B.Sc. Apparel Production Technology

Syllabus

AFFILIATED COLLEGES

Program Code: 26S

2023 – 2024 onwards

BHARATHIAR UNIVERSITY

(A State University, Accredited with "A++" Grade by NAAC,
Ranked 21st among Indian Universities by MHRD-NIRF)

Coimbatore - 641 046, Tamil Nadu, India

Program Educational Objectives (PEOs)	
The **B.Sc. Apparel Production Technology** program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PEO1	Graduates will have successful professional careers in Industry & Academia in the field of Apparel Production
PEO2	Graduates will become successful entrepreneur in Apparel and related fields
PEO3	Graduates will continue to learn and advance their careers through attainment of Professional certification and seeking higher education.
PEO4	Graduates will be competent through effective communication, soft skills and teamwork skills and will be able to relate garment industry issues to broader social contexts
PEO5	Graduates will be professional, ethical and demonstrate spirit of excellence and leadership in their successful professional career

Program Specific Outcomes (PSOs)	
After the successful completion of B.Sc. **Apparel Production Technology** program, the students are expected to	
PSO1	To be able to understand the buyer requirements and expectations in terms of domestic and international market trends and quality standards prevailing in the Fashion and apparel industry.
PSO2	Demonstrate the knowledge and understanding of the industrial engineering concepts related to apparel manufacturing
PSO3	Apply domain knowledge and problem-solving skills to solve real time problems in apparel production
PSO4	Designs & develop new methods & procedures for better utilization of resources
PSO5	Have Entrepreneurship and Life Skills to start their own businesses

Program Outcomes (POs)	
On successful completion of the **B.Sc. Apparel Production Technology**	
PO1	Students will be able to understand the principles and techniques of various processes of apparel manufacturing
PO2	understand the principles and concepts of various aspects of industrial engineering techniques in apparel manufacturing
PO3	Demonstrate the knowledge and skills of industrial engineering techniques for improved planning & the utilization of resources
PO4	To study the process & activities and demonstrate the knowledge for developing Procedures & designing process flow
PO5	To be able to identify, analyze and to design an optimal solution to the problems using the tools & techniques
PO6	Demonstrate knowledge and understanding of the management principles and apply these to one's own work to manage projects
PO7	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

BHARATHIAR UNIVERSITY: COIMBATORE 641046

B.Sc. Apparel Production Technology (CBCS PATTERN)

(*For the students admitted from the academic year **2023-2024** and onwards*)

Scheme of Examination

Course Code	Title of the Course	Hours/ Week	Examination				Credits
			Duration in Hours	Maximum Marks			
				CIA	ESE	Total	
	Semester I						
I	Language I	6	3	25	75	100	4
II	English I	6	3	25	75	100	4
III	Core Paper I - Basic Textiles	4	3	25	75	100	4
III	Core Paper II - Apparel Manufacturing Technology	4	3	25	75	100	4
III	Core Paper III - Practical I - Yarn and Fabric Analysis Practical	4	3	20	30	50	2
III	Allied Paper I - Fabric Manufacturing Technology	4	3	25	75	100	4
IV	Environmental Studies	2	3	-	50	50	2
	Total	**30**	**-**	**145**	**455**	**600**	**24**
	Semester II						
I	Language II	6	3	25	75	100	4
II	English II	4	3	25	25	50 @	2
	Naan Mudhalvan Skill Course - Language Proficiency for employability- Effective English	2	-	25	25	50 #	2
	http://kb.naanmudhalvan.in/Special:Filepath/Cambridge_Course_Details.pdf						
III	Core Paper IV – Garment Machines and Equipments	4	3	20	55	75	3
III	Core Paper V - Practical II - Pattern Making Practical	4	3	40	60	100	4
III	Core Paper VI - Practical III - Garment Construction I – Practical	4	3	30	45	75	3

III	Allied Paper II - Textile Chemical Processing	4	3	25	75	100	4
IV	Value Education – Human Rights	2	3	-	50	50	2
	Total	**30**	**-**	**190**	**410**	**600**	**24**

	Semester III						
I	Language III	4	3	25	75	100	4
II	English III	4	3	25	75	100	4
III	Core Paper VII – Industrial Engineering – I	5	3	20	55	75	3
III	Core Paper VIII - Practical IV - Garment Construction II – Practical	6	3	30	45	75	3
III	Allied Paper III - Apparel Quality Control and Quality Assurance	5	3	25	75	100	4
III	Skill based Subject I – Garment Accessories and Trims	4	3	20	55	75	3
IV	Basic Tamil** / Advanced Tamil (OR) Non-major elective - I (Yoga for Human Excellence) / Women's Rights*	2	3	-	50	50	2
	Total	**30**	**-**	**145**	**430**	**575**	**23**
	Semester IV						
I	Language IV	4	3	25	75	100	4
II	English IV	4	3	25	75	100	4
IV	Naan Mudhalvan Skill Course – Digital skills for employability- Office Fundamentals	2	-	25	25	50 @	2
	http://kb.naanmudhalvan.in/Special:Filepath/Microsoft_Course_Details.xlsx						
III	Core Paper IX - Industrial Engineering - II	5	3	20	55	75	3
III	Core Paper X - Mini Project – I and viva voce ##	5	-	12	38	50	2
III	Allied Paper IV - Human Resource Management	4	3	25	75	100	4
III	Skill based Subject II - Production Planning, Control and Inventory Management	4	3	20	55	75	3

IV	Basic Tamil**/Advanced Tamil (OR) Non-major elective -II (General Awareness) *	2	3	-	50	50	2
	Total	**30**	**-**	**152**	**448**	**600**	**24**
	Semester V						
III	Core Paper XI – Industrial Engineering - III	4	3	25	75	100	4
III	Core Paper XII – QMS in Apparel Production	4	3	25	75	100	4
III	Core Paper XIII - Practical V – Computer Applications Practical	4	3	30	45	75	3
III	Core Paper XIV - Mini Project II and viva voce ##	10	-	40	110	150	6
III	Elective Paper I	4	3	25	75	100	4
III	Skill based Subject III – Behavioral Intervention Skills	4	3	20	55	75	3
	Grand Total	**30**	**-**	**165**	**435**	**600**	**24**
	Semester VI						
III	Core Paper XV – Project Work and Viva Voce ##	18	-	50	150	200	8
III	Elective Paper II	4	3	25	75	100	4
III	Elective Paper III	4	3	25	75	100	4
III	Skill based Subject IV – Lean six sigma	4	3	20	55	75	3
V	Extension Activities **	-	-	50	-	50	2
IV	Naan Mudhalvan Skill Course :Employability Readiness- Naandi / Unmati/ Quest / Izapy / IBM Skill Build						
	Total	**30**	**-**	**170**	**355**	**525**	**21**
	Grand Total	**180**	**-**	**967**	**2533**	**3500**	**140**

CIA – Continuous Internal Assessment
CEE – Comprehensive External Examination

* No Continuous Internal Assessment (CIA). Only University Examinations.
** No University Examinations. Only Continuous Internal Assessment (CIA).

@ English II- University semester examination will be conducted for 50 marks (As per existing pattern of Examination) and it will be converted for 25 marks.
# Naan Mudhalvan – Skill courses- external 25 marks will be assessed by Industry and internal will be offered by respective course teacher.

Mark Division for Internship and Project

Paper title	Total Marks	CIA	CEE	
			Evaluation	Viva-Voce
Core Paper X - Mini Project – I and Viva Voce ##	50	12	25	13
Core Paper XIV - Mini Project II and Viva Voce ##	150	40	75	35
Core Paper XV – Project Work and Viva Voce ##	200	50	100	50

Additional Credit Course
Earning Additional credit course is not mandatory for Programme Completion.
Prescribed courses under UGC – SWAYAM/ MOOCS/ NPTEL will be available for the affiliated colleges, as an optional.

List of Elective papers (Colleges can choose any one of the papers as electives)		
Elective – I	A	Technology advancements in apparel production
	B	ERP in Apparel Industry
	C	TQM in Apparel Industry
Elective – II	A	Entrepreneurship
	B	Leadership & Emotional Intelligence
	C	Interpersonal Skills
Elective - III	A	Training & Development
	B	Factory Compliance
	C	Value Stream Mapping


First
Semester

Course Code	13A	Basic Textiles	L	T	P	C
Core	Paper I		-	4	-	4
Pre-requisite	Basic knowledge in science		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Educate about characteristics of different types of textile fibres used in apparel industry
2. Instruct about the various yarn manufacturing methods
3. Teach about the fibre and yarn quality parameters

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Differentiate the characteristics various natural fibres	K3
CO2	Differentiate the production of semi synthetic fibres and their characteristics	K2
CO3	Understand about the production of synthetic fibres and their characteristics	K2
CO4	Understand the principle of cotton spinning system and Differentiate the characteristics carded and combed yarns	K3
CO5	Realize about the advancements in fibres and yarn production methods	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Natural Fibre	12 hours

Classification of textile fibres - Properties of textile fibres. Cotton: Grading of cotton - Properties. Production & properties of Flax & Jute fibres. Production and Properties of silk - varieties of silk. Wool fibre grading –– Properties– comparison of Woollen & Worsted Yarns.

Unit:2	Regenerated Fibre	12 hours

Manufacturing process sequence of viscose fibre. Properties of viscose & Lyocell fibres. Production process & properties of acetate fibres. Brief study about Bamboo, banana & Soyabean fibres. Filament Spinning Techniques.

Unit:3	Synthetic Fibre	12 hours

Polymer & its types. Requirements of fibre forming polymer. Study about manufacturing process of Polyester, Nylon, Acrylic & Spandex fibres & Properties. Brief study about texturization.

Unit:4	Yarn Formation	12 hours

Introduction to yarn classification – Staple spinning system – Production sequence for cotton yarn – Comparison of carded and combed yarn – Yarn winding – waxing – Study of yarn quality parameters – Various yarn & package defects. Introduction to blended textiles. Ply yarn production. Yarn numbering systems.

Unit:5	Advancements in fibres and yarns	12 hours

Introduction to organic cotton. Brief study about micro fibre & hollow fibres. Brief study about OE & Air jet spinning. Study about Fancy yarns. Sewing threads manufacturing process. Introduction to sustainable textiles.

	Total Lecture hours	60 hours

Text Book(s)

1	A text book of fibre science and technology, Mishra, S.P., New Age International Publishers, 2005
2	Textile yarns, Technology, Structure and Applications, Goswami.B.C. Martindale.J.G, Scardino.F.L., Wiley India Pvt., Ltd, 2010

Reference Books	
1	Hand book of textile fibres, Volume II, fifth edition, Gordon Cook, J, Wood head publishing Ltd., 1984
2	Man-made fibres, Moncrieff R W, Newnes-Butterworths, 1975
Related online content	
1.	https://sewguide.com/textile-fibers/
2.	http://textilefashionstudy.com/what-is-textile-fiber-classifications-of-textile-fiber/
3.	https://sites.google.com/site/textileschoolorg/yarn/process-of-yarn-formation
4.	https://www.textileschool.com//448/man-made-regenerated-cellulose-fibres/
Course Designed By: Dr.P.P. Gopalakrishnan	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	S	M	M	L	L	L	M
CO2	S	M	M	L	L	L	M
CO3	S	M	M	L	L	L	M
CO4	S	M	M	L	L	L	M
CO5	S	M	M	L	L	L	M

*S-Strong; M-Medium; L-Low

Course Code	13 B	Apparel Manufacturing Technology	L	T	P	C
Core	Paper II		-	4	-	4
Pre-requisite	Basic knowledge in Apparel Production Processes		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Instruct about weaving preparatory process and weaving
2. Make the students to learn about various woven fabric structures and machine mechanism
3. Teach about knitting machine elements and knit fabric structures

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	List out the various activities of apparel manufacturing process	K2
CO2	Differentiate the various types of cutting machines used and applications of various types of stitches in sewing process	K3
CO3	Analyze the various factors influencing quality in sewing	K3
CO4	Calculate thread consumption for various types of stitches	K3
CO5	Distinguish about the types of trims & accessories used in apparels	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Introduction to Apparel Manufacture	12 hours

Different departments & their role in garment industry. Product types and its influence. Garment analysis and its classification - measurement and size charts for men, women, and children - requirement and breakdown of garments - flow process - torso and bifurcated garments.

Unit:2	Cutting Process & Types of Stitches	12 hours

Fabric Receipt & Cutting process: fabric checking for quality – cutting process & its types – Ticketing & bundling – sewing process -Stitches and seams: basic principles of stitch formation – classification of stitches based on federal standards – detailed study of application of all stitches - comparison of stitches.

Unit:3	Seam Finishing	12 hours

Detailed study on seams classification as per federal standards –seam finishes – devices for introducing fullness. Thread consumption for various types of stitches and garments. Fabric selection techniques – Additional dress making techniques-trimming details for quality look.

Unit:4	Defects in Sewing	12 hours

Detailed study on various stitching, sewing and assembly defects - causes & remedies: skip stitch, unbalanced, puckering, gathering, needle defects, thread problems – quality of threads and its impact on sewing quality – sew ability and its influencing factors – needle cutting index.

Unit:5	Finishing & Packing	12 hours

Fusing and its requirements– interlinings – fusible resin types. Introduction to trims and accessories attachments -label, zips, fasteners – Sewing ticket numbering. Packaging types and materials. Finishing & Packing - Dispatching.

	Total Lecture hours	60 hours

Text Book(s)

1	Apparel Manufacturing Hand Book, Jacob Solinger, Bobbin Media Corporation, 1988
2	Technology of Clothing Manufacture, Herold Carr & B. Latham, Wiley-Blackwell, 1994

Reference Books

1	Knitted Clothing Technology, T. Bracken Berry, Wiley-Blackwell, 1992
Related online content	
1.	https://www.intouch-quality.com/blog/4-sewing-stitches-used-in-manufacturing-and-their-benefits
2.	https://garmentsmerchandising.com/types-of-stitch-used-in-garments/
3.	https://sewguide.com/how-to-sew-seams/
4.	https://ordnur.com/sewing/sewing-defects-solve-with-root-causes/
Course Designed By: Mrs Arundhati Ghoshal	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	M	M	M	M	L	M
CO2	S	M	M	M	M	L	M
CO3	S	M	M	M	M	L	M
CO4	S	S	S	S	S	L	M
CO5	S	M	M	M	M	L	M

*S-Strong; M-Medium; L-Low

Course Code	13 P	Yarn and Fabric Analysis Practical	L	T	P	C
Core		Practical I	-	-	4	2
Pre-requisite		Basic knowledge in fibres & yarns	Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Train the students in testing of yarn for its various parameters
2. Train in various physical & chemical testing of fabrics

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Evaluate & identify the fibre composition in a given blend	K5
CO2	Evaluate the yarn quality parameters such as count, strength & twist	K5
CO3	Evaluate the fabric quality parameters such as CRA, drapability & pilling	K5
CO4	Evaluate the fabric colour fastness to washing, rubbing	K5
CO5	Evaluate the fabric dimensional stability	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Ex.No.1	Determination of count of yarn using wrap reel & weighing scale	04 hours
Ex.No.2	Determination of lea strength & CSP using lea strength tester	06 hours
Ex.No.3	Determination of yarn count from fabric swatch using beesley balance.	04 hours
Ex.No.4	Determination of twist of single yarn using electronic twist tester.	04 hours
Ex.No.5	Analyze the given knitted fabric for its areal density, stitch density, stitch length and yarn count	05 hours
Ex.No.6	Analyze the given sample for its blend composition	05 hours
Ex.No.7	Determination of fabric pilling using ICI pill box	05 hours
Ex.No.8	Determination of fabric bursting strength	04 hours
Ex.No.9	Determination of CRA of fabric using crease recover tester.	04 hours
Ex.No.10	Determination of colour fastness of given sample to washing by using Launderometer.	05 hours
Ex.No.11	Determination of colour fastness of given sample to rubbing by using crock meter	04 hours
Ex.No.12	Determination of dimensional stability% of a given fabric/garment to washing.	05 hours
Ex.No.13	Determination of fabric drape ability using drape meter	05 hours
	Total Lecture hours	**60 hours**

Text Book(s)

1 Principles of Textile Testing, J. E. Booth, Butterworth‟s, 1986

Reference Book

1 Handbook of Textile Testing and Quality Control. Elliot B. Grover and D. S. Hamby. Textile Book Publishers, 1960

Related online content

1 https://textilefocus.com/textile-testing-methods-based-iso-standard

2 https://www.qima.com/testing/textile-fabric/physical-testing-textiles

Course Designed By: Dr.P.P. Gopalakrishnan

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	S	S	M	L	L	L	S
CO2	S	S	M	L	L	L	S
CO3	S	S	M	L	L	L	S
CO4	S	S	M	L	L	L	S
CO5	S	S	M	L	L	L	S

*S-Strong; M-Medium; L-Low

Course Code	1AB	Fabric Manufacturing Technology	L	T	P	C
Allied	Paper I		-	4	-	4
Pre-requisite	Basic knowledge in fibres & yarns		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Discuss the principles & basic mechanisms of knitting and Weaving process
2. Clarify about the formation of various woven and knitted fabric structures
3. Illustrate the defects in woven & knitted fabrics and the remedies

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	List out the various preparatory processes for weaving	K2
CO2	Learn the basic mechanisms of weaving and differentiate the merits and demerits the types of looms used	K3
CO3	Learn the principle of knitting process and various elements of weft knitting machine	K2
CO4	Differentiate the characteristics of basic knit fabric structures	K3
CO5	Learn about flat knitting and warp knitting technologies	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Weaving preparatory processes	12 hours

Different fabric forming methods. Introduction to weaving - Weaving preparatory processes and its objectives (Winding, Warping, Sizing & drawing in).

Unit:2	Weaving Machines	12 hours

Passage of material through a plain power loom – Basic mechanisms of a weaving – Primary, secondary & auxiliary motions – Fabric defects, causes & remedies. Brief study about shuttle less looms. Study Basic weaves (Plain weave, Twill & Satin) and its derivatives

Unit:3	Knitting Machine Elements	12 hours

Comparison of weaving and knitting processes. Principles of weft and warp knitting. Knitting machine elements and description. Classification of knitting machines. Yarn passage diagram of a circular knitting machine. Knitting cycle of latch needle with sinker.

Unit:4	Weft Knit Structures	12 hours

Terms and definitions in knitting. Principal weft knit stitches - Knit, tuck and miss stitch formation and properties - Representation of weft knit stitches – Study of Basic weft knit structures - Needle gating -– Characteristics of basic weft knit structures. Brief study about derivatives of weft knit Structures.

Unit:5	Warp Knitting	12 hours

Knitted fabric faults – Causes and Remedies. Comparison of circular and Flat Knitting – Yarn passage diagram of a flat knitting machine. Warp knitting terminologies – Open lap and closed lap. Basic lapping variations - Study of knitting elements of Tricot and Raschel machines. Comparison of weft and warp knitting.

	Total Lecture hours	60 hours

Text Book(s)

1	Knitting Technology, D.B. Ajgaonkar, Universal Publishing Corporation, Mumbai, 2006
2	Handbook of weaving, Sabit Adanur, SRC Press, 2009

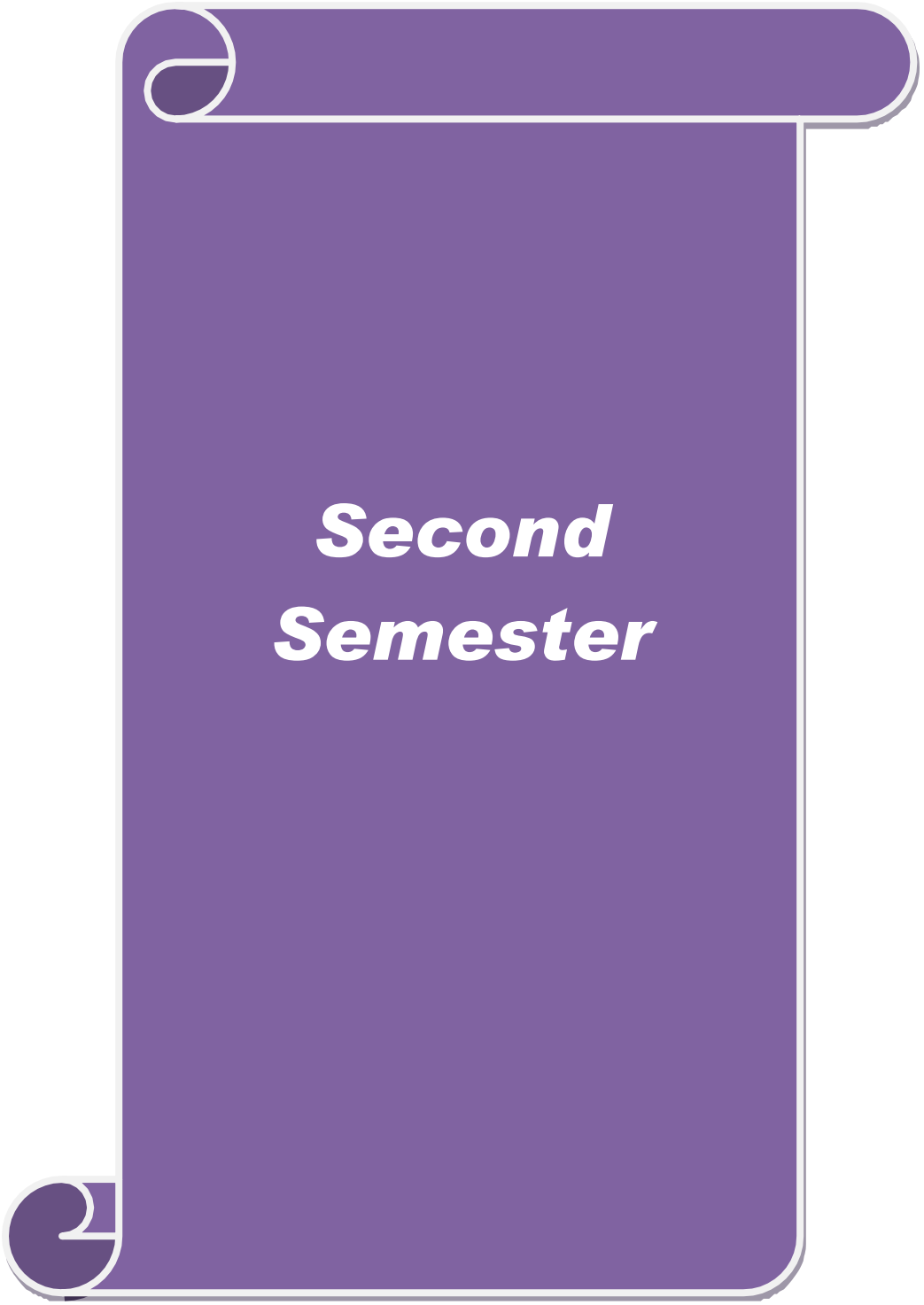
Reference Books

1	Knitting Technology Second Edition, David Spencer, Wood Head Publishing Ltd. England

	1989
2	Flat Knitting, Samuel Raz, Meisenbach Bamberg, 1993
3	Principles of Weaving, R. Marks, A.T.C. Robinson, The Textile Institute, Manchester, 1976
Related online content	
1.	https://nptel.ac.in/courses/116/102/116102005/
2.	https://textilestudycenter.com/classification-of-loom/
3.	https://www.textileschool.com/246/basics-weaving-woven-fabrics/
4.	https://textilestudycenter.com/fundamentals-warp-knitting/
Course Designed By: Dr.P.P. Gopalakrishnan	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	S	L	L	L	L	L	M
CO2	S	L	L	L	L	L	M
CO3	S	L	L	L	L	L	M
CO4	S	L	L	L	L	L	M
CO5	S	L	L	L	L	L	M

*S-Strong; M-Medium; L-Low


Second
Semester

Course Code	23 A	Garment Machines and Equipment	L	T	P	C
Core	Paper III		-	4	-	3
Pre-requisite	Basic knowledge in garment production processes		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Teach about methods of pattern making and marker making
2. Impart learning about choice of cutting & sewing machines for apparel production
3. Educate the principles of fusing & pressing of garments

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	List out the patter making methods & spreading types	K2
CO2	Differentiate the applications of various types of cutting machines	K3
CO3	Evaluate the significance of various elements of sewing machines	K3
CO4	Differentiate the applications of various types of sewing machines	K2
CO5	Gain knowledge of about the fusing & pressing machines	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Pattern Making & Spreading	12 hours

Apparel Production: - Definition- fundamentals- basic types of process. -Pattern making- Drafting –Draping – Grading & Marker planning - Marker Efficiency-Factors affecting marker efficiency. - Marker duplicating methods – Computer aided marker making. Spreading-Introduction - Requirements of the process- Methods of spreading- Spreading quality specification - Equipments and tools.

Unit:2	Cutting Machines	12 hours

Fabric cutting – Objective- method. - Cutting equipment and tool analysis- Fabric cutting machineries- Vertical reciprocity cutting machine - rotary cutting machine- band knife cutting machine- die-cutting machine - clickers& pressers - cutting drills- laser cutting, plasma cutting - water jet cutting - ultrasonic cutting-cutting method analysis- computerized cutting machine, shade ticketing machine.

Unit:3	Sewing Machine Elements	12 hours

Concept of Sewing. Sewing machine – Parts and functions, identification and classification, bed types, classification of stitching mechanism, presser feet, feed mechanism, rotary feed, platform feed, other types prime feed and auxiliary feed. Special attachments in sewing machines

Unit:4	Sewing Machine Types	12 hours

Sewing machinery & Equipments- Tables& auxiliary equipment – Types, basic sewing machine- general sewing, –SNLS, DNLS, over lock, blind stitching, buttonholes, bar tacking, button sewing, label sewing, special sewing machine, Embroidery sewing machines, mechanized work place, work aids and its types. Latest developments in sewing machines. Sewing machine maintenance.

Unit:5	Finishing Machines	12hours

Fusing equipment, methods of fusing. Pressing- Introduction, means of pressing, pressing equipment and methods: iron, steam press, steam air finisher, steam tunnel, pleating, permanent press. Garment folding-types Packaging- method and equipments.

	Total Lecture hours	60 hours

Text Book(s)

1	The Technology of Clothing Manufacture, Harold Carr and Barbara Latham, Blackwell Science Ltd, England, 1994

2	Introduction to Clothing Manufacture, Gerry Cooklin, Blackwell Science Ltd, England, 1991
Reference Books	
1	Apparel Manufacturing Handbook, Jacob Solinger, Van Nostrand Reinhold Company, 1980
2	Apparel Manufacturing Sewn Product Analysis, Ruth E. Glock and Grace I. Kunz Pearson, Prentice Hall, 2005.
Related online content	
1.	https://garmentsmerchandising.com/fabric-cutting-machines-apparel/
2.	https://www.onlineclothingstudy.com/2017/03/different-types-of-industrial-sewing.html
3.	https://textilecourse.blogspot.com/2018/04/different-types-sewing-machines.html
4.	https://sewguide.com/types-of-sewing-machines/
Course Designed By: Mrs.V.N. Narmadha Devi	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	S	S	M	M	M	L	M
CO2	S	S	M	M	M	L	M
CO3	S	S	S	S	S	L	M
CO4	S	S	M	M	M	L	M
CO5	S	S	M	M	M	L	M

*S-Strong; M-Medium; L-Low

Course Code	23 P	Pattern Making Practical	L	T	P	C
Core	Practical II		-	-	4	4
Pre-requisite	Basic knowledge in garment measuring points & use of computers		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Train the students in preparing patterns for various styles
2. Enable the students to grade the prepared pattern for various sizes

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Understand the measurement chart and specifications & gain knowledge about allowances at various points	K2
CO2	Apply the knowledge and draft the pattern manually as well as using CAD software	K2
CO3	Create pattern any given measurement manually as well as using CAD software	K3
CO4	Grade the pattern for any size from basic size manually as well as using CAD software	K5
CO5	Calculate the maker efficiency and apply ways to reduce wastage	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Part A		30 hours
Styles		
Ex.No.1	Men's Basic T Shirt	2 hours
Ex.No.2	Raglan with Pocket	3 hours
Ex.No.3	Men's Polo T Shirt	3 hours
Ex.No.4	Men's Trouser	3 hours
Ex.No.5	Men's T-Shirt with hood	3 hours
Ex.No.6	Men's Inner Garment – Vests RN / RNS	2 hours
Ex.No.7	Brief	2 hours
Ex.No.8	Ladies Skirt	2 hours
Ex.No.9	Women's Nightwear	2 hours
Ex.No.10	Kid's Wear – Romber	2 hours
Ex.No.11	Kid's Wear – A Line frock	3 hours
Ex.No.12	Children's Suits and Pyjama	3 hours
Part B		**30 hours**

1. Create Pattern on computer screen, adding details to patterns.
2. Saving, extracting & editing patterns from stock library of Patterns.
3. Grading patterns on different size scale.
4. Making Marker plan for cutting fabrics.
5. Estimating lay length and calculating marker efficiency.
6. Fit analysis of the given pattern.

	Total Lecture hours	60 hours

Text Book(s)

1	Professional pattern making for designers – women's wear men's casual wear, Jack Handford, Fairchild Publications, 2003
2	Pattern making for fashion design, Helen Joseph Armstrong, Pearson Publications, 2003

Reference Book

1	Pattern cutting for clothing using CAD, Lectra & Modaris, M. Stott, Woodhead Publishing, 2012
Related online content	
1	https://www.textileschool.com/293/pattern-making
2	https://www.thecreativecurator.com/pattern-making
Course Designed By: Mrs.V.N. Narmadha Devi	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	S	M	M	M	M	L	M
CO2	S	M	M	M	M	L	M
CO3	S	M	M	M	M	L	M
CO4	S	M	M	M	M	L	M
CO5	S	M	M	M	M	L	M

*S-Strong; M-Medium; L-Low

Course Code	23 Q	Garment Construction I - Practical	L	T	P	C
Core	Practical - III		-	-	4	3
Pre-requisite	Basic knowledge in types of sewing machines & stitches		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Make the students to Practice and learn sewing various shapes
2. Make them to draft patterns for various components
3. Impart learning about sewing of various components

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Threading the machines and prepare samples for sewing	K5
CO2	Prepare of samples of different types of seams & fullness	K5
CO3	Prepare of samples of different types sleeves	K5
CO4	Prepare of samples of different types collars	K5
CO5	Prepare of samples of different types plackets & pockets	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Ex.No.1	Threading practice for SNLS machine Over Lock machine, Flat Lock machine	8 hours
Ex.No.2	Sample preparations for SNLS machine Over Lock machine, Flat Lock Machine.	8 hours
Ex.No.3	Preparation of samples for seam (any 5)-plain, Top Stitched, Flat fell, piped seam	8 hours
Ex.No.4	Preparation of samples for seam finishes (any 3) - overcast, Hem, Edge Stitched, bound.	4 hours
Ex.No.5	Preparation of samples for fullness-darts, tucks (any 3)-pin, cross, group Tucking with scalloped effect, Pleats (any 3)-knife, box, kick, gathering bymachine, elastic. Ruffles-single, double.	4 hours
Ex.No.6	Preparation of samples for facing and binding-bias facing, shaped facing, Binding.	4 hours
Ex.No.7	Preparation of samples for plackets -continuous, bound, faced and zipper Plackets, Tailored Placket, button and buttonhole, press, button, hook and eye.	4 hours
Ex.No.8	Preparation of samples for sleeves-plain sleeve, puff sleeve, raglan and kimono sleeve	4 hours
Ex.No.9	Preparations of samples with yoke –simple yoke, yoke supporting fullness.	4 hours
Ex.No.10	Preparation of samples for collar - peter pan collar, shirt collar	4 hours
Ex.No.11	Preparation of samples for pocket-patch Pocket	4 hours
Ex.No.12	Safety practices while working on sewing machine. Care and maintenance on Sewing machine.	4 hours
	Total Lecture hours	**60 hours**

Text Book(s)

1	The Technology of Clothing Manufacture, Harold Carr& Barbara Latham Black well Sciences, 1996
2	Apparel Manufacturing Handbook: Analysis, Principles and Practice, Jacob Solinger, Bobbin

	Media Corporation, 1988
3	Apparel Manufacturing Sewn Product Analysis, Ruth E. Glock and Grace I. Kunz, Pearson Prentice Hall, 2005.
Reference Books	
1	Sewing for the Apparel Industry, Shaeffer Claire, Prentice Hall, New Jersey, 2001.
2	A New Look at Apparel Mechanization, Technical Advisory Committee of AAMA, 1978.
Related online content	
1	https://ncert.nic.in/vocational/pdf/ivsm103.pdf
2	https://www.textileschool.com/258/garment-construction-techniques
Course Designed By: Mrs.R. Sneha	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	L	S	S	S	S	L	M
CO2	L	S	S	S	S	L	M
CO3	L	S	S	S	S	L	M
CO4	L	S	S	S	S	L	M
CO5	L	S	S	S	S	L	M

*S-Strong; M-Medium; L-Low

Course Code	2AB	Textile Chemical Processing	L	T	P	C
Allied	Paper II		-	4	-	4
Pre-requisite	Basic knowledge in fibre chemistry & basic science		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Describe the basics of preparatory processes for textile colouration
2. Describe the selection of dyes & machines for dyeing & printing of various fibres
3. Elaborate about the various types of finishing available for weft knitted structures

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Define the process route for various textile materials	K2
CO2	Define the selection of machine & dyes for dyeing process	K3
CO3	Select the right method and technique for printing	K3
CO4	Identify the fabrics with various finished effects	K4
CO5	Understand the importance of ETP and merits of enzymes	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Preparatory processes	12 hours

Water: water hardness – types - softening process. Preparatory process sequence for woven & knitted fabrics and its objectives (Singeing, Desizing, scouring, Bleaching & Mercerization)– Role of Textile auxiliaries used in processing industry

Unit:2	Dyeing process	12 hours

Concept of colour - classification of dyes – Dyeing of cotton with reactive dyes. Dyeing of polyester with disperse dyes –Dyeing of blended textile materials – Principles of different dyeing machines: soft flow –Cheese and HTHP beam machines – merits & demerits. Brief study of Garment dyeing

Unit:3	Printing process	12 hours

Introduction to printing - Various methods of printing – Screen Preparation process –Digital printing concept. Styles of printing. After treatment of printed materials.

Unit:4	Finishing	12 hours

Objectives – Types. Mechanical finish: Calendaring – Compacting –Raising – Shearing & Cropping – Sueding – Stentering – Sand blasting - Novel trends in finishing: Acid, Stone, Enzyme, Peach finish, & Aroma finish. Brief study about chemical finishing

Unit:5	Latest techniques, Eco process & Quality control	12 hours

Computer Colour Matching – Airflow dyeing techniques – Effluent Treatment Process – Application of enzymes in processing industry.

	Total Lecture hours	60 hours

Text Book(s)

1	Technology of Bleaching and Dyeing of Textile Fibres Vol.1, Part I, Chakravarthy RR And Trivedi S.S, Mahajan Book Publishers, 1979
2	The Bleaching and Dyeing of Cotton Material, Prayag R.S, Weaver‟s Service Cent, 1983

Reference Books

1	Dyeing and chemical technology of textile fibres, E.R. Trotman, Charles Griffin & Co.,1970
2	Textile Colouration and Finishing, Warren.S. Perkins, Carolina Academic Press, Durham,

	North Carolina, 1996
Related online content	
1.	http://textilefashionstudy.com/process-flow-chart-of-dyeing-textile-materials-basic-structure-of-wet-processing-technology/
2.	https://www.creative-enzymes.com/resource/Application-Of-Enzymes-In-Textile-Industry_62.html
3.	https://www.contrado.co.uk/blog/printing-methods-differences/
4.	http://neoakruthi.com/blog/etp-for-textile-industry.html
Course Designed By: Dr.P.P. Gopalakrishnan	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	S	L	L	L	L	L	M
CO2	S	L	L	L	L	L	M
CO3	S	L	L	L	L	L	M
CO4	S	L	L	L	L	L	M
CO5	S	L	L	L	L	L	M

*S-Strong; M-Medium; L-Low


Third
Semester

Course Code	33A	Industrial Engineering – I	L	T	P	C
Core	Paper VII		-	5	-	3
Pre-requisite	Basic knowledge in sewing process		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Impart the significance of process standardization,
2. Teach about method study and time study procedures
3. Discuss about the importance of operatory training and methodology

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Learn and implement methods for Individual and group process standardization	K2
CO2	Do method study for an activity and design suitable lay out	K3
CO3	Derive standard time for an operation	K4
CO4	Do capacity calculation for a given information	K4
CO5	Understand the importance of operator training and its impact on productivity	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	**Individual process and group process standardization**	**12 hours**

Introduction to Industrial Engineering – Need of IE – Different production measurement techniques –Individual process standardization procedure – Its impact in factory costing and performanceimprovement. Introduction to group process and its importance – Need of group process improvement – Its impact in factory costing and performance improvement

Unit:2	**Method Study**	**12 hours**

Movements – Rules of right and wrong movements – Stages – Skill Analysis – Attention points – Work station layout – How to draw work station layout, Principles of Work station layout – Method study procedure – Method improvements tools.

Unit:3	**Time Study procedure**	**12 hours**

Introduction to work measurement – Time study procedure – GSD (General Sewing Data) – How to take observe timing – Performance rating – Performance rating using cards and walking – Normal Time – Allowances and its different types – Deriving Standard Time (Standard Allowed Minute/ Standard Minute Value)

Unit:4	**Production calculations**	**12 hours**

Standard Time calculation practice – Time study sheet – Capacity calculation procedure and the practice – Efficiency calculation and the practice – Potential production pieces calculation and the Practice.

Unit:5	**Operator training methodology**	**12 hours**

New trainees training – Steps involved – Induction – Machine knowledge and Maintenance – Foundation skills – Loop exercise and steps – Operation skills training – Operation skills identification – Training exercise development – Effective instruction – Sequence of Instruction – Trainability assessment – Low performer improvement steps

	Total Lecture hours	**60 hours**

Text Book(s)

1	Industrial Engineering in Apparel Production: V. Ramesh Babu, Woodhead Publishing India, 2011
2	Industrial Engineering Manual for the Textile Industry, Enrick, Norbert Lloyd, R. E. Krieger Pub. Co., 1978

Reference Books

1	Maynard`s industrial engineering handbook 5th Edition, Kjell B. Zandin, Mc Graw Hill, 2001
2	Industrial engineering and management, Khanna, O.P, Dhanpat Rai Publications, 2018
Related online content	
1.	https://garmentsmerchandising.com/process-flow-chart-of-industrial-engineering-ie/
2.	http://work-study.info/time-study-in-apparel-industry/
3.	https://texeducation.wordpress.com/2014/04/12/time-study-in-industrial-engineering-rmg/
4.	https://apparelresources.com/business-news/manufacturing/operator-training-apparel-manufacturing/
Course Designed By: Dr.P.P. Gopalakrishnan	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	L	S	S	S	S	S	M
CO2	L	S	S	S	S	S	M
CO3	L	S	S	S	S	S	M
CO4	L	S	S	S	S	S	M
CO5	L	S	S	S	S	S	M

*S-Strong; M-Medium; L-Low

Course Code	33P	Garment Construction II - Practical	L	T	P	C
Core	Practical IV		-	-	6	3
Pre-requisite	Basic knowledge in pattern making & sewing		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Make the students to get practice on use of various types of sewing machines
2. Impart knowledge to cut fabric as per pattern & construction of garment

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Work on various types of sewing machines	K4
CO2	Decide & choose suitable sewing machines for construction	K4
CO3	Set the machine as per quality requirements	K5
CO4	Sew the parts as per specification	K6
CO5	Identify causes for defects and able to rectify it	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

I Men's Style		
Ex.No.1	Men's Basic T Shirt	06 hours
Ex.No.2	Raglan with Pocket	07 hours
Ex.No.3	Men's Polo T Shirt	07 hours
Ex.No.4	Men's Trouser	06 hours
Ex.No.5	Men's T-Shirt with hood	07 hours
Ex.No.6	Men's Inner Garment – Vests RN / RNS	06 hours
Ex.No.7	Brief	06 ours
II. Women's Style		
Ex.No.1	Ladies Skirt	06 hours
Ex.No.2	Women's Nightwear	06 hours
III. Kid's Style		
Ex.No.1	Kid's Wear – Romber	06 hours
Ex.No.2	Kid's Wear – A Line frock	06 hours
Ex.No.3	Children's Suits and Pyjama	06 hours
	Total Lecture hours	**75 hours**

Text Book(s)

1	Illustrated Guide to Sewing: Garment Construction: A Complete Course on Making Clothing for Fit and Fashion Paperback, Colleen Dorsey, Fox Chapel Publishing, 2011

Reference Books

1	Clothing Construction, Clara M, Brown, Owens Press, 2011
2	Garment construction skills, Premlata Mullick, 2017

Related online content

1	https://www.textileschool.com/258/garment-construction-techniques
2	https://www.youtube.com/watch?v=n0c2TY5JKI4

Course Designed By: Mrs.R. Sneha

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M	S	S	S	S	L	M
CO2	M	S	S	S	S	L	M
CO3	M	S	S	S	S	L	M
CO4	M	S	S	S	S	L	M
CO5	M	S	S	S	S	L	M

*S-Strong; M-Medium; L-Low

Course Code	3AA	Apparel Quality Control and Quality Assurance	L	T	P	C
Allied	Paper III		-	5	-	4
Pre-requisite	Basic knowledge about defects in products		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Instruct about various test for yarns, fabrics & garments
2. Describe about various levels of inspection & its procedure in apparel production
3. Describe about various norms & standards followed in testing and inspection

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Understand the Inspection process, its types & its importance	K2
CO2	Evaluate the quality of raw material through inspection & testing	K2
CO3	Identify various defects occur during apparel production and its causes	K3
CO4	Be trained about the final inspection procedure	K2
CO5	Learn about care instructions & assess the standards used in apparel production	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Quality & Inspection	15 hours

Importance of Quality. Quality terminologies. Objectives of Testing - atmospheric conditions for testing lab. Quality problems in fabric, sewing threads & other accessories. Introduction to inspection - Definition - Types of Inspection

Unit:2	Raw Material Testing	12 hours

Fabric inspection systems Testing of Sewing thread, zippers, Buttons, elastic waist bands and Fusible interlinings**.** In process inspection and its significance in apparel quality.

Unit:3	In process Inspection	12 hours

Defects in pattern making, spreading, Sewing, Ironing & Packing. Assembly defects in sewing. Testing of Seam strength & seam slippage, needle cutting / yarn severance, sewability of fabrics.

Unit:4	Final Inspection	12 hours

Concept of AQL. Final inspection procedures & MIL STD standards. Categories of defects. Package quality testing.

Unit:5	Standards	12 hours

Tools of quality control. Introduction to Care labels. Brief study about Testing Standards. Brief study about Oeko-Tex Standards.

	Total Lecture hours	60 hours

Text Book(s)

1	Physical Testing of Textiles, B P Saville, Woodhead Publishing, 1999
2	Managing Quality in Apparel Industries, Pradeep V Metha & Satish K. Bhardwaj, NIFT, 1998

Reference Books

1	Evaluating apparel quality, Sue Humphries Sharp, Linda B Donnell & Anitha A Stamper, Fairchild Books, 1991
2	Textile Testing, Arindam Basu, South India Textile Research Association, 2006

Related online content

1.	http://textilemerchandising.com/quality-assurance-and-quality-control/
2.	https://insight-quality.com/garment-quality-control-procedures/

3.	https://garmentsmerchandising.com/acceptable-quality-level-apparel-industry/
4.	http://texhour.com/aql-and-type-of-defects
Course Designed By: Dr.P.P. Gopalakrishnan	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	S	M	M	M	M	L	S
CO2	S	M	M	M	M	L	S
CO3	S	M	M	M	M	L	S
CO4	S	M	M	M	M	L	S
CO5	S	M	M	M	M	L	S

*S-Strong; M-Medium; L-Low

Course Code	3ZA	Garment Accessories and Trims	L	T	P	C
Skill Based Subject	Skill Based Subject I		-	4	-	3
Pre-requisite	Knowledge about the types of accessories & trims used in garment		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Educate about various types of trims & accessories used in apparels
2. Teach about the quality requirements

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Distinguish the types of accessories used in garment	K2
CO2	Differentiate the types of fibres used in making sewing & embroidery threads	K3
CO3	Assess the various types of closures used in apparels	K3
CO4	Learn about the various types of trims used	K3
CO5	List out the quality requirements for polybag & carton box	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Garment Accessories	09 hours

Introduction to garment accessories - Selecting garment accessories - Types of garment accessories: Basic accessories - Decorative accessories - Finishing accessories –Accessories for children's wear - Design development for different accessories - Safety issues for different accessories in children's garment - Small parts: choking hazards - Decorative trims and Embellishments.

Unit:2	Sewing and embroidery threads:	09 hours

Sewing threads – Textile fibres used for making sewing threads – Thread Construction – Ticket Number – Quality parameters applicable to sewing threads and testing– Thread packages - Embroidery threads – Quality requirements – Fibres used for embroidery threads - Quality evaluation of embroidery threads

Unit:3	Closures	09 hours

Zippers – Component parts - Types – Application techniques - Quality parameters and testing - Buttons – types – Quality requirements & testing procedures –Elastic – Application techniques – Types – Quality requirements and testing procedures. Draw strings – Method of application - Quality parameters – Velcro - Method of application techniques – Quality parameters – Snap fastness –Types – Method of application - Quality parameters- Hooks – types – Methods of application –Quality Norms

Unit:4	Supporting & Decorative Trims	09 hours

Lining : Importance - Method of application – Quality requirements – Interlining : Importance - Types - Method of application – Quality requirements - Fusing foam : importance – Types – Method of application – Quality requirements – Label and its types – Method application on garment – Quality requirements – Lace – Importance and its types – Quality parameters – Method of application – Appliqué : Importance – Types of materials – Applique cutting techniques – Application methods – Quality requirements . Sequins: Introduction about various sequins and their types – Application techniques – Quality requirements.

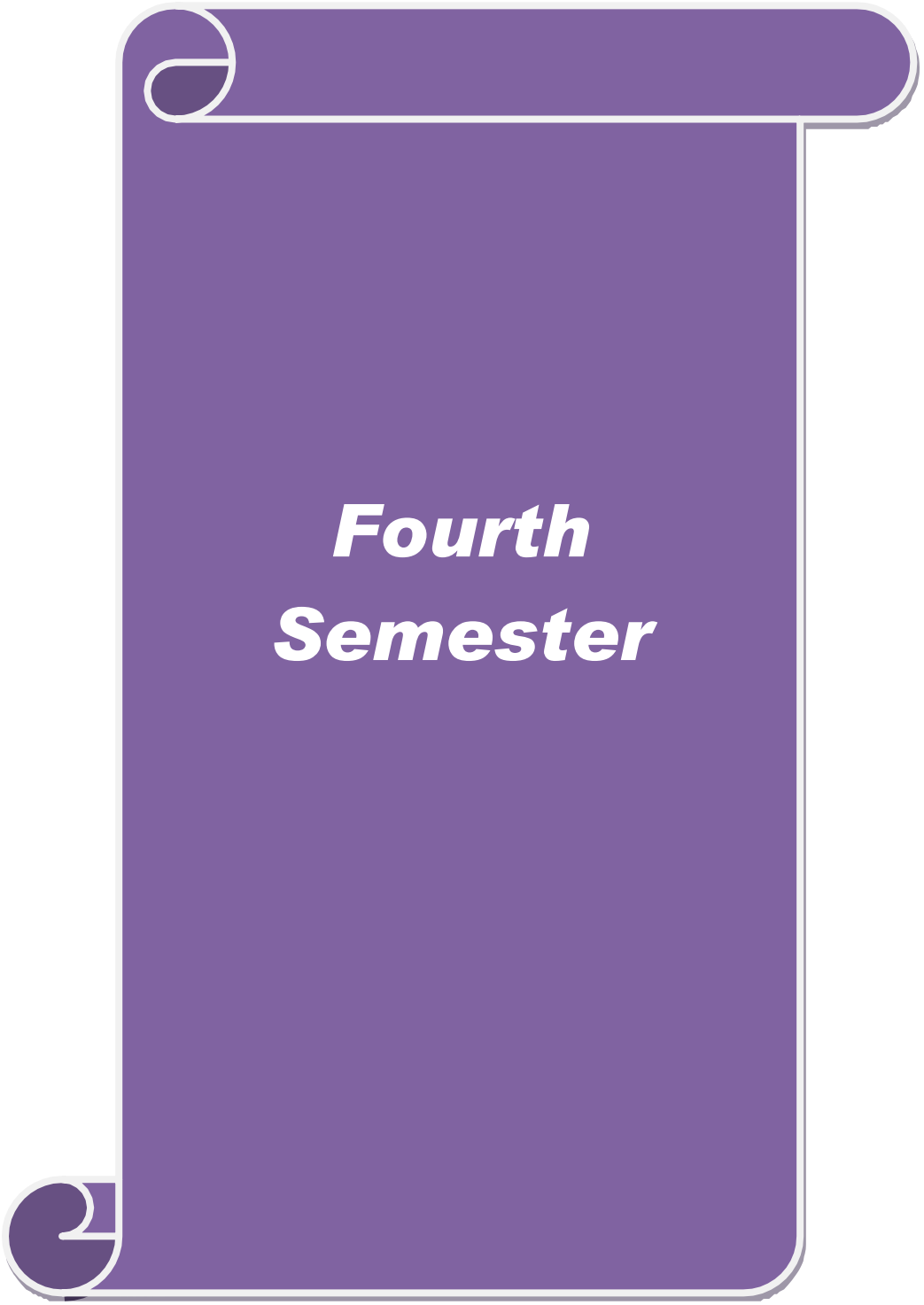
Unit:5	Packing Accessories	09 hours

Tags and its types – Quality requirements – Poly bags and its types - Quality norms pertaining to poly bags – Hangers and its types – Cartons and its types –Testing required for apparel export Cartons – Factors to be considered for export cartons - Wrappers and Tissues – Pouches for

inner wear – Latest innovation in packing accessories		
	Total Lecture hours	**45 hours**
Text Book(s)		
1	Fashion apparel accessories & home finishing‟s, Diamond Professor Emeritus, Jay; Diamond Ajunct Faculty, Ellen., Prentice Hall, 2006	
2	Know Your Fashion Accessories, Celia Stall-Meadows, Tana Stufflebean, Fairchild Books & Visuals, 2003	
Reference Books		
1	Carr and Latham‟s Technology of Clothing Manufacture, Edited by David J. Tyler, 2009	
2	Apparel Manufacturing Handbook, Analysis, Principles and Practice, Jacob Solinger, Bobbin Media Corporation, 1988	
Related online content		
1.	https://ordnur.com/textile/list-of-trimmings-and-accessories-use-in-garments/	
2.	https://www.onlineclothingstudy.com/2018/10/the-fusing-technology-fusing-parameters.html	
3.	https://apparelresources.com/fashion-news/trends/trims-and-accessories-from-being-functional-to-giving-an-innovative-edge-to-garments/	
4.	https://medium.com/@stitchdiary/importance-of-decorative-trims-in-the-garment-industry-3b306e4b59ef	
Course Designed By: Ms.B. Jeyanthi		

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	S	M	S	M	M	L	M
CO2	S	M	S	M	M	L	M
CO3	S	M	S	M	M	L	M
O4	S	M	S	M	M	L	M
CO5	S	M	S	M	M	L	M

*S-Strong; M-Medium; L-Low


Fourth
Semester

Course Code	43A	Industrial Engineering – II	L	T	P	C
Core	Paper IX		-	5	-	3
Pre-requisite	Basic knowledge about sewing & concepts of IE		Syllabus Version			2023-2024

Course Objectives:

The main objectives of this course are to:

1. Instruct about types of production systems in apparel manufacturing
2. Make the students to learn about takt time concept, bottle neck management, NPT and MMR and itsimpact on cost

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Differentiate the merits and demerits of various types of production systems	K3
CO2	Calculate takt time and draw Yamazumi chart	K4
CO3	Suggest ways for Bottle neck management	K4
CO4	Learn about NPT capturing	K3
CO5	Learn about the significance of man machine ratio on process cost	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Production systems	12 hours

Different production systems – Its advantages and disadvantages – Line production system – Progressive bundle system and Single piece flow – Modular production system – Batch production system – Unit production system – Eton system

Unit:2	Takt time concept	12 hours

Takt time introduction – Importance of takt time in lean methodology –How to derive Takt time – Yamazumi chart with FTT (First Time Through) – Plotting sequence of operation using Takt time cart – Initial line balancing – Operation bulletin development

Unit:3	Bottle neck management	12 hours

Importance of bottle neck management – Impact of un-balanced/ balanced line – Different bottle neck management techniques and its cost impact – Hourly production capturing – Dynamic line balancing and frequency of dynamic line balancing

Unit:4	Factors affecting production efficiency	12 hours

Introduction to Non-productive Time (NPT) – Capturing Non-productive time – Machine break time – Feeding delays – Style changeover time – Rework impact in production efficiency – Methods of operator and the skill level

Unit:5	Man Machine Ratio	12 hours

Procedure to derive actual Man – Machine Ratio – Importance of Man – Machine Ratio – International standard – How to reduce MMR – Self checking – Self trimming concept – Staff allocation using MMR Concept

	Total Lecture hours	60 hours

Text Book(s)

1	Industrial Engineering in Apparel Production: V. Ramesh Babu, Woodhead Publishing India, 2011
2	Industrial Engineering Manual for the Textile Industry, Enrick, Norbert Lloyd, R. E. Krieger Pub. Co., 1978

Reference Books

1	Maynard`s industrial engineering handbook 5th Edition, Kjell B. Zandin, Mc Graw Hill, 2001
2	Industrial engineering and management, Khanna, O.P, Dhanpat Rai Publications, 2018

Related online content	
1.	https://www.onlineclothingstudy.com/2011/09/garment-production-systems.html
2.	https://textilestudycenter.com/garment-production-system/
3.	https://tulip.co/blog/lean-manufacturing/what-is-takt-time/#:~:text=Takt%20time%20is%20the%20rate,measure%20of%20output%20against%20demand.
4.	https://www.jjsmanufacturing.com/blog/what-is-takt-time-why-is-it-important-and-how-to-calculate-it
Course Designed By: Mrs.V.N. Narmadha Devi	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M	S	S	S	S	L	M
CO2	M	S	S	S	S	L	M
CO3	M	S	S	S	S	L	M
CO4	M	S	S	S	S	L	M
CO5	M	S	S	S	S	L	M

*S-Strong; M-Medium; L-Low

Course Code	47V	Mini Project – I and Viva Voce	L	T	P	C
Core	Paper X - Viva Voce		-	-	5	2
Pre-requisite	Basic knowledge about concepts of method study. Time study , takt time & OB		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Enable the students to understand the right method of doing the sewing process.
2. Enable the students to understand and derive the standard time for each operation of garment assembly and estimation total garment SAM
3. Enable the students to understand the takt time concept and develop operation bulletin for a product.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Study sewing method, identifying wrong movements and stages	K5
CO2	Develop improved method by eliminating wrong movements and stages	K6
CO3	Measuring the work and establishing standards time	K3
CO4	Calculate takt time for a product	K3
CO5	Develop OB for given style	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Develop new method of sewing by eliminating unnecessary stages and movements and to estimate the productivity improvement and quality.
Deriving standard time for each operation and for total garment for any one style
Development of Takt time Operation Bulletin (OB) for one product in apparel factory with proper establishment of method study and time study procedure. Students have to prepare report and assessment is done by viva voce examination.

	Total Lecture hours	**75 hours**

Text Book(s)

1	Industrial Engineering in Apparel Production: V. Ramesh Babu, Woodhead Publishing India in Textiles, 2011

Reference Book

1	William K Hodson, “Maynard‟s Industrial Engineering Handbook”, Mc Graw-Hill, Inc., New York,1992
2	Industrial Engineering in Apparel Manufacturing, Dr. Prabir Jana, Dr. Manoj Tiwari, Apparel Resources Pvt. Ltd., 2020

Related online content

1	https://www.projectengineer.net/takt-time-the-rhythm-of-manufacturing
2	https://www.onlineclothingstudy.com/2018/02/smaller-production-lines

Course Designed By: Mr.K. Balamurugan

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M	M	S	S	S	S	M
CO2	M	M	S	S	S	S	M
CO3	M	M	S	S	S	S	M
CO4	M	M	S	S	S	S	M
CO5	M	M	S	S	S	S	M

*S-Strong; M-Medium; L-Low

Course Code	4AA	Human Resource Management	L	T	P	C
Allied	Paper IV		-	4	-	4
Pre-requisite	Basic knowledge about role of operators in productivity improvement		Syllabus version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Enable the students to learn on the fundamentals of Human Resource Management
2. Make them to understand about the various policies and practices used in managing human resources.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Understand the basic concepts of Human Resource Management	K2
CO2	Learn about Human Resource Planning	K2
CO3	Assess the various methods of developing Human Resources skills	K3
CO4	Analyze the performance of Human Resources in the organisation	K5
CO5	Understand the grievances of employees and solve their grievances	K1

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1	Introduction to HRM	12 hours

Human Resource Management – concept- evolution – scope and objectives - functions. Role of Human Resource manager – Qualities of human resource manager - human Resource policies.

Unit:2	Human Resource Planning	12 hours

Human Resource Planning – importance – forecasting HR requirements – matching demand and supply of Human Resources – Recruitment – sources and methods of recruitment – employee Selection – steps in selection process – selection tests and its types – induction and socialization.

Unit:3	Developing Human Resources	12h ours

Employee training – need, types and benefits of training – Executive development – Career Planning and development.

Unit:4	Monitoring Human Resources	12 hours

Performance appraisal – need for appraisal – steps and methods involved in appraisal - Employee compensation – methods of compensation – factors determining compensation. Impact of Absenteeism & Labour turnover –Scientific way of Capturing and analyzing Absenteeism and Labour turnover – Control measures

Unit:5	Employee Grievance and redress	12 hours

Employee grievance – forms of grievance – causes – steps in grievance handling. Grievance handling mechanism – Procedure in recording and handling grievances – Role of welfare officer in grievance handling – model grievance procedure. Employee Discipline – its approaches – causes of indiscipline –steps in disciplinary action.

	Total Lecture hours	60 hours

Text Book(s)

1	Human Resource Management, Dr. Tripathi, Wisdom Publications, Delhi, 2009.

Reference Books	
1	Human Resource Management, 3rd Edition, Rao V.S.P, Excel Books, 2010
2	Human Resource Management, 6th Edition, Ashwathappa, K., Tata McGraw Hill, 2010
3	Human Resource Management, 1th Edition, DeCenzo, D.A. and Robbins, S.P., Wiley India, 2011
4	Human Resource Management, 12th Edition, Dessler, G., Pearson, 2011
5	Personnel Management, Mamoria, C.B and Gaonkar, S.V, Himalaya Publishing House, 2011
Related online content	
1	https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_HRM_NOTES.pdf
2	https://brauss.in/hrm-basic-notes.pdf
Course Designed By: Dr.N. Velmathi	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	L	L	M	M	M	S	M
CO2	L	L	M	M	M	S	M
CO3	L	L	M	M	M	S	M
CO4	L	L	M	M	M	S	M
CO5	L	L	M	M	M	S	M

S-Strong; M-Medium; L-Low

Course Code	4ZB	Production Planning, Control and Inventory Management	L	T	P	C
Skill Based Subject		Skill Based Subject II	-	4	-	3
Pre-requisite	Basic knowledge about production & productivity		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Enable the students to understand about T&A
2. Educate them to do capacity planning & thread requirements
3. Instruct about the importance of inventory management

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Interpret T&A & its influence on production efficiency	K2
CO2	Do critical path analysis	K4
CO3	Do capacity planning	K4
CO4	Calculate thread consumption & requirement planning	K4
CO5	Analyze inventory management scientifically	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Pre-production activity and its timeline	09 hours

Different stages of pre-production – Complete order T&A understanding with Fabric, trims and accessories in-house timelines – Role of T&A in influencing production efficiency

Unit:2	Production T&A	09 hours

T&A in cutting, production and finishing – T&A for printing and embroidery – Standards and issues faced in industry in meeting timelines – Critical path analysis

Unit:3	Capacity Planning	09 hours

Introduction to capacity planning – Planning of capacity using minutes in Industrial Engineering – Learning curve in production development – Calculation of monthly capacity planning chart – Requirement vs. actuals – How to allot capacity and do style allocation in lines

Unit:4	Thread consumption	09 hours

Different sewing thread consumption measuring techniques – Sewing thread consumption for different types of stitches and seams – Standard – How to calculate thread consumption for knit and woven garments and its procedures

Unit:5	Inventory Management	09 hours

Importance of inventory management in production floor – Allowed Work In Progress for the department and inside the workstation of different production departments – Scientific inventory management techniques – Kanban system – Super market model – WIP monitoring template in floor and steps to ensure the WIP

	Total Lecture hours	45 hours

Text Book(s)

1	Introduction to Clothing Manufacture, Gerry Cooklin, Wiley, 1991
2	Introduction to Production Management, A. J. Chuter, Wiley, 1995

Reference Books

1	Industrial engineering and management, Khanna, O.P, Dhanpat Rai Publications, 2018
2	Industrial Relations & Labour Laws, P.C. Tripathi, C.B. Gupta, N.D. Kapoor, Sultan Chand & sons, 2020

Related online content

1.	https://www.textiletoday.com.bd/fashion-merchandising-time-and-action-calendar/

2.	https://www.onlineclothingstudy.com/2015/09/kanban-system-in-lean-manufacturing.html
3.	https://leanmanufacturingtools.org/kanban/
4.	https://ordnur.com/apparel/what-is-wip-wip-calculation-reducing-reporting-in-garments-manufacturing/
Course Designed By: Mrs.V.N. Narmadha Devi	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M	S	S	S	S	L	M
CO2	M	S	S	S	S	L	M
CO3	M	S	S	S	S	L	M
CO4	M	S	S	S	S	L	M
CO5	M	S	S	S	S	L	M

*S-Strong; M-Medium; L-Low


Fifth
Semester

Course Code	53A	Industrial Engineering III	L	T	P	C
Core		Paper XI	-	4	-	4
Pre-requisite	Knowledge in basics of IE		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Instruct the skill levels required to perform various activities
2. Educate about floater concept and its significance
3. Discuss about the significance of CPM on process cost

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Capture skill level of operators and prepare skill matrix	K4
CO2	Set the line for a new style and follow zero hour strategy	K4
CO3	Understand the floater concept & development of floaters	K2
CO4	Understand the advancements in machines and its impact	K3
CO5	Understand the significance of cost per minute	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Operator Skill Matrix	12 hours

Capturing skill level of the operators – Capacity Vs. Actual production difference – Plot of skill level in skill matrix – Skill demand analysis – Potential skill gap identification – Training of workers using skill gap analysis

Unit:2	Line setting – Style changeover	12 hours

Line setting checklist – Allotment of staff of line setting – Style changeover techniques using SMED concept – Procedure in SMED concept – Internal and external timing – Time allocation for each operation – Capturing of line setting time, throughput time and its analysis – Zero-hour output strategy

Unit:3	Multi skilling – Floater strategy	12 hours

Need of floaters – Absenteeism and Labour turnover – Skill requirement during style change – Calculating floaters requirement – Floaters development strategy – Deployment of floaters in the factory floor

Unit:4	Advancements	12 hours

Folders/ Aid availability – Developments – Poka-yoke (Error proofing techniques) – De-skilling aids – Engineering work station layout.

Unit:5	Factory Cost Per Minute estimation	12 hours

Cost per Minute concept — Actual CPM – Different categories in calculating CPM and its importance. Direct and indirect Salary – Wages and salaries – Minimum wages act – Provident Fund and ESI – bonus. Staff requirement estimation, Other expenses – Rent, Electricity, boiler wood, Phone – stationeries- transportation- depreciation-maintenance – interest on working capital-welfare.

	Total Lecture hours	60 hours

Text Book(s)

1	Materials Management in Clothing Production, David J Tyler, “Prentice Hall, New Jersey, 1991.
2	Fashion design and Product development, Harold Carr John Wiley and Sons Inc., New York, 1991.

Reference Books

1	Industrial Engineering in Apparel Production: V. Ramesh Babu, Woodhead Publishing India, 2011
2	Industrial Manufacturing, Dr. Prabir Jana, Dr. Manoj Tiwari, Apparel
	Resources Pvt. Ltd., 2020
Related online content	
1.	https://vasantkothari.com/content/view_presentation/118/Man-Machine-Ratio
2.	http://iegarments.blogspot.com/2017/08/quick-changeover.html
3.	http://www.iitg.ac.in/aimtdr2014/PROCEEDINGS/papers/61.pdf
4.	https://www.leanproduction.com/smed.html
5.	https://www.rnaautomation.com/blog/poka-yoke-in-manufacturing/
Course Designed By: Mr.V. Rajendran	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M	S	S	S	S	L	M
CO2	M	S	S	S	S	L	M
CO3	M	S	S	S	S	L	M
CO4	M	S	S	S	S	L	M
CO5	M	S	S	S	S	L	M

*S-Strong; M-Medium; L-Low

Course Code	53B	QMS in Apparel Production	L	T	P	C
Core		Paper XII	-	4	-	4
Pre-requisite	Knowledge about the functions of employees in organization		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Instruct the students about importance of QMS in an organization
2. Educate them to develop JDs & SOPs
3. Inculcate the Importance of training & development

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Understand about QMS	K2
CO2	Develop JD for any given job	K4
CO3	Understand the concept of process flow & Design process flow	K4
CO4	Develop SO for any activity	K4
CO5	Analyze the types of training to be given for operators	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	QMS structure	12 hours

Introduction to Quality Management System (QMS) – Importance and Need – Flow in QMS – Vision & Mission – Short term goals – Organization Hierarchy – Job description – Process flow –SOP – Performance Management System

Unit:2	Development of JD	12 hours

Understanding of Job description template – Understanding of roles and responsibilities – Job alternatives – Key performance indicators for Staff – Reports/ MIS to be followed

Unit:3	Process Flow designing	12 hours

Understanding of process flow – Importance – Symbols in process flow and its uses – Process flow sequence – Plotting of checklist, sub processes, files, decision making with corrective actions

Unit:4	SOP development	12 hours

Importance of Standard Operating Procedure – Linking process flow with SOP – Basics points inSOP – Who, When, Where, How – Designing and communication of SOP to respective – Implementation of SOP

Unit:5	Training and Development plan	12 hours

Training importance and needs – Skills analysis using JD – Development of training calendar –Types of training – Class room training and On the job training – Training methodology –Monitoring of training impact using PMS

	Total Lecture hours	60 hours

Text Book(s)

Industrial Engineering in Apparel Production: V. Ramesh Babu, Woodhead Publishing India, 2011

Industrial Engineering Manual for the Textile Industry, Enrick, Norbert Lloyd, R. E. Krieger Pub. Co., 1978

Reference Books

Maynard`s industrial engineering handbook 5th Edition, Kjell B. Zandin, Mc Graw Hill, 2001

Industrial engineering and management, Khanna, O.P, Dhanpat Rai Publications, 2018

Related online content	
1.	https://www.edrawmax.com/flowchart/
2.	https://ordnur.com/standard-operating-procedure/apparel-industry-sop/
3.	https://www.yourretailcoach.in/how-to-write-standard-operating-procedures-for-an-apparel-brand/
4.	https://targetjobs.co.uk/careers-advice/job-descriptions/278991-clothing-and-textile-technologist-job-description
Course Designed By: Dr. D. Anita Rachel	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M	M	S	S	S	L	M
CO2	M	M	S	S	S	L	M
CO3	M	M	S	S	S	L	M
CO4	M	M	S	S	S	L	M
CO5	M	M	S	S	S	L	M

*S-Strong; M-Medium; L-Low

Course Code	53P	Computer Application - Practical	L	T	P	C
Core		Practical V	-	-	5	3
Pre-requisite		Basic knowledge in computer science	Syllabus Version			2023-2024

Course Objectives:

The main objectives of this course are to:

1. Teach the basics of word, power point, excel and prepare the sheet data sheet
2. Train the students in the basics of designing using Corel draw
3. Train the students in the basics of layout preparation

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Create a document using MS Word and mail merging	K5
CO2	Create a document using MS Excel	K3
CO3	Create a document using MS Excel	K2
CO4	Create a design using CorelDraw	K6
CO5	Design a layout	K6

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

1.	Create line, bar and pie charts for the given data using MS Excel	06 hours
2.	Prepare a power point presentation about a product. Apply animation and slide timing.	06 hours
3.	To learn the tools and its applications in Corel draw	12 hours
4.	To design the layout for Cutting section	09 hours
5.	To design the layout for Sewing section	09 hours
6.	To design the layout for Ironing section room	09 hours
7	To design the layout for Garment factory	12 hours

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

	Total Lecture hours	**75 hours**

Text Book(s)

1	MS office 2000 for everyone, Sanjay saxena, Sangam books Ltd, 2000

Reference Books

1	Fundamentals of computers, Rajaraman V, Prentice-Hall of India, 1985
2	Practical techniques in MS Word, Neibauer, Alan R, 1986

Related online content	
1	https://www.coreldraw.com/en/pages/tutorials/coreldraw
2	https://www.computer-pdf.com

Course Designed By: Dr.P.P. Gopalakrishnan

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**			
CO1	L	L	L	L	M	L	S			
CO2	L	L	L	L	M	L	S			
CO3	L	L	L	L	M	L	S			
CO4	L	L	L	L	M	L	S			
CO5	L	L	L	L	M	L	S			

*S-Strong; M-Medium; L-Low

Course Code	57V	Mini Project – II and Viva Voce	L	T	P	C
Core		Viva Voce	-	-	10	6
Pre-requisite	Basic knowledge about costs		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Enable the students to record the expenses and arrive CPM of a factory and to compare the CPM of standard factory and suggest ways and means to reduce it.
2. Enable the students to identify the problems in production and finding the ways to solve it.
3. To study the KPI for each designation in factory.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Estimate the CPM of a factory	K2
CO2	Identify the major issues in a factory	K3
CO3	Solve problems in a factory and by finding root causes for an issue and eliminating root causes using various tools and techniques	K5
CO4	Develop PMS tool	K6
CO5	Implement and analyze the impact of the tool	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Calculating Cost per Minute (CPM) of a factory with give inference to the factory on the expenses and efficiency part. Identify 2 problems in factory and take necessary actions and show the impact. Consolidated report preparation of the above Development of one PMS tools for factory performance improvement – Implementation of the tool in the factory and analyze the impact. Students have to prepare report and assessment is done by viva voce examination.

	Total Lecture hours	**150 hours**

Text Book(s)

1	Industrial Engineering in Apparel Manufacturing, Dr. Prabir Jana, Dr. Manoj Tiwari, Apparel Resources Pvt. Ltd., 2020.
2	Maynard‟s Industrial Engineering Handbook, William K Hodson Mc Graw-Hill, Inc., New York, 1992.

Reference Books

1	Industrial Engineering in Apparel Manufacturing, Dr. Prabir Jana, Dr. Manoj Tiwari, Apparel Resources Pvt. Ltd., 2020

Related online content

1	https://ordnur.com/apparel/costing-sheet-of-garments-manufacturing
2	https://www.onlineclothingstudy.com/2014/02/how-to.

Course Designed By: Dr.P.P. Gopalakrishnan

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M	M	S	S	S	L	M
CO2	M	M	S	S	S	L	M
CO3	M	M	S	S	S	L	M
CO4	M	M	S	S	S	L	M
CO5	M	M	S	S	S	L	M

*S-Strong; M-Medium; L-Low

Course Code	5ZC	Behavioral Intervention Skills	L	T	P	C
Skill based Subject		Skill based Subject III	-	3	-	3
Pre-requisite	Basic knowledge about organization & employee contribution to productivity		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Educate about the models of organizational behaviors
2. Instruct about learning theories and importance of motivation
3. Teach the difference between group and team

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Realize the scope of Organizational behaviour	K2
CO2	Gain knowledge about the personality determinants	K3
CO3	Understand the importance of motivation	K3
CO4	Differentiate groups and teams	K4
CO5	Understand and implement the stress reduction techniques	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Introduction to OB	9 hours

Organizational behaviour –definition, nature and scope – contributing disciplines to Organizational behaviour – models of Organizational behaviour.

Unit:2	Personality	9hours

Learning – definition – theories of learning – classical conditioning, operant conditioning, social learning and cognitive theory. Attitude – types and components of attitude. Personality – determinants – personality traits- MBTI & Big five model – theories of personality – factors influencing personality. Perception – process – factors influencing perception.

Unit:3	Motivation	9 hours

Motivation – early and contemporary theories of motivation – motivation at work place. Leadership – theories of leadership. Organizational Power and Politics.

Unit:4	Team Development	9 hours

Group – basic concepts and types of groups- causes for group formation. Work teams- types of teams – stages in team development.

Unit:5	Stress	9 hours

Organizational stress – factors causing stress – stress reduction techniques. Organizational culture – concepts – types of culture – methods of learning culture.

	Total Lecture hours	45 hours

Text Book(s)

1	Organizational behavior, 11th edition, Fred Luthans, McGraw Hill, 2001
2	Organizational Behavior, 4th Edition, Khanka, S.S., S. Chand, 2010

Reference Books

1	Organizational behaviour, 14th edition, Stephen P Robbins, Pearson, 2011
2	Organizational Behaviour, New Strom & Davis, McGraw Hill, 2004
3	Understanding Organisational Behaviour, 2nd Edition, Udai Pareek, Oxford Higher Education, 2004.

Related online content

1	https://www.slideshare.net/rajasshrie1/chapter-1-ob-38248150
2	https://youtu.be/8iVpF81xrYM
3	https://www.youtube.com/watch?v=O7FASKDY0bQ
4	https://www.researchgate.net/publication/330409437_UNIT_4_STRESS_MANAGEMENT/link/5c3e92bc299bf12be3cb389a/download
Course Designed By: Dr.N. Velmathi	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	L	L	M	M	M	S	M
CO2	L	L	M	M	M	S	M
CO3	L	L	M	M	M	S	M
CO4	L	L	M	M	M	S	M
CO5	L	L	M	M	M	S	M

*S-Strong; M-Medium; L-Low


Sixth
Semester

Course Code	67V	Project Work and Viva voce	L	T	P	C
Core		Viva Voce	-	-	19	8
Pre-requisite	Knowledge about IE tools & techniques and its implementation		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Educate about problem identification in the field of apparel production & related field
2. Train them to make Survey or carry out activities leading to generation of new knowledge.
3. Enable them to prepare a report and make a presentation

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Apply the learned concepts for managing production	K3
CO2	Find out solution for the various issues arises in daily production	K4
CO3	Improve skill in planning managing resources and production	K4
CO4	Develop interpersonal skill to work as a tem	K4
CO5	Confident enough to work in production as IE	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Production Management of cutting, sewing and finishing – Job description of production manager – KPI of production manager – Skill required for production manager – Team under production management – Daily works management of production manager - Resource requirement and fulfilment – On time arrival of garments cut panels, trims and accessories – Workers requirement – Skills availability and requirement – Line balancing – Bottle neck management – Efficiency improvement – Cost reduction using CPM – Supporting department for effective production management – Team management skills

Application of all concepts for managing production floor in apparel industry and prepare a detailed project report. Students have to manage a sewing floor of 100 machines/ cutting floor/ finishing floor for 3 months time.

	Total Lecture hours	**285 hours**

Text Book(s)

1	Apparel Production Management and the Technical Package, Myers-McDevitt, Paula J, United Kingdom, Bloomsbury Academic, 2010.
2	Apparel Manufacturing Management Systems: A Computer-Oriented Approach. United States, McPherson, Edwin M. Elsevier Science, 1987.

Reference Book

1	Management of Technology Systems in Garment Industry. India, Colovic, Gordana, WPI India, 2011.

Related online content

1	https://www.onlineclothingstudy.com/2020/07/9-video-tutorials-on

Course Designed By: Dr.P.P. Gopalakrishnan

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M	M	S	S	S	L	S
CO2	M	M	S	S	S	L	S
CO3	M	M	S	S	S	L	S
CO4	M	M	S	S	S	L	S
CO5	M	M	S	S	S	L	S

*S-Strong; M-Medium; L-Low

Course Code	6ZD	LEAN SIX SIGMA	L	T	P	C
Skill Based Subject		Skill Based Subject IV	-	3	-	3
Pre-requisite	Knowledge about wastes in production and its significance		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Teach about principles of six sigma and lean
2. Educate about tools and techniques of six sigma and lean

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Understand Principles of lean and Six Sigma Concepts, their similarities and differences	K2
CO2	Apply the Lean Six Sigma Methodology real time situations	K3
CO3	Apply Six Sigma tools & techniques in production	K3
CO4	Understand about the lean tools and apply	K4
CO5	Implement of lean six sigma concept	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1	Lean Six Sigma concept	09 hours

Introduction to Lean Principles and Six Sigma Concepts-Similarities and differences – Synergy-Evolution of Lean Six Sigma

Unit:2	Lean Six Sigma Approach	09 hours

Lean Six Sigma Methodology- Phases of Lean Six Sigma Method, Managing Lean Six sigma Project, Six sigma Methodologies (DMAIC, DMADV, DFSS)

Unit:3	Six Sigma Tools And Techniques	09 hours

Advanced Statistical Tools - Statistical Process Control-Process Capability Analysis Sigma computation -Hypothesis Testing-ANOVA-Design of Experiments- chi-square test, Regression analysis –Case studies

Unit:4	Lean Tools	09 hours

Value Stream Mapping – Poka Yoke-5S-Cycle Time Analysis-Push-Pull Systems- Waste Elimination- Total Productive Maintenance- Failure Mode Effect Analysis- Standard Work Practices-Control Plans, SMED, Kanban, Visual control, Kaizen – Case studies

Unit:5	Lean Six Sigma Implementation	09 hours

Identifying Lean Six Sigma Projects, Define Scope, Planning for Implementation, Selection of tools and techniques for each phase, Measuring the Benefits

	Total Lecture hours	45 hours

Text Book(s)

1	What is Lean Six Sigma, Michael L. George, David Rowlands, Bill Kastle, McGraw-Hill, 2003

Reference Books

1	The Six Sigma Handbook, Thomas Pyzdek & Paul Keller, McGraw-Hill, 2000
2	Lean Thinking, James P. Womack, Daniel T. Jones, Free press business, 2003
3	Implementing Six Sigma: Smarter Solutions Using Statistical Methods, Forrest W. Breyfogle III, Wiley, 2003
4	Toyota Talent, Liker, Jeffrey; Meier P David, Tata McGraw Hills, 2007

Related online content

1	https://www.tutorialspoint.com/six_sigma/six_sigma_introduction.htm
2	https://www.sixsigmaonline.org
Course Designed By: Mrs.V.N. Narmadha Devi	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M	M	S	S	S	L	S
CO2	M	M	S	S	S	L	S
CO3	M	M	S	S	S	L	S
CO4	M	M	S	S	S	L	S
CO5	M	M	S	S	S	L	S

*S-Strong; M-Medium; L-Low


Elective
Courses

Course Code	5EA	Technology Advancements in Apparel Production	L	T	P	C
Elective		Paper I - A	-	4	-	4
Pre-requisite	Knowledge about sewing process & machines, equipment used		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Educate the students about automations and its impact in various sections of apparel production

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Understand the applications of AI	K2
CO2	Learn advancements in spreading & cutting methods	K3
CO3	Be aware of the applications of robotics in sewing	K3
CO4	Learn about automation in material handling	K2
CO5	Become skilled at the automation in PPC	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	**Application of artificial intelligence**	**12 hours**

Application of artificial intelligence in fabric production - Predicting fabric properties - Color solutions - Fabric fault detection - Computer-aided design systems - Body dimensions and garment sizing -3D body scanners - Virtual fit of garments - International standardization activities of garment sizing - garment manufacturing- Performance of sewn seam - Production planning and control - . Final garment inspection

Unit:2	**Automation for Spreading & Cutting room**	**12 hours**

Introduction - role of automation in textile material spreading and cutting - - Automated lay planning -Automated spreading methods and machines - Automated fabric fault registration - Automated fabric pattern matching - Automated cutting methods and cutting systems - Automatic Fusing of cut components - Advanced fusing technologies to avoid fabric shrinkage - Future trends in automation of textile material spread

Unit:3	**Automated Material Handling**	**12 hours**

Introduction - Definition of material handling - Properties of material and processes - Gripping technologies for textile handling - Automation in material handling related to high-performance textiles - New conveyer systems - Digital tracking with radio-frequency identification

Unit:4	**Automation and robotics for sewing room**	**12 hours**

Introduction - Computer numerical control technologies for sewing process - Sewing automats and sewing units - Robotics for three-dimensional sewing operations - Real-time sewing cell with two lightweight industrial robots - Advantages and disadvantages of automation in sewing - Sewing machines with under bed trimmer - Sewing machine with automatic bobbin changer - Sewing automats for gent‟s and lady‟s shirts - Sewing automats for casual bottom wear - Sewing automats for formal wear - Sewing automats for knitwear and intimate wear - Sewing automats for non apparel sewn products - Sewing preparatory machines with automatic control system

Unit:5	**Automation in PPC & Quality Monitoring**	**12 hours**

Introduction - Automation in production systems - Reasons for automation and advanced tools - Strategies for automation and production systems - Advantages and disadvantages of automation - Advancements in production planning - Application of different software and planning tools in production planning and control - Computerized manufacturing support systems - Quality

monitoring of fabrics - Detection methods - Defect classification methods - Quality monitoring of seams - Two-dimensional process - pattern recognition - Photogrammetry - Laser triangulation and light-section method - Comparison of measurement methods - Quality monitoring of welded seams		
	Total Lecture hours	**60 hours**
Text Book(s)		
1	Automation in Garment Manufacturing, Raj Kishore Nayak, Rajiv Padhye, Woodhead Publishing, 2017	
Reference Books		
1	Fundamentals of artificial intelligence techniques for apparel management applications Z. X. Guo, 2015	
Related online content		
1.	https://emerj.com/ai-sector-overviews/artificial-intelligence-for-clothing-and-apparel/	
2.	https://www.textileworld.com/textile-world/features/2020/03/automated-cutting-sewing-developments/#:~:text=Automation%20In%20Cutting,drastically%20reduced%20the%20human%20workforce.	
3.	https://www.onlineclothingstudy.com/2013/07/automatic-overhead-material-handling.html	
4.	https://fashion2apparel.blogspot.com/2018/03/automation-apparel-manufacturing.html	
Course Designed By: Dr.P.P. Gopalakrishnan		

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	L	L	M	M	M	L	S
CO2	L	L	M	M	M	L	S
CO3	L	L	M	M	M	L	S
CO4	L	L	M	M	M	L	S
CO5	L	L	M	M	M	L	S

*S-Strong; M-Medium; L-Low

Course Code	5EB	ERP in Apparel Industry	L	T	P	C
Elective		Paper I - B	-	4	-	4
Pre-requisite	Knowledge in production monitoring and control		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Teach the students about role and importance of ERP in apparel business
2. Educate about various business models of ERP package and its management
3. Enable them to learn about the MIS

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Be familiar with the benefits of ERP	K2
CO2	Be aware of the implementation of ERP in apparel industry	K3
CO3	Become skilled at about the models of ERP	K3
CO4	Ascertain the MIS in apparel in garment industry	K4
CO5	Gain knowledge of usage of computers in apparel production management	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Introduction to ERP	12 hours

Enterprise Resource Planning - principle, framework, application and suitability in garment production - Introduction: ERP: An Overview, enterprise – an overview, types of Enterprises, need for ERP, benefits of ERP, ERP and related technologies, Business Process Reengineering (BPR), Benefits of BPR

Unit:2	ERP Implementation	12 hours

Client/Server architecture; technology choices; SCM, CRM – concepts, Business Process Re engineering, Data ware Housing, Data mining, ERP system packages - Implementation of ERP: ERP implementation lifecycle, implementation methodology, hidden costs, organizing the implementation, vendors, consultants and users, contracts with vendors, consultants and employees, project management and monitoring

Unit:3	Modules in ERP	12 hours

ERP implementation strategies – organizational and social issues, data safety & security, ERP implementation in a garment production facility - The Business Modules: Business modules in an ERP package - finance, manufacturing, human resources, plant maintenance, materials management, quality management, sales and distribution. Significance and advantages of each of the modules

Unit:4	ERP in apparel industry	12 hours

Management Information System in Garment Industry – management, key aspects of management, functions, management as a control system, levels of management. ERP in apparel industry: Production resource planning – principles and management of and demand chain analysis– quick response strategy - material management for „Quick Response" – „Just in Time (JIT) Technology"; Production planning, costing and merchandising software

Unit:5	Computer Applications	12 hours

Information – requirements, properties and scope, information economics, types and characteristics. Computer Applications – EDI in garment technology; Use of Computers in Designing, Pattern making, computerized production systems, communicating with vendors and buyers; Telephone, fax, video conferencing, intranet, internet, etc; Export documentation, retailing; Methods of communicating with consumers.

	Total Lecture hours	60 hours

Text Book(s)	
1	ERP Demystified, Alexis Leon, Tata McGraw Hill, New Delhi, 2000.
2	Enterprise Resource Planning – Concepts and Practice", Garg Vinod Kumar and Venkitakrishnan N. K PHI, New Delhi, 2003
Reference Books	
1	Concepts in Enterprise Resource Planning, Joseph A. Brady, Ellen F. Monk, Bret Wagner, Thompson Course Technology, USA, 2001.
2	Enterprise Resource Planning, Leon, Alexis. Tata McGraw-Hill, 2008.
3	Supply Chain Management, Rahul V. Altekar, Prentice-Hall of India Private Ltd.2008
4	Supply Chain Logistics Management, Donald J Bowersox, David J Closs, M. Bixby Cooper, McGraw-Hill Companies, 2008.
5	Supply chain Management, N. Chandrasekaran, OXFORD university press, 2009
6	ERP in Apparel Industry, D. Anita Rachel, Kongunadu Publications India Pvt. Ltd, 2016
Related online content	
1	https://garmentmerchendising.com/implementation-of-erp-in-apparel-industry
2	https://www.fibre2fashion.com/industry-article/6151/erp-in-apparel-and
Course Designed By: Dr. D. Anita Rachel	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M	M	M	M	M	S	M
CO2	M	M	M	M	M	S	M
CO3	M	M	M	M	M	S	M
CO4	M	M	M	M	M	S	M
CO5	M	M	M	M	M	S	M

*S-Strong; M-Medium; L-Low

Course Code	5EC	TQM in Apparel Industry	L	T	P	C
Elective		Paper I - C	-	4	-	4
Pre-requisite	Knowledge about quality concepts		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Enable the students to know about concepts and techniques in Total Quality Management.
2. Develop skills to use Quality control tools and techniques in solving quality problems.
3. Make them understand about various International standards such as ISO, OHSAS, SA 8000

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Understand the fundamentals of Total Quality Management	K2
CO2	Apply the various principles of TQM	K4
CO3	Use the SQC tools to maintain process quality	K5
CO4	Use the Quality control tools and techniques in solving quality problems	K5
CO5	Be aware of various international standards	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1	Introduction To Quality Management	12 hours

Definition of Quality – Dimensions of Product Quality – Key elements of total quality - Quality Planning – Quality costs —Quality Statements: vision, mission and policy statements; – Strategic Planning, Quality Gurus - Deming Principles on TQM – Juran Trilogy – Crosby Principles on TQM - Japanese 5S Principles - Kaizen. - Concept of Quality Circles

Unit:2	TQM Principles	12 hours

Principles of TQM, Leadership – Concepts – Quality Trilogy – Four pillars of TQM – PDCA cycle & PDSA cycle. Role of Senior Management – Quality Council, Customer satisfaction – Customer Perception of Quality, Customer Complaints, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement

Unit:3	Statistical Process Control and Process Capability	12 hours

Meaning and significance of Statistical Process Control (SPC) - construction of control charts for variables and attributes; Process Capability – meaning, significance and measurement - Seven Tools of Quality –Control Chart, Pareto Diagram, Ishikawa Diagram, Histogram, Flow Charts, Scatter Diagram, and Stratification

Unit:4	TQM Tools	12 hours

Benchmarking – Reasons to Benchmark – Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, and Benefits – Taguchi Quality Loss Function – Total Productive Maintenance (TPM) – Concept, Improvement Needs, and FMEA – Stages of FMEA.

Unit:5	Quality Systems Organizing and Implementation	12 hours

Elements of ISO – Benefits of ISO 9000 System. ISO 9001:2008: Guidelines and Standard Clauses – Implementation Procedures and requirements– Quality Manual and its contents. Accreditation and Certification agencies. Quality audit: Types of quality audit – Audit procedure. Environmental Management System (EMS): Elements of EMS – Benefits– Environmental Policies. Studies on SA8000, OHSAS 18000, WRAP.

	Total Lecture hours	60 hours

Text Book(s)

1	Total Quality Management, N. Srinivasa Gupta, B. Valarmathi, Tata McGraw Hill Education Pvt Ltd.2009
Reference Books	
1	Total Quality Management, Poornima M. Charantimath, Pearson, 2009
2	Total Quality Management, B. Janakiraman, R.K. Gopal, PHI Learning Pvt. Ltd., 2009.
3	Total Quality Management, S. Bhaskar, Anuradha Publications, 2011
Related online content	
1	https://www.edunotes.in/ge6757-total-quality-management
2	https://www.youtube.com/watch?v=yWlAOFs04go
3	https://lecturenotes.in/notes/20800-note-for-total-quality-management-tqm-by-engineering-kings?reading=true&continue=2
Course Designed By: Dr.N. Velmathi	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M	M	M	M	S	S	M
CO2	M	M	M	M	S	S	M
CO3	M	M	M	M	S	S	M
CO4	M	M	M	M	S	S	M
CO5	M	M	M	M	S	S	M

*S-Strong; M-Medium; L-Low

Course Code	6EA	Entrepreneurship	L	T	P	C
Elective		Paper II - A	-	4	-	4
Pre-requisite	Knowledge about the scope for entrepreneurship		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Enable the students to learn about the challenges of starting new ventures
2. Enable them to investigate, understand and internalize the process of setting up a new business.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Understand the concept of entrepreneurship and traits of entrepreneur	K1
CO2	Be trained about the identification of a project and project report preparation	K5
CO3	Gain knowledge of about the formalities of SSI‟s Registration	K3
CO4	Learn about the role of support institutions	K2
CO5	Find out about Incubation centres and start up India schemes	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Introduction to Entrepreneurship	12 hours

Entrepreneurship: Concept and Definitions; Entrepreneurship and Economic Development; Classification and Types of Entrepreneurs; Entrepreneurial Competencies; Factor Affecting Entrepreneurial Growth – Economic, Non-Economic Factors; EDP Programmes; Entrepreneurial Training; Entrepreneur; Manager Vs. Entrepreneur.

Unit:2	Starting the venture	12 hours

Project Identification – Project formulation – Project design - preparing project report - Project Planning and Scheduling using Networking Techniques of PERT / CPM; Methods of Project Appraisal.

Unit:3	SSI and Registration	12 hours

Small Enterprises and Enterprise Launching procedures and Formalities. Role of SSI in Economic Development of India; SSI; Registration; NOC from Pollution Board; project report presentation guidelines

Unit:4	Sources of Finance and Institutional Assistance	12 hours

Role of Support Institutions and Management of Small Business: Director of Industries; DIC; SIDO; SIDBI; Small Industries Development Corporation (SIDC); SISI; NSIC; NISIET, NIESBUD; TANSIDCO; TIIC; State Financial Corporation; KVIC

Unit:5	Financial incentives for SSI	12 hours

Financial incentives and subsidies for SSI‟s, and Tax concessions; – seed capital assistance –Role of entrepreneur in export promotion and import substitution – Social Entrepreneur, Incubation centre, Start-up India

	Total Lecture hours	60 hours

Text Book(s)

1	Entrepreneurial Development, Dr. C.B. Gupta, Sultan Chand & Sons, New Delhi. 2009
2	Entrepreneurial Development, Dr.S.S Khanka, Sultan Chand & Sons, New Delhi 2009

Reference Books

1	Entrepreneurship Development and Small Business Enterprises, Charantimath, Poornima,

	Pearson Education, New Delhi, 2006
2	Entrepreneurship New Venture Creation, David H. Holt, Prentice Hall of India Private Limited, New Delhi, 2005
Related online content	
1	http://assets.vmou.ac.in/BBA12.pdf
2	https://www.youtube.com/watch?v=-VkoDHCDJ4w
Course Designed By: Dr.N. Velmathi	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	L	L	L	L	L	S	M
CO2	L	L	L	L	L	S	M
CO3	L	L	L	L	L	S	M
CO4	L	L	L	L	L	S	M
CO5	L	L	L	L	L	S	M

*S-Strong; M-Medium; L-Low

Course Code	6EB	Leadership and Emotional Intelligence	L	T	P	C
Elective		Paper II - B	-	4	-	4
Pre-requisite	Knowledge about the need for skills and qualities required for managerial persons		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Taught about the necessity of managing emotions
2. Educated about techniques to overcome negative emotions

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Gain knowledge of managing emotions	K2
CO2	Understand importance of team work	K3
CO3	Assess the techniques of managing negative emotions	K3
CO4	Develop positive emotion focus	K4
CO5	Know the importance of goal setting	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Introduction to Emotional intelligence	12 hours

Emotional Intelligence and Self-awareness-Self-awareness and Mindfulness-Emotional Intelligence Core competencies-Johari‟s window-Enneagram Personality Test. Interpersonal Skills and Communication- Developing polished interpersonal skills with staff and colleagues -Listening Skills - Getting along with my manager -Transactional Analysis - Deal with tension and conflict more constructively - Conflict Management techniques - Good interpersonal behaviours - The iceberg model – the Enneagram compulsions

Unit:2	Team Building	12 hours

High Performing Teams - The Glen Parker Team Player Types - Team Roles - Stages of Team Development - Team development model - 5 Squares game - Characteristics of high performing teams - Module 4: Building Trust in Teams - Building Trust and Cooperation - Building trust between team members

Unit:3	Stress Management	12 hours

Self-regulation: managing negative emotions - The skills of self-regulation - The skill of shifting focus and attention - Recognizing negative emotions & their negative impact - Temper negative responses - Techniques for managing and controlling one‟s negative emotions - Managing anger – the Amygdala hijack - Learn how to work more effectively with difficult people - The ability to heal – the healing process - Finding the gift in difficult times -Managing stress.

Unit:4	Positive Emotions	12 hours

Developing a positive emotional focus – Gratitude - Counting your blessings- The law of positive attraction - Channel energy and enthusiasm to motivate - Developing empathy - Empathy in the workplace - Emotional Intelligence Test.

Unit:5	Goal Setting	12 hours

My Purpose and Goal Setting- Aim-Leadership Attitudes - Identifying my soul purpose or life purpose – Hard Work – Smart Work – Speed Process – Non-Emotional behaviour in Industry - Reflections on my talents, gifts and core genius - Motivation, passion and energy- Decision Making with intelligence.

	Total Lecture hours	60 hours

Text Book(s)

1	Learning to lead: A workbook on becoming a leader, 3rd edition, Bennis, W. Cambridge: Perseus Books Group, 2003
2	Reframing organizations: Artistry, choice and leadership, Lee G. Bolman, Terrence E. Deal, · Wiley, 2013
Reference Books	
1	Emotional intelligence 2.0, Travis Bradberry, Jean Greaves, Talent Smart, 2009
2	Leadership 2.0., Travis Bradberry, Jean Greaves, Talent Smart, 2012
3	Changing ways: A practical tool for implementing change within organizations, Murray M. Dalziel, Murray M. Dalziel, Stephen C. Schoonover ,1988
4	Emotional intelligence: Why it can matter more than IQ. Daniel Goleman, New York: Bantam Books, 2012
Related online content	
1	https://www.studocu.com/en-ca/document/ryerson-university/introduction-to-psychology-ii/lecture-notes/lecture-notes-lecture-10-emotion-motivation-stress-health/218490/view
2	https://ncert.nic.in/ncerts/l/kepy109.pdf
3	https://www.researchgate.net/publication/330409437_UNIT_4_STRESS_MANAGEMENT/link/5c3e92bc299bf12be3cb389a/download
4	https://lecturenotes.in/seminar-ppt/32628-seminar-ppt-on-goal-setting?reading=true
Course Designed By: Dr.P.P. Gopalakrishnan	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	L	L	L	L	L	S	M
CO2	L	L	L	L	L	S	M
CO3	L	L	L	L	L	S	M
CO4	L	L	L	L	L	S	M
CO5	L	L	L	L	L	S	M

*S-Strong; M-Medium; L-Low

Course Code	6EC	Interpersonal Skills	L	T	P	C
Elective		Paper II - C	-	4	-	4
Pre-requisite	Knowledge about the need for skills and qualities required for managerial persons		Syllabus Version	2023-2024		

Course Objectives:

The main objectives of this course are to:

1. Equip students with the English language skills.
2. Provide guidance and practice in general conversation and to improve general and academic listening skills
3. Enable them to make effective presentations.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Listen and respond appropriately.	K2
CO2	Speak clearly on a given topic	K3
CO3	Make effective presentations	K3
CO4	Participate in group discussions	K4
CO5	Participate confidently and appropriately in conversations both formal and informal	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Pronunciation	12 hours

Listening as a key skill- its importance- speaking – give personal information – ask for personal information – express ability – enquire about ability – ask for clarification Improving pronunciation – pronunciation basics taking lecture notes – preparing to listen to a lecture – articulate a complete idea as opposed to producing fragmented utterances.

Unit:2	Listening Skills	12 hours

Listen to a process information- give information, as part of a simple explanation – conversation starters: small talk – stressing syllables and speaking clearly – intonation patterns – compare and contrast information and ideas from multiple sources- converse with reasonable accuracy over a wide range of everyday topics.

Unit:3	Fluency	12 hours

Lexical chunking for accuracy and fluency- factors influence fluency, deliver a five-minute informal talk – greet – respond to greetings – describe health and symptoms – invite and offer – accept – decline – take leave – listen for and follow the gist- listen for detail

Unit:4	Group Discussion	12 hours

Being an active listener: giving verbal and non-verbal feedback – participating in a group discussion – summarizing academic readings and lectures conversational speech listening to and participating in conversations – persuade.

Unit:5	Presentations	12 hours

Formal and informal talk – listen to follow and respond to explanations, directions and instructions in academic and business contexts – strategies for presentations and interactive communication – group/pair presentations – negotiate disagreement in group work.

	Total Lecture hours	60 hours

Text Book(s)

1	Skills for Success. Listening and Speaking. Level 4, Brooks, Margret, Oxford University Press, Oxford, 2011.
2	Speak Now Level 3, Richards, C. Jack. & David Bholke. Oxford University Press, Oxford, 2010

Reference Books	
1	Communicative English for Engineers and Professionals, Bhatnagar, Nitin and Mamta Bhatnagar, Pearson, New Delhi, 2010.
2	Practical English Classroom, Hughes, Glyn and Josephine Moate. Oxford University Press: Oxford, 2014.
Related online content	
1	https://www.youtube.com/watch?v=-Y-R9hDl7lU&feature=youtu.be
2	https://www.educationcorner.com/listening-skills.html
3	https://www.tutorialspoint.com/interpersonal_skills/interpersonal_skills_tutorial.pdf
Course Designed By: Dr.N. Velmathi	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	L	L	L	L	M	S	M
CO2	L	L	L	L	M	S	M
CO3	L	L	L	L	M	S	M
CO4	L	L	L	L	M	S	M
CO5	L	L	L	L	M	S	M

*S-Strong; M-Medium; L-Low

Course Code	6ED	Training and Development	L	T	P	C
Elective		Paper III - A	-	4	-	4
Pre-requisite	Knowledge about the need for skill training to employees		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Develop the skills, abilities, and practical elements of employee development and performance improvement in organization
2. Enable them to apply appropriate methods and techniques for identifying training needs.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Learn the importance of training & development of human resources	K2
CO2	Apply the methodologies of training and development	K3
CO3	Understand the skills, abilities and practical elements of employee development and performance improvement in organizations and will be able to Implement	K2
CO4	learn about design and conduct needs analyses and to plan, implement and evaluate Training programs.	K3
CO5	Implement the new developments in training methods	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1	Introduction to Training	12 hours

Concepts and Rationale of Training and Development; overview of training and development systems; organizing training department; training and development policies; linking training and development to company‟s strategy; Requisites of Effective Training; Role of External agencies in Training and Development. Meaning and purpose of Training need assessment

Unit:2	Training and Development Methodologies	12 hours

Overview of Training Methodologies- Logic and Process of Learning; Principles of Learning; Individual differences in learning, learning process, learning curve, learning management system; Criteria for Method Selection; Skills of an Effective Trainer; Use of Audio-Visual Aids in training; Computer Aided Instructions- Distance Learning, Open Learning, E- Learning; Technologies Convergence and Multimedia Environment. Development Techniques for enhancing decision–making and interpersonal skills, Case-study, in-basket exercise, special projects, multiple management Programme Learning, Action learning, Syndicate Work, Games, Action Maze, Role Play; Demonstration and Practice Monitoring; Coaching; Self Diagnostic Skills, Experience Learning, Discovery Learning, Brain Storming, Counselling, Position Rotation, Team Building, and Sensitivity Training.

Unit:3	Designing Training and Development Programs	12 hours

Organisation of Training and Development programs, Training design, kinds of training and development programs- competence based and role-based training; orientation and socialization; diversity training, choice of training and development methods, Preparation of trainers; developing training materials; E-learning environment; Flexible learning modules; Self development; Training process outsourcing.

Unit:4	Evaluation of Training and Development	12 hours

Reasons for evaluating Training and development programs, Problems in evaluation; Evaluation planning and data collection, different evaluation frameworks, Problems of Measurement and Evaluation; Costing of training, measuring costs and benefits of training program, obtaining feedback of trainees; Methods of evaluating effectiveness of Training Efforts; Kirkpatrick Model of Training Effectiveness; Training issues resulting from the external environment and internal needs of the company.

Unit:5	**Emerging Trends in Training and Development**	**12 hours**
Gamification, team training and six sigma training; Electronic Enabled Training Systems (EETS)- Concept and types, benefits and challenges in using EETS; concerns in implementation of EETS – availability, incorporation, extension, and learning renewals for EETS; use of EETS and its up scalability; follow up activities; Training and development initiatives of some selected companies from private and public sectors and MNCs.		
	Total Lecture hours	**60 hours**

Text Book(s)	
1	Handbook of Training and Development, Prior John, Grower, 1994
2	Handbook of Training and Development, Trvelove Steve, Blackwell Business, 1994
Reference Books	
1	Training and Development Handbook, Robert L Craig McGraw Hill, 1987.
2	Training Interventions in Job-skill Development, James E. Gardner, Addison-Wesley, 1981
3	Management Training in Organisations, Ishwar Dayal, Prentice Hall, 1970
Related online content	
1	http://www.pondiuni.edu.in/sites/default/files/training-development-260214.pdf
2	https://www.youtube.com/watch?v=85RVEas4AXs
3	https://youtu.be/b-JC4JwrSbM
4	https://www.youtube.com/watch?v=a0Q-Ho27vpU&feature=youtu.be
Course Designed By: Dr.D.Anita Rachel	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	L	L	M	L	M	S	M
CO2	L	L	M	L	M	S	M
CO3	L	L	M	L	M	S	M
CO4	L	L	M	L	M	S	M
CO5	L	L	M	L	M	S	M

*S-Strong; M-Medium; L-Low

Course Code	6EE	Factory Compliance	L	T	P	C
Elective		Paper III - B	-	4	-	4
Pre-requisite	Knowledge about the need for standards & its significance		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Taught about welfare and benefits to be provided for employees
2. Taught about importance of employee safety in work area and suitable measures to be followed
3. Taught about training and signals to be followed to deal with emergency situations

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Be aware of employee welfare measures	K2
CO2	Know about the Types and Schemes available for organized sectors	K3
CO3	Implement the accident prevention methods in industry	K3
CO4	Inculcate Knowledge & the importance of safety in dealing with chemicals	K2
CO5	Gain knowledge on emergency evacuation	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Introduction to Employee welfare	12 hours

Employee Welfare - Meaning, Objectives, Scope, Limitations and Types of Employee Welfare- Statutory and Non-statutory Welfare measures, Fringe benefits.

Unit:2	Social Security	12 hours

Social Security - Concept, Need, Types and Schemes for the organized sector in India-Maternity, ESI Scheme, EPF Scheme, Industrial health and Hygiene, Accident and Compensation.

Unit:3	Health & Safety	12 hours

Basic Principles of Accident Prevention – Basic philosophy of industrial accidents – near miss reporting and learning lessons. Safety and Health Policy. Types of hazards – Role of supervisor in promoting safety & health. Prevention and Control Techniques – Hierarchy of Controls Dilution & Substitution, etc. Segregation, Enclosure, Isolation, Barricading, Guarding, Interlocks.

Unit:4	Hazards	12 hours

Chemical Hazards and Specific Control Measures –Storage, handling and transportation of chemicals. Chemical Safety Data Sheets/ MSDS. House Keeping. Personal Protective Equipment. Fire and Explosion Hazards – Fire Prevention and Control; Portable and fixed fire fighting systems - Hazards area classification.

Unit:5	Emergency Plan	12 hours

The onsite Emergency Plan - Key persons and their responsibilities - Alarms - Control room - Evacuation- Assembly points - Emergency Control Centre – Rehearsals. Off-site Emergency Plan . Safety audit –OHSAS – EMS - Environmental Management System.

	Total Lecture hours	60 hours

Text Book(s)

1	Compliances Under Labour Laws, H L Kumar, Universal Law Publishing, 2010

Reference Books

1	Labour and Industrial Laws, 4th Edition P. K. Padhi, PHI Learning Pvt. Ltd. 2019

2	Law Relating to Leave Holidays and Absenteeism in Industries, H.L. Kumar, Universal Law Publishing, 2009
3	Labour law compliance and human resource management innovation: Robertson, Raymond. Ang, Debra, Dehejia, Rajeev., Brown, Drusilla, Better Factories Cambodia, Switzerland: ILO, 2011.
Related online content	
1	https://www.youtube.com/watch?v=aD5xAqx7ItM
2	https://www.youtube.com/watch?v=KoDiuL6NqgQ
3	https://blog.ipleaders.in/compliance-checklist-factories-act/
Course Designed By: Dr. D. Anita Rachel	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M	M	L	L	L	M	S
CO2	M	M	L	L	L	M	S
CO3	M	M	L	L	L	M	S
CO4	M	M	L	L	L	M	S
CO5	M	M	L	L	L	M	S

*S-Strong; M-Medium; L-Low

Course Code	6EF	Value Stream Mapping	L	T	P	C
Elective		Paper III - C	-	4	-	4
Pre-requisite	Knowledge about the flow of process and activities		Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Taught about the importance of developing value stream mapping
2. Taught about the various symbols used in value stream mapping

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Understand the principles of VSM	K2
CO2	Know the symbols used in developing VSM	K3
CO3	Develop the VSM based on the learning	K3
CO4	Study the VSM and identify the scope for improvement	K4
CO5	Develop the improved VSM	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1	Introduction to VSM	12 hours

Purpose of value stream mapping – Need – Steps in Value Stream Mapping – Current state – Future state mapping – Principles of value stream mapping – Lean concepts in Value stream mapping

Unit:2	Symbols in Value Stream Mapping	12 hours

Customer/ Supplier Icon – Dedicated process flow icon – Shared process flow – Icon – Data box icon – Work cell Icon – Inventory icons – Shipments icon – Push arrow icon – Supermarket icon – Material pull icon – Production control icon

Unit:3	Advanced Symbols in Value Stream Mapping	12 hours

Manual Info Icon – Electronic Info Icon – Production Kanban Icon – Withdrawal Kanban Icon – Signal Kanban icon – Kanban post icon – Sequenced pull icon – Load levelling icon – MRP/ ERP Icon – Go see Icon – Verbal information icon – Operator icon – Timeline icon

Unit:4	Stating current state	12hours

Selecting the product (family) to map – VSM Symbols – Defining the process boundaries – The Process Steps – Information Flows – Process Data – Calculating the Time Line – Multiple Suppliers and Customers – Interpreting the Data

Unit:5	Developing Future state	12 hours

Reduce Cycle Time – Reduce setups / reduce batches – Improve quality performance – Change delivery schedules – Implement Kanban – Moving from current to future state map.

	Total Lecture hours	60 hours

Text Book(s)

1	Value Stream Mapping, Karen Martin, Mike Osterling, McGraw-Hill Education, 2013
2	Value Stream Mapping for Lean Development, Drew Locher, Taylor & Francis, 2008

Reference Books

1	Lean Manufacturing Implementation in Garment Industry, Sain Manoj Kumar, Lap Lambert Academic Publishing GmbH KG 2013

Related online content

1	https://apparelresources.com/business-news/manufacturing/value-stream

2	https://www.onlineclothingstudy.com/2016/01/value-stream-mapping-vsm
3	https://leanmanufacturing.online/value-stream-map
Course Designed By: Dr.P.P. Gopalakrishnan	

Mapping with Programme Outcomes							
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	L	M	S	M	S	L	M
CO2	L	M	S	M	S	L	M
CO3	L	M	S	M	S	L	M
CO4	L	M	S	M	S	L	M
CO5	L	M	S	M	S	L	M

*S-Strong; M-Medium; L-Low


Fifth
Semester

B.Sc. APPAREL PRODUCTION TECHNOLOGY

Syllabus

3 (With effect from 2023-2024 onwards)

Program Code: 26S

Bharathiar University
(A State University, Accredited with "A"Grade by NAAC and
13th Rank among Indian Universities by MHRD-NIRF)
Coimbatore 641 046, INDIA

List of Elective papers (Colleges can choose any one of the papers as electives)			
Elective – I	A	5EA	Technology advancements in apparel production
	B	5EB	ERP in Apparel Industry
	C	5EC	TQM in Apparel Industry
Elective – II	A	6EA	Entrepreneurship
	B	6EB	Leadership and Emotional Intelligence
	C	6EC	Interpersonal Skills
Elective - III	A	6ED	Training and Development
	B	6EE	Factory Compliance
	C	6EF	Value Stream Mapping

Add on courses-Additional Credit Course

Naan Mudhalvan Skill courses

Students are encouraged to register through the website www.naanmudhalvan.tn.gov.in and take up the courses to enhance their skills

Prescribed courses under UGC – SWAYAM/ MOOCS/ NPTEL will be available for the affiliated colleges, as an optional.

Earning Additional credit is not mandatory for Programme Completion.