Geo Textile by NWM John.
5. Geo synthetics world by J. N. Mandal.
6. Designing with Geo synthetics by R. M. Koerner.
7. Geotextiles by Dr P.K.Banerjee (IIT,New Delhi private circulation).
8. Geotextiles by BTRA (Private circulation)

Course Outcomes:

Students will be able to

1. Describe the logic and processes involved in Nonwoven and Geo textiles
2. Classify the Nonwoven and Geo textiles
3. Prepare technical data sheet of each sector of Nonwoven and Geo textiles
4. Compile the fibres used, technology applied in manufacturing of Nonwoven and Geo textiles. Evaluate the performance of Nonwoven and Geo textiles withdifferent test methods of Indian and International standards.

FINAL YEAR B. TEXT- SEMESTER- I

7.2 GARMENT TECHNOLOGY (TT)

Lectures	:	3 Hrs / Week
Practical		2 Hrs / Week
Theory Paper	:	100 Marks
Term work		50 Marks
Subject Total	:	150 Marks

Course objectives

1. To explain the basics of apparel industry
2. To describe pre-production and post-production processes of apparel industry.
3. To describe production processes of apparel industry.
4. To explain applications of CAD-CAM in apparel industry.

I) **The Garment Industry**: Structure of the garment Industry, sectors of Industry, product types and organization. Apparel industry in India, Domestic industry, size of the industry, nature of the industry, and its developments in recent years. Export industry: Size and nature of the industry.

II) **Basic Pattern Making:** Measurement Taking – Size chart and Measuring of Sizes. Definition of various garments parts & positions. Methods: Bespoke method & Industrial method (Using Blocks) – Basic block construction – Block preparation & correction. Figure analysis: Body ideals, body proportion, height, weight distribution, body parts, individual figure analysis, study of body measurement of all age groups. Muslin pattern, commercial pattern, sizes and its understanding, fabric preparation for garment construction.

III) **Manufacturing Technology**:

- Types of Fabric Packages – Types of Fabrics – One Way – Two Way Fabrics – Their effect on spreading –Methods of Fabric spreading – Spreading equipments – Computerized spreaders – Marker making –Marker efficiency – Factors affecting marker efficiency – Marker duplicating methods – Computer aided marker making.
- Introduction to cutting machines – Types and functions of cutting machines – straight knife, round knife, band knife, cutting machines – Notches, drills, die

cutting machines – Computerized cutting machines –maintenance of cutting machines – common defects in cutting & their remedies.

- ❖ Types of needles – Parts of needles and their function – Needle size - sewing thread – properties of sewing threads – ticket number – fabric sewability. Seam quality – effect of stitch type on seam quality. Selection of seam and stitch.
- ❖ Federal classification of seam and stitches – Basic parts of sewing machine – Needle – Bobbin case /Bobbin hook, Loopers – Loop spreader – Threading fingers – Throat plate – Tongue chaining plates – Takeup devices – Tensioners – Feed dog – Pressure foot for sewing.
- ❖ Sewing Technology : feed systems, , machinery and equipment, basic sewing machines, like general sewing, over locking, safety stitching, blind stitching, button holes, bartacking, & button sewing, special sewing machines like three thread overlock with a microprocessor, Sewing problems.

a) **Fusing Technology:** Construction of Fusible, Fusing process, Fusing machinery, quality control.

b) Study of various components such as buttons, zips, underlining, Hooks and ornamental materials, - fly, kissing, lap; Button and buttonholes, hooks and eye snaps, Velcro and other accessories.

IV) **Pressing Technology:** Classification, components of Pressing, machinery and equipments viz. Hand irons, dry iron, electric steam iron, under pressing, top pressing, scissors press, Carousel machines, Steam dolly, tunnel finishing, controls, handling systems, boiler room.

V) **Garment Finishing and Inspection:** Attaching buttons, marking, sewing labels, cleaning, final touch, fitting quality, live models, measurements, viewing the garments, quality standards.

VI) **Production Technology**: Manual systems, making through, section system, progressive bundle system, straight line system, mechanical transport systems, selective conveyor belt system, unit production system, quick response sewing system.

- ❖ Ware Housing: Handling equipment, storage equipment, packing equipment.
- ❖ CAD/CAM in Garment Manufacturing.

List of the Practical

1) Study of the process flow of the apparel industry
2) Study of 4 point inspection and 10 point inspection.
3) Study of various cutting machines used in apparel industry.
4) Study of various specialized cutting machines used in apparel industry.
5) Study of the basic sewing machines used for garment manufacturing.
6) Study of special sewing machines used for garment manufacturing.
7) Study of the manual pattern making
8) Study of the CAD-CAM in apparel industry.
9) Study of fashion studio softwares.
10) Study of the digitiser and plotter.
11) Study of computerized embroidery machine.
12) Visit to the apparel industry.

Reference Books

1) Introduction to clothing Manufacture by Gerry Cooklin
2) Technology of clothing manufacture by Harrold carr & Barbara Lathem
3) Apparel Manufacturing Handbook by Jacob Solinger.,
4) Clothing construction and wardrobe planning by Dora S. Lewin, Mabel Goode Bowers, Manetta Knttunen –– The Macmillan co New York
5) Garment Technology by Dr. V.Subramaniam –– Winter School booklets 1990
6) BIS publications 1989.

Course Outcomes

At the end of the course students will be able to

1. Describe the structure and classification of Apparel industries as per size, labor, and product and understand the development of apparel industry in India.
2. Describe the various requirements and importance of pattern making, cutting, sewing, finishing and Inspection.
3. Compare various production technologies and its types.
4. Discuss the applications of CAD-CAM in apparel industry.

FINAL YEAR B. TEXT - SEMESTER-I

7.3 FABRIC SCIENCE (TT)

Lectures	:	3 Hrs / Week
Practicals	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Practical Exam	:	50 Marks
Subject Total	:	175 Marks

Course Objectives:

1. To discuss classification of fabric properties.
2. To discuss aesthetic and comfort properties of fabric.
3. To describe serviceability of fabric in relation to their performance aspect.
4. To discuss modern testing instruments for evaluation of fabric properties.

1) Structure of Fabric

Classification & Structures of fabrics, geometrical properties of fabrics

2) Comfort Properties of Fabrics

a) Fabric Thickness and Compression Resilience:

Nomenclature, compressional resilience properties of textile structures, factors contributing compressional resilience, Methods of measurement

b) Thermal Transmission Properties of Textile Structures

Nomenclature, Definitions of terms – thermal properties- thermal insulation, coldfeel, chillproofness, Factors affecting thermal properties, Methods of measuring thermal properties

c) Air – Permeability

Nomenclature, Measurement, Factors affecting Air Permeability of Fabrics, significance of air permeability of fabrics

d) Moisture Transmission

Nomenclature, Moisture permeability properties of fabrics, factors affecting moisture transmission, Measurement.

3. Fabric Water Relations

Nomenclature, water proofing, water repellency, Mechanics of Wetting, developments in water proof & water repellent fabrics, Factors influencing water repellency & proofing, Methods of Measuring water repellency & proofing- wetting time test, water head test

4. Aesthetic Properties of Fabrics

a) Crease Retention Wrinkle Resistance & Dimensional Stability

Nomenclature, Mechanics of Wrinkle Resistance, Inherent Wrinkle Resistance properties of fibres, effect of humidity and wetting on wrinkle resistance, chemical methods for improving wrinkle resistance and their effects, geometric factors influencing wrinkle resistance, Methods of Measurement, dimensional stability and shape retention.

b)Fabric Bending

Cloth stiffness, relation between fiber and fabric stiffness, factors contributing fabric stiffness, measurement of bending parameters

c)Luster

Subjective aspects of luster, Physics of light reflection in luster, Measurement of Luster, effect of fabric construction on luster

5. Fabric Serviceability:

Abrasion and Wear Resistance

Nomenclature, Mechanics of abrasion, factors influencing the abrasion resistance of a fabric, geometric aspects, abrasion aspects, method of measurement- universal wear tester

6. Fabric Hand

Concept of fabric hand, objective and subjective fabric hand, objective evaluation by KAWABATA technique, FAST technique

List of Experiments

1. Estimation of Fabric Wear performance by using Universal Wear Tester.
2. Comparison of Crease Recovery of Grey & Resin Finished Cotton Fabric.

3. Analysis of plain, twill, sateen weave fabrics- Cover Factor & GSM.
4. Estimation of Thermal Insulation Behavior of different Weave/Cover/Fiber types of Fabric.
5. To estimate the Water proofing ability of fabric by water head tester
6. To assess the pilling performance of various fabrics
7. To determine the Stiffness & Drape of Woven & Knitted Fabrics.
8. To study the air permeability of a fabric for its suitability for various applications.
9. To Study the Bending behavior of different weaves by Cyclic Bending Test.
10. To determine the puncture resistance of Non-woven Fabric.

Reference Books

1. Properties of fibres, yarns & fabrics by Kaswel
2. Structural Mechanics of fibres, yarns & fabrics by Herle, Grosberg and Backer.
3. Textile Yarn by Martindale and Goswami. .
4. Physical Testing and quality control textile progress, Vol.23, No.1/2/3, by K. Slater.
5. Principle of Textile Testing by J.E. Booth.
6. Mario Bona – Textile Quality (Eurotex Series).
7. Cotton Testing by Steadman,
8. Physical Testing of Textiles by B.P. Saville
9. Textile Testing – Fibre Yarn & Fabric – by Dr. Arindam Basu (ATIRA)
10. Testing & Quality Management by Dr.V.K. Kothari (IIT-Delhi)

Course Outcomes:

Students will be able to:

1. Classify various fabric structures and properties.
2. Demonstrate aspects of aesthetic and comfort in relation to various fabric properties.
3. Explain relation between fabric structural parameters in relation to serviceability.
4. Interpret the results of fabric properties tested on modern testing instruments.

FINAL YEAR B. TEXT - SEMESTER-I

7.4 TEXTILE MILL PLANNING AND ORGANISATION (TT/MMTT/TPE)

Lectures	:	4 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Subject Total	:	125 Marks

Course Objectives:

1. To Explain ProjectPlanning,FormulationofaProjectReportforSpinning,Weaving,KnittingUnits, Techno economic
2. To explainPlant&MachineryLayout,MachinerySpecificationSelection&Civil/BuildingConstruction approach
3. To calculate numberofMachines essential in each textile process for targeted production quantity.
4. To explain MaterialsHandling concept and method ,Labour Complement

UNIT I:

Project Planning - Introduction, Capital investment required for project, Phases of Capital Budgeting, Difficulties in Capital expenditure, Phases involved.

Formulation of a Project Report for Spinning, Weaving, Knitting Units - Assumptions, Machinery Organizations, Requirement of Miscellaneous Fixed Assets. Machinery Stores, Spares and in process inventories. Machinery erection, commissioning. Need of modernization and automation in Textile plants. Factors related to safety in Textile Plants.

UNIT II:

Techno-economic Viability - Calculations of cost of project – Means of Finance – Estimates of sales & production – cost of production – working capital requirement – Profitability Projection – Break even point – Projected cash flow statements.

UNIT III:

Site Selection - Selection of site for textile mills, General location, Actual selection of specific site, Calculation of spatial requirements, factors influencing site selection, Humidification considerations.

Civil/Building Construction - Consideration in building design, size, shape and configuration of building. Architectural & structural aspects of textile mill building. Building morphology, General principles of building construction & building functions, Types of factory buildings, Types of building construction. Material for construction with special reference to walls, roofs, floors, false ceilings, fire resistance, sound proof, etc. Colour schemes for buildings, interior & machinery in textile mills. Cost considerations in building construction.Amenities required as per standards**.**

UNIT IV:

Plant & Machinery Layout - Significance of the concept, objectives and principles of layouts, kinds of layouts and their comparisons, flow pattern, work station design, tools and devices of making layouts, use of Auto-Cad for layouts, storage space requirements, plant layout procedure, factors influencing layouts, selection of layout, effect of automation on plant layout, symptoms of bad layout. Layout aspects of spinning, weaving, knitting and composite mills. Spatial requirements of spinning / weaving / knitting machines .Modern trends material handling.

UNIT V:

Machinery Specification, Selection & Calculation for No. of Machines - Selection of machines & machinery specifications required for the product in spinning, weaving, knitting etc.

Calculation for number of machines in spinning /spin plan - Preparation of organization for ring spinning mill and preparatory, departments based on ring spindle capacity and production of ring spun yarn. (Carded, Combed, Blended, Folded). Assumptions for draft, waste, efficieny etc.

Calculation for number of machines in weaving / weave plan - Preparation of organization for shuttle & shuttleless weaving mill and preparatory departments based on number of weaving machines & production of different cloths. Calculation regarding efficiency, waste, crimp, production rates, raw material and number of machinery required at different processes**.**

UNIT VI:

Materials Handling - Definition and importance of materials handling, functions and principles of materials handling, material handling methods, engineering and economic factors, relationship to plant layout, selection and type of material handling

equipments, study of different types of equipments used for materials handling in spinning, weaving, knitting mills. Latest trends in materials handling.

Labour Complement - Types of labour required, labour complement, labour and staff required for spinning and weaving based on workload consideration. Job evaluation and merit rating.

Process Parameters – All spinning, weaving process and important norms.

Reference Books

1. Textile Project Management by A. Ormerod, The Textile Institute Publication.
2. Project, Planning Analysis, Selection Implementation & Review by Prasanna Chandra, Tata McGraw Hill Publishing Co. Ltd.,
3. Management of Textile Production, A. Ormorod. Newnes – Butter Wortrs Publication.
4. Plant location, Layout & Maintenance by Ruddele Reed.
5. Industrial Organisation & Engg. Economics T.R. Banga & S.C. Sharma, Khanna Publishers, Delhi.
6. Norms for Process Parameters, Productivity etc. ATIRA, BTRA, SITRA, NITRA, etc.
7. Trade Literature of Different Machinery Manufacturers.
8. Management of Textile Industry – Dr. V. Dudeja

Course Outcomes:

At the end of the course student will able to

1. Understand the project report preparation for textile activity.
2. Understand layout preparation process, machine specifications and construction concept.
3. Calculate spin plan and weave plan.
4. Understand material handling equipments used in textile industry and labour complement details

FINAL YEAR B.TEXT. - SEMESTER - I

7.5 TEXTILE UTILITIES (TT/MMTT)

Lectures : 4 Hrs/week

Theory Paper : 100 marks

Subject Total : 100 marks

Course Objectives:

1. To learn need of humidification in textile industry.
   To learn various psychrometric processes for air treatment.

2. To learn different types of air conditioning systems, elements used and their features in modern plants.
   To learn how to estimate heat load and capacity of Humidification plant.

3. To learn and select different type of drives in Textile engineering.
   To learn and select illumination system for textile processes.
   To learn, apply and calculate energy bill in textile industry.

4. To learn and apply energy auditing in textile industry.
   To learn and improve power quality.

1. a) Need for humidification in Textile Mills- Effect of temperature & R.H. on human body &Textile processes. Ambient conditions required in various departments of a textile mill. Basic definitions related to Psychrometry, interrelations of various properties, Psychrometric chart and its use, various psychrometric processes like cooling, heating, humidification, de-humidification, etc. Aspects of evaporating cooling method and refrigerative cooling method.

b) Arrangements and layout of standard humidification methods for spinning, weaving and knitting processes – Return air ducts, Return Air Plenum, Filters, Return Air fans, Dampers, Supply Air Fans, Washers, Eliminators, Supply Air Plenum, Supply Air Duct, Diffusers etc. Study of the construction of each component.

2. a) Humidification plant design: Considerations for a humidification plant design and air circulation systems, Heat load calculations in the department, air circulation and the design features of the plant such as fan capacity, Sizes of Dampers, Washers, Ducts, Return Air and Supply Air openings in the department.

b) Various controls in humidification plants. Recent developments in humidification plant used in spinning, weaving, knitting departments.

3. Pumps, Compressors and Fans used in Textile Industry:-

a) Various types of pumps, its classification and characteristics. Suitability of pumps used in textile mills.

b) Compressors: - Compression methods, intermittent, continuous. Classification of compressors and brief study of construction, working, advantages, limitations of each type. Compressed air requirement in Textile mills, Calculation of compressor capacity. Compressor accessories such as reservoir, dryer, lubrication system, filters, cooling towers, etc.

c) Fans: -Classification, construction and working of different types of fans. Centrifugal, Axial flow and Radial flow. Fan capacity, power and efficiency. Fan selection. Pneumatic conveying of materials in textile mills.

4. a) Drives Used on Textile machines:-

Selection of drives, AC and DC motors, starters, losses, efficiency, speed control, of AC and DC motors, vector control, soft starters, inverters for speed control, factors affecting energy consumption in induction motors.

Design features of energy efficient motors, motor capacity calculation for Air compressors, blowers, pumps, hydraulic systems. Motors used in textile industry, operation of compressor and its power consumption and tips.

5. a) **Energy Management:-** Electrical power required in Textile mills. Maximum demand, Average demand, Power factor, Load factor, Calculation related to energy requirement. Methods of power measurement, introduction to power analyzer and tariff. Control of maximum demand for saving. Power factor control for saving. Load factor and saving. Receiving and Distribution of Power in Textiles

b) Power Quality Improvement: Concept of power quality, harmonics & methods of harmonics elimination, Concept of power triangle, active power, apparent and reactive power, various modern methods of improving power factor and its importance in industries.

6. a) Electricity Transmission & its application - High Tension substation Transformers, Capacitors, Switch yard, Panels, etc. Types of cables–sizes andcalculations. Methods of Power distribution in the department. Methods of

procuring H.T. supply and policies and charges and deposits based on connected load and maximum demand. Methods of captive generation Brief production to D.G set and furnace oil, calculation of techno-economic viability. Energy Audit - Principle, energy measurement and energy conservation. Recent developments in energy efficient equipments. Harmonics in supply. Concept of power quality. Concept of payback and investment in the corrective action taken after auditing. Scope for energy audit in various dept. in text. Industry.

b) Unconventional energy sources – solar energy, solar photovoltaic cell, wind energy, Tidal energy, bio-energy, fuel cell.

Reference Books:-

1) Air Conditioning and Refrigeration by Arora and Domkundwar.
2) Air Conditioning and Refrigeration by Khurmi and Gupta.
3) Manual of Humidification – Batliboi Ltd.,
4) Air Conditioning in Textiles by S.P. Patel.
5) Compressors by Royce N Brown.
6) Refrigeration and Air Conditioning by P.L. Ballaney.
7) Refrigeration and Air Conditioning by P. Arora.
8) Utilisation and traction by S.L. Uppal.
9) Power system by V.K. Mehta.
10) Electrical power system by Dr. H.P. Inamdar.
11) Utilisation of electrical power and electric traction by J.b Gupta

Course Outcomes:

Student will be

1. Able to know importance of humidification in textile industry and its systems and components. Able to select various psychrometric processes for air treatment.

2. Able to select different types of air conditioning systems, elements used and their features in modern plants, Able to calculate heat load and capacity of humidification plant.

3. Able to select proper drives in textile engineering. Able to select proper illumination system for textile processes. Able to calculate energy bill in textile industry and understand how to reduce cost of energy and save money.

4. Able to audit a system and arrest the loss and save energy. Able to understand effect of bad quality of power and how to improve the quality and design a system.

FINAL YEAR B. TEXT - SEMESTER-I

7.6 DENIM MANUFACTURING AND FINISHING (TT) (ELECTIVE-I)

Lectures : 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total : 100 Marks

Course Objectives:

1. To discuss manufacturing aspects of Denim
2. To explain effect of various parameters yarn, fabric and dyeing on effect on denim products
3. To explain quality parameters of denim
4. To describe generation of various effects in fabric and on garments

1. Introduction to denim, types of denim

Construction of denim fabrics, general technical aspects of denim, effects generated on denim products, various types of denim such as – over-dyed, quick-wash, blends, printed and coated denims.

2. Indigo dye and dyeing chemistry

History of indigo, chemistry of indigo dyeing, pH dependent ring dyeing, ionic forms of indigo. Factors responsible for dye uptake such as dye concentration, immersion time, oxidation time, number of dipping, temperature, pH, cotton morphology and pre-treatments.

3. Dyeing and sizing equipments and process

Pre-requisites of indigo dyeing equipments, pre-requisites for continuous dyeing range. Sequence and method used for rope dyeing machine and sheet dyeing machine. Precautions while dealing with indigo dyeing.

Dyeing process, dosing, dyeing with mixture of indigo and other dyes like sulphur.

Sizing of warp

4. Yarn and fabric characteristics and their effect on denim

Structure and properties of ring and rotor coarser yarns, productivity, economics and effects of yarn. Characteristics and manufacturing of specialty yarns used for denim.

Various fabric forming technology for denim manufacturing; Fabric construction and weave, different characteristics of denim fabrics.

5. Finishing of denim fabric

Fabric process sequences, effect of individual operations like desizing, bleaching, mercerization, selection of fabric finishing sequence; pre-shrinking and softening Over-dyeing and coating of denim fabric.

6. Washing effects on denim garments

Effect after washings, desired and essential properties and effect on denim. Construction and working of washing machine. Different washing effects, their process and mechanism – stone washing, denim bleaching, acid washing, enzyme washing etc. Selection of abrading material like pumice stone, balls, mechanical abradants.

Fading effects using laser, prints. Over dying of garments, novel fading effects. Selection and use of softeners.

References:

1. Denim: Manufacture, Finishing and Applications by, Roshan Paul, WoodHead Publishing.
2. Textile colouration, by J. N. Chakraborty
3. Textile colouration, by Asimkumar Roy Chaudhury
4. Denim: A Fabric for All, M S Parmar, Nitra Publication
5. AATCC Garment Wet Processing Technical Manual, Pub. AATCC, NC

Course Outcomes:

Student should be able to,

1. Explain manufacturing aspects of Denim
2. Describe effect of various parameters yarn, fabric and dyeing on effect on denim products
3. Explain quality parameters of denim
4. Describe generation of various effects in fabric and on garments

FINAL YEAR B. TEXT - SEMESTER-I

7.6 TOTAL QUALITY MANAGEMENT (TT/MMTT/TC) (ELECTIVE-I)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives

1. To know and understand basic concepts related to TQM and quality control improvement tools.

2. To understand the benchmarking and kaizen concepts.

3. To understand the concept of organizing TQM

4. To know TQM models and quality audit.

I Introduction

Quality, Total quality, Rationale for total quality, key elements of total quality, quality circles, quality gurus.

II Quality Control and Improvement Tools

Check Sheet, Histogram, Pareto Chart, Cause and Effect diagram, Scatter diagram, Control chart, Tree diagram, Matrix diagram, Process decision program chart, Process capability studies, Zero defect program (POKA-YOKE).

III Benchmarking and Kaizen

Benchmarking, Rationale of benchmarking, Approach and process, Prerequisites of benchmarking, Benefits of benchmarking, Obstacles to successful benchmarking, perpetual benchmarking. Concept of Kaizen, Kaizen vs Innovation, Kaizen and management, Kaizen practice.

IV Organizing for TQM

The system approach, organizing for quality implementation, switching over from traditional quality to total quality management, roles in transition, small group & employer involvement, team for TQM.

V TQM Models

Demings Award criteria, Malcolm Baldridge national quality award, European quality award, Australian quality award, Confederation of Indian Industries award.

VI Quality Management System & Quality Audit

Quality Systems, Quality management principles, ISO 9001 : 2000, ISO 14000, Future of quality system audit, Audit objectives, types of quality audit, Quality Auditor, Audit performance.

Reference Books:

1. Introduction to Total Quality by Goetsch, D.L. & Davis,S.
2. Juran, J.M. & Gryna, F.M. : Quality Planning and Analysis.
3. Total Quality Management by Ross, J.E. :.
4. Total Quality Management by Charantimath, P.M. :.
5. Testing & Quality Management by Dr. V. K. Kothari, AFL Publication – Process in Textiles.
6. Total Quality Management by D. H. Bester Field et al Pearson Education, Inc.
7. ISO 9000 – Meeting the new international standards by Perry L. Johnson McGraw Hill Inc.
8. Handbook of Total Quality Management by R. P. Mohanty & R. R. Lakhe, Jaico Publishing House,.
9. Total Quality Management by Dale H. Besterfield, Carol Besterfied , Pearson Education.

Course Outcomes

1. Understand basic concepts related to TQM and quality control improvement tools.
2. Understand the benchmarking and kaizen concepts..
3. Understand the concept of organizing TQM
4. Understand the TQM models and quality audit.

FINAL YEAR B. TEXT - SEMESTER-I

7.6 TEXTILE PRODUCT ENGINEERING (TT/MMTT) (ELECTIVE-I)

Lectures : 3 Hrs / Week
Theory Paper: 100 Marks
Subject Total : 100 Marks

Course Objective

1. To describe the concept, scope and logic of product development in Textiles
2. To describe the stages of product development such as market research, product life cycle and bench marking
3. To illustrate the scope and merits of simulation of textile products including simulation tools available like FABCAD, MECHFAB.
4. To discuss the different case studies related to the product development of technical textile products

UNIT I

Product Engineering – Objectives and Scope of product development in textiles and clothing. Performance and serviceability concepts in textiles. Effect of changes in fibre, yarn type and fabric construction and finishing on performance and serviceability of textile products.

UNIT II

Consideration of a good product design. Product development procedure -Selection of product, Product analysis, Product design procedure, Product Appraisal – Functional, aesthetic, Manufacturing and economical analysis.

UNIT III

Product life cycle. Market Research, Material Research, Equipment and process research, Bench Marking

UNIT IV

Simulation of specified properties or structures leading to design – Special yarns, Simulation of Woven & Non – woven fabrics,

UNIT V

Concept of overall designing procedure, Texture by using computer graphics, CAD, FABCAD and MECHFAB.

UNIT VI

Case studies related to product development of textiles.

Reference Books

1. Hand book of Textile Design Principles, Process and Practice by Jacquie Wilson, Textile Institute Publication.
2. The Design Logic of Textile Products, Textile progress vol. 27, No. 3, T Matuo and M. N. Suresh. The Textile Institute Publication.
3. Engineering Design by George Dieter.
4. Total Quality Management by Dale H. Besterfield.
5. Proceedings of the Seminar – Non woven Technology, Market and Product Potential, IIT, New Delhi, December 2006.
6. New product development in textiles: Innovation and production, Edited by L. Horne, Published by Woodhead Publishing Limited in association with The Textile Institute,2012

Course Outcome

1. Understand significance of product development in textiles and its overall design logic
2. Explain the market research, product life cycle and bench marking with suitable examples in textiles
3. Apply the knowledge of simulation for the product development
4. Study & Analyze the techno economics of each of the case studies

FINAL YEAR B. TEXT - SEMESTER-I

7.6 ECONOMICS AND INDUSTRIAL LAWS (TT/MMTT/TPE/TC) (ELECTIVE-I)

Lectures : 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total : 100 Marks

Course Objectives

1 To understand the basic economic concept.

2 To explain the demand analysis and scale of production.

3 To understand the forms of market and concepts of National Income.

4 To explain the basic concepts of international trade

I) Definition of Economics – Nature and Scope of Economics,Economy types, Basic economics problems basic terms & concepts.

II) Demand Analysis – Human Wants – Consumption and standard of living, Demand and law of demand – Elasticity of demand. Supply and Law of Supply - Consumer's surplus

III) Scale of Production – Laws of returns to scale – Costs and cost curves – Equilibrium of the firm and industry.

IV) Markets and Forms of market - Features of Perfect and Imperfect Competition. Price Determination under perfect competition – market price and normal price – price determination under imperfect competition.

V) National Income – Concept and importance – Nature and functions of money, Credit and Credit Instruments - Banking – Central Banking.

VI) International Trade - Balance of Trade and Payments – Foreign exchange rate determination, Public finance, Public expenditure, Public revenue, Public debt, taxation.

Reference Books

1. Elementary Economics Theory by K. K. Dewett and J. D. Varma
2. Basic Economics by James A. Dgal, Nicholas Karatjas
3. Applied Economics by Derek T. Lobley.
4. Micro Economic Theory by M. C. Vaish.

5. Principles of Economics by D. N. Dwived.
6. Economics Analysis, Decision Making & Policy by George Leland Bach.
7. Contemporary Economics by Milton H.
8. Engineering Management by Frgidon Mazda – Addison Weley Longman Pearson Education.
9. Economics Environment of Business by V. K. Garg Sultan Chand & Sons Educational Publishers.
10. Management for Business and Industry by Cloute S. George.
11. Essentials of Management by Koontz Odonell.

Course Outcome

Student will be able to,

1 Understand the basic concepts & problems of economics.

2 Understand demand analysis & scale of production.

3 Understand the forms of market, National Income & Banking system.

4 Understand the basic concepts of international trade.

FINAL YEAR B. TEXT - SEMESTER-I

7.6 FIBRE REINFORCED COMPOSITES (TT/MMTT) (ELECTIVE-I)

Lectures: 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total: 100 Marks

Course Objectives:

1. To explain requirements of fibre and matrix for composite fabrication
2. To understand fibre-matrix interactions in unidirectional lamina
3. To explain properties of composites
4. To explain details of various methods of composite fabrication

UNIT I

Introduction – Definition, General Characteristic, Applications of composites.

Materials – Fibres, Matrix, Thermoset matrix, thermoplastic matrix, fibre surface treatment, fillers and other additives, incorporation of fibres into matrix, fibre content, density & void content

UNIT II

Mechanics – Fibre - matrix interactions in a unidirectional lamina, characteristics of fibre reinforced lamina, laminated structure, Inter matrix stresses.

Performance – Static, mechanical properties fatigue properties, impact properties, other properties, environmental effects, long term properties, fracture behavior & damage tolerance.

UNIT III

Manufacturing – Fundamental, Bag moulding process, compression molding, pultrusion, filament winding, other manufacturing process, Manufacturing process for thermoplastic composites, quality inspection methods.

UNIT IV

Design – failure predictions, laminate design considerations, joint design, design examples, application examples.

UNIT V

Metal and ceramic Matrix composites – Metal Matrix composites, ceramic Matrix composites,

UNIT VI

Analysis and modelling of three dimensional textile structural composites.

Reference Books

1. Fabre reinforced composites by P. K. Mallick
2. Composite materials: Engineering & science by F. L. Mathew & R. D. Rawlings.
3. Micro structural Characterization of fibre reinforced composites by John Summer scales.
4. New millennium fibres by T. Hongu & G. O. Phillips.
5. Effects of mechanical & Physical properties on fabric hand by H. M. Behery.
6. 3-D Textile reinforcements in composite materials by Prof. A. Miravete
7. Mechanics of Textile & Laminated composites by A. E. Bogdanovich & C. M. Pastore.

Course Outcomes:

1. Describe the logic, need, requirements of composites based on end use
2. Understand the manufacturing of the composites and fibre used for fabrication
3. Evaluate the performance of composites including fibre matrix interactions
4. Design the product suited to high end applications.

FINAL YEAR B.TEXT. - SEMESTER - I

7.7 SEMINAR-I (TT/MMTT/TPE/TC/FT)

Lecture	:	2 Hrs / Week
Term Work	:	50 Marks
Subject Total	:	50 Marks

Course Objectives

1. To explain the importance of seminar.
2. To expose the students to literature survey procedure.
3. To describe the technical write up of seminar report in the standard format
4. To enhance his/her communication, stage daring and presentation skill

Topic - In the beginning of the semester, every student of the class will be assigned a seminar topic in the emerging / perspective field in the area of textiles such as Spinning, Weaving, Fibres, Testing, Chemical processing and alike. Seminar should be based on the literature survey on any topic of textiles.

Seminar Preparation and Presentation – Student will collect the information on the above subjects and submit the report on the dates specified by the concerned faculty. The seminar report will be of minimum 15 pages and maximum 25 pages. The spacing between the lines will be 1.5. The font size will be 13.5 point Times New Roman. The list of reference must be given at the end of seminar report. The list of reference should be written as per the Textile Research Journal format. The student has to present seminar in front of the faculty member of the department and his/her classmates. The faculty member, based on the quality of the work and preparation and understanding of the candidate, shall do an assessment of the seminar internally.

Term Work Marks – Seminar Report - 20 Marks Presentation - 30 Marks

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

1. Select appropriate title for seminar
2. Collect required information for the seminar through literature survey
3. Write seminar report in standard format
4. Demonstrate communication, and presentation skills

FINAL YEAR B. TEXT - SEMESTER-I

7.8 INPLANT TRAINING - II (TT/MMTT/TPE/TC/FT)

Term Work : 50 Marks

Course Objective

1. To expose the students to the industrial environment and its work culture.
2. To expose the students to machineries and processes.
3. To develop understanding of techniques like production planning. Quality Assurance, Maintenance practices, Environment and Pollution Control, Management Information System.
4. To provide hands-on training on machines and instruments

Training Period:

Four weeks after completion of second semester of Third Year B.Text.

Industry:

Spinning, Weaving, Garment, Processing, Synthetics, Textile Chemicals and Auxiliaries, R & D, Machinery Manufacturing, Marketing etc. as per the course.

Training:

Observe working of industry and collect data as per guidelines in the daily diary, manual, study machineries / systems / practices.

Training Report:

Report should be prepared as per following guidelines and submitted for evaluation -

* Report should have Title on Cover of Report as per Format.
* Report should be prepared as per following sequence -
  - I Page Certificate from Institute as per Format.
  - II Page Acknowledgement
  - III Page Programme of Training
  - IV Page Introduction of Industry
  - V Page Index with Page Numbers
  - VI Page Plant/Dept. Layout
  - VII Page Organizational Structure.
  - VIII Page Department wise/Product wise Report

This report should be based on

1) Own Observations made, data collected during Inplant Training like study of Machinery, Actual Production and Efficiency, Production Control, Modern Developments in Machines/Process, Flow Chart of Processes, Speed of Important Parts, Labour Allocation, Maintenance Practices, Process Control and Quality Control Activities etc. roles and responsibilities of various Workers/TechnicalStaffs'

2) Special Study like Mini Project Undertaken, Costing, ProductionPlanning and Control, Target Achievement, Information regardinghumidification plant, Utility, Electrical Supply, Store, Purchase, Marketing,Sales, Samples, Lay-out of Mill etc.

Course Outcomes

Students will be able to,

1. Understand the industrial environment and work culture.
2. Understand the machineries and processes of industries.
3. Reproduce the techniques like production planning, Quality Assurance, Maintenance practices, Environment and Pollution Control, Management Information System.
4. Use hand on training skills.

FINAL YEAR B. TEXT. - SEMESTER- I

7.2 KNITTING TECHNOLOGY (MMTT)

Lectures	:	3 Hrs / Week
Practical	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

Course Objective

1. To define basic terms and definitions used in knitting
2. To explain loop forming cycle, process, fabric structure, production and fabric calculation in circular weft knitting
3. To explain loop forming cycle, process fabric structure in flat knitting
4. To explain loop forming cycle, process fabric structure production and fabric calculation in warp knitting

1. Introduction

a. Types of knitted fabrics, their applications, properties and basic structure of warp & weft knitting.
b. Terms and definitions used in knitting. Comparison of knitting with woven fabric with respect to production and properties.
c. Concept of hand knitting. Evolution of knitting from hand to machine knitting.
d. Concept of flat and circular knitting.

2. Circular Weft Knitting

a. Knitting cycle and basic elements of knitting. Essential elements of knitting machine – yarn supply arrangement, loop forming arrangement and fabric take down mechanism.
b. Passage of yarn through circular weft knitting machine. Study of elements of knitting machines such as :
   i. Creel – Construction, types, capacity and their suitability.
   ii. Yarn feeding – Need, construction, drive, types of positive and negative feeders, stop motions, indicators, tensioners etc.

iii. Loop forming mechanism – Knitting cycle, types of needles and their comparison. Study of essential elements of loop forming such as cylinder, sinker, cam, dial, yarn guide.

iv. Take down motion – Spreader, Nip roller, cloth roller, Drive mechanism and its types, cloth roller capacity. Machine and material monitoring systems.

3. Weft Knit Structures:

a. Principle stitches such as Knit, Tuck, Miss and their representation and their effect on fabric properties.

b. Types and properties of knitted fabrics such as single jersey, double jersey (Interlock, Rib and Purl). Manufacturing process of these fabrics. Conditions for the use of delayed and synchronized timings.

c. Fabric analysis method, representation of design, Needle order, Cam order. Basic designs and the derivatives (1. Single Jersey – cross - miss, lapique, longitudinal tuck stripes, plain pique. 2. Rib – Milano, half Milano, cardigan, half cardigan, double cardigan, Swiss and French double pique. 3. Interlock- Interlock Pique, Texi pique, Pin tuck, Interlock super Roma, Bourrelet}

d. Concept of colour Jacquards.

4. Knitting Processes – Advances, fabric quality and calculations

a. Relative Technology (Relanit) on circular knitting machines.

b. Concept of mechanical and electronic jacquard.

c. Structure and knitting of fleecy and plush fabrics

d. Concept and mechanism of striper and loop transfer

e. Weft knitted fabric defects and their remedies. Yarn quality requirements

f. Circular weft knitting machine production calculations, fabric weight and Tightness factor. Knitted fabric relaxation concept.

g. Relation between machine gauge and yarn count.

5. Flat Knitting

a. Basic elements and their functions of flat knitting machine. Hand and machine operated flat knitting machines and their knitting actions.

b. Machine operation for various stitches such as Miss, Tuck, Transfer, and Drop Stitch.

c. Design with and without needle selection, bed racking, new formed and transfer loop for hand and power operated machines.
d. Concept of seamless knitting

6. Warp Knitting

a. Fabric Loop diagram, properties and applications of warp knitting.
b. Knitting cycle and basic elements of warp knitting
c. Passage of yarn through warp knitting machine.
d. Essential elements of warp knitting machine such as yarn supply arrangement, loop forming mechanism and fabric take down mechanism.
e. Knitting cycle of Tricot and Raschel warp knitting machine.
f. Warp Knitted Fabric Structure - Study and representation of single, two guide-bar and multi guide-bar (Tricot, Raschel) structures.
g. Weft insertion techniques, Terry technique, Sinker pile fabrics, fall plate, cut press techniques.
h. Net fabric manufacturing
i. Warp knitted fabric defects and their remedies. Yarn quality requirements
j. Production calculation on weight and length basis
k. Fabric weight calculation
l. Concept of rack, run-in

List of Experiments:-

1. Study of single jersey circular weft knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion and Production calculation.
2. Study of double jersey circular weft knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion and Production calculation.
3. Study of warp knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion and Production calculation.
4. Study of flat knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion.

5. Design setting on single jersey circular weft knitting machine- Machine operation, cam and needle arrangements, yarn feeding and take down setting.
6. Design setting on Double jersey circular weft knitting machine- Machine operation, cam and needle arrangements, yarn feeding and take down setting.
7. Design setting on Warp knitting machine- Machine operation, cam chain preparation.
8. Knitted fabric analysis Single jersey
9. Knitted fabric analysis Interlock fabric
10. Knitted fabric analysis Rib fabric.
11. Knitted fabric analysis with Knit, tuck and miss stitches
12. Visit to circular knitting unit.

Reference Books:-

1. Knitting Technology by Prof. D. B. Ajgaonkar.
2. Circular Knitting by Dr. Chandrashekhar Iyer.
3. Knitting Technology by Mr. D. Spenser.
4. Warp Knitting by Dr. S. Raz.
5. Flat Knitting by Dr. S. Raz.

Course Outcome

1. Understand basic terms and definitions used in knitting.
2. Understand loop forming cycle, process, fabric structure, production and fabric calculation in circular weft knitting.
3. Understand loop forming cycle, process, and fabric structure in flat knitting.
4. Understand loop forming cycle, process, fabric structure, production and fabric calculation in warp knitting.

FINAL YEAR B. TEXT - SEMESTER-I

7.3 YARN AND FABRIC SCIENCE (MMTT)

Lectures	:	3 Hrs / Week
Practicals	:	2 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Practical Exam	:	50 Marks
Subject Total	:	175 Marks

Course Objectives:

1. To discuss classification and geometry of different yarn structures.
2. To study mechanical properties of yarn.
3. To discuss aesthetic and comfort properties of fabric.
4. To explain serviceability of fabric in relation to their performance aspect.

1. Classification and Structure of yarn

Classification of yarns, Yarn structures – fundamental structural features of yarns. Structurally related performance of yarn, effect of mechanical & chemical treatment

2. Ideal Yarn Geometry and Fibre Migration

a) Twist in Yarns

Geometry of twisted yarns, idealized helical geometry, twist contraction, twist and packing of fibers in yarns, idealized packing and packing in actual yarn, concentrating and deviating features of actual yarn, specific volume and packing fraction, derivation of K(Schwarz constant)

b) Form and fiber arrangement in twisted yarns

Fiber migration – Ideal migration, Characterization of migration behavior, Factors affecting migration of man-made fibers in the yarn, tension variation as a mechanism of migration, frequency and order of migration.

3. Mechanical Properties of Yarn

a) Theory of the extension of continuous filament yarns

Simplest analysis of tensile behavior, analysis with transverse forces & lateral contraction, analysis for large extension, prediction of breakage, prediction of load - extension curve, energy method, Observed extension & breakage of continuous filament yarn,

b) Tensile Behavior of Actual Yarns

Mechanics of yarn structures, tensile behavior of continuous filament yarns. Influence of processing factors on tensile properties of yarns. Observed extension & breakage of spun yarns, experimental studies

4. Thermo physiological Comfort

a) Thermal Transmission Properties of Textile Structures

Nomenclature, Definitions of terms – thermal properties- thermal insulation, coldfeel, chillproofness, Factors affecting thermal properties, Methods of measuring thermal properties

b) Moisture Transmission

Nomenclature, Moisture permeability properties of fabrics, factors affecting moisture transmission, Measurement.

5. Aesthetic and Tactile Comfort

a) Crease Retention Wrinkle Resistance & Dimensional Stability

Nomenclature, Mechanics of Wrinkle Resistance, Inherent Wrinkle Resistance properties of fibres, effect of humidity and wetting on wrinkle resistance, chemical methods for improving wrinkle resistance and their effects, geometric factors influencing wrinkle resistance, Methods of Measurement, dimensional stability and shape retention.

b) Fabric Hand

Objective & subjective evaluation of fabric hand, Hand Nomenclature, Factors influencing fabric hand, Measurement of fabric hand by Kawabata & FAST techniques

6. Serviceability, Wear & Abrasion

Nomenclature, serviceability, wear & abrasion, Mechanics of abrasion, Influence of fabric/yarn/fiber structural parameters on abrasion resistance of fabric

List of Experiments

1. Dry & Wet tenacity of cotton / blends.
2. Measurement of Filament Friction by Zweigle Friction Tester..
3. Estimation of Fabric Wear performance by using Universal Wear Tester.
4. To estimate Crease recovery of Heat Set & Non- Heat Set Polyester Fabrics

5. To compare Thermal Insulation Behaviour of Staple Yarn & Filament Yarn, Woven Fabric.
6. To estimate the Filament Diameter by using microscope
7. To estimate the Water proofing ability of fabric by water head tester.
8. To Study the Bending behaviour for Filament & staple Yarn Fabric by Cyclic Bending Tester.
9. To determine Air permeability of different Fabrics.
10. To determine the puncture resistance of Non-woven Fabric.

Reference Books

1. Structural Mechanics of fibres, yarns & fabrics by Herle, Grosberg and Backer.
2. Textile Yarn by Martindale and Goswami.
3. Properties of fibres, yarns & fabrics by Kaswel.
4. Physical Testing and quality control textile progress, Vol.23, No.1/2/3, by K. Slater.
5. Principle of Textile Testing by J.E. Booth.
6. Mario Bona – Textile Quality (Eurotex Series).
7. Cotton Testing by Steadman,
8. Physical Testing of Textiles by B.P. Saville
9. Textile Testing – Fibre Yarn & Fabric – by Dr. Arindam Basu (ATIRA)
10. Testing & Quality Management by Dr.V.K. Kothari (IIT-Delhi)

Course Outcomes:

Students will be able to:

1. Understand different yarn structures in relation to properties.
2. Apply the effect of yarn structure to mechanical properties of yarn.
3. Demonstrate aspects of aesthetic and comfort in relation to various fabric properties.
4. Explain relation between fabric structural parameters in relation to serviceability.

FINAL YEAR B. TEXT - SEMESTER- I

7.6 GARMENT TECHNOLOGY (MMTT/TPE) (ELECTIVE-I)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course objectives

1. To explain the basics of apparel industry
2. To describe pre-production and post-production processes of apparel industry.
3. To describe production processes of apparel industry.
4. To explain applications of CAD-CAM in apparel industry.

I) **The Garment Industry**: Structure of the garment Industry, sectors of Industry, product types and organization. Apparel industry in India, Domestic industry, size of the industry, nature of the industry, and its developments in recent years. Export industry: Size and nature of the industry.

II) **Basic Pattern Making:** Measurement Taking – Size chart and Measuring of Sizes. Definition of various garments parts & positions. Methods: Bespoke method & Industrial method (Using Blocks) – Basic block construction – Block preparation & correction. Figure analysis: Body ideals, body proportion, height, weight distribution, body parts, individual figure analysis, study of body measurement of all age groups. Muslin pattern, commercial pattern, sizes and its understanding, fabric preparation for garment construction.

III) **Manufacturing Technology**:

- Types of Fabric Packages – Types of Fabrics – One Way – Two Way Fabrics –Their effect on spreading –Methods of Fabric spreading – Spreading equipments – Computerized spreaders – Marker making –Marker efficiency – Factors affecting marker efficiency – Marker duplicating methods – Computer aided marker making.
- Introduction to cutting machines – Types and functions of cutting machines – straight knife, round knife, band knife, cutting machines – Notches, drills, die cutting machines – Computerized cutting machines –maintenance of cutting machines – common defects in cutting & their remedies.

- ❖ Types of needles – Parts of needles and their function – Needle size - sewing thread – properties of sewing threads – ticket number – fabric sewability. Seam quality – effect of stitch type on seam quality. Selection of seam and stitch.
- ❖ Federal classification of seam and stitches – Basic parts of sewing machine – Needle – Bobbin case /Bobbin hook, Loopers – Loop spreader – Threading fingers – Throat plate – Tongue chaining plates – Takeup devices – Tensioners – Feed dog – Pressure foot for sewing.

c) Sewing Technology : feed systems, , machinery and equipment, basic sewing machines, like general sewing, over locking, safety stitching, blind stitching, button holes, bartacking, & button sewing, special sewing machines like three thread overlock with a microprocessor, Sewing problems

d) **Fusing Technology:** Construction of Fusibles, Fusing process, Fusing machinery, quality control.

e) Study of various components such as buttons, zips, underlining, Hooks and ornamental materials, - fly, kissing, lap; Button and buttonholes, hooks and eye snaps, Velcro and other accessories.

IV) Pressing Technology: Classification, components of Pressing, machinery and equipments viz. Hand irons, dry iron, electric steam iron, under pressing, top pressing, scissors press, Carousel machines, Steam dolly, tunnel finishing, controls, handling systems, boiler room.

V) Garment Finishing and Inspection: Attaching buttons, marking, sewing labels, cleaning, final touch, fitting quality, live models, measurements, viewing the garments, quality standards.

VI) Production Technology: Manual systems, making through, section system, progressive bundle system, straight line system, mechanical transport systems, selective conveyor belt system, unit production system, quick response sewing system.

- ❖ Ware Housing: Handling equipment, storage equipment, packing equipment.
- ❖ CAD/CAM in Garment Manufacturing.

Reference Books

1) Introduction to clothing Manufacture by Gerry Cooklin
2) Technology of clothing manufacture by Harrold carr & Barbara Lathem
3) Apparel Manufacturing Handbook by Jacob Solinger.,
4) Clothing construction and wardrobe planning by Dora S. Lewin, Mabel Goode Bowers, Manetta Knttunen –– The Macmillan co New York
5) Garment Technology by Dr. V.Subramaniam –– Winter School booklets 1990
6) BIS publications 1989.

Course Outcomes

At the end of the course students will be able to

1. Describe the structure and classification of Apparel industries as per size, labor, and product and understand the development of apparel industry in India.
2. Describe the various requirements and importance of pattern making, cutting, sewing, finishing and Inspection.
3. Compare various production technologies and its types.
4. Discuss the applications of CAD-CAM in apparel industry.

FINAL YEAR B. TEXT SEMESTER- I

7.1 ENGINEERING DESIGN OF TEXTILE MACHINES – II (TPE)

Lecture	:	3 Hrs / Week
Practical	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Oral Exam	:	50 Marks
Subject Total	:	175 Marks

Course Objectives:

1. To get familiar with methods of design of mechanical components for various conditions of fluctuating loads.
2. To get familiar with design procedure of sliding & rolling contact bearings.
3. To know design procedure of Thin & Thick cylinders. To know design considerations of machine frames, concept of optimum design & various parameters for economical design. To get familiar with CAD & CAE.
4. To get familiar with design procedures of various types of gears.

1. **Design against fluctuating load** – Stress concentration, fluctuating stresses, fatigue failure, endurance limit, Notch sensitivity, Reversed stresses - design for finite and infinite life, Cumulative damage in fatigue, Soderberg & Goodman diagrams, Modified Goodman diagrams, fatigue design under combined stresses.

2. **A) Design of Rolling contact bearings** – Introduction, classification, basic terminology, selection from manufacturer's catalogue, design for cyclic loads & speeds, bearing with a probability of survival other than 90%, mounting of bearing.

B) Design of Sliding contact bearings –Hydrodynamic and Hydrostatic lubrication, Viscosity, Hydrostatic step bearing & energy losses in it, Raimondi & Boyd method, temperature rise, bearing design – selection of parameters, constructional details & materials etc.

3. **Design of pressure vessels** – Classification, design of thin & thick cylinders, spherical vessels, Autofrettage, Compound cylinder, end closures.

4. **A) Design of Spur gears** – force analysis in spur gears, gear tooth failures, material selection, beam strength & wear strength of gear tooth, gear design for maximum power transmitting capacity.

   B) Design of Helical gears – terminology, virtual number of teeth, force analysis, beam strength & wear strength.

5. **A) Design of Bevel gears** – terminology, force analysis, beam strength & wear strength.

   B) Design of Worm & worm wheel – terminology and proportions of worm gears, force analysis, friction in worm gears, material selection, strength rating & wear rating of worm gears, Thermal considerations.

6. **A) Design considerations of machine frames** – Design consideration of machine frames, bed, covers and bodies, design consideration for casting, forging & fabricated parts.

   B) Standardization, cost consideration in design from manufacturing requirement & from customer's requirement.

   C) Introduction to CAD & CAE – Introduction to solid modeling package & analysis package, concept of optimum design.

List of Experiments:

Design problems and drawing sheets based on above topics (Minimum five assignments) viz.

1. Design against fluctuating load.
2. Design considerations of machine frames & cost consideration in design.
3. Design of Rolling contact bearings.
4. Design of Sliding contact bearings.
5. Design of Pressure vessels.
6. Design of Gears.

Reference Books

1. Design of Machine Elements by V.B. Bhandari.
2. A Textbook of Machine Design by R.S. Khurmi & J. K. Gupta.
3. Design of Machine Elements by T. Krishna Rao Vol. I & II.
4. Machine Design by P. Kannaiah.
5. Design of Machine Elements by Spotts

6. Mechanical System Design by R. B. Patil.
7. Machine Tool Design & Numerical Control by N. K. Mehta.
8. Machine Tool Design by Basu & Pal.
9. Mechanics of Spinning Machines – R. Rengaswamy.

Course Outcomes:

Student will be able,

1. To design mechanical components subjected to various conditions of fluctuating loads by constructing S-N diagram, Soderberg & Modified Goodman diagram.
2. To explain construction, working, advantages & disadvantages of sliding & rolling contact bearings, designing the same. Select rolling bearing from manufacturer's catalogue for a given application.
3. To design Thin & Thick cylinders. Plot/draw the stress pattern for the compound cylinder. Explain with sketches various types of end closures used for cylindrical pressure vessels & compare them. To explain design considerations of machine frames. To describe parameters for economical design, concept of optimum design & applications of solid modeling & analysis package.
4. To design various types of gears according to the applications.

FINAL YEAR B. TEXT - SEMESTER-I

7.2 THEORY OF TEXTILE MACHINES-II (TPE)

Lectures	:	3 Hrs / Week
Practicals	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Subject Total	:	125 Marks

Course Objectives

1. To understand the theory, design, analysis and use of different types of gears or epicycle gears.
2. To understand theory, design and calculations based on the clutch and brakes.
3. To understand Static and Dynamic Balancing, Balancing of textile machine components, its uses. To understand about vibrations, its adverse and beneficial. Effects and applications from industry point of view.
4. To understand about Construction, classification, mounting, maintenance & applications of Antifriction and sliding bearings. Students should know about different types of drives used and its applications and power required for different textile machines.

1. Balancing - Static and Dynamic Balancing of rotary masses. Balancing machines. Balancing of textile machine components – carding cylinder, spindles of Ring frame.

2. Toothed and Epicyclic gearing –

a) Toothed gearing: Gear tooth terminology and geometry, Condition for constant velocity ratio, velocity of sliding of teeth, form of teeth. Effect of change in central distance on velocity ratio. Length of path of contact, arc of contact for involute teeth. Interference, minimum number of teeth on pinion for involute rack to avoid interference. Minimum number of teeth on gear to avoid interference.

b) Epicyclic gearing - Gear trains, determination of velocity ratio and torque in epicyclic gear trains. Study of epicyclic gear trains used in speed frame, carding and comber.

3. **Brakes and Clutches** - Simple band brake, Band & block brake, shoe brake. Different types of clutches – plate & cone clutches. Application to textile machines.
4. **Vibrations** - Longitudinal, torsional vibrations, free and forced vibrations, natural frequency. Whirling of shaft, critical speed.
5. **Antifriction and sliding bearings** - Construction, classification, mounting, maintenance & application to textile machines. Mathematical estimation of static and dynamic load, life of bearing, Selection of antifriction bearing.
6. **Drives and power transmission:**
   a) **Drives :** Different types of drives used in spinning. PIV, VPS, frequency controlled drive and applications.
   b) **Power transmission**: Power required for textile machines. Ring frame, speedframe, carding and looms.

List of Experiments:

Minimum five experiments based on above.

1. Static balancing of rotary masses.
2. Dynamic balancing of rotary masses.
3. Generation of Involute gear tooth profile.
4. Study of Epicyclic gearing on speed frame / carding / comber / Rapier machine.
5. Study of Brakes.
6. Study of clutches.
7. Calculation of natural frequency of single degree of freedom vibration.
8. Study of forced vibration characteristics.
9. Study of whirling of shaft.
10. Assembly & Dismantling of bearing of spinning / weaving machine.
11. Study of PIV & VPS, frequency control drive.
12. Study of power consumption of a loom or any spinning machine.

Reference Books

1. Theory of Machines - Ballani & Khurmi.
2. Theory of Machines - S.S. Rattan.
3. Mechanics of Textile M/c. Part-I & II - Huntan & Slatter

4. Textile Mathematics Part –I, II, III - Booth.
5. Mechanics of Spinning Machines – R. Rengaswamy.

Course Outcome

Student will be able to,

1. To explain theory, design, analysis and use of different types of gears or epicycle gears.
2. To explain design and analysis based on the clutch and brakes.
3. To explain about static and dynamic balancing. Balancing of different machine components. Student should be able to explain about vibration and its analysis.
4. To explain Construction, classification, mounting, maintenance & applications of drives, antifriction and sliding bearings. To explain power consumption pattern required for different textile machines.

FINAL YEAR B.TEXT. - SEMESTER - I

7.3 MAINTENANCE OF TEXTILE MACHINES (TPE)

Lectures : 3 Hrs / week
Practical : 3 Hrs / week
Theory Paper : 100 marks
Term Work : 25 Marks
Practical Exam. : 50 marks
Subject Total : 175 marks

Course Objectives:

1. To learn need of maintenance, its functions, types & scheduling.
2. To study & elaborate maintenance practices in Spinning preparatory & Spinning processes.
3. To study & elaborate maintenance practices in Weaving preparatory & Weaving processes.
4. To learn concepts of maintenance audit, SQC synchronization & recording of maintenance activities.

1. a) Maintenance – concept, importance, objectives of maintenance, Breakdown & planned maintenance sub classification of planned maintenance, Procedure for planning, schedules for preventive maintenance.

b) Maintenance of spinning preparatory machines - schedules, staff, precautions & methods to be followed during maintenance activities, tools & gauges used for maintenance.

2. a)Maintenance of Ringframe & Compact Spinning Mechanisms - schedules, staff, precautions & methods to be followed, Tools & gauges used, Maintenance of Rotor Spinning Machines – Schedules, Precautions, Methods etc.

b) Study of aprons & cots used in spinning & their maintenance.

3. a) Machine audit – concept and auditing of spinning machines. Energy conservation in spinning

b) SQC synchronization with maintenance – SQC activities useful for maintenance in various departments of spinning.

4. a) Maintenance of weaving preparatory machines, schedules, critical points of maintenance, precautions to be taken during maintenance operations for Winding, Warping, & Sizing machines.

b) Maintenance of plain & automatic loom - Schedules, critical points, precautions, mechanism wise auditing of plain & automatic looms.

5. Maintenance of shuttleless weaving machines - Approach towards maintenance of latest weaving machines, Critical maintenance points of various shuttleless weaving machines like projectile, rapier, air jet.

6. a) Recording of maintenance activities & its importance.

b) Introduction to logic & approach of maintenance of chemical processing machines.

List of Experiments:-

1. Auditing of carding machine and study of card room maintenance machines.
2. Auditing of draw frame, classimat analysis and roller setting.
3. Auditing of speed frame and spectrogram analysis.
4. Auditing of Ring frame and its settings.
5. Auditing of comber and its settings.
6. Study of basic pneumatic circuits.
7. Study of air circuits used on ring frame G5/1, speed frame LF 1400 and Airjet weaving machine.
8. Study of cots maintenance equipments.
9. Auditing and setting of shedding and picking mechanisms of plain loom.
10. Auditing and setting of pirn changing mechanism of autoloom.
11. Auditing and setting of sulzer picking mechanism.
12. Auditing and setting of sulzer shedding mechanism.
13. Mill visit – Spinning Maintenance.
14. Mill visit – Weaving Maintenance.

Reference Books:-

1. Maintenance manuals by BTRA for various spinning & weaving machines.
2. BTRA monograph series.
3. Spinning machinery maintenance by SITRA
4. Maintenance manuals of different machinery manufacturers of spinning & weaving machines.

Course Outcomes:

Student will be able to,

1. Explain need of maintenance, its functions, types & scheduling
2. Explain & use maintenance practices in Spinning preparatory & Spinning processes
3. Explain & use maintenance practices in Weaving preparatory & Weaving processes
4. Explain concepts of maintenance audit, SQC synchronization & recording of maintenance activities

FINAL YEAR B.TEXT. SEMESTER - I

7.5 AIR CONDITIONING & HUMIDIFICATION IN TEXTILES (TPE)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives:

1. To understand the function of refrigerants, its desirable properties and applications. To understand basic terminology of air conditioning, psychrometric processes & application of the same in textile industry & interpret psychometric chart. To get familiar with the procedure for solving the numericals based on psychrometric processes.
2. To get familiar with types of air refrigeration and simple vapour compression refrigeration system and factors affecting the same. To understand different equipments used in refrigeration system.
3. To know principle and types of different air conditioning systems for human comfort & to provide ambient conditions in industry for facilitating production activities.
4. To understand principle, types and design of air distribution systems. To get familiar with ventilation and air changes required for various departments of textile mill, calculations of heat load, cooling coil capacity, humidifier capacity and heating coil capacity. To get acquainted with developments in humidification plants of textile industry.

1. Introduction to Refrigeration - Laws of thermodynamics applied to refrigeration. Introduction to basic terms COP of a Refrigerator, Difference between heat engine refrigerator and heat pump , flow energy work, difference between gas and vapour, ton of refrigeration.

2. A) Refrigeration - Air refrigeration system – Reversed Carnot cycle as most efficient refrigerators, Bell Coleman cycle, advantages, disadvantages of air refrigeration, simple vapour compression refrigeration system, comparison with air compression system.

B) Refrigerants - Introduction, classification, properties of an ideal refrigerant, secondary refrigerants, comparison of refrigerants – Air, NH_3, R-11, R-12, selection of refrigerant, environment friendly refrigerants.

3. **A) RAC Equipments -** working principle and applications of hermetically sealed compressor, condenser, evaporator, fans, blowers, air washers, filters, heaters, heat pumps, grills, registers, humidifiers and dehumidifiers used in textile A/C plant.

B) Comfort - Factors affecting comfort, thermal exchange of human body with environment, heat disorders, comfort chart.

4. **Psychrometry -** Psychrometric terms, Dalton's law of partial pressure, psychrometric relations, psychrometric chart, psychrometric processes – sensible heating and cooling, humidification & dehumidification cooling with dehumidification, heating with humidification, humidification by steam injection, adiabatic chemical dehumidification, adiabatic mixing of air streams, bypass factor of heating and cooling coil, efficiency of heating and cooling coil, efficiency of humidifier, sensible heat factor, numericals based on above topics.

5. **A) Air conditioning systems -** Summer air conditioning, winter air conditioning, modern year round air conditioning, ambient conditions required in various departments of textile mill and controlling ambient conditions.

B) Air distribution systems – Duct classification, Duct material, Construction, Pressure in Ducts rectangular equivalent of round duct, principle of duct sizing, different air distribution systems.

6. **A)Design of Air conditioning system-** Design hints for practical design of air conditioning and humidification plant, ventilation and air changes required for various departments of textile mill, calculations of heat load, cooling coil capacity, humidifier capacity, heating coil capacity.

B) Low temperature refrigeration- Limitation of Vapour compression refrigeration system for attaining low temperature, Cascade refrigeration system, manufacture of Dry ice.

C) Developments in Air conditioning system– Modern developments in humidification plants of textile industry.

Reference Books:

1) Refrigeration and Air conditioning by R. K. Rajput.
2) A Course in Refrigeration and Air-conditioning by Arora & Domkundwar.
3) Refrigeration and Air conditioning by R.S. Khurmi.
4) Refrigeration and Air conditioning by C.P. Arora.
5) Principles of Refrigeration by Roy J. Dossat.
6) Air conditioning in Textile mills by S.P. Patel (ATIRA).

Course Outcome:

Students will be able to,

1. To explain the function of refrigerants and describe its desirable properties and applications. To describe psychrometric processes & solve the numericals based on it analytically as well as with the help of psychrometric chart.
2. Describe the types and factors affecting on air refrigeration and simple vapour compression refrigeration system. To explain different equipments used in refrigeration system.
3. To discuss principle and types of different air conditioning systems which gives comfort to human body and provide ambient conditions to industry for facilitating production activities.
4. To design, analyze heat load, capacity of air distribution systems required for textile mill. To explain developments in humidification plants of textile industry.

FINAL YEAR B. TEXT - SEMESTER-I

7.6 MECHATRONICS (TPE) (ELECTIVE-I)

Lectures : 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total : 100 Marks

Course Objectives:

1. To explain basic concepts, need and scope of mechatronic systems and robotics in modern textile machines.
2. To describe elements of mechatronic system- transducers, controllers and actuators & their types
3. To explain design process of mechatronic system, modelling, programming, robotics and material handling
4. To evaluate mechatronic systems used in textiles.

I) Introduction

Multidisciplinary approach, scope, elements in mechatronics design, applications, control system and its types, proportional, integral, differential controller, analog & digital controller.

II) Sensors and Drives in Mechatronics

Principles & types of transducers and sensors

Electrical motors, stepper motors, servo principle, Hydraulic and pneumatic actuators, variable frequency drives, relays and solenoids, selection criterion for drives.

III) PLC and MEMS

PLC- Basic concept, fundamentals, ladder diagram & its construction, PLC - block diagram, internal circuit of discrete type input and output terminals, interfacing of sensors & actuators, PLC scan cycle, basic PLC programming procedure

MEMS- Introduction, materials, sensors, actuators, fabrication methods, application of MEMS - Accelerometer, humidity micro sensor

IV) Modelling

Basic concepts, spring, damper, mass/inertia element, equivalent elements in electrical, fluid and thermal systems, model of electrical motor

V) Automation and Robotics

Automation- need and types automation, factors affecting

Robotics- Scope, anatomy, configuration, drives, types of robots, transmission systems, end effectors, applications, Methods of robot programming, limitations, capabilities, various commands in robot programming

VI) Design of Mechatronic System and Material Handling Applications

Design process, comparison of traditional and mechatronic design, some case studies piece counting, robotic walking machine. Auto feed and auto doffing, weft selector, yarn clearer systems in textile machines.

Material Handling Applications – General consideration, task planning, pick & place, loading unloading, inspection and assembly etc.

Reference Books:

1. “Mechatronics” by N. P. Mahalik, Tata McGraw Hill.
2. Mechatronics by M. D. Singh & J. G. Joshi, Prentice Hall Publication.
3. “Introduction to Mechatronics” by David G. Aleiatore & Michael B. Histand, Tata McGraw Hill.
4. “Programmable Logic Controllers” by John W. Webb & Ronald A Reis, Prentice Hall India.
5. “Robotics” by K. S. Fu, R. C. Gonzalez, C. S. G. Lee, McGraw Hill.
6. “Robotics Technology & Flexible Automation” Satyarajan Deb, Tara McGraw Hill.
7. “Industrial Robotics” Mikell P Grover, Mitchell Weiss, Roger N. Nagel, Nicols G. Odrey, McGraw Hill.
8. “Textile Robotics & Automation” by M. G. Mahadevan, Abhishek Publication, Chandigad
9. “Electronic Controls in Textile Machines” NCUTE Training Programme January 2000.

Course Outcomes:

Student will be able to,

1. Explain basic concepts, need and scope of mechatronic systems and robotics in modern textile machines

2. Describe elements of mechatronic system- transducers, controllers and actuators & their types
3. Explain design process of mechatronic system, modelling, programming, robotics and material handling
4. Evaluate mechatronic systems used in textiles.

FINAL YEAR B. TEXT - SEMESTER-I

7.6 NON WOVEN TECHNOLOGY (TPE) (ELECTIVE-I)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objective:

1. To understand the concept of Nonwoven Textiles
2. To define Nonwoven and Geo Textiles
3. To classify Nonwoven and Geo Textiles
4. To analyze and identify the Nonwoven and Geo textile products and to apply knowledge of Nonwoven and Geo textiles in testing and product development

Unit I:

Historical background of nonwovens, non woven definition, stages in Non-woven manufacturing

Web Forming Techniques: carding, Garnetting, air laid, wet process, polymer extrusion.

Classification of nonwoven – On the basis of use, on the basis of manufacturing process, on the basis of web formation, on the basis of bonding.

Unit II:

Dry laid webs – fibre selection, fibre preparation, web formation, layering, Wet laid nonwoven – Raw materials, production process, special features of the wet laid process and its product. Spun laced webs

Mechanically bonded webs – needle punched nonwovens, Application of needle punching, stitch bonded nonwovens, applications.

Hydro entangled nonwovens – Bonding process, water system, filtration system, web drying, properties of spun laced webs, applications.

Unit III:

Chemically bonded nonwoven – Latex binder, other types of nonwoven binders, formulation, order of formulation, bonding technology – saturation, foam bonding,

spray bonding, print bonding, powder bonding, application of chemical bonded nonwovens.

Thermally bonded nonwovens – binder, binding fibres, binding powder, binding webs, methods of thermal bonding – Hot calendaring, belt calendaring, oven bonding, ultrasonic bonding, radiant heat bonding.

Melt blown nonwovens

Unit IV:

Overview of geo textiles, types of geo textile, development of Geo textiles, functions of Geo textiles.

Raw materials used fibre properties for geo textiles, production of Geo textiles. Such as wovens, non-wovens, knitted, grids, mats, ties, cellular Geo textiles, webs, stripes, bio degradable geo textiles, and their properties for different functions and test methods.

Types of soils, their characteristics, testing of soil.

Unit V:

Filtration and erosion control application. Principles, Erosion control for inland waterways, coastal erosion protection, scour protection, rain fall erosion control.

Drainage application: structural drainage, fin drains, land drainage etc.

Separation application: Unpaved Road, Paved road, Railways.

Unit VI:

Soil Reinforcement application. Steep faced embankment, slope stabilization, Retaining walls, Geo Textiles pile capping.

Growth of Geo textiles, potential of geo textiles in India.

Durability and creep: Soil induced degradation, chemical pollution, Temperature resistance, sunlight degradation, stress relaxation.

Reference Books

1. Nonwoven Process Performance & Testing – Turbak
2. Nonwoven Fabric Construction Synthetic Fibres – Jan-Mar 2007.
3. Proceedings of the Seminar - Nonwoven Technology Market & Product Potential, IIT, New Delhi December 2006.

4. Geo Textile by NWM John.
5. Geo synthetics world by J. N. Mandal.
6. Designing with Geo synthetics by R. M. Koerner.
7. Geotextiles by Dr P.K.Banerjee (IIT,New Delhi private circulation).
8. Geotextiles by BTRA (Private circulation)

Course Outcomes:

Students will be able to

1. Describe the logic and processes involved in Nonwoven and Geo textiles
2. Classify the Nonwoven and Geo textiles
3. Prepare technical data sheet of each sector of Nonwoven and Geo textiles
4. Compile the fibres used, technology applied in manufacturing of Nonwoven and Geo textiles. Evaluate the performance of Nonwoven and Geo textiles withdifferent test methods of Indian and International standards.

FINAL YEAR B. TEXT - SEMESTER-I

7.6 PROCESS CONTROL IN SPINNING (TPE)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

COURSE OBJECTIVES:

1. Explain the principals of process management, concepts of total quality management and ISO 9000 the wastage and its effect on cost of production.
2. Explain the process of choosing process parameters and application of the chosen parameters at preparatory processes and ring spinning system.
3. Illustrate the methodology of process and product performance evaluation and role of norms.
4. Describe the role of machine parameters and machine technology on process and product quality and cost.

UNIT 1

a) Introduction to process management – Meaning of process management, various phases of process management like planning, organizing, linking of customer feedback and process management, cycle of process management.

b) The Cost of Quality – Definition, three views of quality costs, measuring quality costs, use of quality cost, information, accounting systems, activity based costing.

c) Concepts of ISO – Concepts of ISO 9000 series, other quality systems, implementation, documentation, post certification, ISO / QS 9000 elements, internal auditing.

UNIT 2

a) Total Quality Management (TQM) – Fundamental concepts of TQM, Basic approach, quality & business performance service quality versus product quality, obstacles.

b) Leadership – Concepts, implementation, role of senior management, management role in quality, characteristics of leaders, Ethics & shared values, communication management systems, Decision making.

c) Customer focus & satisfaction – Customer perception of quality, process versus customer, feedback, service quality customer relation & profitability, buyer supplier relationship, supplier partnership, continuous process improvement

UNIT 3

a) Raw material management – Importance, need of instrumental evaluation, traditional methods of cotton selection, importance of cost in raw material, use of linear programming for mixing, bale management, yarn engineering.

b) Yarn Realization – Importance, estimation process, norms for various yarns like cotton, blended etc., analysis of yarn realization from mills.

c) Process management in blow room & card – Blow room & card as integrated system, control of waste, cleaning efficiency, neps & fibre rupture, contamination control, selection of proper sequence process parameters.

UNIT 4

a) Process management at Comber preparatory & combing –

Significance & importance of good lap for comber, evaluation of comber performance, fractionating efficiency of comber, comber waste analysis, influence of various factors on combing performance.

b) Process management at Draw frame

Drafting wave & its significance, roller nip movement, roller speed variation, roller vibration, influence of parameters like speed, setting, Role of auto leveler, role of material channelizing in spinning.

c) Process management at speed frame –

Influence of process parameters like flyer speed, twist, break draft and settings on roving quality. Reasons for stretch in roving and its control at speed frame.

UNIT 5

Process Management in Ring Spinning –

a) Influence of various machine and material parameters on yarn quality.

Control of yarn count & strength, within & between bobbin variation, Control of yarn evenness & imperfections, Types of yarn irregularities, measurement causes & assessment.

b) **Control of yarn Hairiness**- measurement, role played by fibre properties & process parameters.

c) End breaks in spinning –Importance, assessment & controls

d) Control of Yarn and package faults – Influence of fibre properties, machine parameters on classimat faults control of faults. Study & control of faults like slubs, crackers, spinners double bad piecing, double gaiting, slough off etc.

UNIT 6

a) Role of maintenance in product quality – Specific maintenance activities from blow room to ring spinning which directly reflect on yarn quality.

b) Role of On & off line monitoring, centralized data collection systems in spinning.

c) Productivity – Importance, definition of indices of productivity, analysis & shortfall in productivity, productivity indices, standards, means to improve productivity, productivity of different sections in spinning, comparison & reasons for losses.

d) Production Costing and Parameters influencing the production cost

Reference Books

1. Testing & Quality Management by Dr. V. K. Kothari, AFL Publication – Process in Textiles.
2. Textile Quality Physical method of Product & Process Control by Mairio Bona COMMETT program of EEC.
3. Process Control in Spinning by A. R. Khare & T. R. Subramaniam, ATIRA Publication.
4. SITRA publication.
5. Total Quality Management – A How to program for high performance business by John M. Kelly, Published by Aleycuder, Hamitton Institute Inc.
6. Total Quality Management by D. H. Bester Field et al Pearson Education, Inc.
7. ISO 9000 – Meeting the new international standards by Perry L. Johnson McGraw Hill Inc.Uster Statistics
8. Process Control in Spinning – Dr. K. R. SalhotraATIRA Publications.
9. Yarn Hairiness by A. Barella Textile Progress Vol 13 No 1 Textile Institute.

COURSE OUTCOMES

1. Understand the role of machine technology and parameters on product quality.
2. Understand the principles of process management and quality management.

3. Understand the process of choosing process parameters at preparatory and ring spinning stages
4. Apply the chosen process parameters and assess the influence of parameters at different ring spinning process stages. Test the product properties and compare with norms of the industry.

FINAL YEAR B.TEXT. – SEMESTER-I

7.1 PROCESS PLANNING IN TEXTILES (TC)

Lectures	:	4 hrs. / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

Course Objectives:

1. Describe the general objectives, organization structure of dye-house and the principle and functions of management to comply with quality with respect with respect to ISO.
2. Explain the location, site and factors to be considered for building construction with respect to work place.
3. Calculate the production of each machine used in process house and its norms and also calculate the water and energy requirement for each step and costing of the same and conservation steps.
4. Discuss lay-out and equipment used for material handling, positioning and norms for lighting costing and its classification; Calculate chemical cost in various operation in textile chemical processing.

1) Quality aspects:

Objectives of dye house, Structure of the organization, Principle and functions of management, Role of HRD in management, Concept of ISO

2) Setting up of modern process house:

Selection of location, Selection of site, Construction of building for modern process.

3) Norms for machine production:-

Norms of production for singeing m/c, jiggers, jet dyeing and soft flow dyeing M/cs, flat bed and rotary screen printing m/c, production norms for heat setting and other finishes. Norms of production for CBR and CDR m/c.

4) Consumption of Water and thermal energy:-

Consumption of water in pretreatment, dyeing and printing. Water consumption measures

Various fuels used in process houses. Consumption of energy in pretreatments, dyeing, printing and finishing. Energy consumption measures

5) Lighting requirement and costing:-

Work place and norms of lighting. Position of lighting.

Classification of costing. Chemical costing per kg. in pre treatment, dyeing, printing and finishing.

6) Material Handling and Quality aspects

Goals of material handling. Material handling and plant layout. Material handling equipments.

Concept of R & D. in process house, Quality assurance department & their functions, Production planning department (PPD) their functions.

Term Work

1) Preparation of layout plan and machinery layout for
    a. Package dyeing unit.
    b. 100% cotton woven goods processing.
    c. Synthetic and / or blend processing.
    d. Knit goods processing.
2) Preparation of project report for modern process house.

Reference Books:

1) Dye house management manual by James Park and John Shore
2) Plant-layout and material handling by Fred E. Meyers.
3) Management of Textile Industry by V.D. Dudeja.
4) Management perspectives in textile industry – BTRA.
5) Textile Manufacturing by M.G. Kulkarni.
6) PMR's Textile laws and Policy by Somesekhar B.V. and Dr.Raj Mogili A.

Course Outcome

Student will be able to

a. Understand the objectives and organization structure of dye-house with the role of management, HRD and ISO quality management.
b. Summarize important factors for selection of location, site and building construction & understand the norms with production calculations for unit operations in textile chemical processing.
c. Analyze and calculate water requirement, thermal energy requirement for each step of processing and also to calculate cost and recommend steps towards conservation.
d. Prepare lay-out plan, material handling and equipment used, lighting positioning and norms, costing and its classification, chemical cost in various operations in textile chemical processing.

FINAL YEAR B. TEXT - SEMESTER-I

7.2 FLUID MECHANICS AND HEAT OPERATIONS (TC)

Lectures	:	3 Hrs / Week
Practicals	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

Course Objectives

1. To relate the scope of fluid flow study in textile processing areas and to discuss the necessity of fluid flow and impart the principles of fluid statics.
2. To discuss the flow patterns of dynamic flow with respect to different behaviours based on theories and to understand the concept of fluid flow and evaluate the energy loss.
3. To point out the flow measurement techniques and articulate the respective measurements. And To compare the different mechanisms involved in pumping of liquid and gases.
4. To discuss different modes of heat transfer and interpret the laws governing them. And To demonstrate the necessity of heat exchangers.

Unit 1. Introduction to Fluid Flow:-

Definition, nature & classification of fluids. Study of fluid properties like density, viscosity, surface tension, vapour pressure. Principles of fluid statics. Applications of fluid statics. Newton's law of viscosity Newtonian & non Newtonian fluids. Rheological behaviour of fluids, Numerical based on above topics

Manometers, mechanical gauges. Numerical based on fluid pressure measurement. Fluid flow measuring devices (classification). Study of venturimeter. Orfice meter, rota meter, pitot tubes & weirs. Numerical based on above.

Unit 2. Fluid Dynamics:-

Study of flow patterns, Reynolds experiment. Rheological behaviour of fluids, Equation of continuity, Bernoulli's equation, and pump-work calculations based on above equations. Applications of equations of fluid flow for discharge through pipe, a small orifice & pumps**.**

Fluid Flow Through Pipes & Open Channels: - Flow resistance in pipes. Concept of friction factor & calculations of energy losses based on friction factor. Energy losses in straight pipes, changing cross sections, fittings. Concept of equivalent diameters. Study of pipes, pipe fitting & tubing & valves suitable in textile process**.**

Unit 3. Pumping of Liquids / Gases:-

Suction, discharge, net-positive suction heads, centrifugal & reciprocating pumps. Pumps used in textile wet processing industry. Pumping of gases – Fans, blowers & compressors.

Unit 4. Introduction to Heat Transfer:-

Need of understanding the fundamentals of heat transfer Modes of heat transfer like conduction, convection & radiation. Fourier's law of heat conduction, heat flow through infinitely long hollow cylinder, a plane wall & a sphere & their respective composites. Applications of conduction heat transfer to industry e.g. thermal insulation over steam pipes, insulation over drying chamber, cabinet etc. Numerical based on above.

Unit 5. Heat Transfer by Convection and Radiation:-

Definition, concept of dimensional analysis, dimensionless numbers. Heat transfer coefficients, free & forced convection. Heat transfer with change of phases like boiling & condensation. Numerical based on above Definition, Terminologies, pertaining to radiation. Steafan-Boltzmanm's Law of Radiation, Kirchhoff's law of radiation, Wien's law of radiation. Numerical based on above.

Application of radiation heat transfer to industry in general & textiles in particular.

Unit 6. Heat Exchangers:-

Definition and classification of heat exchangers. Study of heat exchangers suitable in a textile process house, Fouling factor, Log-mean temperature difference, effectiveness of heat exchangers.

Numericals based on above topics

List of Experiments

1. Calibration of Venturimeter.
2. Calibration of Orificemeter.
3. Calibration of Triangular notch
4. Bernoulli's Experiment

5. Reynolds Experiment
6. Study of fluid friction through pipe.
7. Study of centrifugal pump
8. Determination of thermal conductivity of insulating material by sphere in sphere method.
9. Determination of thermal conductivity Composite wall apparatus
10. Study of heat transfer by natural convection
11. Verification of Steafan - Boltzmann's Law.
12. Study of Critical Heat Flux Apparatus.

Reference Books

1. Fluid Mechanics and Hydraulics, by Giles, McGraw-Hill (1971).
2. Fluid mechanics, R.K.Bansal, Laxmi Publications ;(2016).
3. Fluid mechanics,Dr. P.N. Nodi and S.M. Seth (2009).
4. Heat transfer, S.P.Sukhatme (2005).
5. 'Process Heat Transfer' by Kern, McGraw-Hill, (1954).
6. A course in heat and mass transfer by Arora,Domkundwar.Dhanpat Rai and Co.
7. Fluid Mechanics by FM White McGraw-Hill.

Course Outcomes

At the end of the course students will be able to

1. Illustrate basic objectives of fluid flow study in textile processing and to reproduce various principles involved in fluid flow study.
2. Criticize the flow patterns of dynamic flow with respect to different behaviours based on theories of various type of fluid flow and to discriminate various techniques and articulate the respective measurements.
3. Distinguish various mechanisms involved in pumping of liquid and gases and. differentiate modes of heat transfer, Criticize the necessity of heat exchangers.
4. Evaluate the energy loss in pumping of fluid, calculation regarding heat exchangers.

FINAL YEAR B. TEXT. – SEMESTER - I

7.3 TESTING AND ANALYSIS OF TEXTILES (TC)

Lectures	:	3 Hrs/week
Practical	:	3 Hrs/week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Practical Exam	:	50 Marks
Sub. Total	:	200 Marks

Course Outcomes:

1. To discuss the need of testing, statistical terms, standards, equipments and interpretation of results.
2. To explain properties of apparel textile such as colour fastness to various agencies, finishes applied; their test methods and evaluation.
3. To explain test method and result analysis of various auxiliary used in textile chemical processing.
4. To explain the concept of Eco-testing. Source, hazard effect, principle of testing and norms for acceptance; to explain the principle of instruments like UV-Visible Spectrophotometer, chromatography, atomic absorption spectroscopy.

1. Introduction

Importance of testing, Sampling, Statistical terms, Acceptance Sampling, Errors and Quality. Introduction to the standards like ISO, ASTM, AATCC and BIS; Certifications like Okö-tex, Organic cotton and GOTS.

2. Colour Fastness of Dyed and Printed Goods

General Principle of colour fastness testing, sample preparation, multifibres, grey scale, conditions of viewing and illumination.

Evaluation of colour fastness to washing and home laundering and various reference detergents; Colour Fastness to Rubbing, Perspiration, Water, Sea water, Chlorinated pool water, Light, Sublimation, Bleaching with hypochlorite and Peroxide, atmospheric ozone, Dry-cleaning and saliva.

3. Evaluation of Functional Finishes

Importance and principle of evaluation of functional finishes like Durable Press Rating, Flammability, soil release, Anti-microbial and Sun Protection.

4. Care Labeling

Introduction, voluntary and mandatory care label, Care label symbols.

Various systems of care label, Instructions for washing, bleaching, drying, ironing, dry cleaning, and placement of care label.

5. Testing and Analysis of Auxiliaries

Surfactants: identification of classes like anionic, cationic and non-ionic, evaluation of solid content and moisture content, effective active content, determination of cloud point and HLB.

Auxiliaries: chelating value of chelating agent, peroxide retention property of stabilizers, evaluation of efficiency of leveling agent, dispersing agent, defoamers. Evaluation of migration and leveling agents.

Softeners: ionic nature of softeners, polymer content, oil content, Active content of cationic softeners.

6. Eco-Testing

Concepts of Eco-Testing of Textiles; Principles of evaluation of Banned amines, Formaldehyde, PCP and heavy metals. Sources of hazards chemicals and their norms.

Instruments: Classification of chromatographic methods, Principle and working and Application of HPLC, GCMS; Concept, laws, instrument and working principle of UV – Visible spectroscopy and AAS.

List of Experiments

1. Evaluation of colour fastness to Washing
2. Evaluation of colour fastness to Rubbing
3. Evaluation of colour fastness to Sublimation
4. Evaluation of colour fastness to Perspiration
5. Evaluation of colour fastness to Light

6. Evaluation of colour fastness to Bleach with hypochlorite and peroxide
7. Evaluation of dimensional stability to washing, dry heat relaxation shrinkage
8. Evaluation of water extracted from finished fabric
9. Determination of water repellency – Spray test
10. Determination of free Formaldehyde
11. Determination of Active Content of emulsion softener
12. Determination of Active Content of Leveling and Dispersing agent.
13. Evaluation of colour fastness to Saliva
14. Evaluation of Flammability.

References

1. Textile Physics by B P Savili
2. AATCC and ISO Standards Manual
3. Textile Finishing by Scholinger
4. Fabric Care by Naomi D'soza
5. Testing of Eco-Parameters by S Subramanian, Anita hazara; Textile Committee
6. Elementary Organic spectroscopy – Principles and Chemical Application by Y R Sharma
7. Spectroscopy of Organic Compounds by P S Kalsi
8. Basic Concepts of Analytical Chemistry, Second Addition by S M Khopkar

Course Outcomes:

Student shall be able to,

1. To summarize need of testing, statistical terms, standards, equipments and interpretation of results.
2. To describe properties of apparel textile such as colour fastness to various agencies, finishes applied; their test methods and evaluation.
3. To explain test method and analyze various auxiliary used in textile chemical processing.
4. To explain the concept of Eco-testing. Source, hazard effect, principle of testing and norms for acceptance; to understand the principle of instruments like UV-Visible Spectrophotometer, chromatography, atomic absorption spectroscopy.

FINAL YEAR B. TEXT - SEMESTER-I

7.4 MANUFACTURING ASPECTS OF TECHNICAL TEXTILES (TC)

Lectures : 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total : 100 Marks

Course Objectives:

1. To explain textile substrate, polymeric raw material for coating and coating technology.
2. To describe application, requirements of coated textiles
3. To explain the use of textile in different technical field like defense and military, medical textiles, filtration, automotive textiles and geotextiles
4. To explain the principle and manufacturing of water proof breathable fabric; work wear and protective textile

1) Coating Materials and Coating Technology:

Material: Rubber (natural and synthetic), polyvinyl chloride, polyurethane, Acrylic polymers, Adhesive, coating additives and curing assistances

Techniques: General features, knife coating, roll coating, Dip coating, transfer coating, Gravure coating, rotary screen coating, calendaring, Hot melt coating, scatter coating, laminating coating

2) Coated Textile:

Different textile substrates and their preparation

Applications: synthetic leather, coated architectural textiles, fluid containers, tarpaulins, automotive air bag fabrics and interiors, carpet backing, Water proof breathable coating.

3) Military and Defence Textiles: Introduction, protective clothing, textiles used in defence systems and weapons.

4) Medical Textiles: Introduction, materials used in bio-textiles, classification of medical textiles, textiles for implantation, non-implantable textiles, textiles for extra corporeal (biomedical), Health care and hygiene products.

5) Geotextiles, Filtration and industrial Textiles:

Geo-synthetics and Geotextile materials, geotextile properties, geotextile functions and applications, Principles of filtration, equipments, textiles in dry and liquid filtration, testing of filters.Air bags, seat belts, tarpaulins, hoses, belts, inflatable textiles.

6) Protective and Sports Textiles:

Thermo-physiological comfort, concept of water proof breathable fabrics, performance assessment of water proof breathable fabrics, Clothing and various textile based sport's products.

Concept and requirements of work wear and protective textiles, high temp. textiles, thermal insulation, flame resistant, Mechanical and electrical protective clothings, , radiation protection, high visibility textiles.

Concept and textile applications of phase change materials and shape memory polymenrs.

Reference Books

1. Hand book of technical textiles by A.R. Horrock and S.C. Anand
2. Coated textiles Principles and applications by Dr. A.K. Sen
3. Medical textiles '96 by Subhash Anand
4. Automotive textiles by Dr. S.K. Mukhopadhyay and J.F. partridge, The Textile Institute.
5. Wellington sear's hand book of Industrial textiles by Dr. Sabit Adanur.

Course Outcomes:

Student shall be able to,

1. Explain textile substrate, polymeric raw material for coating and coating technology.
2. Describe application, requirements of coated textiles
3. Enumerate the use of textile in different technical field like defense and military, medical textiles, filtration, automotive textiles and geotextiles
4. Explain the principle and manufacturing of water proof breathable fabric; work wear and protective textile

FINAL YEAR B. TEXT - SEMESTER-I

7.5 TEXTILE PROCESSING MACHINERY (TC)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives:

1. To describe the functions and working of various machinery used in pretreatment of textiles.
2. To explain working of different dyeing and printing machines.
3. To explain working of various finishing machines
4. To explain working of different garment processing machines.

I) **Shearing and Cropping, Singeing machine** - Various types of shearing machines for woven fabric, surface shearing for terry towels, carpets, etc. Working and maintenance of shearing and cropping machine.

Construction, working and maintenance of singeing machines. Various types of gas singeing machines for woven and knit goods.

II) **Scouring and Bleaching Machine** - Various types of kiers with different methods of heating system, Vapor lock machine, Tumbler solvent scouring machine and continuous solvent scouring machinery. J-box for continuous scouring, pad-roll system of scouring.

Equipments for conventional bleaching. Bleaching on super jumbo jiggers, Hydraulic jigger and continuous bleaching range.

III) **Mercerizing, Washing, Relaxing MachinesandMachinery for knit goods** – Yarn mercerization machines, fabric mercerization machines like pad chain, pad chainless and padless – chainless. Caustic recovery plant.

Open width and Rope form washing machines. Water extraction equipments of different mechanism like centrifuging, mangling, suction.

Reversing machine, hose cutting, singeing machine, mercerising machine, continuous bleaching range. Relax Dryer, Compactor, Stenter, Tumble dryer.

IV) Dyeing and Printing machinery - Batch and continuous fibre dyeing machine, Hank dyeing m/c., Package dyeing machine, different types of packages.

Jigger, different types of Jiggers, winch dyeing machine, Horizontal beam dyeing machine. Pad batch and continuous open width fabric dyeing range. Different types of padding mangles. Different types of Jet dyeing machines, Soft flow, over flow & air flow dyeing machine.

General aspects of Textile Printing machinery. Study of roller printing machine. Study of construction & working of rotary printing m/c. &flat bed printing machine. Method of preparation of screen for flat bed and rotary screen printing machine. Continuous & cut panel thermo transfer printing. Developments in printing machines. Inkjet printing machines. Study of agers, steamers &polymeriser.

V) Finishing machinery - General out line of finishing processes. Drying equipments like V.D.R., Float dryer, stenter for drying & finishing. Study of thermic fluid heater. Other finishing machines like friction calender, schrienercalender, felt calender, sanforising machine, decatising, raising machine, Peach finish machine. Aero finish machine, heat recovery system.

VI) Garment Processing machine - All types of paddle dyeing machine, Tumble dyeing m/c. High temperature garment dyeing machine. Machinery used for printing of garments & finishing of garments.

Reference Books

1) Handbook of Textile processing machinery by R.S. Bhagwat
2) Dyeing of polyester & its blends by Prof. M. L. Gulrajani
3) Engineering in Textile coloration by C. Duckworth
4) Norms for Textile Machinery – N.T.C.
5) Technology of Printing by Dr. V.A. Shenai
6) Technology of finishing by J.T. Marsh

Course Outcomes:

At the end of the course students will be able to

1. Describe the functions and working of various machinery used in pretreatment of textiles.

2. Explain working of different dyeing and printing machines.
3. Explain working of various finishing machines
4. Explain working of different garment processing machines.

FINAL YEAR B. TEXT. SEMESTER - I

7.6 ENERGY MANAGEMENT IN CHEMICAL PROCESSING (TC)

(ELECTIVE – I)

Lectures : 3 Hrs /week

Theory Paper: 100 marks.

Sub. Total : 100 marks

Course Objectives:

1. To explain basics of energy; forms of energy required in textile processing unit, types of fuel and its properties.
2. To explain generation and distribution of thermal energy in the form of steam and thermic fluid; minimizing wastage, its utilization and consumption calculations.
3. To describe billing parameters of electricity, measures to utilize electrical energy efficiently and related consumption calculation. Explain efficient utilization of compressed air.
4. To describe measures to conserve energy in the form of thermal, electrical and compressed air; concept of energy audit; explain importance of non-conventional sources of energy.

1 Basics of Energy and Fuels

Basics of Energy: Types and sources of Energy, Forms of energy and units of measurement; Need of various Energy Sources required in Textile Processing like thermal, electrical and compressed air; Concept and need of Energy Management.

Classification of Fuel, Types and Quality of fuels, Calorific value of fuel and its measurement.

2 Thermal Energy

Need of thermal energy in textile, Basics of thermal energy,

Steam:Thermal behavior of water, heat balance equation, Methods of generation of Steam and its quality requirement, efficient steam generation - boiler,

Thermopac:Need and concept, design of system and rating

3. Steam Distribution and Consumption

steam distribution and Its utilization, size of steam pipe line, accessories in steam distribution line, Calculation related to measurement of thermal energy – Direct heating, Indirect heating, Batch process unit operations, Continuous process and thermopac, Calculation related to measurement of Steam Consumption in textile processing, norms and capacity requirement of boiler.

Drying of Textile and its economics, machinery required

4 Electrical Energy and compressed air

Methods of Electricity Generation, Quality of Electric Supply, Leakages, voltage Fluctuations their reasons and economical aspects, Power Transmission and cables, Power Factor, Calculations related to measurement of electrical energy, norms for lighting

Types, working and quality requirements of compressed air, its utilization.

5 Energy Audit

Need of energy audit, method & types of energy audits, Energy audit performance, instruments required, Energy consumption of various textile machines, Thermal energy for Batch operation, Thermal energy for Continuous operations, Electricity consumption

6. Energy Conservation and Non-Conventional Sources

Co-generation and its economics, advantages;

Methods of energy conservation in various departments of process house with regards to thermal energy, electrical Energy, lighting, compressed air and water;

Concepts of Reduce, Reuse and Recycle with textile specific examples, Energy saving through process modification, machine modification or alternative chemical / technology with textile specific examples

Non-conventional energy sources and their application areas in textile like Wind, Biogas and Solar energy either for thermal or electrical energy generation.

Reference Books:

1. Energy Conservation in Industries – Vol.I & II, Centre of Plant Engg. Services Hydrabad.
2. Conventional Energy Technology – By S.B. Pandya.
3. ATIRA – Circular Report June, 1988, Mill Endavours to conserve electricity by D.H. Shah, J.S. Parajia.
4. Energy Consumption & Conservation in Fibre Producing & Textile Industries Textile Progress Vol.13, No.3.
5. Renewable Energy Resources by John Twidell.
6. Economy Energy & Environment in Textile Wet Processing by Editor S.S. Trivedi.
7. Utilities by D K Bhattacharya, A K Jain, S. Saxena, Pub. NITRA

Course Outcomes:

Student shall be able to,

1. Explain basics of energy; forms of energy required in textile processing unit, types of fuel and its properties.
2. Explain generation and distribution of thermal energy in the form of steam and thermic fluid; minimizing wastage, its utilization and consumption calculations.
3. Describe billing parameters of electricity, measures to utilize electrical energy efficiently and related consumption calculation. Explain efficient utilization of compressed air.
4. Describe measures to conserve energy in the form of thermal, electrical and compressed air; concept of energy audit; explain importance of non-conventional sources of energy

FINAL YEAR B. TEXT - SEMESTER-I

7.6 POLYMERS AND COMPOSITES (TC)

Lectures : 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total : 100 Marks

Course Objectives:

1. To explain requirements of polymer / fibre and matrix for composite fabrication & their types
2. To describe the polymer/fibre-matrix interactions in unidirectional lamina
3. To explain details of various methods of composite fabrication
4. To explain properties of composites and their applications

UNIT-I General introduction: Meaning and types of composite materials. Schematic representation of two component polymer systems. Limitations of conventional engineering materials. Role of matrix in composites. Classification of matrix. Properties of matrix influencing performance of composite. Various matrix materials. Reinforcements. Possible combinations of several forms of fibres composite type. Types of composites. Composites verses traditional materials. Applications of fibre composites.

Polymer matrix materials: Thermosetting resins, unsaturated polyester resins, Vinyl ester resins, Epoxy resins, Phenolic resins, Polyimides, Furan resins.

Thermoplastic resins: Polyarylene Ethers, Thermoplastic polyimides, Polyphenylene Sulphide, PBI, LCP. Comparison between thermosetting and thermoplastic resins. Design of high temperature matrix resins. Factors influencing heat resistance, Strength of select chemical bonds. Design of composite materials, the concept of load transfer.

UNIT-II Fabrication: Liquid resin impregnation routes, pressurized consolidation of resin prepregs, injection mouldings of thermoplastics, hot press mouldings of thermoplastics, powder blending and consolidation, physical vapour deposition diffusion bonding of foils, Layered ceramic composites, reactive processing, carbon/carbon composites, powder based routes

UNIT-III Interface region: Bonding mechanisms: absorption and wetting, inter diffusion and chemical reaction, electrostatic attraction, mechanical keying, residual stresses. Bond strength: Measurements of bond strength: single fiber pull out strength, single fiber push out and push down strength. Control of bond strength: coupling agents and environmental effects, toughness reducing coatings, interfacial chemical reaction and diffusion barrier coatings

UNIT-IV Strength of composites: Failure mode of long fibers like axial tensile failure, transverse tensile failure, shear failure, failure in compression. Failure of laminae under off-axis loads. Strength of laminates like tensile cracking, interlaminar stresses and edge effects. Basic concepts of fracture mechanics, interfacial fracture and crack deflection. Contributions to work of fracture like Matrix deformation, fiber fracture, interfacial debonding and frictional sliding. Subcritical crack growth like fatigue and stress corrosion cracking.

UNIT-V Thermal behavior of composites: Thermal stresses and strains, thermal expansivities, thermal cycling of unidirectional composites, thermal cycling of laminates, basics of matrix and fiber in relation to creep, axial creep of long fiber composites, transverse creep and discontinuously reinforced composites. Thermal conduction mechanism like heat transfer, conductivity of composites and interfacial thermal resistance.

UNIT-VI Applications of composites: minesweeper hull, sheet processing rolls, helicopter rotor blade, and golf driving club, racing bicycle, diesel engine piston, microelectronics housing, aircraft brakes and gas turbine combustor can.

Reference Books

1. Physical Texting of Textiles by B. P. Saville.
2. Fabre reinforced composites by P. K. Mallick
3. Composite materials: Engineering & science by F. L. Mathew & R. D. Rawlings.
4. Micro structural Characterisation of fibre reinforced composites by John Summerscales.
5. New millennium fibres by T. Hongu& G. O. Phillips.
6. Effects of mechanical & Physical properties on fabric hand by H. M. Behery

7. 3-D Textile reinforcements in composite materials by Prof. A. Miravete

8. Mechanics of Textile & Laminated composites by A. E. Bogdanovich& C. M. Pastore.

9. Textile Testing & Analysis by B. J. Collier.

10. Handbook of Technical Textiles by A. R. Horrocks& S. C. Anand.

11. Nanofibers& nanotechnology in textiles by P. J. Brown & K. Stevens.

12. 3-D Textile reinforcements in composite materials by Prof. A. Miravete

Course Outcomes:

Student will be able to,

1. Describe the logic, need, requirements of composites based on end use
2. Explain the manufacturing of the composites and fibre used for fabrication
3. Evaluate the performance of composites including fibre matrix interactions
4. Discuss the 3D textile structural composites.

FINAL YEAR B.TEXT. - SEMESTER - I

7.1 GARMENT PROJECT PLANNING AND IMPLEMENTATION (FT)

Lectures : 4 hrs. /week.
Theory Paper: 100 marks.
Term Work : 50 marks
Sub. Total : 150 marks

Course objectives

1. To explain project planning
2. To estimate the production capacity and machine requirement for the garment manufacturing processes
3. To formulate the project report for the garment unit.
4. To describe the material handling and labour compliments for the garment industry

1) Project Planning: Introduction, Capital investment required for project, Phases of Capital Budgeting, Difficulties in Capital expenditure, Phases involved.

2) Machinery Specification, Selection of Machines: Selection of machines & machinery specifications required for the product in Shirts, trousers, knit goods, made-ups, suits, ladies dress material etc.Preparation of organization for clothing industry, departments based on number of pieces and production of finished garment. Calculation regarding machinery, work allotment, production rates, amount of raw material required and no. of machinery required at different stages of garment manufacturing.

3) Site Selection, layout and logistics in garment manufacturing: Selection of site for Garment industry, General location, Actual selection of specific site, Calculation of spatial requirements, factors influencing site selection, Climatic considerations, geo-technical report, bearing pressure etc. General information about textile & garment manufacturing industry centers in India**,** Analyze of the planning, layout and logistics in garment manufacturing, Application of computers in preparing for the production of clothing , Risk Analysis , Optimization of planning , Layout optimization , Logistics in garment industry, symptoms of bad layout. Layout aspects of garment unit.

4) **Civil/Building Construction:** Consideration in building design, size, shape and configuration of building. Architectural & structural aspects of garment unit building. Building morphology, General principles of building construction & building functions, Types of factory buildings, Types of building construction. Material for construction with special reference to walls, roofs, floors, false ceilings, fire resistance, sound proof, etc. Colour schemes for buildings, interior & machinery in garment unit. Cost considerations in building construction, organogram of building construction, Team, Tenders & Contract.

5) **Formulation of a Project Report for Garment Units:** Assumptions, Machinery Organizations, Requirement of Miscellaneous Fixed Assets & Machinery Stores & Spares, Requirement & Calculations related to Electrical Power, Lighting, Water, Steam, Compressed Air, etc. Calculations of cost of project – Means of Finance – Estimates of sales & production – cost of production – working capital requirement – Profitability Projection – Break-even point – Projected cash flow statements

6) **Materials Handling and labour compliments:** Definition and importance of materials handling, functions and principles of materials handling, material handling methods, engineering and economic factors, relationship to plant layout, selection and type of material handling equipments, study of different types of equipments used for materials handling in garment unit**,** Types of labors required, labors compliment, labors and staff required for garment industry based on workload consideration

Termwork-

Termwork marks will be given on the basis of assignments

Reference Books:

1. Jacob Solinger., “Apparel Manufacturing Handbook ", Vannostrand Reinhold Company (1980).
2. Gordana Colovic, “Management of Technology Systems in the Garment Industry”, Woodhead Publishing.
3. Bethel, Tann , Atwater and Rung, " Production Control ", McGraw Hill Book Co., New York, (1948).

4. Biegel, John. E., “Production Control ", A Quantitative Approach” Prentice Hall Inc., (1971) 2nd edition.
5. Apple. J. M., “Plant Layout and Materials Handling ", The Ronald Press Co., New York (1950).
6. Textile Project Management by A. Ormerod, The Textile Institute Publication.
7. Goal Directed Project Management by E.S. Andersen, K.V. Grude & Tore Hang, Coopers & Cybranl Publication.
8. Project, Planning Analysis, Selection Implementation & Review by Prasanna Chandra, Tata McGraw Hill Publishing Co. Ltd.,
9. Management of Textile Production, A. Ormorod. Newnes – Butter Wortrs Publication.
10. Plant location, Layout & Maintenance by Ruddele Reed.
11. Industrial Organisation & Engg. Economics T.R. Banga & S.C. Sharma, Khanna Publishers, Delhi.
12. Norms for Process Parameters, Productivity etc. NITRA.
13. Trade Literature of Different Machinery Manufacturers.

Course Outcomes

At the end of the course students will be able to

1. Describe project planning and describe the phases of capital budgeting process.
2. Estimate production capacity and machine requirement for the garment manufacturing
3. Formulate the project report for the garment unit by doing the techno economic viability.
4. explain the material handling, and labour compliments for the garment units

FINAL YEAR B. TEXT. – SEMESTER – I

7.2 ECONOMICS AND COSTING IN APPAREL INDUSTRY (FT)

Lectures	:	4 Hours / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives:

1. Explain significance Economics.
2. Explain the different theories in economics.
3. Describe various elements of garment costing.
4. Explain various methods of costing, overheads and depreciation.

1) Definition of Economics – Nature and scope – Economy types, Problems and Functioning, Basic Terms and concepts.
2) Human Wants – Consumption and standard of living – Demand analysis-consumers surplus – Demand and law of Demand – Elasticity of demand.
3) Theory of Distribution – General – Wages – Trade Unions and Industrial relations.
4) National Income – Concepts and importance – Inequalities of income and employment – Nature and Function of money – Monetary Standards – Theory of money and Prices – Credit and credit instruments – Banking – Central Bank – International Trade – Balance of payment – Foreign Exchange rate determination – Public Finance – Public expenditure – Public Revenue – Taxation , Public debt.
5) Costing: Definition, aims and objectives, difference between estimating and costing. Elements of cost - direct and indirect costs, fixed and variable costs, cost of production, advertisement cost, and selling cost. Various types of costing – Marginal costing, Absorption (full) costing, principles, advantages and disadvantages. Overheads – factory, administrative, sales and distribution. Depreciation: reasons for depreciation, methods of calculating depreciation. Breakeven point, contribution and profit, CVP analysis, margin of safety, Full cost pricing and marginal cost pricing

6) Costing of garments: factors that determine the price of garments – material cost – cost of sewing thread, cost of fabric consumption, and cost of processing. Factors affecting cost – width of fabric and design, lot size, and cost of components – cutting cost – making and trim cost (CMT cost). Packing & labeling cost – different types and functions. Uses of brand and size label – duty draw back etc. cost of bought out components, thread, Button, Zippers, Interlining, Shipment cost, cost calculation of ladies, Men and children's wear – woven and knitted – simple problems.

Reference Books:

1. Basic Economics by James A. Dgal, Nicholas Karatjas,
2. Applied Economics by Derek T Lobley,
3. Macro Economic Theory by M.C. Vaish,
4. Principles of Economics by D.N. Dwived.
5. Economics Analysis, Decision Making & Policy by George Leland Bach.
6. Elementary Economic Theory by K.K. Dewett & J.D. Varma.
7. Contemporary Economics by Milton H.
8. Johnson Maurice, E. Moore, "Apparel Product Development", Om Book Service, 2001.
9. Katherin McKelvy, "Fashion Source Book", Om Book Service, 2001.

Course Outcomes:

1. Understand significance Economics.
2. Understand the different theories in economics.
3. Understand various elements of garment costing.
4. Understand various methods of costing, overheads and depreciation.

FINAL YEAR B.TEXT. - SEMESTER – I

7.3 ADVANCED GARMENT CONSTRUCTION (FT)

Lectures	:	4 hrs/ week.
Practical	:	3 hrs/ week
Theory Paper	:	100 marks.
Term work	:	50 marks.
Practical Exam	:	50 marks
Subject Total	:	200 marks

Course Objectives

1. To explain fabric preparation stages, cutting principles and material handling.
2. To describe the pattern alteration methods of achieving fit in garments.
3. To demonstrate the draping process for selected styles.
4. To describe the procedure of construction for couture-bridal dress and other specialty garments

1. **Fabric grain**: Importance of grain in fabric cutting & garment construction, various methods of straightening the grain & fabric ends for woven and knit fabrics. Material handling processes for various fabrics.
2. **Fitting**: Principles of good fit**,** Sequence of fitting Alterations to achieve a good fit, Fitting problems associated with various garments and solutions
3. **Pattern alterations:**
   General principles & importance of shortening, lengthening of blouse, increasing & decreasing of shoulder slope, increasing the depth and opening of necklines, altering sleeve cap, alternation of patterns for defective/ unusual figures.
4. **Advanced Draping:** Sleeve, flared and gored skirt, pants, collars, and dresses.
5. **Garment construction:**
   Logical sequence development for garment construction, construction procedure for: Men's S.B and D.B Coats, Bridal Dress, Children Party wear, machinery and equipments required for the same
   Specialty Garment Construction:
   Construction procedure for: Fire fighting suit, Floaters jacket, Space Suit etc. machinery and equipments required for the same

6. **Quality –** Introduction, What is quality? Importance of Quality, AQL, in line inspection, final inspection, Quality Expectations in garment industry.

   Inspection and Testing: Terms and definitions QC, QA, QM

   Quality Management Systems in apparel industry.

List of Experiments:

1. Study of pattern making tools, stitching machine and measurements of dress form, live model and garment.
2. Machine practice to sew lines in various shapes, following a guide line on SNLS machine. (Paper exercise)
3. Machine practice to sew lines in various shapes, following a guide line on SNLS machine. (Fabric exercise)
4. Prepare samples for various seams and stitches.
5. Draft and stitch 5 piece patterns set and check for fit.
6. To develop patterns by using dart manipulation techniques.
7. Prepare and stitch patterns for graduated and radiating darts
8. Adopt and stitch patterns for puff and raglan sleeve.
9. Adopt and stitch patterns for collar with stand and peter pan collar
10. Draft and prepare sample for different types of cuffs.
11. Draft and prepare sample for patch and side pockets.
12. Draft and prepare samples for shirt placket and sleeve placket

Reference Books

1. Pattern making for fashion design by Helen Joseph Armstrong fifth edition, Pearson Education, Inc. ISBN-10: 0-13-606934-7
2. Pattern grading for women's clothes by Gerry Cooklin, Blackwell Publishing. ISBN 0-632-05692-4
3. Metric pattern cutting for women's wear by Winifred Aldrich, Blackwell Publishing. 5th edition, ISBN: 978-1-118-37205-0
4. Metric pattern cutting for men's wear by Winifred Aldrich, Blackwell Publishing. 5th edition, ISBN 978-81-265-3241-4

5. The art of fashion draping by connie amaden-crawford, third edition, Fairchild Publications, Inc. ISBN 81-8710-7359
6. Draping for fashion design by Hilde Jaffe and Nurie Relis, fourth edition, Pearson Education, Inc. ISBN 978-81-317-2696-9
7. Juran's Quality Handbook by Joseph M. Juran, Blanton Godfrey, Robert E. Hoogstoel, Edward G. Schilling, fifth edition, McGraw-Hill Companies, Inc. ISBN 0-07-034003-X

Course Outcomes

1. Explain preparation stages, cutting principles and material handling.
2. Describe the pattern alteration methods of achieving fit in garments.
3. Demonstrate the draping process for selected styles.
4. Describe the procedure of construction for couture-bridal dress and other specialty garments

FINAL YEAR B. TEXT. – SEMESTER – I

7.4 FASHION CO-ORDINATION (FT)

Lectures	:	3 Hours / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives:

1. Explain fashion journalism, fashion communication and promotion.
2. Explain salient features, advantages and limitations of various types of advertisement media used for fashion promotion.
3. Discuss various components of visual merchandising in fashion retailing.
4. Describe fashion dress as non-verbal communication.

1. **Advertising and promotion:** Meaning of mass communication andmass media, Print Media, Broadcasting media and New age media.
2. **Fashion Journalism:** Reporting Trends, forecasts, fashion shows, trade fairs and exhibitions, Contemporary issues in fashion, Fashion history, magazine and feature writing
3. **Fashion Photography and Styling:** Digital photography techniques, Photo editing, Modelling and their styling, Digital video editing, Fashion photography for magazines, Professional case study.
4. **Visual Merchandising:** Introduction to visual merchandising, Store design and layout planning, exhibition and display design, graphic design.
5. **Fashion Organization:** The power of the press, Public relations, trend forecasting, Fashion schools, Modelling agencies, forecasting agencies, The fashion calendar.
6. **Fashion dress communication:** fashion as social process**-** Cultural system, Fashion system, Negotiation with others, Negotiation with self. Dress and World Religions- ideology and dress, Religion, Dress and Religious Fundamentalism, Dress modesty and sexuality, Religious dress and social change. Dress and Social Change- Innovation, Powerful influences, Conflict, Capitalism.

Reference Books:

1. Visual Merchandising for Fashion by Sarah Bailey and Jonathan Baker (2014), A&C Black. ISBN: 2940496129.
2. Fashion Writing and Criticism: History, Theory, Practice by Peter McNeil Sanda Miller (2014), Bloomsbury Publishing. ISBN: 9780857854711.
3. Fashion Journalism by Julie Bradford (2014), Routledge. ISBN: 1136475354.
4. Fashion Marketing Communications by Gaynor Lea-Greenwood (2012), John Wiley & Sons. ISBN: 1118496167.
5. Fashion Marketing by Mike Easey (2009), John Wiley & Sons. ISBN: 1444309560.
6. Mastering Fashion Marketing by Tim Jackson and David Shaw (2008), Palgrave Macmillan. ISBN: 1137213469.
7. Store Design and Visual Merchandising: Creating Store Space That Encourages Buying by Claus Ebster and Marion Garaus (2011), Business Expert Press. ISBN: 160649094X.
8. Visual Merchandising by Swati Bhalla and Anuraag S.(2010), Tata McGraw-Hill Education. ISBN: 1259081826.
9. Success guide to exciting fashion shows by Thelma H. Shirley (1978), Fashion Imprints.
10. How to Give a Fashion Show by Frieda Steinmann Curtis (1950), Fairchild Publications.

Course Outcomes:

1. Create and deliver a presentation, as a member of team, on contemporary issues in fashion journalism, fashion communication and promotion.
2. Explain salient features, advantages and limitations of various types of advertisement media used for fashion promotion.
3. Interpret components of visual merchandising in fashion retailing.
4. Appraise fashion dress as non-verbal communication.

FINAL YEAR B. TEXT. – SEMESTER – I

7.5 APPAREL PRODUCTION PLANNING AND CONTROL (FT)

Lectures	:	4 Hours / Week
Practical	:	3 Hours / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

Course Objectives:

1. Explain various concepts of process and quality management.
2. Explain steps from prototype to production model.
3. Describe line balancing, quality inspection, quality standards in apparel industry.
4. Explain operational breakdown for various garments.

1. **Introduction to Process Management:** Meaning of process management, Objective, Scope and approach to achieve maximum quality, production, productivity, efficiency with minimum of cost, Methodology adopted for the same. Various phases of process management, key variables of process management.

2. **Quality Concepts:** Evolution of quality concepts: SQC, TQC, TQM, ISO 9000, Lean Manufacturing: Types of wastages and its impact on organizational performance, Kaizen, SMED, 5 S systems, KANBAN, VSM, KPIs, PDCA. Cost of quality conformance and non-conformance.

3. **Production Planning and Control:** Definition, Importance, Various terms related to capacity – committed capacity, planned capacity, required capacity, potential capacity. Managing plant capacity, SAM calculations. Learning curve. Line balancing – Determination and allocation of manpower and machines for balanced production in existing plant for a given target.

4. **Cutting:** Guidelines for bundle ticket design, functions of bundle tickets, bundle ticket control. Lay lot planning: Numerical exercises on lay lot planning to optimize cutting cost, bundling, ticketing and cutting room control formats.

5. **Operation Sequence Development:** Garment breakdown with machine and attachment details, development of production flowchart. Different manufacturing systems.

6. **Quality in Apparel Development:** Quality inspection of fabrics, different types of defects in fabrics - minor and major defects, their remedies. Inspection of defects – 4 point and 10 point systems. 10 parameter report and its importance. Quality assurance in garment development like pattern making, cutting and garment construction: Inspection procedures to avoid problems, quality standards and tolerances. Coordinating departmental activities. Quality monitoring of trims and accessories. Quality standards for packing materials, packed goods, warehousing and shipping.

Reference Books:

1. Introduction to Clothing Production Management by A.J. Chuter (1995), John Wiley & Sons. ISBN: 0632039396.
2. Materials Management in Clothing Production by David J. Tyler (1991), John Wiley & Sons. ISBN:0632028963.
3. Apparel Manufacturing Handbook: Analysis, Principles and Practice by Jacob Solinger (1981), Van Nostrand Reinhold Company. ISBN: 0442219040.
4. Production Planning & Control by Sammel Eliou (1993), Wiley Eastern Pvt. Ltd.
5. Apparel Manufacturing: Sewn Product Analysis by Grace I. Kunz and Ruth E. Glock (2004), Prentice Hall. ISBN: 0131119826.

Course Outcomes:

1. Explain various concepts of process and quality management.
2. Explain steps from prototype to production model.
3. Describe line balancing, quality inspection, quality standards in apparel industry.
4. Decide operational breakdown for various garments.

FINAL YEAR B.TEXT. - SEMESTER – I

7.6 FASHION ACCESSORIES (FT) (ELECTIVE-I)

Lectures : 3 hrs/week.

Theory Paper: 100 marks.

Sub. Total : 100 marks

Course Objectives

1. Describe and classify different fashion accessories.
2. Explain material selection and sourcing process.
3. Explain procedure for Fashion trends and merchandising of accessories
4. Explain jewelleries and travel accessories

1. Introduction to accessory:

Definition, history and classification.

2. Accessory types:

Head gears, footwear. Bows, ties and belts, hand bags, and gloves and Mitts, Scarves, stoles and stacking, Sun glasses, Umbrellas

3. Materials and processes.

Materials required material sourcing, design development and production, Eco-standards followed during the process

4. Fashion trends for accessories:

Fashion trends and merchandising of accessories, Economic importance, Accessory Designers, Major Brand players.

5. Jewellery design and production.

Types of Jewellery- Traditional Jewellery, Earrings, necklaces and bangles, Rings, pedants, bracelets and anklets. Textures and finishes given for the jewellary. Introduction to gems, basic qualities of gems

6. Travel accessories:

Kits, bags, trolley, suitcase. Seasons and fashion accessories

Reference Books

1. Fairchild Encyclopedia of Fashion Accessories by Tortora, Phyllis G., Abling, Bina, Bloomsbury Publishing PLC, ISBN13 : 9781563672835
   Fashion Accessories,The Complete 20th Century Sourcebook by John Peacock, OM publishers, ISBN: 9780500019979

2. How Fashion Works: Couture, Ready-to-Wear and Mass Production by Gavin Waddell, Blackwell Publication, ISBN: 978-0-632-05752-8
3. Fashion: From Concept to Consumer by Gini Stephens Frings, 9th Edition, Pearson publications, ISBN-13: 978-0131590335
4. Cooklin's Garment Technology for Fashion Designers, 2nd Edition by Gerry Cooklin, Steven Hayes, John McLoughlin, Dorothy Fairclough, Blackwell Publications, ISBN: 978
5. Apparel Merchandising by kumar . Abhishek Publications, ISBN: 978

Course Outcomes

1. To describe and classify different fashion accessories.
2. To explain material selection and sourcing process.
3. To explain procedure for Fashion trends and merchandising of accessories
4. To explain jewelleries and travel accessories

FINAL YEAR B. TEXT. – SEMESTER – I

7.6 APPAREL AND FASHION BUSINESS MANAGEMENT (FT) (ELECTIVE-I)

Lectures	:	3 Hours / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives:

1. To explain fashion marketing its scope, nature, importance and functions.
2. To distinguish between different types of market structure
3. To explain advertising, trade fairs and fashion shows and marketing research
4. To explain pricing policies, sales forecasting methods, product mix, product life cycle and branding concepts.

1. **Definition Of Marketing:** Marketing Management-Marketing Concept-Meaning Importance Of Marketing In Developing Countries-Consumer Concept- Difference Between Agricultural Industrial And Consumer Goods – Function Of Marketing-Marketing Environment-Various Environmental Factors Affecting Marketing Function - Marketing of Fashion Products – Importance Of Fashion Marketing.
2. **Market Structure & Marketing Strategy**: Porters Generic Strategies, -Buyers Behavior-Buying Motive Explanation Of Motivation-Marketing Segmentation Of Different Basics. -Definition And Types Of Channels- Channel Policy- Selection Criteria-Whole Sellers Retailers And Middle Men And Their Functions - Buying Office, Buying Agency.
3. **Marketing Research**: Introduction-Definition, nature & Scope –An Aid to Rational Decision-Market Research Methodology – Market Research Process – Implementation - Practical Case Studies In Fashion Marketing.
4. **Branding**: Meaning & Definition – Selecting a Brand Name – Characteristics Of A ‘Good Brand’ Types Of Brands. Brand – Positioning – Types Of Positioning – Various Positioning Strategies – Need For “Made In India Label” (Common – Brand)
5. **Pricing**: Pricing Policies, Meaning to Seller And Buyer price- -Objective Factors Influencing Price Decisions-Competitors Reaction To Price-Multi Product Pricing Distribution Cost Analysis- Management Of Physical Distribution Marketing Risks.

6. **Advertising**: Purpose-Budget Selecting Media- Criteria For Advertisement- Visual Merchandising, Visual Merchandising Techniques- Display - Types Of Displays - Trade Fair Participation-Conducting Fashion Show- Fashion Show Norms.

Reference Books

1. Marketing Management by Philip Kotler and Kevin Lane Keller (2005), Prentice Hall. ISBN: 0131457578.
2. Principles of Marketing by by S.A. Sherlekar and K. Nirmala Prasad (2010), Himalaya Pub. House. ISBN: 1282813366.
3. Marketing Management by S.A. Sherlekar and E. Gordon (2010), Himalaya Pub. House. ISBN: 128281236X.
4. Marketing Fashion: Portfolio Series by Harriet Posner (2011), Laurence King Publishing. ISBN: 1856697231.
5. Fashion Marketing &Merchandising by Mary G. Wolfe (2008), Goodheart-Willcox Pub. ISBN: 1590709209.
6. Fashion Brands: Branding Style from Armani to Zara by Mark Tungate (2012), Kogan Page. ISBN: 0749464461.
7. The End of Fashion: How Marketing Changed the Clothing Business Forever by Teri Agins (2000), William Morrow Paperbacks. ISBN: 0060958200.
8. Fashion Branding Unraveled by Kaled K. Hameide (2011), Fairchild Books. ISBN: 1563678748.
9. In Fashion: From Runway to Retail, Everything You Need to Know to Break Into the Fashion Industry by Annemarie Iverson (2010), Potter Style. ISBN: 0307463834.

Course Outcomes:

1. Explain fashion marketing its scope, nature, importance and functions.
2. To distinguish different types of market structure.
3. Explain concept of advertising, trade fairs and fashion shows and marketing research.
4. Identify different pricing policies and understand sales forecasting methods, product mix, product life cycle and branding concepts.

FINAL YEAR B. TEXT- SEMESTER- I

7.6 HOME TEXTILE IN FASHION (FT) (ELECTIVE-I)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	150 Marks

Course objectives

1. To explain textiles for seating, its application and its scope.
2. To describe bed textiles with its types
3. Classify various types of window textile, towels and kitchen textiles
4. To describe manufacturing processes of floor covering and to describe finishes and test evaluation for home textiles.

1. **Textile for seating** – Upholstery fabrics for domestic applications – scope, fixed upholstery, non-stretch loose covers, stretch covers. Upholstery fabrics for contract use – general, automotive applications, Commercial applications.
2. **Bed Textiles –** Sheets & Pillow Cases, Quilted Textile, Blankets & Rugs - Jacquard blankets, Printed blankets, Fire proof blankets, Baby blankets. Bed Spreads, Mattress covers, (Ticking), Table Textiles – Tablecloths – Colour – Woven & Printed type, jacquard types, embroidered types, non-woven types. Table mats – Colour -woven, Printed jacquard, embroidered.
3. **Window Textiles** – Sun filters (Sheers and nets), Semi-sheers, Reflective textiles, curtain fabrics & drapes, Blinds.Fabrics for Wall Covering, Textile Art – Tapestries, Wall hangings, Textiles for screens & Room Dividers
4. **Towels:** - Types of towels, Bath robes, Beech Towels, Kitchen Towels, Terry towels, Napkins - Construction, weave, pile height, patterning, production, dyeing, finishing, etc. Bathroom Textiles - General shower curtains, Terry Towelling, Kitchen Textiles:-Aprons, Dish cloth, Teacosy, Bread bag, Mittens, Pot Holders, Table Mats – Construction & manufacturing details.
5. **Textile Floor Coverings** – Introduction, Pile Fibres, Backing fibres & fabrics – Tufted carpets, woven carpet. Woven Carpet Manufacture, Aximinster, Tufted Carpet Manufacture – Needling machinery textured & patterned needle felts, thermo-bonded products. Unconventional methods for making carpets – Bonding, knitted carpet, stitch bonding, flocking

6. **Finishes and evaluation in home textiles:** Introduction, protection against unpleasant adour, temperature regulated beddings, Antimicrobial finish, Moisture management finish, Towel finishing, Nanotechnology based home textiles enhancements., Introduction, Test Method for towels, rug and Home textiles

Reference Books

1. Textile Floor coverings by G.H. Crawshaw, Textile Progress, Vol.9, No.2, The Textile Inst. Publisher.
2. Interior Furnishings', Textile Progress, Vol.11, No.1, By Mortimer O.Shea, The Textile Inst. Publication
3. Performance of Home Textiles, Subrata Das, Woodhead Publications India Pvt Ltd.
4. Carpets: Back to Front, Textile Progress, Vol.19, No.3 by – L Cegielka MA, The Textile Inst. Publication

Course Outcomes

At the end of the course students will be able to

1. explain textiles for seating, its application and its scope
2. describe bed textiles with its types
3. Classify various types of window textile, towels and kitchen textiles
4. describe manufacturing processes of floor covering and to describe finishes and test evaluation for home textiles

FINAL YEAR B.TEXT. - SEMESTER – I

7.6 APPAREL PRODUCT ENGINEERING (FT) (ELECTIVE-I)

Lectures : 3 hrs/week.

Theory Paper: 100 marks.

Sub. Total : 100 marks

Course Objectives

1. To identify and analyze fabric, prints/embroidery, trims.
2. To identify the sources of raw materials, the minimum order quantity and price.
3. To develop the prototype and control the quality of garment by using correct and effective information of patterns and construction
4. To develop and analyze pattern making and construction skill.

1. Product Engineering –

Objectives and Scope of product development in textiles and clothing. Performance and serviceability concepts in textiles and apparels. Effect of changes in fibre, yarn type and fabric construction, finishing and Trims on performance and serviceability of apparel products. Consideration of a good product design. Product development procedure -Selection of product, Product analysis, Product design procedure- Preliminary design, Maintainability, Reliability and Redundancy, Final design. Product life cycle.

2. Market Research, Material Research, Equipment and process research

3. Product Appraisal ;

Functional, aesthetic, Manufacturing and economical analysis.

4. Trims used and development of specification sheet

Thread :Cotton/ blend/nylon, count, color, brand etc.

Button: Thermoplastic/metallic/MOP, button size etc.,

Interlining : Fusible /Non-Fusible, Type of base fabric used, Type of Resin used etc.,

Zipper: Nylon/metallic, Teeth size, type slider etc.

Label : Printed/ Woven, no. of color used, etc.

5. Simulation of specified properties or specification:

Color fastness and strength test of sewing thread, loop test and flexural rigidity test of sewing thread, Breakage and melting point test of buttons, strength and bending test of zipper, Elastomeric (ZWICK/INSTRON)) test of Elastic similar analysis and tests of any other trim used in the trims

Development of Measurement Specification Chart with Flat Sketch and with important Construction Details Development of Flow Process Chart with Stitch Type, Seam Diagram and M/C details Development of Pattern Construction of Prototype. Determination of CMT.

6. Case studies related to product development of apparels.

Reference Books

1. Handbook of Textile Design: Principles, Processes, and Practice by Jacquie Wilson, Paperback Publications, ISBN: 978-0849313127
2. The Design Logic of Textile Products by Tsuyoshi Matsuo, Paperback Publications, ISBN: 978-1870372015
3. Engineering Design by George E. Dieter , Linda C. Schmidt 4th Edition, Paperback Publications, ISBN: 9781259064852
4. Total Quality Management by Dale H. Besterfield, Carol Besterfield-Michna, Glen H. Besterfield, Mary Besterfield-Sacre, HermantUrdhwareshe, Rashmi Urdhwareshe, Pearson Education India, ISBN :9788131732274
5. Proceedings of the Seminar – Non woven Technology, Market and Product Potential, IIT, New Delhi, December 2006.
6. Juran's Quality Handbook by Joseph M. Juran, Blanton Godfrey, Robert E. Hoogstoel, Edward G. Schilling, fifth edition, McGraw-Hill Companies, Inc. ISBN 0-07-034003-X

Course Outcomes

1. Identify and analyze fabric, prints/embroidery, and trims.
2. Identify the sources of raw materials, the minimum order quantity and price.
3. Develop the prototype and control the quality of garment by using correct and effective information of patterns and construction
4. Develop and analyze pattern making and construction skill.

FINAL YEAR B. TEXT - SEMESTER-II

8.1 PROCESS MANAGEMENT IN YARN FORMING (TT/MMTT)

Lectures	:	3 Hrs / Week
Practicals	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Practical Exam	:	50 Marks
Subject Total	:	200 Marks

COURSE OBJECTIVES:

1. Explain the principals of process management, concepts of total quality management and ISO 9000 the wastage and its effect on cost of production.
2. Explain the process of choosing process parameters and application of the chosen parameters at preparatory and ring spinning stages.
3. Illustrate the methodology of process and product performance evaluation and role of norms.
4. Describe the role of machine parameters and machine technology on process and product quality and cost.

UNIT 1

a) Introduction to process management – Meaning of process management, various phases of process management like planning, organizing, linking of customer feedback and process management, cycle of process management.

b) The Cost of Quality – Definition, three views of quality costs, measuring quality costs, use of quality cost, information, accounting systems, activity based costing.

c) Concepts of ISO – Concepts of ISO 9000 series, other quality systems, implementation, documentation, post certification, ISO / QS 9000 elements, internal auditing.

UNIT 2

a) Total Quality Management (TQM) – Fundamental concepts of TQM, Basic approach, quality & business performance service quality versus product quality, obstacles

b) Leadership – Concepts, implementation, role of senior management, management role in quality, characteristics of leaders, Ethics & shared values, communication management systems, Decision making

c) Customer focus & satisfaction – Customer perception of quality, process versus customer, feed back, service quality customer relation & profitability, buyer supplier relationship, supplier partnership, continuous process improvement

UNIT 3

a) Raw material management – Importance, need of instrumental evaluation, traditional methods of cotton selection, importance of cost in raw material, use of linear programming for mixing, bale management, yarn engineering.

b)Yarn Realization – Importance, estimation process, norms for various yarns like cotton, blended etc., analysis of yarn realization from mills.

c) Process management in blow room & card – Blow room & card as integrated system, control of waste, cleaning efficiency, neps& fibre rupture, contamination control, selection of proper sequence process parameters.

UNIT 4

a) **Process management at Comber preparatory & combing –**
   Significance & importance of good lap for comber, evaluation of comber performance, fractionating efficiency of comber, comber waste analysis, influence of various factors on combing performance.

b) **Process management at Draw frame**
   Drafting wave & its significance, roller nip movement, roller speed variation, roller vibration, influence of parameters like speed, setting, Role of auto leveler, role of materialchannelizing in spinning.

c) **Process management at Speed frame –**
   Influence of process parameters like flyer speed, twist, break draft and settings on roving quality. Reasons for stretch in roving and its control at speed frame.

UNIT 5

Process management in Ring Spinning –

a) Influence of various machine and material parameters on yarn quality.

b) Control of yarn count and strength, within and between bobbin variation, Control of yarn evenness and imperfections, Types of yarn irregularities, measurement causes and assessment.

c) **Control of yarn Hairiness**- measurement, role played by fibre properties and process parameters.

d) End breaks in spinning –Importance, assessment and controls

e) Control of Yarn and package faults – Influence of fibre properties, machine parameters on classimat faults, control of faults.Study and control of faults like slubs, crackers, spinners double bad piecing, double gaiting, slough off, hard/soft packages etc.

UNIT 6

a) Role of maintenance in product quality – Specific maintenance activities from blow room to ring spinning which directly reflect on yarn quality.

b) Role of On & off line monitoring, centralized data collection systems in spinning.

c) Productivity – Importance, definition of indices of productivity, analysis & shortfall in productivity, productivity indices, standards, means to improve productivity, productivity of different sections in spinning, comparison & reasons for losses.

d) Production Costing and Parameters influencing the production cost

List of Experiments

1. Testing of various cotton samples & their suitability for various counts, Setting up of standards for given cotton to process carded & combed counts.
2. To evaluate performance of a blow room for given cotton.
3. To study effects of various parameters on transfer efficiency of card.
4. To study fibre orientation by No. of passages on draw frame with Lindsley technique.
5. Influence of step gauge setting on sliver quality.
6. To study effect of cylinder speed at comber.
7. To study stretch in roving & effect on U%, coil spacing.
8. 8To study break draft & its effect on roving quality.
9. To study effect of break draft on yarn quality.
10. 10 To study effect of spacer on yarn quality.
11. 11To study display & data system related to different ring frames

12. Effect of yarn conditioning on yarn properties.
13. To study hairiness of yarn produced on different ring frames.
14. To compare yarn qualities of compact & normal yarn.
15. Mill visit – To observe idle spindle, end breaks & material channeling.
16. Mill visit – To evaluate blow room cleaning, waste Noil % & Soft waste

Reference Books

1. Testing & Quality Management by Dr. V. K. Kothari, AFL Publication – Process in Textiles.
2. Textile Quality Physical method of Product & Process Control by Mairio Bona COMMETT program of EEC.
3. Process Control in Spinning by A. R. Khare& T. R. Subramaniam, ATIRA Publication.SITRA publication.
4. Total Quality Management – A How to program for high performance business by John M. Kelly, Published by Aleycuder, Hamitton Institute Inc.
5. Total Quality Management by D. H. Bester Field et al Pearson Education, Inc.
6. ISO 9000 – Meeting the new international standards by Perry L. Johnson McGraw Hill Inc.Uster Statistics
7. Process Control in Spinning – Dr. K. R. Salhotr, ATIRA Publications.
8. Yarn Hairiness by A. Barella Textile Progress Vol 13 No 1 Textile Institute.

COURSE OUTCOMES

1. Understand the role of machine technology and parameters on product quality.
2. Understand the principles of process management and quality management.
3. Understand the process of choosing process parameters at preparatory and ring spinning stages
4. Apply the chosen process parameters and assess the influence of parameters at different ring spinning process stages. Test the product properties and compare with norms of the industry.

FINAL YEAR B.TEXT. - SEMESTER - II

8.2 PROCESS MANAGEMENT IN FABRIC FORMING (TT/MMTT)

Lectures	:	3 Hrs/week
Practical	:	3 Hrs/ week
Theory Paper	:	100 marks
Termwork	:	50 marks
Practical Exam	:	50 marks
Subject Total	:	200 marks

Course Objectives:

1. To explain scope, approach and methodology of process management.
2. To explain process management in weaving preparatory to optimize quality and improvement in efficiency after each process.
3. To explain process management in weaving with respect to fabric quality and productivity.
4. To explain methods to asses and reduce hard waste in weaving processes.

1) Introduction to process management:

Object, scope and approach to achieve quality and productivity in fabric production, and Methodology adopted for the same (SQC, Direct Approach, and online monitoring)

2) Quality and production management in winding:

- Control of yarn joints quality on Automatic Winding machines for various materials – knots and splice (characteristics of good splice, appearance and strength ratings, splice testing, and adjustment of parameters),
- Yarn clearing – Yarn fault classification, Yarn fault classification system, Assessment of clearing performance
- Unwinding and winding tension- Unwinding tension from ring frame bobbin, Minimizing of balloon tension fluctuation through optimum guide distance, unwinding accelerator. Regulating tension through change in winding speed, autotense device.

- Control of Package quality- Causes and remedies for winding package defects.
- Material handling and MIS

3) Process management in warping:

- Characteristics of perfect beam and monitoring the beam quality.
- Machine parameters adjustment and machine condition maintenance for minimizing end breaks for various materials and counts.
- Method of assessing productivity of warping machine & measures to improve the productivity.
- Material handling and MIS

4) Process management in sizing:

- Deciding the size recipe according to material and count of yarn, Preparation of quality size pastes.
- Determination and achieving the correct size pick up by controlling various sizing conditions, Modern pick up control equipment.
- Stretch and moisture level control on multicylinder sizing machine.
- Characteristics of perfect sized beam and its achievement.
- Method to increase weavability .
- Minimizing the size losses at every stage.
- Control of productivity.
- Material handling and work practices to get optimum production and best-sized beams.
- Management information system.

5) Process management in weaving

For Fabric quality (loom shed):

- Causes & remedies for yarn related faults: Weft bars, black ends, slub, and thick end, Double end.
- Causes and remedies for fabric defects on ordinary, automatic looms & shuttle less looms.

- Manual and automatic fabric inspection methods, various point grading systems
- Study of warp and cloth control- pick spacing, cloth fill position, bumping condition- theory, causes and remedies

For productivity:

- Maintaining of loom speed on various weaving machines, limitations on maximum speed from textile point of view, mechanical condition causing reduction in speed.
- Control of Technical, Human and organizational factors affecting loom shed efficiency. Assessment of loom performance after corrective actions
- Control of down time through SMED technique
- Use of snap study in controlling efficiency losses
- Management information system to control productivity

6) Hard waste Reduction in Weaving Department:

- Approach to the reduction of hard-waste
- Control of hard-waste

List of Experiments

1. Optimization of clearer and splicer parameters for different yarn counts and operate the winding machines to observe the results
2. To determine the end breakage rate of warping machine and calculate warping efficiency with the sett details in the visiting unit.
3. To determine size pick up by changing variables on the sample sizing machine to find effect on yarn properties
4. To prepare beam on the sample warping / sizing machine
5. To weave fabric of various weaves on sample weaving machine and observe its effect on the appearance on the fabric
6. To determine the % loss of efficiency for probable reasons through snap study in the visiting weaving unit
7. To find cost per meter for the given woven fabric and knitted fabric considering all elements of the cost in the small scale manufacturing unit

8. Working of air jet machine with different air pressure combinations, blast timings and blast durations
9. Inspection of fabric defects and determination of the packing percent of the given Fabric length in the visiting unit
10. Fabric Analysis 2 samples
11. Fabric Analysis 2 samples
12. Fabric Analysis 2 samples

Reference Books:-

1. Process Control in Weaving by M.C. Paliwal & P.D. Kimothi
2. Weaving: Technology and Operations by Allan Ormerod.
3. Weaving Machine, Mechanisms, Management by Dr. Talukdar, Ajagaonkar, Sriramulu.
4. Machine Manuals of Various Shuttle less Looms and – Preparatory Machines.
5. Shuttle less Weaving: NCUTE Publication.
6. Fundamentals of Yarn Winding by Milind Koranne

Course Outcomes:

Student will be able to,

1. Understand scope, approach and methodology of process management
2. Understand process management in weaving preparatory to optimize quality and improvement in efficiency after each process.
3. Understand process management in weaving with respect to fabric quality and fabric production.
4. Measure the hard waste consumption to control it.

FINAL YEAR B. TEXT - SEMESTER-I

8.3 TEXTILE MILL MANAGEMENT (TT/MMTT/TPE/TC)

Lectures : 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total : 100 Marks

Course Objectives

1. To understand the functions and Principles of Management.
2. To explain the term planning, organizing, staffing.
3. To understand the term leadership, Communication & Controlling.
4. To explain basic concepts of financial management and marketing.

I) Management

Nature, Importance, Elements, Levels of Management, Fundamental Managerial Skills, Functions of Management – Henry Fayol's Principles of Management - Social responsibilities a Manager.

II) Planning & Organizing

The Nature, Characteristics & Process of Planning – Forms of Planning, The Nature, Importance& Steps involved in the process of organizing

III) Staffing & Leadership

Meaning, definition, importance and process of staffing. Types of organization structure, Human resource management & selection - Performance appraisal, Meaning & Importance of leadership, Motivation: Theory X and Y.

IV) Communication & Controlling

Meaning, communication process, effective communication. Meaning, Concept, Definitions, Steps in control process, Techniques and Types of control, Requirements of an effective control system.

V) Financial Management

Balance sheet – Profit loss statement – Financial ratios. Cost Accounting, Meaning of Budget, Objectives, Advantages & Limitations of Budget, and Types

of Budget and Budgetary control, Introduction to Costs, Types of cost, Depreciation, Breakeven analysis.

VI) Marketing

Evolution of marketing, Nature of Marketing, Core concepts of marketing – Marketing Mix, Product Life Cycle, Meaning, Scope, Limitations of Marketing Research - Marketing Research Procedure – Types & Techniques.

Reference Books

1. Essential of Management – by Harold Koontz & Heinz, Weihrich – Tata McGraw- Hill Publishing Company Ltd., New Delhi.
2. Advanced Cost & Management Accounting by P.K. Sikdar – Viva Books Pvt. Ltd., New Delhi.
3. Industrial Engineering & Management by O.P. Khanna & A. Sarup, Dhanapat Rai Publications (P) Ltd., Delhi.
4. Dynamics of Entrepreneurial Development & Management by Vasant Desai – Himalaya Publishing House – Delhi.
5. How to Read a Balance Sheet – An ILO Programmed Book – Oxford & IBH Publishing Co. Pvt. Ltd., Delhi.
6. Enterpreneurial Development by S.S. Khanta , S. chand & Company Ltd., Delhi 110 055.
7. Fundamentals of Marketing by W.J. Stanton, M.J. Etzel B.J. Walker – McGraw-Hill, Inc – New York, St. Laouis etc.
8. Industrial Organisation & Engineering Economics by S.C. Sharma & T.R. Banga Khanna Publishers – 2-B, Nath Market, Nai Sorak, Delhi – 110 006.
9. Marketing Management By Philip Kotler – Prentice – Hall of India Pvt. Ltd., New Delhi – 110 001.
10. Managing Human Resource by Luis R. Gomer Mejia, D.B. Balkin & R. L. Cardy. Pearson Education (Singapore) Pvt. Ltd., Indian Branch, 482 FIE Delhi, India.
11. Cost Accounting by M.E. Thukaram Rao, New Age Internation (P) Ltd., Publishers New Delhi.
12. Project Management by K. Nagaraja, New Age Internation (P) Ltd., Publishers – New Delhi, Bangalore etc.

13. Human Resource Management by Barry Cushway – British Library Cataloguing in Publication data – Published in association with Price Water House Coopers.
14. Management of a Small Scale Industry – Vasant Desai, Himalalya Publishing House, Delhi, Nagpur.
15. Project Management the Managerial Process by Gray & Larson, Tata McGraw Hill Publishing Co. Ltd., New Delhi.

Course Outcome

Student will be able to,

1. Understand significance of functions of management
2. Understand and Apply the planning organizing and staffing concept in textile mill
3. Understand thoroughly concept of leadership, communication & controlling.
4. Understand the concept of financial management & Marketing in Organization.

FINAL YEAR B. TEXT - SEMESTER-II

8.4 TECHNICAL TEXTILES (TT/MMTT)

Lectures	:	4 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives:

1. To explain concept,classification of technical textiles and to explain details of coated and laminated textiles
2. To explain flammability and filtration of technical textiles
3. To explain details of defense textiles ,geo textiles and textile reinforced composites
4. To understand applications in sound insulation, power transmission, cordage, twine and to explain narrow fabric production

Unit I:

Introduction - Definition and scope of Technical Textiles – Market size – present status and future trends in Technical Textiles – Areas of Application of Technical Textiles and Sectors of Technical textiles (Classification).

Filtration Application – Introduction –Fabric construction & Finishing Treatments, Solid-liquid separation, liquid – liquid filtration, liquid-gas separation, Mechanism of filtration.

Unit II

Textiles in Transportation – Introduction, Textiles in passenger cars – Textiles in other road vehicles – Rail applications – Textiles in Air crafts – Marine application.

Review of Geo technical application of Textiles

Unit III:

Textiles in Defence – Introduction, Historical Background – Criteria for modern military textiles materials – various application of Textiles in various areas of defence such as environmental protection, thermal insulation, water proof water vapour

permeable materials – ballistic protection – heat protection – biological and chemical warfare protection, High altitude fabrics, etc.

Unit IV:

Heat and Flame Protection Applications – Flammability, thermal characteristics and combustion mechanisms of fibres, prevention of combustion – Flame retardant fibres suitable for protective clothing –Testing of Flame retardant and Flame proof fabrics.

Medical Textiles – Introduction – Non implantable materials, extra corporeal devices – Implantable materials - Health care / hygiene products.

Unit V:

Textile Reinforced Composite Materials – Introduction to composite materials – Textile reinforcement – Applications of composites in brief.

Narrow fabric production methods - Applications in Technical Textiles.

Unit VI:

Coating & Lamination Textiles - Introduction –materials for coating – Substrate for coating – Coating methods - Fusible interlinings – physical properties of coated fabrics - Laminating – Applications of coated fabrics and Laminated Textiles.

Miscellaneous Applications – Electrical insulation – Battery separators – synthetic turf – sound insulation –Agro textiles, parachute textiles, ropes, cordage and twines.

Reference Books

1. Hand book of Technical Textiles Edited by A.R. Horrocks & S.C. Anand., Wood head Publication. Ltd. England.
2. Wellington Seass Handbook of Industrial Textiles by Sabit Adanur, Technomic Publication Co. Lancaster.
3. High Performance Fibres, Textile Progress, Vol.25, No.3/4, By S.K. Mukhopadhyay, Textile Institute Publication.
4. The Production & Properties of Narrow Fabrics, Textile Progress, Vol.8, No.4, By – J.P. Turner, The Textile Institute Publication.
5. Protective Clothing, Textile Progress, Vol.22, No.2/3/4, By P.W. Harrison, The Textile Institute Publication.

6. Automotive Textiles, Textile Progress, Vol.29, No.1/2 by S.K. Mukhopadhyay & J.F. Partridge, Textile Inst. Publication.
7. The Thermal Insulation Properties of Fabrics Textile Progress, Vol.24, No.4, J.O. Ukponmwan, Textile Inst. Publication.
8. Industrial Application of Textile : Textiles for Filtration and Coated fabrics Textile Progress, Vol.14, No.1, By Pushpa Bajaj & A.K. Sengupta, The Textile Inst. Publication.

Course Outcomes:

1. Describe the classification of technical textiles
2. Discuss the flammability characteristics of technical textiles including Limiting Oxygen Index(LOI).
3. Compile the fibres used, technology applied in manufacturing of technical textiles based on end use like filtration, Medical use, composites, defence and other industrial applications
4. Evaluate the performance of technical textiles with different test methods of Indian and International standards.

FINAL YEAR B. TEXT - SEMESTER-II

8.5 INFORMATION TECHNOLOGY IN TEXTILES (TT/MMTT/TPE/TC)

(ELECTIVE-II)

Lectures : 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total : 100 Marks

Course Objectives:

1. Apply a broad body of fundamental knowledge of information technologies in selected areas of study from the areas of: networking, management, web application development and database.
2. Use the latest information technologies, and with self- learning capabilities, solve real-world IT related problems.
3. Exhibit a range interpersonal and academic skills with a strong focus on development practice in an independent or collaborative environment.
4. Present foundation technical and theoretical knowledge.

1) Role of Information systems in Organization

Definition of Information Systems, Issues related to organizations and information systems. IS as a means of extracting the required information by the organizations, Types of information systems found in organizations: data processing systems, knowledge work systems, and management information systems. Their main differences, Internal and external information with respect to the organization, Definition of Strategic, Tactical and Operation, IT evolution

2) Goals of IT Deployment

Development of IT applications in business, Potential of IT in Textile Manufacturing, need and framework of IT use in textile. Vision and Important areas, data versus information, information resources, basic elements of IT in Textile mills, past and present IT in textile mills, elements of nonintegrated computer environment in manufacturing. Strategic planning, information resources management concept

3) Enterprise IT Infrastructure

Broad vision, Idea of architecture and standards, Inter and intra- enterprise integration, general areas of IT application- integrated product and process design, shop floor production, business practices, New areas of IT applications- virtual factory, programmable and reconfigurable factory, net worked factory, microfactory etc., Non-manufacturing areas- knowledge and information management,. Planning the enterprise IT infrastructure.

4) Computer Based Information Systems

Information management, manager and systems, computer-based information systems,information services organization, justifying the CBIS, achieving the CBIS.

5) Getting Connected for IT

Introduction, Telecommunications, LANs, WANs and Internets, information Super Highway and the Internet, World Wide Web, Idea of Client-Server Architecture

6) IT Enabled organizational change

Approaches towards It implementation, types of changes related to IT implementation, other issues.

Reference Books

1. Enterprise Resource Planning: Concept and Practice, By Vinod Kumar, Venkitakrishnan
2. Enterprise Resource Planning by Ellen Monk

Course Outcomes

At the end of the course students will be able to

1. Understand the fundamentals of information technology
2. Learn core concepts of computing and modern systems
3. Understand modern software programs and packages
4. Learn about upcoming IT technologies

FINAL YEAR B. TEXT - SEMESTER-II

8.5 HOME TEXTILES AND TERRY TOWEL MANUFACTURING (TT)

(ELECTIVE-II)

Lectures: 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total: 100 Marks

Course Objectives:

1. To describe various types of home textiles and their manufacturing methods.
2. To understand requirements of different home textiles.
3. To understand requirements of terry toweling machine and importance of terry structure parameters.
4. To understand various finishes and evaluation methods of home textile.

1) Textile for seating

Upholstery fabrics for domestic applications – scope, fixed upholstery, non-stretch loose covers, stretch covers. Upholstery fabrics for contract use – general, automotive applications, Commercial applications.

2) Window Textiles and Bed Textiles

Window textile - Sun filters (Sheers and nets), Semi-sheers, Reflective textiles, curtain fabrics & drapes, Blinds.

Bed Textile - Sheets & Pillow Cases, Quilted Textile, Blankets & Rugs - Jacquard blankets, Printed blankets, Fire proof blankets, Baby blankets. Bed Spreads, Mattress covers, (Ticking)

3) Table Textiles and Floor Coverings

Tablecloths – Colour – Woven & Printed type, jacquard types, embroidered types, non-woven types. Table mats – Colour -woven, Printed jacquard, embroidered.

Textile Floor Coverings – Introduction, Pile Fibres, Backing fibres & fabrics – Tufted carpets, woven carpet. Woven Carpet Manufacture, Aximinster, Tufted Carpet Manufacture – Needling machinery textured & patterned needle felts, thermo-bonded products. Unconventional methods for making carpets – Bonding, knitted carpet, stitch bonding, flocking.

4) Kitchen Textiles

Aprons, Dish cloth, Teacosy, Bread bag, Mittens, Pot Holders, Table Mats – Construction & manufacturing details.

5) Terry Towelling

Loom equipment for Terry Towelling, Terry Motions for shuttle and shuttleless loom, Special motions for Terry Weaving, Terry structures, Terry Weaves, Specifications of yarn used in Terry Towels, Parameters of Terry for Pile height, Pile length, No. of piles/unit area. Types of towels, Bath robes, Beach Towels, Kitchen Towels, Terry towels, Napkins - Construction, weave, pile height, patterning, production, dyeing, finishing, etc.

Velour - Types of velvets – Jacquard, Dobby, Plain, Printed – Manufacture & construction. Methods of velour making by cutting and shearing.

6) Finishes used in Home Textiles and Evaluation of Home Textiles

Introduction, protection against unpleasant odour, temperature regulated beddings, Antimicrobial finish, Moisture management finish, Towel finishing, Nanotechnology based home textiles enhancements.

Evaluation of Home Textiles: - Introduction, Test Method for towels, rug and Home textiles

Performance specifications of different home textiles: - Importance, requirements of the US market, UK Market, Canada market.

Reference Books

1. Textile Floor coverings by G.H. Crawshaw, Textile Progress, Vol.9, No.
2. The Textile Inst. Publisher. 2. Interior Furnishings', Textile Progress, Vol.11, No.1, By Mortimer O.Shea, The Textile Inst. Publication
3. Performance of Home Textiles, Subrata Das, Woodhead Publications India Pvt Ltd.
4. Carpets: Back to Front, Textile Progress, Vol.19, No.3 by – L Cegielka MA, The Textile Inst. Publication
5. Grosicki Z., "Advanced Textile Design & Colour: Blackwell Science.
6. Weaving Machine, Mechanisms, Management by Dr. Talukdar, Ajagaonkar, Sriramulu.

Course Outcome

Student will be able to,

1. To identify correct manufacturing method as per requirement of home textiles.
2. To describe requirements of different home textile.
3. To identify appropriate machine and motion for terry weaving and understand the importance of various terry structure parameters and its impact on towels performance.
4. To identify correct finishes on particular home textile and to identify the correct evaluation methods for home textile.

FINAL YEAR B. TEXT - SEMESTER-II

8.5 ENTREPRENEURSHIP (TT/MMTT) (ELECTIVE- II)

Lectures : 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total: 100 Marks

Course Objectives

1. To know and understand important concepts related to entrepreneurship.
2. To identify environmental factors affecting entrepreneur and project appraisal techniques.
3. To make students understand the policy framework in India for entrepreneurship development.
4. To know and understand the social entrepreneurship concept.

Unit 1. Entrepreneurship Perspectives

Concepts of entrepreneur, entrepreneurship and start-ups. Importance and Characteristics of entrepreneurs, Types of entrepreneurs, Entrepreneur Vs Manager, Entrepreneur Vs. Intrapreneur. Benefits and potential risks of entrepreneurship, Factors affecting growth of Entrepreneurship in India, Role of Entrepreneurship in Economic Development.

Unit 2. Business Opportunity Identification

Business ideas, methods of generating ideas, and opportunity recognition, Meaning and significance of a business plan, components of a business plan, and feasibility study

Unit 3. Environment and Entrepreneurship

Environment factors affecting entrepreneurship, institutional finance and Entrepreneurship. Local mobility of entrepreneurs

Unit 4. Project Appraisal

Project Appraisal techniques, economic, Steps Analysis, Financial Analysis;
Market Analysis, Technical Feasibility.

Unit 5. Institutions Supporting Entrepreneurs

Central level Institutions: NABARD; SIDBI, NIC, KVIC; SIDIO; NSIC Ltd; etc. – state level Institutions –DICs- SFC- SSIDC- Other financial assistance.

Unit 6. Social Entrepreneurship

Need, Types, characteristics and benefits of social enterprises/social entrepreneurship. Rural entrepreneurship: Need and problems of rural entrepreneurship, challenges and opportunities. Women entrepreneurship: Role of government.

References

1. Vasant Desai (2010), "The Dynamics of Entrepreneurship Development and Management", Sixth edition, Himalaya Publishing House.
2. S.Anil Kumar, S.C. Poornima, Mini.K.Abraham and K.Jayashree (2003), "Entrepreneurship Development", First Edition, New Age International Publishers.
3. Dr. S.S. Khanka (2013), "Entrepreneurial Development", Revised Edition, S. Chand and Company Ltd.
4. Ashish Gupta (2010), "Indian Entrepreneurial Culture", First Edition, New Age International Publishers.
5. Peter F. Drucker, Innovation and Entrepreneurship.
6. A.Sahay, M. S. Chhikara, New Vistas of Entrepreneurship: Challenges & Opportunities.
7. Poornima M.CH., Entrepreneurship Development –Small Business Enterprises, Pearson, Delhi,2009

Course Outcomes

At the end of the course students will be able to

1. Understand the significance of entrepreneurship in any economy with business opportunity identification.
2. Understand the environmental factors affecting entrepreneur and project appraisal techniques.
3. Understand various schemes and institutions promoting entrepreneurship in India.
4. Understand the social entrepreneurship concept.

FINAL YEAR B. TEXT - SEMESTER-II

8.5 MAINTENANCE MANAGEMENT IN TEXTILE (TT) (ELECTIVE-II)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives:

1. To learn need of maintenance, its functions, types & scheduling.
2. To study & elaborate maintenance practices in Spinning preparatory & Spinning processes.
3. To study & elaborate maintenance practices in Weaving preparatory & Weaving processes.
4. To learn concepts of maintenance audit, SQC synchronization & recording of maintenance activities.

1. Management - Basic concept of maintenance management, its role in profitability of company, planned maintenance and breakdown maintenance & economic aspects-sub classes of planned maintenance, Mechanism of planned maintenance, optimum planned maintenance, Computer applications in maintenance management.

2. a) Maintenance of spinning preparatory machines, schedules, precautions & methods to be followed during maintenance activities, tools & gauges used for maintenance.

b) Maintenance of Ringframe & Rotor Spinning Machine - schedules, staff, precautions & methods to be followed, Tools & gauges used. Study of aprons & cots used in spinning & their maintenance

3. a) Machine audit – concept and auditing of spinning machines. Energy conservation in spinning

b) SQC synchronization with maintenance – SQC activities useful for maintenance in various departments of spinning.

4. a) Basic concept of lubrication, types of lubricants used for textile machines, Lubricant storage, handling, and precautions. Essential properties of lubricants for various frictional behaviour.

b) Maintenance of weaving preparatory machines, schedules, critical points of maintenance, precautions to be taken during maintenance operations.

5. a) Maintenance of plain & auto loom - Schedules, critical points, precautions, auditing of plain & auto loom.

b) Maintenance of shuttleless weaving machines. Approach towards maintenance of latest weaving machines, Critical maintenance points of various shuttleless weaving machines.

6. a) Recording of maintenance activities & its importance.

b) Concept of on line lubrication and cleaning.

Reference Books:-

1. Maintenance manuals by BTRA for various spinning & weaving machines.
2. BTRA monograph series.
3. Spinning machinery maintenance by SITRA
4. Maintenance manuals of different machinery manufacturers of spinning & weaving machines.

Course Outcomes:

Student will be able to,

1. Explain need of maintenance, its functions, types & scheduling
2. Explain & use maintenance practices in Spinning preparatory & Spinning processes
3. Explain & use maintenance practices in Weaving preparatory & Weaving processes
4. Explain concepts of maintenance audit, SQC synchronization & recording of maintenance activities

FINAL YEAR B. TEXT - SEMESTER-II

8.5 ORGANIZATIONAL BEHAVIOUR AND HUMANITIES (TT/MMTT/TPE/TC)

(ELECTIVE-II)

Lectures: 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total: 100 Marks

Course Objectives

1 To explain the fundamentals of organizational behavior, leadership concept and reward systems used to motivate the employees in an organization.
2 To understand the Individual and Interpersonal Behavioral concept
3 To understand the organizational change and its effects with Emerging Aspects of O.B.
4 To understand the concept of Business Environment.

I) Fundamentals of Organizational Behaviour

Definition, scope and importance of OB, The dynamics of people organizations – Managing communications – Social systems and organizational culture – Political institution – Society and the state.

II) Motivation and Leadership

Motivation – Concept of Motivation, Content approaches, Appraising and rewording performance, Leadership – What is leadership, Trait approaches, Empowerment and participation.

III) Individual and Interpersonal Behaviour

Employee attitudes and their effects – Issues between organizations and individuals – Interpersonal behavior, Informal & formal groups – Teams and team building

IV) Change and its Effects

Organizational change: Meaning, definition & nature of organizational change, types of organizational change, Managing change – Stress and counseling

V) Emerging Aspects of Organizational Behaviour

Organizational behavior across cultures,Conditions affecting multinational operations, Managing International Workforce, Productivity and cultural contingencies, Cross cultural communication.

VI) Business & Environment-

Meaning of business, Changing concept and objectives of business, Business ethics – Importance of ethics – Need for business to be ethical – Ethical problems in business – How to make business ethical – Social responsibility of business – Meaning of environment – Business firm and its environment – Constituents of business environment – Suppliers – Customers –Competitors – Public – Marketing intermediaries – Economic environment – Technological environment – Political environment – Social environment – Legal environment – Union management relations.

Reference Books

1. Organizational Behaviour – Human Behaviour at Work by J. W. Newstrom & Keitn Davis – Tata Mcgraw – Hill Publishing Company Limited – New Delhi.
2. Industrial Engineering and Management by O. P. Khanna & A. Surup – Dhanpat Rai Publications (P) Ltd., New Delhi
3. Industrial Organization and Engineering Economics by S. C. Sharma and T. R. Banga – Khanna Publishers – New Delhi 110 006
4. Strategic Management and Business Policy by T. L. Wheelen and J. D. Hunger Addison Wesley, of Addison Wesley Longmen
5. Managing Recruitment Training and Development by Elizabeth M Christopher and Larry E. Smith – Viva Books Pvt. Ltd., - New Delhi – Madras.
6. Target Setting and Goal Achievement – A practical guide for managers by Richard Hale and Peter Whitlam – Kogan Page India Pvt Ltd., 4325/3, Ansari Road, Daryaganj, New Delhi 110 002
7. Basic Managerial Skill for All by E. H. Mcgrath, S. J. Prentice – Hall of India – New Delhi

9. How to Manage Organizational Change – The Sunday times – by D. E. Hussey Kogan page India Pvt. Ltd., - Daryaganj, New Delhi – 100 002
10. Performance Appraisals – A critical view edited by Sumati Reddy – The ICFAI University press, 52, Nagarjuna Hills, Punjagatta, Hyderabad, India 500 082
11. Management in New Age – Western windows eastern Doors by Subhash Sharma New age International (P) Ltd., Publishers – New Delhi, Bangalore etc.

Course Outcome

At the end of course students will be able to:

Sr. No	Course Outcome
1	Understand the fundamentals of organizational behavior, leadership and motivational concepts.
2	Understand the attitudes and their effects on groups and organizations.
3	Understand the cause and effects of employees stress.
4	Understand the differential environmental factors influencing business.

FINAL YEAR B.TEXT. - SEMESTER - II

8.6 SEMINAR-II (TT/MMTT/TPE/TC/FT)

Lecture	:	2 Hrs / Week
Term Work	:	50 Marks
Subject Total	:	50 Marks

Course Objectives

1. To explain the importance of seminar.
2. To expose the students to literature survey procedure.
3. To describe the technical write up of seminar report in the standard format
4. To enhance his/her communication, stage daring and presentation skill

Topic - In the beginning of the semester, every student of the class will be assigned a seminar topic in the emerging / perspective field in the area of textiles such as Spinning, Weaving, Fibres, Testing, Chemical processing and alike. Seminar should be based on the literature survey on any topic of textiles.

Seminar Preparation and Presentation – Student will collect the information on the above subjects and submit the report on the dates specified by the concerned faculty. The seminar report will be of minimum 15 pages and maximum 25 pages. The spacing between the lines will be 1.5. The font size will be 13.5 point Times New Roman. The list of reference must be given at the end of seminar report. The list of reference should be written as per the Textile Research Journal format. The student has to present seminar in front of the faculty member of the department and his/her classmates. The faculty member, based on the quality of the work and preparation and understanding of the candidate, shall do an assessment of the seminar internally.

Term Work Marks – Seminar Report - 20 Marks Presentation - 30 Marks

Course Outcomes:

At the end of course students will be able to:

1. Select appropriate title for seminar
2. Collect required information for the seminar through literature survey
3. Write seminar report in standard format
4. Demonstrate communication, and presentation skills

FINAL YEAR B.TEXT. - SEMESTER - II

8.7 DISSERTATION (TT/MMTT/TPE/TC/FT)

Practical	:	6 Hrs / Week
Term Work	:	50 Marks
Oral Examination	:	100 Marks
Subject Total	:	150 Marks

CourseObjectives:

1. To identify the problem /idea and review and summarize the literature for the topic of the identified problem
2. To describe the process for undertaking the research/survey
3. To explain various tools of testing and analysis for the data in order to draw relevant conclusions.
4. To demonstrate effective communication skills and team work.

Topics: - Project work shall be based on any of the following topics.

i. Manufacturing of products, its testing and analysis.
ii. Fabrication of equipments / gadget.
iii. Extensive survey of industrial practices.
iv. A work on industrial problems and finding out remedial measures.
v. Experimental verification on principles used in textiles.
vi. Extensive numerical analysis of some problem may be carried out using computer.

Project Report:

Project report should be of 60 to 70 pages. For standardization of the project reports the following format should be strictly followed.

Project report contents:

i. Title Sheet
ii. Certificate
iii. Acknowledgement
iv. Index
v. Abstract
vi. Introduction
vii. Literature survey

viii. Plan of Work.
ix. Results and Discussion
x. conclusions
xi. References
xii. Annexures, etc. if any.

The references should be given in the following standard format:
For Books:
"Authors", "Title of Book";; Publisher; Year of the Edition;

For Papers:
"Authors", "Title of Paper"; "Name of journal",; "Year", "Issue No," Page No".

Project report format:

i. Page size : Trimmed A4
ii. Left Margin – 1.5"
iii. Right Margin – 1"
iv. Top Margin – 1"
v. Bottom Margin – 1"
vi. Para Text : Arial 12 fonts
vii. Title:16 bold
viii. Sub title: 14 Bold
ix. Line Spacing : 1.5 Lines
x. Page Numbers: Right aligned at footer.
xi. The text should be justified.

Two hard bound copies of report should be submitted to the institute along with a soft copy in a C.D.

Assessment of Dissertation Work:-

Term work of 50 marks is assigned for dissertation work. A dissertation committee will observe the progress of the work by arranging two progress reviews and based on the performance the term work marks will be assigned.

Oral Examination:-

One internal and one external examiner from industry / research organization / academia will be conducting oral examination.

CourseOutcomes:

Students will be

1. Able to identify the problem /idea and review and summarize the literature for the topic of the identified problem
2. Able to formulate and design suitable experimental plan.
3. Able to understand and use various tools of testing and analysis for the data in order to draw relevant conclusions.
4. Able to communicate effectivelyas amemberofteam

FINAL YEAR B. TEXT - SEMESTER-II

8.5 SPECIALITY FIBRES (MMTT) (ELECTIVE-II)

Lectures: 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total: 100 Marks

Course Objectives:

1. To explain the importance and need for speciality fibres and yarns
2. To explain the manufacturing of speciality yarns using conventional and Unconventional yarn manufacturing machinery
3. To explain the properties of speciality yarns
4. To describe the applications for speciality yarns

Course Content:

Unit 1: Core and cover yarns: - Principles of formation of yarn, constructional details of machine, process description, production of different types of core and cover yarns, yarn properties & end uses.

Unit 2: Melange Yarn: - Concepts of producing mélange yarn. Process and sequence used for production of Melange yarn.
Neppy and fleck yarn: - Production, properties of yarn & applications**.**

Unit 3: Special Yarns on Unconventional Spinning Technologies: - Manufacture Properties & end uses of, SIRO, Bobtex, Self-twist, Twistless, etc. Concepts of composite yarns

Unit 4: Metalized Yarns: - Concepts of Metallic and Metalized yarns, Characteristics of metalized yarn – Manufacture of metalized yarns , Applications of yarns.

Unit 5: Sewing Threads: - Introduction to thread construction, Characteristics of sewing threads, production methods, Types of threads packages,
Embroidery Yarns, Laces & Braids: - Introduction, Process sequence, Manufacturing details & Machines required. Properties & application of embroidery yarns, Laces & Braids.

Unit 6: Ropes, Cordage, & Twines: - Requirements of initial fibres & yarns, Manufacturing process, structures & properties of yarns.

Manufacture of some special purpose yarns like:– Slub, double twist, Knop yarn, Chenille yarn, Diamond yarn, Eccentric yarn, Boucle yarn, Thick 'n' Thin Yarns**.**

Reference Books

1. Sewing Threads' Textile progress vol.30 no.3/4, by J.O. Ukponmwan, The Textile Inst. Publisher.
2. 'Modern Yarns for Modern Fabrics Seminar' Conference proceedings. By TTI, The Textile Inst. Publisher.
3. Woollen – Yarn manufacture' Textile progress, vol.15, no.1/2 by D.A. ROSS, The Textile Inst. Publisher.
4. 'The production of textured yarn by methods other than the false – twist technique, The Textile progress vol.16, No.3, By D.K. Wilson and T Kollu, The textile Inst. Publisher.
5. Yarns & Fabric Classification Main Items in wool and blends, Italtex Editor.
6. Fancy yarns: Their manufacture and application R H Gong and R M Wright, UMIST, UK, The Textile Inst. Publisher.
7. The Textile Institute Publication - Manual of Textile Technology – Short Staple Spinning Series Vol. V – New Spinning System by W. Klein.
8. Fundamentals of staple yarn manufacture: Lawrence Carl.

Course Outcomes:

Students will be able to:

1. understand the importance and need for speciality fibres and yarns
2. explain the manufacturing of speciality yarns using conventional and Unconventional yarn manufacturing machinery
3. explain the properties of speciality yarns
4. describe the applications for speciality yarns

FINAL YEAR B.TEXT. - SEMESTER - II

8.5 NANO FIBRES TECHNOLOGY (MMTT) (ELECTIVE-II)

Lectures : 3 Hrs/week

Theory Paper : 100 marks

Subject Total : 100 marks

Course Objectives:

1. To explain nano fiber production.
2. To describe the morphologies of electrospun nanofibres.
3. To explain processing of composite functional nanofibers, carbon nanotube and nanofibre reinforced polymer fibres
4. To explain developments in nanofibres.

Course Contents

Unit 1.

Nano fiber production: Introduction, principles of electrostatic atomization, Electrospraying and electrospinning by the capillary method, Electrospraying and electrospinning by the charge injection method, Solution electrospinning, Melt electrospinning.

Types and processing of structured functional nanofibers:

Core-shell, aligned, porous and gradient nanofibers, Core-shell nanofibers, Aligned nanofibers, Porous nanofibers Gradient nanofibers, Applications of structured functional nanofibers

Continuous yarns from electro spun nano fibers:

electro spun nanofibers: background and terminology, controlling fiber orientation, producing non-contiguous or short yarns, producing continuous yarns

Unit 2.

Morphologies of electrospun nanofibres: Introduction, The electrospinning process and fibre morphology, Polymer concentration and fibre diameter, Fibre bead formation and fibre surface morphology, Controlling fibre alignment and web morphologies, Bicomponent cross-sectional nanofibres, Future trends.

Unit 3.

Processing of composite functional nanofibers: Formation of polymer and polymer composite nanofibers, Formation of polymer and nano particle composite nanofibers, Formation of polymer and inorganic salt composite nanofibers, Examples and applications of composite functional nanofibers

Unit 4.

Carbon nanotube and nanofibre reinforced polymer fibres: Introduction, Synthesis and properties of carbon nanotubes, Developing nanotube/nanofibre–polymer composites, Adding nanotubes and nanofibres to polymer fibres, Mechanical, electrical and other properties of nanocomposite fibres, Future trends

Unit 5.

Nanofilled polypropylene fibres: Introduction, Polymer layered silicate nanocomposites, the structure and properties of layered silicate, polypropylene nanocomposites, Nanosilica filled polypropylene nanocomposites, Calcium carbonate and other additives

Unit 6.

Applications: Filtration applications, drug delivery applications, tissue engineering, in lithium-ion batteries, sensor applications, clothing for protection against chemical and biological hazards, food processing, sound absorption, electromagnetic wave attenuation and bioreactor, water purification, microelectronics. Developments in nanofibers.

Reference Books

1. Nanofibers and nanotechnology in textiles, Edited by P. J. Brown and K. Stevens, Wood head Publishing Limited Cambridge, England, 2007
2. Functional nanofibers and their applications, Edited by Qufu Wei, Wood head Publishing Limited, 2012
3. Fundamentals of Fibre Formation: The Science of Fibre Spinning and Drawing,Andrzej Ziabicki, Wiley, 1976.
4. High speed spinning - Ziabicki and Kawai , Woodhead Publishing

5. Man Made fibre science and technology - Marks and Allas. Wiley interscience New York, 1968.
6. Manufactured fibre technology - Edited By V.B. Gupta, and V.K. Kothari,Springer Science business Media
7. Production of synthetic fibres – A.A. Vaidya

Course Outcomes:

At the end of the course students will be able to

1. Describe nano fiber production.
2. Explain the morphologies of electrospun nanofibres.
3. Describe processing of composite functional nanofibers, carbon nanotube and nanofibre reinforced polymer fibres
4. Describe developments in nanofibres.

FINAL YEAR B.TEXT. - SEMESTER - II

8.1 FLUID FLOW SYSTEMS AND CONTROLS (TPE)

Lectures	:	3 Hrs/week
Practical	:	3 Hrs/week
Theory Paper	:	100 marks
Term Work	:	50 Marks
Practical Exam.	:	50 marks
Subject Total	:	200 marks

Course Objectives:

5. To discuss need of Hydraulic & pneumatic systems, their types, merits & demerits & ISO symbols.
6. To study &learn elements of fluid systems like Air compressor, hydraulic power pack, filter, dryer etc.
7. To study &learn different types of valves, actuators & working of basic pneumatic & hydraulic circuits.
8. To learn concepts of maintenance, troubleshooting of pneumatic & hydraulic systems& piping required.

1.

a) Introduction to hydraulic and pneumatic systems, Areas of applications, relative merits and demerits, comparison of above systems with electrical, mechanical and hybrid systems.

b) ISO / JIC symbols used in pneumatics and Hydraulics and properties of compressed air for pneumatic systems, advantages of compressed air.

2.

a)Fluid conditioning elements – filter, lubricator, dryers, heat exchangers, pressure regulators and strainers used in hydraulics and pneumatics.

b) Study of control valves in pneumatics and hydraulics – A) Pressure control, B) Direction control C) flow control valves D) special valves

3.

a) Air compressors – Reciprocating compressor and Numerical treatment.

b) Study of actuators – Linear and rotary actuators in pneumatics and hydraulics.

4.

a) Pneumatic circuits and applications – Basic Pneumatic Circuits - Speed control, sequencing, time delay, actuation of pneumatic motor.

b) Maintenance and trouble shooting in pneumatic and hydraulic system

5.

a) Hydraulic Systems – Introduction in brief, properties of fluid, types and selection of fluids.

b) Study of pumps used in hydraulic system and hydraulic power pack.

6.

a) Hydraulic circuits and applications – Basic hydraulic circuit - Speed control, sequencing, counter balancing, study of systems in Textile machines.

b) Pipes and Fitting, accumulator, Pressure intensifiers.

List of Experiments:-

1. Study of direction control valves.
2. Study of meter – in flow circuit.
3. Study of meter – out flow circuit.
4. Operation of DAC – Unidirectional Control.
5. Operation of DAC – Bidirectional Control.
6. Study of circuits using sequence valve & time delay valve.
7. Study of pneumatic circuits on Textile Machines.
8. Study of different types of compressors used in pneumatic circuits.
9. Study of different types of pumps used in hydraulic circuits.
10. Study of ISO conventions used in pneumatics & hydraulics.
11. Study of power pack used in Hydraulic circuit.
12. Study of solenoid operated valves in Pneumatic & Hydraulic circuits.

Reference Books:-

1. Pneumatics and Hydraulics – Harry L. Stewart.
2. Hydraulics & Pneumatics – Andrew Parr.
3. Pneumatic systems (Principles & Maintenance) – S. R. Majumdar.
4. Oil Hydraulics – S. R. Majumdar.

5. Industrial Hydraulics – John Pippenger & Tyler Hicks.

Course Outcomes:

Student will be able to,

1. Explain use of Hydraulic & pneumatic systems, their types, merits & demerits & will be able to draw ISO symbols.
2. Explain elements of fluid systems like Air compressor, hydraulic power pack, filter, dryer etc.
3. Explain use of different types of valves, actuators & working of basic pneumatic & hydraulic circuits.
4. Explain concepts of maintenance, troubleshooting of pneumatic & hydraulic systems & piping required.

FINAL YEAR B. TEXT - SEMESTER-II

8.2 INSTRUMENTATION & METROLOGY (TPE)

Lectures	:	3 Hrs / Week
Practicals	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Practical Exam	:	50 Marks
Subject Total	:	200 Marks

Course Objectives

1. To understand the Need of measurement, Methods of Measurement, Study of different Instruments which require for measurement of line and angle dimensions.
2. To understand about surface finish, Straightness & Flatness, External Threads its measurement methods with the help of different instruments.
3. To understand about types of Comparators Interferometry, its applications in different industry. Students should be able to understand about Limit, Fits, Tolerances, its necessity in any industry.
4. To understand different types of Instruments and gauges used in spinning and weaving department, its applications.

I) Measurement:-

Introduction, Need of measurement, Methods of Measurement, International standards of Measurement - a) Line standards b) End standards c) Wavelength standards, System of measurement. Accuracy & precision of measurement

II) Study of Instruments:-

a) Linear measurement : Vernier Calliper, Micrometer, Height gauge, Depth gauge, Slip gauges, Grades of Slip gauges, application, Universal measuring machine.

b) Angle measurement: Measurement of angle by using instruments like Bevel protractors, Clinometer, Angle dekkor. Angle gauges, Auto collimator, case studies of measurement of an unknown angle by using Sine bar, Standard balls & Rollers etc.

III) Surface Finish measurement and Straightness - Flatness measurement : -

a) Surface finish: Roughness, Wavyness, lay, methods of measuring roughness, Ra value, RMS value, CLA value, Ten point height method, Instrument for measuring surface Texture, Profilometer

b) Straightness & Flatness: Inspection of straightness & Flatness by using instruments straight edge, spirit level, Auto-collimator, Beam comparator, Tests to check squareness, parallelism of the axes.

IV) Interferometry and Measurement of External Threads: -

a) Interferometry: Principles, optical flat, Typical applications of optical flat.

b) Measurement of External Threads : Thread geometry, different errors in screw threads, measurement of form of thread with profile projector, pitch measurement, measurement of thread diameter with standard wires. Screw thread micrometer.

V) Comparators and Limit, Fits, Tolerances:

a) **Comparators :**Study of Mechanical, Electrical, Electronic, Pneumatic, Optical comparators

b) Limit, Fits, Tolerances: - Introduction to limit, fits, allowances, Tolerances, Unilateral, bilateral tolerances, Interchangeability, types of fits, Systems of fits, Introduction to limit gauges, GO-NOGO gauges. Taylor's Principle.

VI) Study of Instruments and gauges used in spinning and weaving:-

Prism calliper, stroboscope, spring balance, tachometer, frame level, pressure gauge, saddle gauge, gauges useed in looms like Simco, Ruti-C, Airjet etc.

List of Experiments:-

Five experiments based on below referred areas in combination.

1. Study & use of various instruments.
2. Use of comparators.
3. Screw thread measurement.
4. Gear Inspection.
5. Use of optical profile projector.
6. Use of sine bar.
7. Use of optical flat.

8. Use of standard ball & roller for angle measurement.

Reference Books:-

1. Engineering Metrology – I.C. Gupta
2. Engineering Metrology – R.K. Jain
3. Practical Engineering Metrology – Sharp K.W.B. Pitman, London.
4. Metrology and quality control – M.S. Mahajan , B.S. chaudhari , vrinda pulications

Course Outcome

Student will be able to,

1. To explain need, methods of measurement and different types used for angle and line measurement.
2. To explain about surface finish, Straightness & Flatness, External Threads its measurement methods.
3. To explain different types of comparators, Interferometry, its application in different industry. To explain Limit, Fits, Tolerances, its necessity in any industry.
4. To explain different Instruments and gauges used in spinning and weaving department, its applications.

FINAL YEARYEAR B.TEXT. SEM-II

8.4 MAINTENANCE MANAGEMENT (TPE)

Lectures : 4 Hrs/week

Theory Paper : 100 marks

Subject Total : 100 marks

Course Objectives:

1. To explain management concept applied to maintenance of machines, basic functions, methodology and application to planned maintenance, condition based maintenance.
2. To describe management functions planning, scheduling, organizing, controlling, budgeting, record keeping related to machine maintenance.
3. Explanation to enumerate indices related to machine downtime, utilization, spare part management, inventory.
4. To explain use of value analysis, value engineering, machine replacement, modernization decisions to improve profitability of company using maintenance management.

1. INTRODUCTION - Basic concept of maintenance management its role in profitability of company, planned maintenance and breakdown maintenance & economic aspects, subclasses of planned maintenance, Mechanism of planned maintenance optimum planned maintenance, Computer applications in maintenance management.

2. a) Condition based maintenance – Importance, subjective & objective inspections, types of condition monitoring techniques, Detailed study of (NDT) non-destructive testings, performance evaluation, debris analysis, dynamic analysis.

b) Equipment Replacement – Need for replacement, Selection of appropriate alternative of replacement.

3. a) Performance Evaluation of maintenance function – Control – Methods of control and use of various indices.

b) Spare parts management – Importance & means of inventory control.

4. a) Failure Analysis – Classification of failures, method of failure analysis, use of trouble shooting charts & other techniques.

b) Planning, scheduling, maintenance organization, performance evaluation of maintenance function, PERT, CPM and other techniques for planning.

5. a) Value Analysis & value Engineering – concept and techniques of value analysis & value engineering

b) Lubrication management – Importance, measures for economy in lubrication management.

6. Maintenance budgeting – Methods of budgeting, selective budgeting control, techno economics of maintenance.

Reference Books:-

1. Maintenance Management volumes 1 to 21, by IMME Delhi.
2. Maintenance Management, SITRA Publication.

Course Outcomes:

Student will be able to,

1. Able to explain maintenance management, basic functions, methodology and application to planned maintenance, condition based maintenance.
2. To understand and describe management functions planning, scheduling, organizing, controlling, budgeting, record keeping related to machine maintenance.
3. Able to calculate and use indices related to machine downtime, utilization, spare part management, and inventory.
4. To explain use of value analysis, value engineering, machine replacement, modernization decisions to improve profitability of company using maintenance management.

FINAL YEAR B. TEXT. SEMESTER-II

8.5 CONDITION BASED MONITORING TECHNIQUES (TPE) (ELECTIVE-II)

Lectures : 3 Hrs/week
Theory Paper : 100 marks
Subject Total : 100 marks

Course Objectives:

1. To explain working principles types and usefulness of condition based monitoring, its comparison with conventional planned maintenance.
2. To describe details of NDT, Contaminant examination techniques used for monitoring and their applications.
3. Explanation to learn Dynamic Analysis, parameters, related tomachine vibrations. Methods of vibration monitoring, its isolation, materials used to control machine vibration and noise.
4. Describe performance monitoring techniques used for mechanical conditions as well as such techniques in textile on line monitoring.

1) Introduction to Condition Monitoring - Subjective & objective assessment, advantages of condition based maintenance over preventive maintenance. Types of inspections in condition based maintenance.

2) a) **Non Destructive Testings** - Ultrasonic testing, Radiography, Thermography, eddy current testing, Magnetic particle test, Acoustic, emission testing, Temperature measurement, stroboscope, optical inspection techniques.

b) Special Purpose Inspection Methods - Crack detection, leak detection, corrosion monitoring, Contaminant examination – magnetic plug test, SOAP, Particle count method.

3. a) Performance Monitoring - Concept, On line monitoring techniques in Textile machine – Ring data system, Varioset, Classimat, Autolevellers at carding and drawframe, Uster spectrogram.

b) Lubrication Monitoring - Objects, Methods, Laboratory tests & spot tests for oils & greases.

4. Dynamic Analysis - Fundamentals of vibration & noise. Concept of Dynamic analysis, vibration measurement methods, applications. Case study of shock pulse monitoring of antifriction bearing, Machinery noise & analysis.

5. Study of transducers used for vibration and noise measurement – LVDT - Peizo crystal – inductive - condenser mic - peizo mic - electrets microphone, etc.

6. Methods of vibration and noise isolation - Fundamentals related to vibration and isolation of noise, free damped vibrations, vibrations with 6 degrees of freedom. Transmissibility, damping factor. Materials and methods used for isolation of noise

Reference Books:-

1. Maintenance Management Vol. 12, IMME Pub.
2. Summer School on Maintenance Engineering – S.J.C.E. Mysore.
3. Measurement System – E.O. Doeblin, McGrawhill International Pub.
4. Theory & application of Digital Signal Processing – Ranbiner L.R. & Gold B.
5. Mechanical Measurements – Beckwith T.G. and Lewis Buck N.
6. Machinery Noise Measurement – S.J. Yang and A.J. Ellison, Oxford New York.

Course Outcomes:

Student will be able to,

1. Able to classify and explain principles, types and usefulness of condition based monitoring, its advantages over conventional planned maintenance.
2. To describe and identify NDT, Contaminant examination techniques used for monitoring and their applications.
3. Describe Dynamic Analysis, parameters, related to machine vibrations. Methods of vibration monitoring, its isolation and materials used to control machine vibration and noise.
4. Enumerate performance monitoring techniques used for mechanical conditions as well as such techniques in textile on line monitoring.

FINAL YEAR B.TEXT. - SEMESTER - II

8.5 PROCESS CONTROL IN WEAVING (TPE) (ELECTIVE-II)

Lectures : 3 hrs/week

Theory Paper : 100 marks

Subject Total : 100 marks

Course Objectives:

1. To explain scope, approach and methodology of process mangement.
2. To explain process management in weaving preparatory to optimize quality and improvement in efficiency after each process.
3. To explain process control in weaving with respect to fabric quality and fabric production.
4. To explain methods to asses and reduce hard waste in weaving processes.

1. Introduction to process management:

Object, scope and approach to achieve quality and productivity in fabric production, and Methodology adopted for the same (SQC, Direct Approach, and online monitoring)

2. Quality and production management in winding:

- Control of yarn joints quality on Automatic Winding machines for various materials – knots and splice (characteristics of good splice, appearance and strength ratings, splice testing, and adjustment of parameters),
- Yarn clearing.
- Unwinding and winding tension.
- Package quality.
- Material handling and work practices.

3. Process management in warping:

- Characteristics of perfect beam and monitoring the beam quality.
- Machine parameters adjustment and machine condition maintenance for minimizing end breaks for various materials and counts.

- Method of assessing productivity of warping machine & measures to improve the productivity.
- Material handling and work practices to optimize production and quality.

4. Process management in sizing:

- Deciding the size recipe according to material and count of yarn, Preparation of quality size pastes.
- Determination and achieving the correct size pick up by controlling various sizing conditions, Modern pick up control equipment.
- Stretch and moisture level control on multicylinder sizing machine.
- Characteristics of perfect sized beam and its achievement.
- Method to increase weavability .
- Minimizing the size losses at every stage.
- Control of productivity.
- Material handling and work practices to get optimum production and best-sized beams.
- Management information system.

5. Process management in weaving

For Fabric quality (loom shed):

- Causes & remedies for yarn related faults: Weft bars, black ends, slub, and thick end, Double end.
- Causes and remedies for fabric defects on ordinary, automatic looms & shuttle less looms.
- Manual and automatic fabric inspection methods, various point grading systems,

For productivity:

- Maintaining of loom speed on various weaving machines, limitations on maximum speed from textile point of view, mechanical condition causing reduction in speed.
- Control of Technical, Human and organizational factors affecting loom shed efficiency. Assessment of loom performance after corrective actions
- Control of down time through SMED technique

- Use of snap study in controlling efficiency losses
- Management information system to control productivity

6. Hard waste Reduction in Weaving Department:

- Approach to the reduction of hard-waste
- Setting the standards of hard-waste

Reference Books:-

1. Process Control in Weaving by M.C. Paliwal & P.D. Kimothi
2. Weaving: Technology and Operations by Allan Ormerod.
3. Weaving Machine, Mechanisms, Management by Dr. Talukdar, Ajagaonkar, Sriramulu.
4. Machine Manuals of Various Shuttle less Looms and – Preparatory Machines.
5. Shuttle less Weaving: NCUTE Publication.

Course Outcomes:

Student will be able to,

1. To understand scope, approach and methodology of process control.
2. To understand process management in weaving preparatory to optimize quality and improvement in efficiency after each process.
3. To understand process control in weaving with respect to fabric quality and fabric production.
4. Measure the hard waste consumption to control it.

FINAL YEAR B. TEXT - SEMESTER-II

8.5 ENERGY CONSERVATION IN TEXTILES (TPE) (ELECTIVE-II)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives:

1. To explain the need, types, sources of energy used by industry.
2. To describe the methods of measurement and optimisation of energy.
3. Explain impact of fuel utilisation on ecosystem.
4. Aquent students about non-conventional, eco-friendly energy sources

1. **A) Energy** - Basic types of energy, Basic energy, Fuels. Calculations related to measurement of electrical & thermal energy. Concept of energy management.

   B) Various Energy Sources Used in Textile Process - Compressed air, steam, fuel, electricity applications in textile processes. Methods of estimation methods of generation of compressed air & steam. Quality requirements of steam & compressed air.

2. **A) Electrical Energy** - Methods of electricity generation, quality of electric supply, leakages, voltage fluctuations, (economic aspects, limitations) power transmission, cables etc.

   B) Energy Generation From Fuels - Need of thermal energy in textiles, methods, quality & efficiency of fuels, economics of co-generation, efficient steam generation & utilization.

3. Energy Audit - Need of energy audit, method & types of energy audits, energy audit performance, instruments required. Energy consumption of various textile machines.

4. Conservation of Electrical Energy in Spinning - Methods of energy conservation in various departments of spinning and weaving.

5. Conservation of electrical energy in humidification plants, lighting, water supply, compressed air in Textile industry.

6. Non conventional energy sources and their application areas in textile wind, biogas, solar energy etc.

Reference Books:-

1) Energy Conservation in Industries – Vol.I & II, Centre of Plant Engg. Services Hydrabad.
2) Conventional Energy Technology – By S.B. Pandya.
3) ATIRA – Circular Report June, 1988, Mill Endavours to conserve electricity by D.H. Shah, J.S. Parajia.
4) Energy Consumption & Conservation in Fibre Producing & Textile Industries – Textile Progress Vol.13, No.3.
5) Renewable Energy Resources by John Twidell.
6) Economy Energy & Environment in Textile Wet Processing by Editor S.S. Trivedi.

Course Outcomes:

Student will be able to,

1. To explain the need, types, sources of energy used by industry.
2. To describe the methods of measurement and optimisation of energy.
3. Understand and take measures to control impact of fuel utilisation on ecosystem.
4. Identify and use non-conventional, eco-friendly energy sources for textile applications.

FINAL YEAR B.TEXT. - SEMESTER - II

8.1 GARMENT MANUFACTURING AND PROCESSING (TC)

Lectures	:	4 Hrs/week
Practical	:	3 Hrs/week
Theory Paper	:	100 marks
Practical Exam.	:	50 marks
Term work	:	50 marks
Subject Total	:	200 marks

Course Objectives:

1. To describe pre-production and post-production processes of apparel industry.
2. To describe production processes and use CAD-CAM in apparel industry.
3. To discuss the process & machinery used for garment dyeing and printing
4. To list out various finishes used in garment processing and understand the process of wash down effects on denim garments.

1. **Garment manufacturing process:** Introduction to the garment industry, Scenario of the Indian apparel industry with respect to world. Designing, Patternmaking, fusing, sewing, Pressing and finishing and Warehousing
2. **Production technology in apparel industry:** Manual systems, make through systems, straight line systems, modular production systems, unit production systems, quick response systems.
3. Ware Housing: Handling equipment, storage equipment, packing equipment.CAD/CAM in Garment Manufacturing.
4. **Garment Dyeing**

Introduction to Garment processing, Importance of garment processing, Advantages and limitations, Comparison of garment stage and pre garment stage dyeing, General precautions for garment dyeing, Various machinery used for Garment dyeing like paddle dyeing machine, drum dyeing machine, Drying of garment dyed goods, Problems in Garment dyeing and remedies.

5. Garment Printing

Special print recipes for garments like Khadi, Metallic, Flock, Plastizol, Pearl, High density printing, Puff Printing, Foil Printing, Multi arm flat bed printing machine for Garments.

6. Garment Finishing and Garment washing

Process and mechanism of durable press finish, Feather touch finish, Stain Resistant Teflon finish, Moisture management finish.

Objects, Types of washes, Rinse wash, Softener wash, Silicone wash, Enzyme wash, Back Staining, its causes and remedies. Denim wash Flow chart, Stone washing, Novel wash down effects like Acid wash, PP wash, ball wash, towel wash, Denim Hand Sand / Scraping, Sand Blasting.

List of Experiments:-

1. Study of the process flow of the apparel industry
2. Study of 4 point inspection and 10 point inspection.
3. Study of various cutting machines used in apparel industry
4. Study of the sewing machines used for garment manufacturing
5. Dyeing of garment with reactive dyes.
6. Dyeing of garment with pigments using cationising agent.
7. Printing of garment with foam and khadi prints
8. Printing of garment with pearl and metallic prints
9. Enzyme wash of denim garments
10. Stone washing of denim garments
11. Acid and PP wash on denim garments.
12. Visit to the apparel Industry.

Reference Books:-

1) Dinkar Mahajan- Know All About Denim- Mahajan Publishers Private Limited, Ahmadabad.
2) Textile finishing by Derek Heywood
3) Etters J.N., “Influence of Fabric Surface Effects on Colour Depth and Hue of Garment Dyed Textiles”, American Dyestuff Reporter, 1997 (5) 15 – 18

4) Murphy J.M., “Improving Preparation Techniques for Garment Dyeing”, American Dyestuff Reporter, 1987, 41 – 48, 50
5) Introduction to Clothing Manufacture, Gerry Cooklin, Steven George Hayes (Editor), John McLoughlin (Editor), Blackwell Publications, ISBN: 978-0-632-05846-4
6) The Technology of Clothing Manufacture, Harold Carr, Barbara Latham, Paperback Publications, ISBN-13: 978-0632037483

Course Outcomes:

Student will be able to,

1. Describe the various requirements and importance of pattern making, cutting, sewing, finishing and Inspection.
2. Compare various production technologies and its types. Discuss the application of CAD-CAM in apparel industry.
3. Explain the process and machinery used for garment dyeing and describe the process and machinery used for garment printing.
4. Summarize the various finishes used in garment industry & to compare the effects given by various wash down processes in denim processing.

FINAL YEAR B.TEXT. – SEMESTER-II

8.2 QUALITY CONTROL IN CHEMICAL PROCESSING (TC)

Lectures - 3 Hrs. /week
Theory Paper- 100 Marks
Termwork- 50 Marks
Subject Total - 150 Marks

Course Objectives

1. To define process control and quality control, structure, function and importance of quality assurance.
2. To summarize process control parameters in bleaching, dyeing, printing and finishing.
3. To demonstrate various quality control tests of pretreatments, dyeing, printing and finishing.
4. To discuss factors responsible for accidents in textile mills, affecting health or safety hazards, electrical safety and safe handling of different chemicals.

1.Quality Control / Assurance:-

Definition of process and quality control, Need of process control, Approach towards process control, Definition of quality, Importance of kaizen and bench marking.
Importance of quality assurance, Structure and functions of quality assurance department.

2.Process Control in Pretreatment and Dyeing:-

Process control parameters for singeing, desizing, scouring, bleaching, mercerizing and continuous bleaching range, Problem and remedies in pretreatments.
Process control parameters for jiggers, padding mangles, jet dyeing m/c., package dyeing m/cs., soft flow dyeing m/cs. and continuous dyeing range, Measures to achieve RIGHT FIRST TIME dyeing, Problem and remedies in dyeing.

3.Process Control in Printing and Finishing:-

Process control parameters for Flat bed screen printing m/c., rotary screen printing m/c.Problem and remedies in printing, Process control parameter for stenters, sanforising, calenders, Drying range. Problem and remedies in finishing.

4. Quality Control in Pretreatments, dyeing and printing

Various Testing methods like –

Whiteness, Ash content, Barium activity number, Axial Ratio, Carboxyl group content, Copper number, Weight loss, Fluidity. Norms for testing of bleaching and mercerizing processes.

Various testing methods like –

Light, Washing, Rubbing, Sublimation, Perspiration.

Norms for testing of dyeing and printing.

5. Quality control in finishing -

Various testing methods like –

Iodine absorption, Crease recovery angle, Bending length.

Norms for testing of finished methods. .

6. Accidents and Safety

Factors responsible for accidents in textile mills.Factors affecting health or safety of workers or health hazards like flooring, machinery, lighting, drainage, maintenance, material handling, plant – layout and storage.

Electrical safety, Use of safety aids, Different chemicals used in wet processing, their safe norms, safe handling and safety measurement.

Term Work

1) Preparation process control chart for
    a. Package dyeing machine.
    b. Jigger.
    c. Kier.
    d. Printing machine.
    e. Washing range.
    f. Stenter.
2) Preparation of quality control parameters chart for
    a. Pretreatments
    b. Dyeing
    c. Printing
    d. Finishing

Reference Books:-

1. Testing and Quality Management – Vol.-I by Dr.V.K. Kothari IAFL Publication, S-351, Greater Kailash Part-I, New Delhi.
2. Norms for the textile industry Part-III – booklet published by ATIRA, Ahmedabad.
3. Norms in textile industry – ATIRA, BTRA, SITRA, NITRA.
4. Industrial quality by Lawrence S. Aft published by St. Lucie Press, Washington D.C.
5. Industrial Safety and Control Handbook, published by National Safety council and Associate (Data) Publishers Pvt. Ltd.,
6. Occupational safety and health in the textile industry by textile committee.
7. Occupational health and safety by Dr. V.A. Shenai.

Course Outcome

Student will be able to,

1. Ability to understand process and quality control, importance of quality assurance.
2. Ability to analyze process control parameters of wet processing.
3. Ability to understand various quality control tests of bleaching, dyeing, printing and finishing.
4. Ability to analysis of factors responsible for accidents in textile mills, affecting health hazards and electrical and chemical safety.

FINAL YEAR B. TEXT - SEMESTER-II

8.4 THEORY OF DYEING & COLOUR MEASUREMENTS (TC)

Lectures : 3 Hrs / Week
Practicals : 3 Hrs / Week
Theory Paper: 100 Marks
Term Work : 50 Marks
Subject Total : 150 Marks

Course Objectives:

1. To describe the importance of fibre structure, Drawing & heat setting on dyeing properties and basics of dyeing and kinetics of dyeing.
2. To define equilibrium absorption, diffusion co-efficient and time of dyeing and also to discuss various theory of dyeing and know factors affecting reactive dyeing, disperse dyeing and dyeing of nylon and acrylic
3. To discuss basics of color perception and laws of absorption of light.To know various methods of color specification like CIE, Hunter and Munsell
4. To discuss viewing geometry, monochromators and detectors and discuss principle and working of single, double beam and dual beam spectrophotometer.To analyze various outputs of color matching

UNIT-I Fine structure of cotton, wool, silk, polyester, nylon and acrylic, various proposed theories of fibre structure. Influence of fibre structure, drawing and heat setting on dyeing behaviour

UNIT-II Relation between dye molecules and polymeric chains of the fibres, Substantivity and affinity, Thermodynamic derivations of affinity equations, Kinetics of dyeing, Factors affecting kinetics of dyeing, Derivations of various absorption isotherms, Electrical effects in dyeing equilibrium. Monolayer technique and continuous variable method to identify dye – fibre bonds.

UNIT-III Glass transition temperature and its effect on dyeability and dye diffusion, Factors affecting dye diffusion, Fick's first and second laws of diffusion, Concepts of equilibrium absorption, diffusion coefficient and time of half dyeing, Derivation of William Landel ferry (WLF) equation and its significance, Free volume and solubility

parameter theory of dyeing, Various theories of carrier dyeing. Concept of partition coefficient

Factors affecting reactive dyeing, dyeing of polyester, dyeing of nylon and acrylic, Concept of solid dyeing., reserve dyeing, cross – dyeing and tone on tone dyeing, Continuous Dyeing

UNIT-IV Relation between light and dye, dye and eye. Light, colour and electromagnetic spectrum, Planckin radiations and colour temp, Daylight and CIE standard illuminants, Sources of artificial light, properties of artificial lights, Interaction of light with matter, Beer Lambert's law of absorption of light

Theories of colour vision, Colour primaries and colour mixing – Additive and subtractive, Colour specification – Munsell colour order system, Ostawald colour system, CIE system, CIE lab, System, Hunter lab, Tristimulus values, Standard observer

UNIT-V Concept of normal optics and reverse optics, Viewing geometry, Bidirectional geometry, circumferential bi-directional geometry, Concept of 2o and 10o observer angle, Concept of specular and diffuse reflection, Factors affecting diffusion of light, Types of monochromators, advantages and disadvantages of each type of monochromators, Precaution to be taken for monochromator, Photodetectors types - PMT & SPD, Principle and working of colorimeter. Principle, advantages and disadvantages of single beam, double beam, dual beam and microflash

spectro photometers, Precautions to be taken for spectro photometer, Reflectance and transmission spectrophotometer, Variables affecting visual and instrumental estimates of colour

UNIT-VI Metamerism and Dichroism. Sample preparation for CCM Application to textile processing, Advantages & limitations of CCM, Colour difference, shade sorting, relative dye strength and tone analysis, Assessment of whiteness, yellowness and brightness, Computing and analyzing CCM results, Recipe formulation, batch correction, shade library

List of Experiments

1. Preparation of database of Direct dye.
2. Preparation of database of Disperse dye.
3. Preparation of database of Vat dye.
4. Preparation of database of Sulphur dye.
5. Comparison of bleaching methods using CCM.
6. Determination of washing fastness using CCM.
7. Shade sorting using CCM.
8. Determination of Tristimulus values.
9. Estimation of whiteness Index & yellowness index.
10. Determination of relative strength of dye.
11. Batch correction using CCM.
12. Estimation of colour strength difference

Reference Books

1. Physical chemistry of dyeing by Thomas Vickerstaff.
2. Theory of Coloration of Textiles by Alan Johnson, Society of Dyers and Colourists.
3. Computer colour analysis: Textile applications by Dr. A.D. Sule.
4. Instrumental colour measurements and computer aided colour matching for textiles by Dr. H. S. Shah & Dr. R. S. Gandhi.
5. Colour Physics for industry by Roderick Mc Donald.
6. Chemical Processing of Synthetic fibres by Dr. K. V. Datye & A. A. Vaidya.

Course Outcomes:

Student will be able to,

1. Explain the importance of fibre structure, Drawing & heat setting on dyeing properties and basics of dyeing and kinetics of dyeing
2. Explain equilibrium absorption, diffusion co-efficient and time of dyeing and also to discuss various theory of dyeing and know factors affecting reactive dyeing, disperse dyeing and dyeing of nylon and acrylic
3. Illustrate basics of color perception and laws of absorption of light.To know various methods of color specification like CIE, Hunter and Munsell

4. Explain viewing geometry, mono-chromators and detectors and discus principle and working of single, double beam and dual beam spectrophotometer.To analyze various outputs of color matching

FINAL YEAR B. TEXT. SEMESTER-II

8.5 ADVANCED CHEMICAL PROCESSING (TC) (ELECTIVE – II)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives

1. To discuss use of biotechnology and eco-friendly processes.
2. To explain the recent advancements in dyes, mechanism of dyeing and techniques of dyeing of various substrate.
3. To discuss the concept of digital printing and transfer printing with its salient features.
4. To explain the significance of nanotechnology, plasma technology and minimum application techniques in textile.

1) PROCESS MODIFICATIONS IN PRETREATMENTS

Developments in singeing, desizing and its eco-aspects, bleaching and its eco-aspects, Eco-friendly peracetic acid bleaching, Eco-friendly retting of Jute, Redox H_2O_2 bleaching, Concept of Eco-friendly stabilizers for H_2O_2 bleaching, Combined operations like desizing- scouring- bleaching, solvent scouring, Hot mercerization, add-on mercerization and ammonia treatment. Combined bioscouring and bleaching of cotton fibers, enzymatic degumming, enzymatic bleaching, nano- biotechnology.

2) DEVELOPMENTS IN DYES AND DYEING TECHNIQUES

Dyeing and its eco-aspects, new dyes and their advantages, Eco-friendly dyeing with sulphur & vat dyes. New developments in reactive dyes like HF dyes, low and no salt reactive dyes, multifunctional dyes, neutral fixing and acid fixing reactive dyes, Photo chromic dyes, thermo chromic dyes, fluorescent dyes. Super critical CO_2 dyeing – concept, mechanism, methods and techno-economical features. Ultrasound in dyeing - Concept, mechanism, methods and techno-economical features. Low temperature dyeing - concept, mechanism, methods and techno-economical features.

3) DIGITAL PRINTINGAND TRANSFER PRINTING

Concept, methods of inkjet printing, colour separation, selection of dyes and developments in inks, techno-economical features

Concept, selection of dyes and paper, mechanism of dye transfer, process sequences, techno-economical features, various transfer-printing machines

4) DEVELOPMENT IN FINISHING

Various Low liquor and minimum application techniques in textile finishing, their advantages and limitations, wrinkle free finishing – concept of wet and moist cross linking, various eco-friendly resin finishes, Concept of UV-A and UV-B, factors affecting UV protection. Various UV- protection finishes and their evaluation, antimicrobial finishes – mode of action, factors affecting, various antimicrobial finishes.

5) APPLICATION OF NANOTECHNOLOGY IN TEXTILES

Nanoscale – Definition, various methods of manufacturing nano materials and their characterization, Nanofibers - Manufacturing, properties and uses of nanofibre, Nanofinishes - Super hydrophobicity and lotus effect, self-cleaning, UV protection finish, Antimicrobial finishes

6) APPLICATION OF PLASMA IN TEXTILES

Concept, types of plasma and their generation, Plasma treatment of textile for water and oil repellency, Interfacial engineering of functional textiles for biomedical applications, plasma modification of wool, plasma modification of natural cellulosic fibers, characterization of plasma treated textiles

Reference Books

1. Biotechnology in Textile processing, by Georg M. Guebitz, Artur Cavaco-paulo, Ryszard Kozlowski, The Hawarth Press, Inc.
2. Dyeing of polyester & its blends by Prof. M. L. Gulrajani
3. Engineering in Textile coloration by C. Duckworth
4. Textile Finishing by Derek Heywood
5. Chemical Finishing of Textiles by W.D. Schindler and P.J. Hauser

6. Textile Energy & Waste Seminar – Textile Institute, 1997.
7. Nanofibres and nanotechnology in textiles edited by P.J.Brown and K. Stevens
8. Conventional Energy Technology – By S.B. Pandya.

Course Outcomes

At the end of the course students will be able to

1. Devise enzymatic pretreatments and modified eco-friendly process for textiles.
2. Substitute in existing dyes and dyeing systems with recent dyes and techniques for superior quality.
3. Adopt to digital printing and transfer printing technique for superior printing quality.
4. Invent the applications of nanotechnology, plasma technology minimum application techniques for minimization of pollution and cost reduction in textiles.

FINAL YEAR B. TEXT - SEMESTER-II

8.5 MERCHANDISING (TC) (ELECTIVE II)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives

1 To explain the apparel business organization.

2 To understand the concept of marketing & marketing research in apparel firm.

3 To understand the concept of merchandising.

4 To understand the concept of sourcing and documentation.

I) **Organization of the Apparel Business -** Introduction to apparel industry - organization of the apparel industry, types of exporters Business concepts applied to the apparel industry

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

III) **Merchandising -** Definition of merchandising - functions of merchandising division - Role and responsibilities of merchandiser, categories and process of apparel merchandizing, fashion accessories merchandizing, apparel export merchandizing, apparel retail merchandizing, different types of buyers - Communications with the buyers - awareness of current market trends – product development line planning line presentation.

IV) **Sourcing -** Need for sourcing - sourcing materials - manufacturing resources planning - principles of MRP – Overseas sourcing - sourcing strategies. Supply chain and demand chain analysis - Materials management for quick response - JIT technology.

V) **Documentation -** Order confirmation, various types of export documents, Pre-shipment Post -shipment documentation, Terms of sale, payment, shipment etc.Export incentives: Duty drawback, DEPB, I / E license - exchange control regulation - foreign exchange regulation acts - export management risk - export

finance. WTO / GATT / MFA - Functions and objectives, successes and failures.

Reference Books

1. D. Sinha., - " Export Planning and Promotion ", - IIMS, Calcutta (1989).
2. Tuhin K. Nandi., - " Import - Export Finance ", - IIMS, Calcutta (1989).
3. Elaine Stone, Jean A. Samples., - “Fashion Merchandising ", McGraw Hill Book Company (1985) ISBN: 0 - 07 - 061742 - 2.
4. S. Shivaramu., - " Export Marketing - A practical guide to Exporters ",Wheeler Publishing (1996) ISBN: 81-7544-166-6.
5. J.A. Jarnow, M.Guerreiro, B.Judelle., - " Inside the Fashion Business " ,Macmillan Publishing Company (1987) ISBN: 0-02-360000-4.
6. M Krishan Kumar, “Apparel Merchandizing”, Abhishek Publications.

Course Outcome

At the end of course students will be able to:

Sr. No	Course Outcome
1	Understand apparel business organization.
2	Understand the concept of marketing & marketing research in apparel firm.
3	Understand the concept of merchandising.
4	Understand the concept of sourcing and documentation for apparel business.

FINAL YEAR B. TEXT. (F.T.) SEMESTER-II

8.1 APPAREL FINISHING AND CARE

Lectures	:	4 Hrs / Week
Practical	:	3 Hrs /Week
Theory Paper	:	100 Marks
Term work	:	50 Marks
Practical Exam.	:	50 Marks
Subject Total	:	200 Marks

Course Objectives

1. Ability to describe working principle & procedure of machines used in garment industry.
2. Ability to Summarize the various specialty finishes used in garment industry & to compare the effects given to garment by various wash down processes
3. To describe the effect of fibre characteristics, water, detergent, stain removal, laundry and dry cleaning process on apparel.
4. To analyse the effect on colour fastness to various agencies like washing, rubbing, etc. on garments in concern with care labels

1) APPAREL FINISHING:-

- **Introduction –** Objects of finishing, Importance of finishing, classification of finishes, Difference between finishing of woven fabric, Knit goods, and Readymade garments. Finishing machinery such as stenter, compressive shrinkage range, calendar, drum washing machine, hydro extractor, Tumble drier.
- **Resin Finishing –** Mechanism of resin finishing, concept of anti-crease, wash-n-wear and durable press finish.
- **Finishing of Synthetic Materials –** Heat setting and weight reduction of polyester

2) FUNCTIONAL FINISHES FOR GARMENTS:-

Concept of garment finishing, Soil release finish, water repellent and flame retardant finish, antimicrobial finish, Anti-static finish. Difference between pre-garment stage and readymade garment stage finishing, finishing of woven / knitted garments, various softening treatments, water resistant breathable finish, Bio polishing, Deodorizing Finish etc.

3) WASH DOWN EFFECTS ON DENIM:-

Stone Wash, Enzyme Wash, Combined enzyme and stone wash, Acid wash, Antique wash, Ball blast, Whiskering, Sand blast, Ice wash

4) CONCEPT OF WOVEN AND KNIT CLOTHING CARE: -

Characteristics of various textile fibers, Identification of fibers, Introduction to laundry process, Laundering and dry cleaning process for garment, various laundry agents like soap, detergent, bleaching agent, optical whitening agents, stiffeners, softeners, Nature and classification of stains, Principle and classification of stain removals, Common stains and their removal

5) DYES AND PIGMENTS:

Dye / Fiber interaction, Behavior dyes and pigments during use and laundering, Grey scales, Importance and measurement of colour fastness to various agencies like washing, rubbing, light, perspiration, bleaching, dry cleaning, sublimation, acids and alkalis. Measurement of colour and terms like depth, K/S, tone, colour difference

6)CARE LABELS AND ENVIRONMENTAL ASPECTS:

Importance of care label. Various systems of care labeling, instructions for washing, drying, ironing, dry cleaning and bleaching.

Concept of banned dyes, formaldehyde, PCP, pesticides, heavy metals, their eco-norms and eco-label.

List of Experiments:

1. Application and evaluation of resin finishing of garment.
2. Weight reduction of polyester to produce silk like finish
3. Application and evaluation of softening and stiffening treatments on garment.
4. Bio-polishing treatment on garment.
5. Application of Stone wash and Acid wash effect on garment.
6. To identify various types of stains and removal of various Stains from garments
7. Evaluation of colour fastness to Rubbing and Sublimation
8. Evaluation of colour fastness to Acids and Alkalis
9. Evaluation of colour fastness to Washing
10. Evaluation of colour fastness to Bleach with Hypochlorite and Peroxide
11. Evaluation of colour fastness to Perspiration
12. Measurement of Colour and Colour Difference using CCM

References:

1. Garment Finishing and Care Labelling by S.S.Satsangi, Usha Publishers, 53-B/AC-IV, Shalimar Bagh, New Delhi.
2. Stain Removing Techniques by S. S. Satsangi, Usha Publishers, 53-B/AC-IV, Shalimar Bagh, New Delhi.
3. Know All About Denim by Dinkar Mahajan Publishers Private Limited, Ahmadabad.
4. Chemical Finishing of textiles by W D Schindler and P J Hauser
5. Textile finishing by Derek Heywood
6. Fundamentals of Textile and Their Care by Dantyagi S., Oriental Longmans Ltd, New Delhi, 1980.
7. Fabric Care by Noemia D' Souza, New Age International Publications
8. Textile and Laundry by Priya Bhargav, Tara Chand, Common Wealth Publishers.

Course Outcomes

At the end of the course students will be able to

1. Describe working principle & procedure of machines used in garment industry.

2. Summarize the various specialty finishes used in garment industry & to compare the effects given to garment by various wash down processes
3. Explain effect of fibre characteristics, water, detergent, stain removal, laundry and dry cleaning process on apparel.
4. Describe the effect on colour fastness to various agencies like washing, rubbing, etc. on garments in concern with care labels

FINAL YEAR B. TEXT- SEMESTER- II

8.2 APPAREL EXPORT MANAGEMENT (FT)

Lectures	:	4 Hrs / Week
Theory Paper	:	100 Marks
Term work	:	50 Marks
Subject Total	:	150 Marks

Course objectives

1. To explain international trade, Exchange rate determination WTO & Trade liberalization.
2. To explain international marketing and foreign trade policies
3. To explain and identify firm establishment process and foreign trade documents.
4. To understand the import procedure, shipment and customs procedure.

1. **Introduction to international trade.**The emerging global scenario-The business of international trade- Trade barriers- Foreign exchange-Exchange rate determination (Spot & forward), the euro dollar market-WTO- Trade liberalization.
2. **International marketing:** International marketing channels-Market selection and market profiling-Product strategies- Promotion strategies-Export pricing-Export finance, Export risk insurance-Export packaging and labeling- Quality control and pre shipment inspection.
3. **Firm Establishment:** Introduction – Export Promotion Councils And Their Role – Registration Formalities – Registration Cum Membership Certificate – Import Export Code – Rbi Code.
4. **Foreign trade & Documents:** Foreign trade control and-Exim policy-Export promotions-Export procedures and documents- Major problem of India's export sector,Need, Rationale And Types Of Documents Relating To Goods – Invoice – Packing Note And List – Certificate Of Origin – Certificate Relating To Shipments – Mate Receipt – Shipping Bill Certificate Of Measurement – Bill Of Lading – Air Way Bill – Documents Relating To Payment – Letter Of Credit – Bill Of Exchange – Letter Of Hypothecation – Bank Certificate For Payment – Document Relating

To Inspection – Certificate Of Inspection – Gsp And Other Forms. Final Year Syllabus Revised – July 2013 30

5. **Import Procedure:** Import License – Procedure For Import License – Import Trade Control Regulation Procedure – Special Schemes – Replenishment License – Advance License – Split Up License – Spares For After Sales Service License – Code Number – Bill Of Entry
6. **Shipment and Customs:** Pre Shipment Inspection And Quality Control – Foreign Exchange Formalities – Pre Shipment Documents. Shipment Of Goods And Port Procedures – Customs Clearance Post Shipment: Formalities And Procedures – Claiming Duty Drawback And Other Benefits – Role Of Clearing And Forwarding Agents.

Reference Books

1. International trade and Export management – Himalaya Publication, Mumbai (1998) Francis Cherunilam.
2. Exim Policy input Output norms – Duty exemption Scheme 2002-2007, Centax publication pvt. Ltd. New Delhi (April 2003 Fourth Edition.) R.K. Jain.
3. Promotion in the Merchandising environment Kristen K, Swanson, Judith C Everett- Fairchild Publication.
4. Hand Book Of Import And Export Procedures - Paras Ram
5. Govt. Of India: Hand Book Of Import And Export Procedures.
6. Bose. A.:" Streamline Your Export Paper Work", International Trade Form, Oct – Dec 1965.
7. CBI Booklets – Netherland
8. ECGC Services And Guidelines 10.AEPC Booklets

Course Outcomes

At the end of the course students will be able to

1. Understand international trade, Exchange rate determination WTO & Trade liberalization
2. Understand international marketing and forging trade policies
3. Understand and identify the firm establishment process and foreign trade documents
4. Understand the import procedure and shipment and customs procedure.

FINAL YEAR B.TEXT. - SEMESTER - I

8.3 FASHION RETAIL MANAGEMENT (FT)

Lectures : 4Hrs/week

Theory Paper : 100 marks

Subject Total : 100 marks

Course Objectives

1. Describe of retail industry and the retailing environment.
2. Develop competency in Retail Planning, Implementation and Management.
3. Describe retail buyers and merchandisers, store operations, supply chain management.
4. Classify trends in fashion retailing.

1) Principles of retailing:

Retail meaning, Social and economic significance of retailing, structure of retailing and distribution channel, opportunities in retailing, retail management decision process. Types of ownership and retailers, Multi-channel retailing- Retail Channels, Evolution, Issues.

2) Consumer buying behavior:

Buying process, decision making, and Influencing factors on buying.

Retail Financial strategy:

Objectives, Profit model, Performance Objectives.

Retail Locations and site selection:

Location types, opportunities, Site Selection, Opportunities and legal issues.

3) Human Resource Management

HRM defined, Importance Motivation, Issues.

Customer Relationship Management:

CRM defined, Process Collection and evaluation of customer data

4) Planning Merchandise assortment and pricing:

Process, Buying plans, Assortment planning.

Retail Pricing strategies:

Setting Retail Prices, Price adjustments, Pricing Strategies & Services

Buying Systems:Process, Buying plans, Assortment planning OTB, preparation.

5) Retail Communication Mix

Communication methods, Types and methods, Store Management

6) Managing resources:

Manpower, infrastructure in retail, Visual Merchandising

Reference

1. Retailing Management by William, Davidson, Daniel J. Sweeney. John Wiley & Sons publication. ISBN: 978-0471850946
2. Retailing Management by Michael Levy, Barton Weitz and Dhruv Grewal 9th edition McGraw-Hill Education publication. ISBN: 978-0078028991
3. Fundamentals Of Retail Management by arup ghosh, Neha Publishers & Distributors, ISBN: 9789381422465
4. Retail Management by Gibson G. Vedamani, Jaico Publishing House. 4th edition ISBN: 978-8179921517
5. Retail Management by chetan bajaj, Rajnish Tuli, Nidhi Varma and Srivastava, Oxford publication. 2nd edition. ISBN: 978-0198061151
6. Retail Management by S.C. Bhatia Atlantic publication, ISBN: 978-8126909827

Course Outcomes

1. To describe retail industry and the retailing environment.
2. To develop competency in Retail Planning, Implementation and Management.
3. To describe retail buyers and merchandisers, store operations, supply chain management.
4. To classify trends in fashion retailing.

FINAL YEAR B. TEXT. – SEMESTER – II

8.4 SMART TEXTILES AND SPECIALITY GARMENTS(FT)

Lectures	:	4 Hours / Week
Theory Paper	:	100 Marks
Term Work	:	50 Marks
Subject Total	:	150 Marks

Course Objectives:

1. To describe geotextiles functions and applications.
2. To explain manufacturing of tyre cords, parachute and filter fabric.
3. To explain engineering of various types of functional garments.
4. To explain wearable electronic system.

1. Geo Textiles

Geo Textiles functions – raw material – woven, non-woven, and knitted geo textiles, Three-Dimensional Textiles and Performs – Application of geo textiles for drainage application, separation application, soil reinforcement and filtration and erosion control

2. Tyre Cords and Fabrics:

Requirements of tyre cord – suitability of various fibres – polyester and nylon tyre cords – manufacture of tyre cords – Physical and mechanical property requirements of tyre cord fabrics – Fabric design – Specifications. Rubberized textiles.**Belts :**Conveyor belts – physical and mechanical properties – construction of belts – manufacture of conveyor belts – power transmission belts**. Hose:** Construction and application. **Parachute Fabrics:** Functions, raw material used, manufacturing techniques, and properties. **Filter Fabrics:** General consideration of filtration of solids from liquids, solid from gases, solids from solids, liquid from liquids, liquids from gases and gases from gases.**Nonwoven filtration:**Filtration in paper, cotton textile industry and viscose manufacturing industry – Cigarette filters.

3. Functional Clothing:

Definition, Classification: Protective functional, Medical functional, Sports functional, Vanity functional, clothing for special needs. Role of fibre, yarn and fabric parameters on functional attributes of functional clothing. Engineering of functional clothing, Requirements from functional clothing: physiological, biomechanical, biomechanical, ergonomics, psychological. Process of material selection. Clothing design: pattern engineering, assembling of garment components. Testing of clothing for functionality.

Various principles of fit: functional ease, movement analysis, prototype testing, etc

4. Medical Textiles:

Sutures, Sanitary napkins, diapers, surgical dressings, healthcare textiles, medical implants like cardiovascular implants, soft tissue implants, orthopedic implants and extra corporeal devices, intelligent clothing for medical and personal health management.

5. Electronic Textiles:

Wearable electronic / computing system in everyday use, architecture, design and interface, aspects and capabilities of wearable computing and personal empowerment, sixth sense, operational details: power supply, text input system, military applications of electronic textiles, wearable entertainment system, wearable gaming, advantages and disadvantages, future developments.

6. Protective Clothing:

Short term and long term survival, military protective clothing, physical, environmental, camouflage and battlefield requirements for military clothing, principles of ballistic protection, technical fibres and fabrics for ballistic protection, ballistic vests and helmets, protection against fire, protection against extreme weather conditions. Space garments.**Sports Clothing:** User activities, environment and requirements, Material requirements for the design of performance sportswear, high performance fibres and fabrics for sportswear, physiological comfort in sportswear, and protection in sports.

Reference Books :

1. Textiles in sport by R Shishoo, 5th edition Shishoo Woodhead Publication. ISBN: 978-1855739222
2. Handbook of Technical Textiles by A.R. Horrocks and S.C. Anand, 2nd edition. Woodhead Publishing Ltd. ISBN: 978-1782424581
3. Intelligent Textiles and Clothing by H. Mattila Woodhead Publishing Ltd ISBN-13: 978-1845690052
4. Textiles for Industrial Applications By R. Senthil Kumar, CRC publication. ISBN-13: 978-1466566491
5. Medical and Hygiene Textile Production: A Handbook by Allison Mathews andMartin Hardingham, Practical Action publication, ISBN: 978-1853392115
6. Techno Textiles 2: Revolutionary Fabrics for Fashion and Design by Sarah E. Braddock C. ISBN : 978-0500286845

7. Geotextiles by N. W. M. John, Blackie publication, ISBN : 9780412013515
8. Handbook of Industrial Textiles, by Sabit Adanur Wellington Sears publication ISBN-13: 978-1566763400

Course Outcomes:

1. Describe geotextiles functions and applications.
2. Explain manufacturing of tyre cords, parachute and filter fabric
3. Explain engineering of various types of functional garments.
4. Explain wearable electronic system.

FINAL YEAR B. TEXT. – SEMESTER – II

8.5 FASHION PHOTOGRAPHY (FT) (ELECTIVE-II)

Lectures	:	3 Hours / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives:

1. Explain importance of colour in photography.
2. Explain various tools and techniques used in fashion photography.
3. Explain differences between photography in natural light and artificial light.
4. Explain how to edit photos using photo editing tools.

1. Color and Photography:

Introduction, History, Composition, Time chart – Color pertaining to slide photography; the colors of light, the balance of color, forming images, color vision, color psychology, color description – color temperature, wave lengths, focusing distances.

2. Equipment and Darkroom Techniques:

Cameras, system camera, lenses, filters, light meters-their care & maintenance, supports and lights, darkroom layout and equipment- wet areas, dry areas; timers-interval, accumulative; processors- small tank, large tank, drum, automatic. Chemicals – Kodak, Beseler, Uni color, Ilford; processes – E-4, E-6, commercial, processing slides, mounting slides, printing slides, projectors and viewing – slide critique, slide presentations, audio visual designs; identifying and correcting faults, slide storage, terms and identifications.

3. Study of Natural Light:

Sun, Skies, Water, Backlighting in direct light, Indirect and reflected light, Diffused light, Early morning, Mid-day, Dusk, Night, Spring, Summer, Autumn, Winter. Adverse conditions – Taking advantages of poor light, Mist and fog, Rain, Storms, Snow and cold, Heat, Underwater photography.

4. Study of Artificial Light:

Tungsten, Flash, Mixing tungsten and flash, Mixing flash and daylight, Mixing daylight and tungsten with flash, Tungsten and flash as complete sources, Florescent, mercury vapor and mixed sources, Oil lamps, torchlight and matches, Alternative lighting.

5. Subject Lighting:

Portraits, Groups, Nudes, Fashion and beauty, Children, Still life, Architecture, Architecture detail, Interiors, Animals, Indoor sports, Outdoor sports, Copying slide. Color Materials and Methods – color process, choosing color slide films – Daylight, Tungsten 3200 & 3400 degrees, Infrared, Slide copy film, Selecting the exposure,Exposure variations, altering the image in the studio, using lenses, using filters

6. Digital Photo Editing:

White balance, exposure, noise reduction, lens correction, filters, framing, refinements, resizing, sharpening, custom brushes, dodge and burn, clone stamp, frequency separation, colour balance, highlights, layer masks, and blending modes.

Reference Books :

1. Fashion Photography: A Complete Guide to the Tools and Techniques of the Trade by Bruce Smith (2008), Amphoto Books. ISBN: 081742721X.
2. Canon Eos 40d Guide to Digital Photography by David D. Busch (2007), Delmar Cengage Learning. ISBN: 1598635107.
3. John Hedgecoe's Complete Guide To Photography by John Hedgecoe (1995), Sterling. ISBN: 0806984279.
4. Manual of Outdoor Photography by Michael Freeman (1983), Ziff Davis World. ISBN: 0871651122.
5. Lighting Techniques for Fashion and Glamour Photography: For Digital and Film Photographers by Stephen A. Dantzig (2005), Amherst Media. ISBN: 1584281472.
6. Unseen Vogue by Hachette UK (2004), Little Brown. ISBN: 0316727660.

Course Outcomes:

1. Appraise importance of colour in photography.
2. Explain various tools and techniques used in fashion photography.
3. Differentiate between photography in natural light and artificial light.
4. Edit photos using photo editing tools.

FINAL YEAR B. TEXT. – SEMESTER – II

8.5 CONSUMER BEHAVIOUR IN FASHION INDUSTRY(FT) (ELECTIVE-II)

Lectures	:	3 Hours / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

Course Objectives:

1. To explain various factors influencing consumer behavior.
2. To discuss various types of consumer decisions.
3. To describe various issues in ethics and consumer protection.
4. To explain Consumer Learning and information processing.

1. Introduction: Introduction to fashion concepts, Apparel Brands: National versus Private, fashion leadership theories and consumer behavior, cycle of fashion adoption, consumers' impact on marketing, the meaning of consumption, marketing's impact on consumers.

2. Cultural influence on consumer behavior: Culture and its aspects cultural categories, Myths and Rituals,Transferring Product Meaning from Culture to Culture.The Creation of Culture,Culture Production Systems,Fashion Products in Movies, TV, and Video Games, The Diffusion of Innovations,Adopting Innovations,Types of Innovations,Prerequisites for Successful Adoption

3. Consumer characteristics and fashion implications: Individual Consumer Dynamics: Motivation and Values, Theories of Motivation for Wearing Clothes,The Motivation Process, Needs,Consumer Involvement,Values, Individual Consumer Dynamics: Perspectives on the Self,Self-Concept,Consumption and Self-Concept,Sex Roles,Body Image.

4. Demographic Subcultures: Age and Consumer Identity, the Youth Market, Baby Busters: Generation X, the Gray Market, Race and Ethnic Subcultures, Income and Social Class,How Social Class Affects Purchase Decisions, Status Symbols,Psychographics,Trend Forecasting,Consumer Perceptions

5. Types of consumer decision: Consumers as Problem Solvers, Problem Recognition,Information Search, Identifying Alternatives, The Family as a Decision-Making Unit. Consumer Decision-Making Process, Types of Consumer Buying Decisions, Marketing Implications of Involvement, Factors Influencing Buying Decisions, Cultural Influences on Buying Decisions, Value - Core American Values, Culture and Advertising, Content Analysis, Consumer Fieldwork, Value Measurement Instruments, Value Measurement Survey Instruments.

6. Group Influence and Fashion Opinion Leadership: Reference Groups,Fashion Conformity and Individuality,Word-of-Mouth Communication,Opinion Leadership, Buying and Disposing, Situational Effects on Consumer Buying. Consumer Learning – Learning Process and Elements of learning.

Reference Books:

1. Consumer Behavior in Fashion by Michael R. and Nancy Rabolt (2008), Prentice Hall. ISBN:0131714740.
2. Consumer Behavior in Fashion by Michael R. Solomon (2013), Cram. ISBN: 9780131714748.
3. The Psychology of Fashion by Michael R. Solomon (1985), Lexington Books. ISBN: 0669091286.
4. Fashion and the Consumer by Jennifer Yurchisin and Kim K. P. Johnson (2010), Bloomsbury Academic. ISBN: 184520798X.
5. Fashion Branding and Consumer Behaviors by Tsan-Ming Choi (2014), Springer-Verlag. ISBN: 9781493902767.

Course Outcomes:

1. To analyze various factors influencing consumer behavior.
2. To explain various types of consumer decisions.
3. To describe various Issues in ethics and consumer protection.
4. To explain consumer learning and information processing.

FINAL YEAR B. TEXT - SEMESTER-II

8.5 OPERATIONAL RESEARCH (FT) (ELECTIVE II)

Lectures : 3 Hrs / Week

Theory Paper: 100 Marks

Subject Total : 100 Marks

Course Objectives

1. To explain concept on operational research and linear programming.
2. To describe various Assignment and Transportation models.
3. To explain Decision theory
4. To explain Queuing theory

1. Introduction of operational research

History, definition of operational research, concept, methodology, methods of operation research and concept of optimization.

2. Linear programming

Formulation of problem, graphical method, simplex method

3. Assignment models

Mathematical statement, methods to solve balanced and unbalanced assignment problems, branch and bound technique, Hungerian method, trans-shipment problem, travelling salesmen problem

4. Transportation models

North-west corner method, matrix minima method, Vogel's approximation, MODI method

5. Decision theory

Decision trees, decision under risk, decision under uncertainty, decision making with utilities

6. Queuing theory

Introduction, structures of queue forming situations, assumptions involved in queuing theory, Kendall's notation, classification of queuing models, Poisson's arrival and exponential service time, application

Reference Books

1. Operations Research: An Introduction by Hamdy A. Taha, 9th Edition, Pearson publication, ISBN: 978-0132555937
2. Operations Research by R. Panneerselvam Prentice-Hall of India publication, ISBN: 978-8120329287
3. Operations Research: An Introduction, P. Mariappan, Pearson publication, ISBN: 978-8131799345
4. Introduction to Operations Research, by Hillier Lieberman, 9th edition McGraw Hill publication, ISBN: 978-0071333467
5. Introduction to Operations Research by Frederick S. Hillier, 9th edition McGraw-Hill Higher Education, ISBN : 978-0073376295
6. Optimization in Operations Research by Ronald L. Rardin, ISBN: 978-0023984150

Course Outcomes

1. Explain concept on operational research and linear programming.
2. Describe various Assignment and Transportation models.
3. Explain Decision theory
4. Explain Queuing theory

FINAL YEAR B.TEXT. - SEMESTER – II

8.5 CAPM FOR MEN'S AND WOMEN'S WEAR (FT) (ELECTIVE-II)

Lectures : 3 hrs/ week.

Theory Paper: 100 marks.

Sub. Total : 100 marks

Course Objectives

1. To explain concept of CAPM in apparel industry
2. To describe Manufacturing and Service Flow of CAPM
3. To explain CAPM in Supply Chain Management
4. To describe CAPM and Quality of product

1. Introduction to Capital Asset Pricing Model (CAPM):

The formula, Security market line, Asset pricing, Asset-specific required return. Risk and diversification, the efficient frontier, the market portfolio, Assumptions of CAPM Problems of CAPM

2. Computer Aided Process Management (CAPM) in Apparel Industry:

Apparel industry size and structure, Apparel Sector in global economy, the role of labor cost and theories of development, CMMS (Computerized Marker Making System), PDMS (Product Data Management Systems)

3. Manufacturing and Service Flow:

Demand management and forecasting, Inventory management, Managing material flow, work flow and information flow

4. Globalization and current scenario:

Concept of globalization, Strategic imperatives and the diamond framework, Issues of offshore production strategies, role of trade barriers and exchange rate fluctuations in global apparel market

5. **CAPM in Supply Chain Management:**

   Role of Category management in Men's and women's wear retailing, influence of supply chain in new product development, Design Production interface, Lean production system

6. **CAPM and Quality of product**

   Impact of advanced apparel manufacturing technology on quality, Six Sigma, Returns Management.

Reference Books

1. The Apparel Industry by Richard Jones, 2nd Edition, Blackwell Publications, ISBN: 978-1-4051-3599-3.
2. Process Management: Creating Value Along the Supply Chain by Wisner, Joel D.; Stanley, Linda L., Cengage Learning, ISBN: 9780324291575
3. Computer-Aided Pattern Design and Product Development by Alison Beazley, Terry Bond, Blackwell Publications, ISBN: 978-1-4051-0283-4
4. Managing Quality in the Apparel Industry by Pradip V.Mehta,S.K.Bhardwaj, new age publishers, ISBN: 978-8122411669.
5. Garment Manufacturing: Processes, Practices and Technology by Prasanta Sarkar, Online Clothing Study. ISBN: 978-9383701759
6. Pattern making for fashion design by Helen Joseph Armstrong fifth edition, Pearson Education, Inc. ISBN-10: 0-13-606934-7

Course Outcomes

1. Explain concept of CAPM in apparel industry
2. Describe Manufacturing and Service Flow of CAPM
3. Explain CAPM in Supply Chain Management
4. Describe CAPM and Quality of product

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FINAL YEAR B.TEXT.- T.T. (TEXTILE TECHNOLOGY) SEMESTER-I

SR. NO.	COMMON TO COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	COMMON TO COURSE	REVISED SUBJECTS	SEM-ESTER
1.	TT/MMTT	Process Management in Yarn Forming-I	I	TT/MMTT	**Recommended for additional 2 more chances**	I
2	TT	Process Management in Fabric Forming-I	I	TT	**Recommended for additional 2 more chances**	I
3.	TT	Structure & Properties of Fabrics	I	TT	Fabric Science	I
4.	TT/MMTT/TPE	Textile Mill Planning and Organization	I	TT/MMTT/TPE	Textile Mill Planning And Organization	I
5.	TT/MMTT/TPE/TC/FT	Industrial Engineering	I	TT/MMTT	**Recommended for additional 2 more chances**	I
6.	TT	**Elective-I**	I	TT	**Elective- I**	I
		i. Speciality Yarns			**Recommended for additional 2 more chances**	
		ii. Garment Manufacturing Technology			**Recommended for additional 2 more chances**	
		iii. Textile Product Engineering			Textile Product Engineering	
		iv. Economics			Economics and Industrial Laws	
7.	TT/MMTT/TPE/TC/FT	Seminar-I	I	TT/MMTT/TPE/TC/FT	Seminar-I	I
8.	TT/MMTT/TPE/TC/FT	Inplant Training-II	I	TT/MMTT/TPE/TC/FT	Inplant Training-II	I

FINAL YEAR B.TEXT. - T.T. (TEXTILE TECHNOLOGY) SEMESTER-II

SR. NO.	COMMON TO COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	COMMON TO COURSE	REVISED SUBJECTS	SEM-ESTER
1.	TT/MMTT	Process Management in Yarn Forming-II	II	TT/MMTT	**Recommended for additional 2 more chances**	II
2	TT	Process Management in Fabric Forming-II	II	TT/MMTT	**Recommended for additional 2 more chances**	II
3.	TT/MMTT/TPE/TC	Textile Mill Management	II	TT/MMTT/TPE/TC	Textile Mill Management	II
4.	TT/MMTT	Technical Textiles	II	TT/MMTT	Technical Textiles	II
5.	TT	Elective-II:	II	TT	Elective- II:	II
		i. Fashion Technology in Apparel and Made Ups			**Recommended for additional 2 more chances**	
		ii. Home Textiles			Home Textiles and Terry Towel Manufacturing	
		iii. Non-Wovens and Geo Textiles			**Recommended for additional 2 more chances**	
		iv. Maintenance Management in Textile			Maintenance Management in Textile	
		v. Organizational Behaviour and Humanities			Organizational Behaviour and Humanities	
6.	TT/MMTT/TPE/TC/FT	Seminar-II	II	TT/MMTT/TPE/TC/FT	Seminar-II	II
7.	TT/MMTT/TPE/TC/FT	Dissertation	II	TT/MMTT/TPE/TC/FT	Dissertation	II

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FINAL YEAR B.TEXT.- M.M.T.T. (MAN MADE TEXTILE TECHNOLOGY) SEMESTER-I

SR. NO.	COMMON TO COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	COMMON TO COURSE	REVISED SUBJECTS	SEM-ESTER
1.	TT/MMTT	Process Management in Yarn Forming-I	I	TT/MMTT	**Recommended for additional 2 more chances**	I
2	MMTT	Manmade Fabric Manufacture-Iv	I	MMTT	Knitting Technology	I
3.	MMTT	Structure & Properties of Manmade Yarns & Fabrics	I	MMTT	Yarn and Fabric Science	I
4.	TT/MMTT/TPE	Textile Mill Planning and Organization	I	TT/MMTT/TPE	Textile Mill Planning and Organization	I
5.	TT/MMTT/TPE/TC/FT	Industrial Engineering	I	TT/MMTT	**Recommended for additional 2 more chances**	I
6.	MMTT	Elective-I:	I	MMTT	Elective- I:	I
		i. Fibre Composites			Fibre Reinforced Composites	
		ii. Garment Manufacturing Technology			Garment Technology	
		iii. Textile Product Engineering			Textile Product Engineering	
		iv. Economics			Economics and Industrial Laws	
7.	TT/MMTT/TPE/TC/FT	Seminar-I	I	TT/MMTT/TPE/TC/FT	Seminar-I	I
8	TT/MMTT/TPE/TC/FT	Inplant Training-II	I	TT/MMTT/TPE/TC/FT	Inplant Training-II	I

FINAL YEAR B.TEXT.- M.M.T.T. (MAN MADE TEXTILE TECHNOLOGY) SEMESTER-II

SR. NO.	COMMON TO COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	COMMON TO COURSE	REVISED SUBJECTS	SEM-ESTER
1.	TT/MMTT	Process Management in Yarn Forming-II	II	TT/MMTT	**Recommended for additional 2 more chances**	II
2	MMTT	Process Management in Weaving	II	TT/MMTT	Process Management in Fabric Forming	II
3.	TT/MMTT/TPE/TC	Textile Mill Management	II	TT/MMTT/TPE/TC	Textile Mill Management	II
4.	TT/MMTT	Technical Textiles	II	TT/MMTT	Technical Textiles	II
5.	MMTT	Elective-II:	II	MMTT	Elective- II:	II
		i. Fashion Technology in Apparel and Made Ups			**Recommended for additional 2 more chances**	
		ii. Home Textiles			**Recommended for additional 2 more chances**	
		iii. Non-Wovens and Geo Textiles			**Recommended for additional 2 more chances**	
		iv. Maintenance Management in Textile			**Recommended for additional 2 more chances**	
		v. Organizational Behaviour and Humanities			Organizational Behaviour and Humanities	
6.	TT/MMTT/TPE/TC/FT	Seminar-II	II	TT/MMTT/TPE/TC/FT	Seminar-II	II
7.	TT/MMTT/TPE/TC/FT	Dissertation	II	TT/MMTT/TPE/TC/FT	Dissertation	II

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FINAL YEAR B.TEXT.- T.P.E. (TEXTILE PLANT ENGINEERING) SEMESTER-I

SR. NO.	COMMON TO COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	COMMON TO COURSES	REVISED SUBJECTS	SEM-ESTER
1.	TPE	Engineering Design of Textile Machines-II	I	TPE	Engineering Design of Textile Machines-II	I
2	TPE	Theory of Textile Machines-II	I	TPE	Theory of Textile Machines-II	I
3.	TPE	Maintenance of Textile Machines	I	TPE	Maintenance of Textile Machines	I
4.	TT/MMTT/TPE	Textile Mill Planning and Organization	I	TT/MMTT/TPE	Textile Mill Planning and Organization	I
5.	TT/MMTT/TPE/TC/FT	Industrial Engineering	I	TPE	**Recommended for additional 2 more chances**	I
6.	TPE	Elective-I:	I	TPE	Elective- II:	I
		i. Mechatronics			Mechatronics	
		ii. Chemical Processing Machinery			**Recommended for additional 2 more chances**	
		iii. Garment Manufacturing Technology			Garment Technology	
		iv. Energy Conservation in Textiles			**Recommended for additional 2 more chances**	
		v. Process Control in Spinning			Process Control in Spinning	
7.	TT/MMTT/TPE/TC/FT	Seminar-I	I	TT/MMTT/TPE/TC/FT	Seminar-I	I
8.	TT/MMTT/TPE/TC/FT	Inplant Training-II	I	TT/MMTT/TPE/TC/FT	Inplant Training-II	I

FINAL YEAR B.TEXT.-T.P.E.(TEXTILE PLANT ENGINEERING) SEMESTER-II

SR. NO.	COMMON TO COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	COMMON TO COURSES	REVISED SUBJECTS	SEM-ESTER
1.	TPE	Fluid Flow Systems & Controls	II	TPE	Fluid Flow Systems & Controls	II
2	TPE	Instrumentation & Metrology	II	TPE	Instrumentation & Metrology	II
3.	TT/MMTT/TPE/TC	Textile Mill Management	II	TT/MMTT/TPE/TC	Textile Mill Management	II
4.	TPE	Maintenance Management	II	TPE	Maintenance Management	II
5.	TPE	Elective-II:	II	TPE	Elective- II:	II
		i. Condition Based Monitoring Techniques			Condition Based Monitoring Techniques	
		ii. Process Control in Weaving			Process Control in Weaving	
		iii. Fashion Technology in Apparels and Made-ups			**Recommended for additional 2 more chances**	
		iv. Industrial Textiles			**Recommended for additional 2 more chances**	
		v. Organizational Behaviour and Humanities			Organizational Behaviour and Humanities	
6.	TT/MMTT/TPE/TC/FT	Seminar-II	II	TT/MMTT/TPE/TC/FT	Seminar-II	II
7.	TT/MMTT/TPE/TC/FT	Dissertation	II	TT/MMTT/TPE/TC/FT	Dissertation	II

D.K.T.E.SOCIETY'S TEXTILE & ENGINEERING INSTITUTE, ICHALKARANJI.
Equivalence of subject at Final Year B.Text. to Revised Textile Courses.

FINAL YEAR B.TEXT.- T.C. (TEXTILE CHEMISTRY) SEMESTER-I

SR. NO.	COMMON TO COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	COMMON TO COURSE	REVISED SUBJECTS	SEM-ESTER
1.	TC	Technology of Finishing - II	I	TC	**Recommended for additional 2 more chances**	I
2	TC	Apparel Manufacturing Technology	I	TC	**Recommended for additional 2 more chances**	I
3.	TC	Testing & Analysis of Textiles	I	TC	Testing & Analysis of Textiles	I
4.	TC	Theory of Dyeing & Colour Measurements	I	TC	**Recommended for additional 2 more chances**	I
5.	TT/MMTT/TPE/TC/FT	Industrial Engineering	I	TC	**Recommended for additional 2 more chances**	I
6.	TC	Elective-I:	I	TC	Elective- I:	I
		i. Advanced Polymer Chemistry			**Recommended for additional 2 more chances**	
		ii. Advanced Chemical Processing			**Recommended for additional 2 more chances**	
		iii. Energy Management in Chemical Processing			Energy Management in Chemical Processing	
		iv. Economics			Economics and Industrial Laws	
7.	TT/MMTT/TPE/TC/FT	Seminar-I	I	TT/MMTT/TPE/TC/FT	Seminar-I	I
8.	TT/MMTT/TPE/TC/FT	Inplant Training-II	I	TT/MMTT/TPE/TC/FT	Inplant Training-II	I

FINAL YEAR B.TEXT.- T.C. (TEXTILE CHEMISTRY) SEMESTER-II

SR. NO.	COMMON TO COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	COMMON TO COURSE	REVISED SUBJECTS	SEM-ESTER
1.	TC	Garment Processing	II	TC	Garment Manufacturing and Processing	II
2	TC	Processing of Yarn & Speciality Fabrics	II	TC	**Recommended for additional 2 more chances**	II
3.	TT/MMTT/TPE/TC	Textile Mill Management	II	TT/MMTT/TPE/TC	Textile Mill Management	II
4.	TC	Manufacture of Technical Textiles	II	TC	**Recommended for additional 2 more chances**	II
5.	TC	Elective-II:	II	TC	Elective- II:	II
		i. Textile Effluent Treatment			**Recommended for additional 2 more chances**	
		ii. . Fashion Technology in Apparels and Made-ups			**Recommended for additional 2 more chances**	
		iii. Organizational Behaviour and Humanities			Organizational Behaviour and Humanities	
		iv. Merchandising			Merchandising	
6.	TT/MMTT/TPE/TC/FT	Seminar-II	II	TT/MMTT/TPE/TC/FT	Seminar-II	II
7.	TT/MMTT/TPE/TC/FT	Dissertation	II	TT/MMTT/TPE/TC/FT	Dissertation	II

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Equivalence of subject at Final Year B.Text. to Revised Textile Courses.

FINAL YEAR B.TEXT.- F.T. (FASHION TECHNOLOGY) SEMESTER-I

SR. NO.	COMMON TO COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	COMMON TO COURSE	REVISED SUBJECTS	SEM-ESTER
1.	FT	Garment Project Planning & Implementation	I	FT	Garment Project Planning & Implementation	I
2	FT	Industrial Economics & Costing of Apparel Products	I	FT	Economics and Costing in Apparel Industry	I
3.	FT	Advanced Garment Construction	I	FT	Advanced Garment Construction	I
4.	TT/MMTT/TPE/TC/FT	Industrial Engineering	I	FT	**Recommended for additional 2 more chances**	I
5.	FT	Process Management in Apparel & Fashion Industry	I	FT	Apparel Production Planning and Control	I
6.	FT	Elective- I:	I	FT	Elective- I:	I
		i. Fashion Accessories			Fashion Accessories	
		ii. Intellectual Property Rights			**Recommended for additional 2 more chances**	
		iii. Home Textiles in Fashion			Home Textiles in Fashion	
		iv. Textile Product Engineering			**Recommended for additional 2 more chances**	
7.	TT/MMTT/TPE/TC/FT	Seminar-I	I	TT/MMTT/TPE/TC/FT	Seminar-I	I
8.	TT/MMTT/TPE/TC/FT	Inplant Training-II	I	TT/MMTT/TPE/TC/FT	Inplant Training-II	I

FINAL YEAR B.TEXT.- F.T. (FASHION TECHNOLOGY) SEMESTER-II

SR. NO.	COMMON TO COURSE	PRE-REVISED SUBJECTS	SEM-ESTER	COMMON TO COURSE	REVISED SUBJECTS	SEM-ESTER
1.	FT	Clothing Care & Science	II	FT	Apparel Finishing and Care	II
2	FT	Import & Export Management	II	FT	Apparel Export Management	II
3.	FT	Apparel & Fashion Business Management	II	FT	Fashion Retail Management	II
4.	FT	Smart Textiles & Speciality Garments	II	FT	Smart Textiles & Speciality Garments	II
5.	FT	Elective-II	II	FT	Elective- II:	II
		i. Fashion Photography			Fashion Photography	
		ii. Consumer Behaviour in Fashion Industry			Consumer Behaviour in Fashion Industry	
		iii. Operational Research			Operational Research	
		iv. CAPM for Men's & Women's Wear			CAPM for Men's & Women's Wear	
6.	TT/MMTT/TPE/TC/FT	Seminar-II	II	TT/MMTT/TPE/TC/FT	Seminar-II	II
7.	TT/MMTT/TPE/TC/FT	Dissertation	II	TT/MMTT/TPE/TC/FT	Dissertation	II