Department of Fashion Technology

Minutes of Board of Studies

The first Board of Studies meeting of Department of Fashion Technology was held on 07th April 2021 at 03:30 P.M in the R&D Lab – Mechanical Department, Sri Manakula Vinayagar Engineering College with the Head of the Department in the Chair.

The following members were present for the BoS meeting

Sl.No	Name of the Member with Designation and official Address	MEMBERS AS PER UGC NORMS
1	Dr. J. Thanikai Vimal Associate Professor and Head Department of Fashion Technology, SMVEC	Chairman
External Members		
2	**Dr.D.Saravanan** Principal Professor – Textile Technology Kumaraguru College of Technology Coimbatore 641 049	Subject Expert (University Nominee)
3	**Dr. C.Prakash,** Director, Indian Institute of handloom Technology, Fulia colony, Shantipur, Nadia (Dt) West Bengal – 741 402	Subject Expert (Academic Council Nominee)
4	**Dr.Sandhya Ravi** Principl, NITTE School of Fashion Technology and Interior Design 6429, NMIT Campus, Yelahanka, Bangalore, Karnataka - 560064	Subject Expert (Academic Council Nominee)
5	**Mrs. R.Geetha Malini** Material Manager, India Sourcing RALPH LAUREN INDIA SOURCING LLP., WeWork Galaxy, Suite 2B-114 43 Residency Rd, Bangalore – 560025	Subject Expert (Academic Council Nominee)
6	**Mr.D.Gopal Krishnan** Manager – Material Planning, PUMA Sports India Private Limited, 509, CMH Road, Indra Nagar, Bangalore - 560038	Subject Expert (Academic Council Nominee)
Internal Members		
7	Mr. L. Martin Assistant Professor Dept. of Mechanical Engineering, SMVEC Madagadipet-605107,	Internal Member
8	Mr. Kalaiselvan Assistant Professor Dept. of Mathematics, SMVEC Madagadipet-605107,	Internal Member
9	Ms. M. Rajeswari Assistant Professor Dept. of Chemistry, SMVEC Madagadipet-605107,	Internal Member

10	Mr. Chandramahan Assistant Professor Dept. of MBA, SMVEC Madagadipet-605107,	Internal Member
11	Ms. R. Suganya Assistant Professor Dept. of English, SMVEC Madagadipet-605107,	Internal Member

Agenda of the Meeting

1) Conformation of minutes of 1st Board of studies
2) To discuss and approve the B.Tech. Degree Curriculum and Syllabi from V to VI semesters for the B.Tech – Fashion Technology and the students admitted in the Academic Year 2020-21. (First Year)
3) To discuss about the uniqueness of the Curriculum (R-2020)
4) To discuss and approve Evaluation Systems
5) To discuss about the Innovative Teaching / Practices Methodology adopted to handle the emerging. / Advanced Technological concept courses
6) To discuss about the Academic calendar and Online and Offline class.
7) Any other item with the permission of chair

Minutes of the Meeting

Dr. J. Thanikai Vimal, Chairman, BoS opened the meeting by welcoming and introducing the external members, to the internal and co-opted members and thanked them for accepting to become the member of the Board of Studies and the meeting thereafter deliberated on agenda items that had been approved by the Chairman.

Item: 1	• Conformation of minutes of 1st Board of studies was approved by the BoS members. Phython and Lab instead of Programming C and lab in 1st Semester syllabus – **The above corrections are approved by BoS members and the details are given in Annexure- I.**
Item: 2	• **Recommended to Academic Council to approve** the B.Tech. Degree Curriculum from I to VIII semesters and syllabus for V to VI the B.Tech – Fashion Technology for the students going to be admitted in the Academic Year 2020-21 (First Year) with few suggestion. • Removal of (Engineering Mathematics – II Multiple Integrals and Transforms) paper in the 2nd semester (**Annexure II**) and instead of any core paper with related to creative arts and illustration paper (Annexure II) – it is more useful for creating more design aspect in 2nd semester itself. Mathematics is not necessary for Fashion Technology students.

- In 3rd Semester, Replacing Operations Research and Statistical Methods with Numerical Methods and Statistics (**Annexure II**).
- Changes in course code for IV Semester in **Annexure – II**
- Testing of Textile and Apparels, Quality Control of Garment and Accessories to be merged as one paper. Transferring the elective paper Environment Engineering and Sustainability from Professional Elective - III into 6th semester core paper (**Annexure** II).

Item: 3

- **Discussion was done on the uniqueness of the Curriculum (R-2020)**

1. Many certification courses (EEC) regarding Fashion Technology are available.

Sl.No	Semester	Batch	Course Planned
1	Sem I	Batch 1	Photoshop
2	Sem II	Batch 1	Corel Draw
3	Sem III	Batch 1	AutoCAD for TEXTILE
4	Sem IV	Batch 1	Industrial Automation
5	Sem V	Batch 1	Digital Marketing
6	Sem VI	Batch 1	Video and Image Processing Development System

Foreign languages suggested to the students are

- Japanese
- French
- Germany

NPTEL/MOOC Courses suggested to the students are

Sl.No	Year / Sem	Course Name	Duration of the course
1	III /VI	Testing of Functional and Technical Textile	12 weeks
2	IV/VIII	Textile Finishing	12 weeks

2. In-Plant training is added along with internship – Without Credit – is appreciated.

Item: 4

- **Recommended to Academic Council to approve** the Evaluation Systems is approved by Board of study.

Item: 5

- **Discussions were done on various** innovative Teaching practices Methodology adopted to handle the emerging / Advanced Technological concept courses -

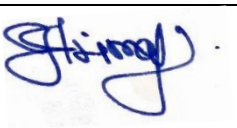
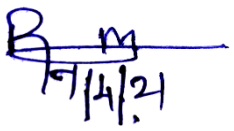
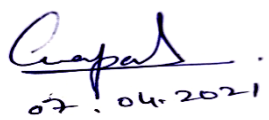
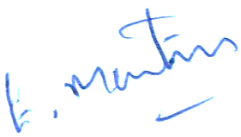
1. Arrangements of Guest Lecture is appreciated.

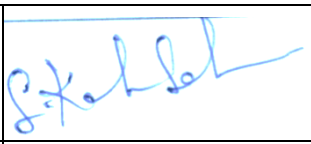
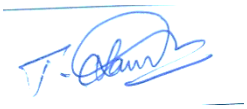
2. Industrial live demo mappings with lecture hours - is appreciated.

3. Visual Merchandising software to be installed for the benefits of the student in the pandemic salutation for learn creativity in visual merchandising platform.

	4. NPTEL Courses offered for advanced concepts – If 3 NPTEL courses are done by the student with high grade means, they have an option to skip an elective in VIII Semester.
Item: 6	**Discussions were done on** Academic calendar and Online and Offline class, The BoS Members are approved by the Online and offline classes.
Item: 7	**Other points Discussed** **Recommended to Academic Council to approve** 18 credits can be given to a student incase if student doing internship by abroad university. **Overall, the committee experts were satisfied with our curriculum structure and syllabus framing**

The meeting was concluded at 5:30PM with vote of thanks by **Dr. J. Thanikai VImal**, Head of Department, Fashion Technology.

Sl.No	Name of the Member with Designation and official Address	Responsibility in the BoS	Signature
1	Dr. J. Thanikai Vimal Associate Professor and Head Department of Fashion Technology, SMVEC	Chairman	
External Members			
2	**Dr.D.Saravanan** Principal Professor – Textile Technology Kumaraguru College of Technology Coimbatore 641 049	University Nominee	 07.04.2021
3	**Dr. C.Prakash,** Director, Indian Institute of handloom Technology, Fulia colony, Shantipur, Nadia (Dt) West Bengal – 741 402	Subject Expert (Academic Council Nominee)	 7/4/2021
4	**Dr.Sandhya Ravi** Principl, NITTE School of Fashion Technology and Interior Design 6429, NMIT Campus, Yelahanka, Bangalore, Karnataka - 560064	Subject Expert (Academic Council Nominee)	 07/04/2021
5	**Mrs. R.Geetha Malini** Material Manager, India Sourcing RALPH LAUREN INDIA SOURCING LLP., WeWork Galaxy, Suite 2B-114 43 Residency Rd, Bangalore – 560025	Subject Expert (Academic Council Nominee)	 7/4/21
6	**Mr.D.Gopal Krishnan** Manager – Material Planning, PUMA Sports India Private Limited, 509, CMH Road, Indra Nagar, Bangalore - 560038	Subject Expert (Academic Council Nominee)	 07.04.2021
Internal Members			
7	Mr. L. Martin Assistant Professor Dept. of Mechanical Engineering, SMVEC Madagadipet-605107,	Internal Member	

8	Mr. Kalaiselvan Assistant Professor Dept. of Mathematics, SMVEC Madagadipet-605107,	Internal Member	
9	Ms. M. Rajeswari Assistant Professor Dept. of Chemistry, SMVEC Madagadipet-605107,	Internal Member	
10	Mr. Chandramohan Assistant Professor Dept. of MBA, SMVEC Madagadipet-605107,	Internal Member	
11	Ms. R. Suganya Assistant Professor Dept. of English, SMVEC Madagadipet-605107,	Internal Member	

Annexure – I

(1. New Syllabus of "PROGRAMMING IN PYTHON and Lab")

		L	T	P	C	Hrs
U20EST110	**PROGRAMMING IN PYTHON** (Common to CSE, IT, CCE, FT)	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To acquire programming skill in core python.
- To learn the basic Syntax and Semantics of Python Programming.
- To learn how to design python program and applications.
- To acquire object oriented skills in python.
- To develop the skill of designing applications using modules and packages

Course Outcomes

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

CO1 - Define the structure and components of a python program. **(K1)**

CO2 - Illustrate the concepts of Python decision statements. **(K2)**

CO3 - Interpret the use of loops and functions to facilitate code reuse. **(K3)**

CO4 - Use list, tuple, Set and dictionary in python program. **(K3)**

CO5 - Read / write data from / to files and structure a program using Exceptions and Modules. **(K3)**

UNIT I INTRODUCTION TO PYTHON PROGRAMMING LANGUAGE (9 Hrs)

Introduction to Python Language **–** Strengths and Weaknesses **–** IDLE **–** Visual Source Code – Arithmetic Operators – Arithmetic Expressions **–** Dynamic Types **–** Naming Conventions **–** String Values **–** String Operations **–** String Slices **–** String Operators **–** Numeric Data Types **–** Conversions

UNIT II DECISION MAKING (9 Hrs)

Control Flow: Introduction – Control Flow and Syntax – Indenting – Relational Operators – Relational Expressions – Logical – Operators – Logical Expressions – If Statement – If else – Elif – Nested if.

UNIT III LOOPING (9 Hrs)

Loop: The while Loop – Break and continue – Nested while Loop – For Loop – Nested for Loop. Functions: parameters – Return values – Local and global scope – Function composition – Recursion and lambda functions.

UNIT IV LIST, TUPLE, SET, DICTIONARY, ARRAY (9 Hrs)

Lists: List operations – List slices – List methods – List loop – Mutability – Aliasing – Cloning lists – List parameters – Tuples: Tuple assignment – Tuple as return value – Advanced list processing – List comprehension – Sets – Dictionaries: Operations and methods – Arrays.

UNIT V FILES, EXCEPTIONS, MODULES, AND PACKAGES (9 Hrs)

Built In Functions. Files and Exception: Text Files – Reading and writing files – Format operator – Command line arguments – Errors and exceptions – Handling exceptions – Modules – Standard modules – Packages – Bit Wise Operators.

Text Books

1. Martin C Brown, "Python The Complete Reference", McGraw-Hill Education, 4th Edition, 2018
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist‘‘, Shroff/O‘Reilly Publishers, 2nd edition, 2016 (http://greenteapress.com/wp/thinkpython/).
3. Reema Thareja, "Python Programming Using Problem Solving Approach", ISBN: 9780199480173, Oxford University Press, First edition, 2017.

Reference Books

1. Robert Sedgewick, “Kevin Wayne, Robert Dondero – Introduction to Programming inPython: An Inter-disciplinary Approach”, Pearson India Education Services Pvt. 2016.
2. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd., 2015.
3. Ben Stephenson, “The Python Workbook A Brief Introduction with Exercises and Solutions”, Springer International Publishing, Switzerland 2014.
4. John V Guttag, “Introduction to Computation and Programming Using Python’’, MIT Press, Revised and expanded Edition, 2013.
5. Charles Dierbach, “Introduction to Computer Science using Python: A Computational Problem-Solving Focus”, Wiley India Edition, 2013.

Web References

1. https://www.learnpython.org/
2. https://pythonprogramming.net/introduction-learn-python-3-tutorials/
3. https://www.codecademy.com/learn/learn-python
4. https://nptel.ac.in/courses/106/106/106106182/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	-	-	-	1	-	-	-	-	-	-	-	1	1	-
2	2	1	-	-	1	-	-	-	-	-	-	-	3	1	-
3	2	1	-	-	1	-	-	-	-	-	-	-	2	1	-
4	3	2	1	1	1	-	-	-	-	-	-	-	2	1	-
5	3	2	1	1	1	-	-	-	-	-	-	-	3	1	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

U20ESP111	PROGRAMMING IN PYTHON LABORATORY	L	T	P	C	Hrs
		0	0	2	1	30

(Common to CSE, IT, CCE,FT)

Course Objectives

- To acquire programming skill in core python.
- To learn how to design python program and applications.
- To acquire object oriented skills in python.
- To design and implement modules and packages.
- To develop the skill of designing applications.

Course Outcomes

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

CO1 - Examine Python syntax and semantics. **(K3)**

CO2 - Demonstrate proficiency in handling Strings and File Systems. **(K3)**

CO3 - Compile, run and manipulate Python Programs using core data structures. **(K3)**

CO4 - Interpret the concepts of Object-Oriented Programming as used in Python. **(K3)**

CO5 - Implement exemplary applications related to modules and packages in Python. **(K3)**

List of Exercises

1. Develop simple programs using python syntax and semantics.
2. Demonstrate python program using Arithmetic expressions.
3. Demonstrate python program using Strings.
4. Demonstrate python program using relational expressions.
5. Understand the decision making statement.
6. Illustrate Conditional statements with real time problems.
7. Write Python Functions to facilitate code reuse.
8. Basic python applications using List, Tuples, Sets.
9. Implementation of searching.
10. Implementation of sorting.
11. Implement python programs using Dictionaries
12. Illustrate file concepts with real time problems
13. Use Exception handling in python applications for error handling.
14. Implement simple applications using Modules
15. Implement simple applications using Packages
16. Develop Real time application like Number guessing, Dice rolling simulator, Mobile contacts, etc

Reference Books

1. Reema Thareja, “Python Programming Using Problem Solving Approach”, Oxford University Press; First edition, 2017.
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python: An Inter- disciplinary Approach”, Pearson India Education Services Pvt., 2016.
3. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd., 2015.
4. Ben Stephenson, “The Python Workbook A Brief Introduction with Exercises and Solutions”, Springer International Publishing, 2014.
5. Paul Gries, Jennifer Campbell and Jason Montojo, “Practical Programming: An Introduction to Computer Science using Python 3”, Pragmatic Programmers, LLC, Second edition, 2013.

Web References

1. https://nptel.ac.in/courses/106/106/106106182/
2. https://www.learnpython.org/
3. https://pythonprogramming.net/introduction-learn-python-3-tutorials/
   https://www.codecademy.com/learn/learn-python

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1	1	-	-	-	1	-	-	-	-	-	-	-	1	1	-
2	2	1	-	-	1	-	-	-	-	-	-	-	3	1	-
3	2	1	-	-	1	-	-	-	-	-	-	-	2	1	-
4	3	2	1	1	1	-	-	-	-	-	-	-	2	1	-
5	3	2	1	1	1	-	-	-	-	-	-	-	3	1	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

Annexure – II
(1. Revised syllabus II, III and V semester)

- The Course Engineering Mathematics – II Multiple Integrals and Transforms paper in the 2nd semester is removed instead of Surface Fabric Design.
- Replacing Operations Research and Statistical Methods with Numerical Methods and Statistics
- Revised syllabus of "Textile Testing and Apparel Quality Evaluation"

		L	T	P	C	Hrs
U20FTT203	**SURFACE FBRIC DESIGN**	**2**	**1**	**0**	**3**	**45**

Course Objectives

- To understand the Surface ornamentation
- To understand the Traditional embroideries
- To teach and train the students in the basics of hand and machine embroidery.
- To impart knowledge on various types of embroidery stitches.
- To impart knowledge on computerized embroidery machines.

Course Outcomes

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

CO1 - Describe the importance of Surface ornamentation. **(K2)**
CO2 - Describe the importance of Traditional embroideries. **(K3)**
CO3 - Attain knowledge on the embroidery tools and the techniques. **(K4)**
CO4 - Identify the different hand embroidery stitches and Indian traditional embroidery. **(K3)**
CO5 - Recognize the processes involved in the machine and computerized embroidery. **(K3)**

UNIT I SURFACE ORNAMENTATION (6 Hrs)

Surface ornamentation - introduction and importance, various methods and techniques, factors influencing the selection of ornamentations. Tools and equipment required.

UNIT II TRADITIONAL EMBROIDERY (9 Hrs)

Traditional embroideries of India – Phulkari, Kasuti, Kashmiri embroidery, Kutch work, Chikkankari and Kantha. Tribal embroidery stitches - designs, colours and materials used for embroidery.

UNIT III HAND STITCHES (10 Hrs)

Hand Embroidery - selection of needle, thread and fabric, design transferring methods. Stitch classification -temporary stitches and permanent stitches. Temporary stitches - basting even, basting uneven, diagonal and slip basting. Permanent stitches - running stitches, hemming, slip stitch, run and back stitch, over casting and whip stitch.

UNIT IV MACHINE EMBROIDERY (8 Hrs)

Machine embroidery - basic principles and operation, types of stitches, developments in embroidery machines. Selection of fabrics and accessories for machine embroidery.

UNIT V COMPUTERIZED EMBROIDERY (12 Hrs)

Computerized embroidery machines - principles, types, special attachments and software used. Single and multi-head embroidery machine - parts, functions and features. Production Process – Concept of designing, punching, digitizing, special effects, networking. Selection of thread, color and stitches. Quality and production control.

Text Books:

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

Reference Books:

1. Joan Nicholson, "Contemporary Embroidery Design", Read Books, 2011

2. Mildred Graves Ryan, Marta Cone, “The Complete Encyclopedia of Stitchery”, Sterling Publishing Company, 2005.
3. Gail Lawther, “Inspirational Ideas for Embroidery on Clothes and Accessories”, Search Press Ltd., 1993.

Web References

1. https://thedesigncart.com/blogs/news/surface-ornamentation-history-and-types
2. https://www.yourlibaas.com/blogs/fashion/10-traditional-embroideries-of-india
3. https://www.thesprucecrafts.com/learn-stitches-and-hand-sewing-projects-2978472
4. https://en.wikipedia.org/wiki/Machine_embroidery
5. http://sewingmachinebuffs.com/what-is-computerized-embroidery/

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1	2	1	-	-	-	2	-	-	3	-	-	-	-	2	-
2	2	1	-	-	-	2	-	-	3	-	-	-	-	2	-
3	2	1	-	-	-	2	-	-	3	-	-	-	-	2	-
4	2	1	-	-	-	2	-	-	3	-	-	-	-	2	-
5	2	1	-	-	-	2	-	-	3	-	-	-	-	2	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

OPERATIONS RESEARCH AND STATISTICAL METHODS

L	T	P	C	Hrs
2	1	0	3	60

COURSE OBJECTIVES

- To know the formulation and solution of LPP
- To learn the optimization technique to the transportation and assignment problems
- To acquire knowledge in project management problems
- To understand the application of testing of hypothesis
- To gain knowledge about χ^2 distributions

COURSE OUTCOMES

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

CO1 - solve the linear programming problem using suitable methods.
CO2 - apply the optimization technique to the transportation and assignment problems.
CO3 - analyze project management problems using project evaluation and review technique and critical path method.
CO4 - test the hypothesis for proportions, mean and standard deviation using Z – test.
CO5 - test the significance of the hypothesis using t, F and χ^2 distributions.

UNIT – I LINEAR PROGRAMMING PROBLEM 12 Hrs

Linear programming problem - Mathematical formulation – Graphical solution method – Canonical and standard forms of Linear Programming Problem – Simplex method (using slack variables only) – Use of artificial variables – Big-M method.

UNIT – II TRANSPORTATION AND ASSIGNMENT PROBLEMS 12 Hrs

Transportation problem – Initial basic feasible solution – North west corner rule – Least cost method – Vogel's approximation method – Modified distribution method – Assignment problem – Hungarian method.

UNIT – III NETWORK ANALYSIS 12 Hrs

Project evaluation and review technique – Critical path method – Cost considerations in project evaluation and review technique and critical path method.

UNIT – IV TESTING OF SIGNIFICANCE FOR LARGE SAMPLES 12 Hrs

Parameter and statistic – Null and alternative hypothesis – Errors in sampling, critical region and level of significance – One tailed and two tailed tests – Testing of hypothesis for proportions, mean, and standard deviation using Z – test.

UNIT – V EXACT SAMPLING DISTRIBUTIONS 12 Hrs

χ^2 tests for independence of attributes, goodness of fit – χ^2 test for population variance – t test for single mean, difference between means and paired t test and F test for variance.

Text books:

1. P. K. Gupta and D. S. Hira, "Problems in Operation Research", Sultan Chand and Sons Publishers, 4th Edition, 2015.
2. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4th Edition (7th reprint), 2018.

Reference books:

1. H. A. Taha, "Operation Research: An Introduction", Pearson Publishers, 9th Edition, 2014.
2. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15th Edition, 2012.
3. S. C. Gupta, V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11th Edition (Reprint), 2019.
4. R. A. Johnson and C. B. Gupta, "Miller and Freund's, "Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.
5. S. Ross, "A first course in probability", Pearson Publishers, 9th Edition, 2019.
6. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, (Reprint), 2003.

Web Resources

1. https://www.researchgate.net/publication/313880623
2. https://nptel.ac.in/courses/117/103/117103017/
3. https://nptel.ac.in/courses/111/107111107128/
4. https://youtu.be/MrOwmSYqkiE
5. https://youtu.be/4U3B5lr-MqM

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	2	-	1	-	-	-	-	-	-	-	-	-
2	3	3	3	2	-	1	-	-	-	-	-	-	-	-	-
3	3	3	3	2	-	1	-	-	-	-	2	1	-	-	-
4	3	3	3	2	-	-	-	-	-	-	2	1	-	-	-
5	2	3	3	2	-	-	-	-	-	-	2	-	-	-	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

U20FTT516	TEXTILE TESTING AND APPAREL QUALITY EVALUATION	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- Students will have fundamental knowledge Sampling and quality standards.
- Students will know the methodology of working of fiber &yarn testing instruments.
- Students will have fundamental knowledge Fabric Testing - Mechanical Properties
- Students will have fundamental knowledge on Fabric Testing – Aesthetics and comfort properties
- Students will know the methodology of quality assurance in the apparel industry.

Course Outcomes (COs)

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

CO1 - Acquire knowledge in sampling techniques and quality standards **(K2)**
CO2 - Apply knowledge in principles of working of fiber &yarn testing instruments. **(K2)**
CO3 - Acquire knowledge in Fabric Testing - Mechanical Properties. **(K3)**
CO4 - Acquire knowledge in Fabric Testing - Aesthetics and comfort properties. **(K3)**
CO5 - Acquire knowledge of quality assurance in the apparel industry. **(K2)**

UNIT I SAMPLING AND QUALITY STANDARDS (9 Hrs)

Definition – random, biased sampling. Terms used in sampling. Sampling techniques for fiber, yarn and fabric. Moisture regain and Moisture content. Standard conditions for testing samples. Quality Standards: AATCC, ASTM, BIS, ISO, CSE. ISO 9001, ISO 14001, OHSAS 18000:2000, GOTS, CPS (Children Protection Standards), Social Compliance.

UNIT II FIBER AND YARN TESTING (9 Hrs)

Fiber: High Volume Instruments (HVI): length, strength, maturity, trash& color module analysis. Advanced Fiber Information System (AFIS): length, nep and trash modules. Determination of yarn count, yarn twist- single and folded yarns. Measurement of yarn hairiness - optical, singeing and hairiness tester- Causes for yarn hairiness. Classification of variation. Methods of measuring evenness –Blackboard, ASTM standards, Cutting and weighing methods. Electronic capacitance – evenness tester – Uster standards. Yarn faults – classification – Classimat. Measurement of yarn strength – Single yarn strength tester –Tensorapid, Tensojet - lea strength tester. CSP& its significance.

UNIT III FABRIC TESTING - MECHANICAL PROPERTIES (9 Hrs)

Fabric tensile strength tester– Raveled strip, Cut strip, Grab methods. Fabric tear strength tester – Elmendorf strength tester. Ballistic strength tester – Hydraulic bursting strength tester. Fabric abrasion resistance – Martindale abrasion tester. Fabric Pilling - I.C.I Pillbox tester. Crimp – Influence of crimp on fabric properties–Shirley crimp tester. Fabric thickness and GSM measurements.

UNIT IV FABRIC TESTING – AESTHETICS AND COMFORT PROPERTIES (9 Hrs)

Fabric Drape – Drape meter. Fabric Stiffness – Shirley Stiffness tester, Fabric crease resistance and crease recovery measurements. Fabric Permeability- Fabric air permeability tester and water permeability tester. Fabric thermal resistance tester.

UNIT V TESTING OF APPAREL PRODUCTION AND ACCESSORY (9 Hrs)

Standard Operating Procedure (SOP), Care labeling of apparel: Standards and methods. Safety issues for different accessories in children garment, prescribing inspection procedures for process and finished garment. Tolerance limits and quality standards for cutting, sewing and finished garments.

Seam strength and seam slippage testing. Peel bond strength, Button strength, Zipper strength testing. Color fastness testing – Washing, Rubbing, Light, Perspiration fastness. Apparel dimensional stability – spirality, skewing and its measurement.

Text Books:

1. Booth J.E., “Principle of Textile Testing”, Butterworth Publications, London, 1989
2. Kothari V. K., “Testing and Quality Management”, Progress in Textile Technology Vol.1, IAFL Publications, New Delhi, 1999

3. Sara J. Kadolph., “Quality Assurance for Textiles and Apparels”, Fair Child Publications, New York, 1998

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1. Saville,B.P. “Physical Testing of Textiles”, Woodhead Publishing Ltd., England,2004.
2. Grover E G and Hamby D. S “Hand Book of Textile testing and quality Control”, Wiley Eastern Pvt. Ltd., New Delhi, 1969.
3. Ruth clock and Grace Kunz., “Apparel Manufacture – Sewn Product Analysis”, Upper Sadle River Publications, New York, 2000
4. Pradip V. Mehta., “Managing Quality in the Apparel Industry”, NIFT Publication, India, 1998
5. Slater K., “Physical Testing and Quality Control”, The Textile Institute, Vol.23, No.1/2/3 Manchester, 1993
6. Arindam Basu, "Textile Testing-Fiber, Yarn & Fabric", SITRA, India, 2001.

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1. https://textilevaluechain.in/textile-articles/textile-testing-and-quality-control/
2. https://www.qima.com/testing/garments-apparel
3. https://www.fibre2fashion.com/industry-article/4345/quality-control-in-apparel
4. https://www.hqts.com/textile-and-apparel/
5. https://www.intouch-quality.com/blog/5-packaging-quality-control-checks-no-importer-can-afford-to-skip

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	-	-	-	-	-	-	-	-	-	-	-	2	-
2	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
3	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
4	2	2	3	-	-	-	3	-	-	-	-	-	-	2	-
5	2	-	2	-	-	-	2	-	-	-	-	-	-	2	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

(2. Revised II and VI semester curriculum)

SEMESTER – II		
Sl. No.	**Course Code**	**Course Title**
Theory		
1	U20BST219	Basics Textile Chemistry
2	U20EST253	Applied Mechanics for Textile Technologists
3	U20EST254	Basic Engineering Graphics for Textile Designing
4	U20FTT203	Surface Fabric Design
5	U20FTT204	Basics of Yarn and Fabric Manufacturing
6	U20FTT205	Concepts of Fashion and Design
Practical		
7	U20ESP255	Basic Engineering Graphics for Textile Designing Lab
8	U20FTP202	Textile manufacturing Lab
9	U20FTP203	Fashion And Design Concept Lab
Employability Enhancement Course		
10	U20FTC2XX	Certification Course - II
11	U20FTS201	Skill Development Course 1*
Mandatory Course		
12	U20FTM202	Environmental Science
Total		

SEMESTER – III		
Sl. No.	**Course Code**	**Course Title**
Theory		
1		Operations Research and Statistical Methods
2	U20FTT306	Fashion Illustration
3	U20FTT307	Pattern Engineering -I
4	U20FTT308	Fabric Structure and Design
5	U20FTT309	Yarns and Fabrics for Fashion
6	U20FTT310	Knitting Technology
Practical		
7	U20BSP326	Statistical Laboratory
8	U20FTP304	Fashion Illustration Lab
9	U20FTP305	Pattern Engineering -I Lab
10	U20FTP306	Fabric Structure and Design Graphics lab
Employability Enhancement Course		
11	U20FTC3XX	Certification Course - III
12	U20FTS302	Skill Development Course 2*
Mandatory Course		
13	U20FTM303	Physical Education

SEMESTER – IV										
Sl. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U20FTT411	Pattern Engineering -II	PC	3	0	0	3	25	75	100
2	U20FTT412	Textile Chemical Processing	PC	3	0	0	3	25	75	100
3	U20FTT413	Apparel machinery and Equipment	PC	3	0	0	3	25	75	100
4	U20FTT414	Garment Construction - I	PC	3	0	0	3	25	75	100
5	U20FTE4XX	Professional Elective - I	PE	3	0	0	3	25	75	100
6	U20XXO4XX	Open Elective-I	OE	3	0	0	3	25	75	100
Practical										
7	U20HSP401	General Proficiency - I	HS	-	-	2	1	50	50	100
8	U20FTP407	Pattern Engineering -II Lab	PC	0	0	2	1	50	50	100
9	U20FTP408	Textile Chemical Processing LAB	PC	0	0	2	1	50	50	100
10	U20FTP409	Garment Construction - I Lab	PC	0	0	2	1	50	50	100
Employability Enhancement Course										
11	U20FTC4XX	Certification Course - IV	EEC	-	-	4	-	100	-	100
12	U20FTS403	Skill Development Course 3*	EEC	0	0	2	-	100	-	100
Mandatory Course										
13	U20FTM404	NSS	MC	0	0	2	-	100	-	100
Total							22	650	650	1300

SEMESTER – V										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U20FTT515	Garment Construction - II	PC	3	0	0	3	25	75	100
2	**U20FTT516**	**Textile Testing and Apparel Quality Evaluation**	PC	3	0	0	3	25	75	100
3	U20FTT517	Fashion Forecasting and Accessories	PC	3	0	0	3	25	75	100
4	U20FTT518	Apparel Merchandising and Cost Management	PC	3	0	0	3	25	75	100
5	U20FTE5XX	Professional Elective - II	PE	3	1	0	3	25	75	100
6	U20XXO5XX	Open Elective-II	OE	3	0	0	3	25	75	100
Practical										
7	U20HSP502	General Proficiency -II	HS	-	-	2	1	50	50	100
8	U20FTP510	Garment Construction - II Lab	PC	0	0	2	1	50	50	100
9	U20FTP511	Fashion Forecasting and Accessories LAB	PC	0	0	2	1	50	50	100
10	U20FTP512	Testing of Textile and Apparels Lab	PC	0	0	2	1	50	50	100
Employability Enhancement Course										
11	U20FTC5XX	Certification Course - V	EEC	0	0	4	-	100	-	100
12	U20FTS504	Skill Development Course 4: Foreign Language/ IELTS - I	EEC	0	0	2	-	100	-	100
13	U20FTS505	Skill Development Course 5: Presentation Skill using ICT	EEC	0	0	2	-	100	-	100
Mandatory Course										
14	U20FTM505	Indian Constitution	MC	2	0	0	-	100	-	100
Total							22	750	650	1400

SEMESTER – VI										
Sl. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U20FTT619	Garment Project Planning	PC	3	0	0	3	25	75	100
2	U20FTT620	CAD – CAM For Apparels	PC	3	0	0	3	25	75	100
3	U20FTT621	Apparel Design Development and Size Fit analysis	PC	3	0	0	3	25	75	100
4	U20FTT622	Environment Engineering and Sustainability	PC	3	0	0	3	25	75	100
5	U20FTE6XX	Professional Elective - III	PE	3	0	0	3	25	75	100
6	U20XXO6XX	Open Elective-III	OE	3	0	0	3	25	75	100
Practical										
7	U20FTP613	Garment Project Planning Lab	PC	0	0	2	1	50	50	100
8	U20FTP614	CAD – CAM For Apparels Lab	PC	0	0	2	1	50	50	100
9	U20FTP615	Apparel Design Development and Size Fit analysis Lab	PC	0	0	2	1	50	50	100
Employability Enhancement Course										
10	U20FTC6XX	Certification Course - VI	EEC	0	0	4	-	100	-	100
11	U20FTS606	Skill Development Course 6: Foreign Language / IELTS - II	EEC	0	0	2	-	100	-	100
12	U20FTS607	Skill Development Course 7: Technical Seminar	EEC	0	0	2	-	100	-	100
13	U20FTS608	Skill Development Course 8: NPTEL / MOOC - I	EEC	0	0	0	-	100	-	100
Mandatory Course										
14	U20FTM606	Essence of Indian Traditional Knowledge	MC	2	0	0	-	100	-	100
Total							21	800	600	1400

Professional Elective – II (Offered in Semester V)		
Sl. No.	**Course Code**	**Course Title**
1	U20FTE506	Technical Textiles
2	U20FTE507	ERP And MIS in Apparel Industry
3	U20FTE508	Advances in Garment Production
4	U20FTE509	Apparel Work Study
5	U20FTE510	Leather Technology

Open Elective – II / Open Elective – III				
1	U20HSO501/ U20HSO601	Product Development and Design	MBA	**Common to B. Tech** (Offered in Semester V for **EEE, ECE, ICE, CIVIL, BME, CCE, FT**) (Offered in Semester VI for **CSE, IT, MECH, Mechatronics, AI&DS**)
2	U20HSO502/ U20HSO602	Intellectual Property and Rights	MBA	
3	U20HSO503/ U20HSO603	Marketing Management and Research	MBA	
4	U20HSO504/ U20HSO604	Project Management for Engineers	MBA	
5	U20HSO505/ U20HSO605	Finance for Engineers	MBA	

Professional Elective – III (Offered in Semester VI)		
Sl. No.	**Course Code**	**Course Title**
1	U20FTE611	Apparel Product Engineering
2	U20FTE612	Advances in garment finishing
3	U20FTE613	Fundamentals of Nanoscience
4	U20FTE614	Denim Garment Manufacturing Technology
5	U20FTE615	Home Textiles in Fashion

		L	T	P	C	Hrs
U20FTT515	**GARMENT CONSTRUCTION - II**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To describe importance of fabric grain,
- To describe importance of Fit and pattern alteration
- To explain advanced draping, drafting and labelling of garments.
- To explain quality aspects of garment.
- To explain advanced tools of garment construction.

Course Outcomes

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

CO1 - Explain describe importance of fabric grain. **(K2)**

CO2 - Explain describe importance of Fit and pattern alteration. **(K3)**

CO3 - Explain advanced draping, drafting and labelling of garments. **(K2)**

CO4 - Explain quality aspects of garment. **(K3)**

CO5 - Explain advanced tools of garment construction. **(K4)**

UNIT I FABRIC GRAIN (9 Hrs)

Importance of grain in fabric cutting & garment construction, various methods of straightening the grain & fabric ends for woven and knit fabrics. Material handling processes for various fabrics.

UNIT II FITTING AND PATTERN ALTERATION (9 Hrs)

Principles of good fit, Sequence of fitting Alterations to achieve a good fit, Fitting problems associated with various garments and solutions. General principles & importance of shortening, lengthening of blouse, increasing & decreasing of shoulder slope, increasing the depth and opening of necklines, altering sleeve cap, alternation of patterns for defective/ unusual figures.

UNIT III GARMENT CONSTRUCTION AND LABELLING (9 Hrs)

Drafting- vest coat, jacket and jeans. Draping-Sleeve, flared and gored skirt, pants, collars, and dresses.

Specialty Garment Construction: Construction procedure for: Firefighting suit, Floater's jacket, Space Suit etc. machinery and equipment required for the same.

Labelling of garments: Introduction, importance, types of labels, American- ISO and other care labelling symbols and system.

UNIT IV QUALITY (9 Hrs)

Definitions, Objective and subjective aspects of quality, 3D and Eight dimensions of Quality, QA and QC, Evolution of quality concepts: SQC, TQC, TQM, ISO 9000, Types of inspection, Statistical Sampling, AQL, 4 point and 10 point inspection, fabric defects and garment defects, factory evaluation, quality assurance in various departments, Quality improvement methodologies, Use of QC tools, Cost of quality conformance and non-conformance. Fabric and garment testing, role of different stake holders in quality of apparels, Quality Improvement case study.

UNIT V ADVANCE TOOLS FOR GARMENT CONSTRUCTION (9 Hrs)

Introduction, latest software programmes, attachments, features of modern garment construction machines. Case studies.

Text Books

1. Jacob Solinger, "Apparel Production Handbook", Reinhold Publications,1998
2. Carr H and Latham B., "The Technology of Clothing Manufacturing", Blackwell Science, U.K.,1994
3. Gerry Cooklin, "Garment Technology ForFashionDesigners", Black well Science, 2000

Reference Books

1. Ruth E. Glock, Grace I. Kunz, "Apparel Manufacturing, Sewn Product Analysis", fourth edition, Pearson Education, ISBN: 8177580760159

2. Laing R.M., Webster J, “Stitches & Seams”, The Textile Institute, India,1998
3. Shaeffer Claire, “Sewing for the Apparel Industry”, Prentice Hall, New Jersey, 2001
4. Singer, “Sewing Lingerie”, Cy De Cosse Incorporated, 1991.
5. Patty Brown & Janett Rice, “Ready-To-Wear Apparel Analysis’”, Third Edition, Prientice Hall Inc., New Jersey,ISBN:0130254347.
6. Ruth Glock, Grace I. Kunz, “Apparel Manufacturing”, Dorling Kindersley Publishing Inc., New Jersey, 1995, ISDN: 0-02-344142-9
7. Pradip V.Mehta, “An Introduction to Quality Control for the Apparel Industry”, J.S.N. Internationals, 1992

Web References

1. https://www.thecuttingclass.com/grainlines/
2. https://www.thesprucecrafts.com/sewing-pattern-alteration-and-fitting-articles-2977364
3. https://www.fibre2fashion.com/industry-article/2111/garment-labels-types-and-styles
4. https://www.fibre2fashion.com/industry-article/3055/quality-systems-for-garment-
5. https://sergerpepper.com/2014/01/sewing-tools-notions.html

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	2	3	-	2	-	-	-	2	1	-	-	1	2	2
2	2	1	3	-	2	-	-	-	2	1	-	-	1	2	2
3	1	2	3	-	2	-	-	-	2	1	-	-	1	2	2
4	1	2	3	-	2	-	-	-	2	1	-	-	1	2	2
5	2	2	3	-	2	-	-	-	2	1	-	-	1	2	2

Correlation Level: 1- Low, 2 - Medium, 3 – High

U20FTT516	TEXTILE TESTING AND APPAREL QUALITY EVALUATION	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- Students will have fundamental knowledge Sampling and quality standards.
- Students will know the methodology of working of fiber &yarn testing instruments.
- Students will have fundamental knowledge Fabric Testing - Mechanical Properties
- Students will have fundamental knowledge on Fabric Testing – Aesthetics and comfort properties
- Students will know the methodology of quality assurance in the apparel industry.

Course Outcomes (COs)

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

CO1 - Acquire knowledge in sampling techniques and quality standards **(K2)**
CO2 - Apply knowledge in principles of working of fiber &yarn testing instruments. **(K2)**
CO3 - Acquire knowledge in Fabric Testing - Mechanical Properties. **(K3)**
CO4 - Acquire knowledge in Fabric Testing - Aesthetics and comfort properties. **(K3)**
CO5 - Acquire knowledge of quality assurance in the apparel industry. **(K2)**

UNIT I SAMPLING AND QUALITY STANDARDS (9 Hrs)

Definition – random, biased sampling. Terms used in sampling. Sampling techniques for fiber, yarn and fabric. Moisture regain and Moisture content. Standard conditions for testing samples. Quality Standards: AATCC, ASTM, BIS, ISO, CSE. ISO 9001, ISO 14001, OHSAS 18000:2000, GOTS, CPS (Children Protection Standards), Social Compliance.

UNIT II FIBER AND YARN TESTING (9 Hrs)

Fiber: High Volume Instruments (HVI): length, strength, maturity, trash& color module analysis. Advanced Fiber Information System (AFIS): length, nep and trash modules. Determination of yarn count, yarn twist- single and folded yarns. Measurement of yarn hairiness - optical, singeing and hairiness tester- Causes for yarn hairiness. Classification of variation. Methods of measuring evenness –Blackboard, ASTM standards, Cutting and weighing methods. Electronic capacitance – evenness tester – Uster standards. Yarn faults – classification – Classimat. Measurement of yarn strength – Single yarn strength tester –Tensorapid, Tensojet - lea strength tester. CSP& its significance.

UNIT III FABRIC TESTING - MECHANICAL PROPERTIES (9 Hrs)

Fabric tensile strength tester– Raveled strip, Cut strip, Grab methods. Fabric tear strength tester – Elmendorf strength tester. Ballistic strength tester – Hydraulic bursting strength tester. Fabric abrasion resistance – Martindale abrasion tester. Fabric Pilling - I.C.I Pillbox tester. Crimp – Influence of crimp on fabric properties–Shirley crimp tester. Fabric thickness and GSM measurements.

UNIT IV FABRIC TESTING – AESTHETICS AND COMFORT PROPERTIES (9 Hrs)

Fabric Drape – Drape meter. Fabric Stiffness – Shirley Stiffness tester, Fabric crease resistance and crease recovery measurements. Fabric Permeability- Fabric air permeability tester and water permeability tester. Fabric thermal resistance tester.

UNIT V TESTING OF APPAREL PRODUCTION AND ACCESSORY (9 Hrs)

Standard Operating Procedure (SOP), Care labeling of apparel: Standards and methods. Safety issues for different accessories in children garment, prescribing inspection procedures for process and finished garment. Tolerance limits and quality standards for cutting, sewing and finished garments.

Seam strength and seam slippage testing. Peel bond strength, Button strength, Zipper strength testing. Color fastness testing – Washing, Rubbing, Light, Perspiration fastness. Apparel dimensional stability – spirality, skewing and its measurement.

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2. Kothari V. K., “Testing and Quality Management”, Progress in Textile Technology Vol.1, IAFL Publications, New Delhi, 1999

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2. Grover E G and Hamby D. S “Hand Book of Textile testing and quality Control”, Wiley Eastern Pvt. Ltd., New Delhi, 1969.
3. Ruth clock and Grace Kunz., “Apparel Manufacture – Sewn Product Analysis”, Upper Sadle River Publications, New York, 2000
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Web References

1. https://textilevaluechain.in/textile-articles/textile-testing-and-quality-control/
2. https://www.qima.com/testing/garments-apparel
3. https://www.fibre2fashion.com/industry-article/4345/quality-control-in-apparel
4. https://www.hqts.com/textile-and-apparel/
5. https://www.intouch-quality.com/blog/5-packaging-quality-control-checks-no-importer-can-afford-to-skip

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	-	-	-	-	-	-	-	-	-	-	-	2	-
2	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
3	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
4	2	2	3	-	-	-	3	-	-	-	-	-	-	2	-
5	2	-	2	-	-	-	2	-	-	-	-	-	-	2	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

		L	T	P	C	Hrs
U20FTT517	**FASHION FORECASTING AND ACCESSORIES**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To enable students to understand about surveys, scans
- To impart the knowledge about colour forecasting.
- Discuss various forecasting methods used by reputed forecasting companies to develop current trend for the local market.
- Describe forecasted colors, fabrics and trends according to seasons and market.
- Describe forecasted components and fashion accessories

Course Outcomes

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

CO1 - Recognize various fabric materials available in market and choose appropriate fabric as per application. **(K2)**

CO2 - Produce articles using various fabric ornamentation techniques. **(K3)**

CO3 - Apply various forecasting methods used by reputed forecasting companies to develop current trend for the local market. **(K2)**

CO4 - Evaluate the forecasted colors, fabrics and trends according to seasons and market type as a member of team and present the same. **(K3)**

CO5 - To explain procedure for Fashion trends and merchandising of accessories. **(K2)**

UNIT I FASHION FORECASTING (9 Hrs)

Meaning of fashion forecasting, role and responsibilities of forecaster, steps in developing a forecast, fashion timetable and seasons, short term and long-term forecasting, avoiding forecasting traps. Innovation characteristics, consumer adoption process and theories, fashion change agents, innovators and fashion leaders, consumer segmentation.

UNIT II COLOUR FORECASTING (9 Hrs)

Importance, colours in marketing, consumers and psychology of colour, language of colour, seasonal colour analysis, fashion colour names, colour cycles, Color Relationships across Product Categories, sources of colour ideas, NCD technique of colour trend analysis and synthesis.

UNIT III TEXTILE & STYLE FORECASTING (9 Hrs)

Fashion in fibres and fabrics, sources of innovation in textile development, timing of innovation, innovation in fibres, yarns fabrics, dyes, finishes and trims, fabric fairs and trade shows, fabric libraries. Silhouette trends. Style forecasting: trend multiplication, different designers with same concept.
Fashion map: geography & off the runway, street fashion. Trend Identification, analysis and synthesis. New uses of products

UNIT IV SALES AND PRESENTING FORECASTING (9 Hrs)

Sales forecasting: Importance, time series technique, correlation regression techniques, qualitative techniques, blending quantitative and qualitative techniques. Sales forecasting in context of product life cycle.

Presenting Forecasts: Objectives, presenting design as a creative process, trend reporting: trend map, trend boards, presentation techniques, publication and forecasting services.

UNIT V FASHION ACCESSORIES FORECASTING (9 Hrs)

Fashion accessories – footwear, handbags, gloves, hats, scarves, hosiery, jewelry, watches; testing of zippers, elastic waist band testing, fusible interlinings; safety issues for different accessories in children garment. Fashion trends and merchandising of accessories, Economic importance, Accessory Designers, Major Brand players.

Text Books:

1. Gwyneth Holland, Rae Jones, Fashion Trend Forecasting, Laurence King Publishing, 2017
2. Evelyn L. Brannon & Lorynn R. Divita, Fashion forecasting, Fairchild books, 2015.
3. Simon Seivewright, ―Basics Fashion Design: Research and Design‖, AVA Publishings SA, UK, 2007.
4. Diehold Frank, ―Elements of forecasting‖, , South-Western College Publishing, USA, 2007.
5. Elinor Renfrew and Colin Renfrew, ―Basics Fashion Design: Developing a Collection‖, AVA Publishings SA, UK, 2009.

6. Marks and Andrea, —Writing for Visual Thinkers: A Guide for Artists and Designers, Peachpit Press, Berkeley 2009.

Reference Books

1. Kate Scully and Debra Johnson Cobh, —Colour forecasting for fashion‖, Laurence King Publishing, 2010.
2. Tracy Diane & Tom Cassidy, —Colour Forecasting‖, Blackwell Publishing, 2005.
3. Evelyn L. Brannon, —Fashion Forecasting‖, Fairchild Books, 2011.
4. Diane.T and Cassidy. T, —Colour forecasting, Blackwell Publishing, 2005
5. Jay Diamond and Ellen Diamond, "Fashion, Apparel, Accessories, Home Furnishings"PearsonPrenticeHall,NewJersey,2007.

Web References

1. https://www.fibre2fashion.com/industry-article/83/fashion-forecasting
2. https://colormarketing.org/2018/06/06/what-is-color-forecasting/
3. https://demand-planning.com/2019/10/02/how-to-present-forecasts-properly/
4. https://www.slideshare.net/aslikarabulut/sales-forecasting
5. https://trendzoom.com/

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COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	-	-	1	3	-	-	-	-	-	-	2	-	-
2	3	3	-	-	2	2	-	-	-	-	-	-	3	-	-
3	2	3	-	-	2	3	-	-	-	-	-	-	2	-	-
4	3	3	-	-	2	3	-	-	-	-	-	-	2	-	-
5	2	2	-	-	2	3	-	-	-	-	-	-	4	-	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

U20FTT518	APPAREL MERCHENDISING AND COST MANAGEMENT	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To describe importance of basic principles of merchandising,
- To describe importance in sourcing and documentation
- To explain cost of apparel products.
- To explain CMT cost for different types of garments.
- To explain pricing techniques, budgeting and cost volume profit analysis.

Course Outcomes

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

CO1 Acquire knowledge in basic principles of merchandising (**K2**)
CO2 Acquire knowledge in sourcing and documentation (**K2**)
CO3 Describe the factors that determine the cost of apparel products (**K2**)
CO4 Calculate the CMT cost for different types of garments (**K4**)
CO5 Acquire knowledge on various pricing techniques, budgeting and cost volume profit analysis (**k3**)

UNIT I MERCHANDISING (9 Hrs)

Definition of merchandising. Classification of exporters- Manufacturer exporter, Merchant exporter, Job worker (CM/CMT), Functions of merchandising division - Role and responsibilities of a merchandiser- different types of buyers. Communications with the buyers -awareness of current market trends– product development- line planning and line presentation.

UNIT II SOURCING AND DOCUMENTATION (9 Hrs)

Need for sourcing-sourcing materials-manufacturing resources planning-principles of MRP. Sourcing strategies- Overseas sourcing. Supply chain and demand chain analysis- Materials management for quick response. Order confirmation, various types of export documents, Pre-shipment, Post -shipment documentation, Terms of sale, payment, shipment etc.

UNIT III COST ACCOUNTING (6 Hrs)

Objectives, uses of cost accounting. Elements of cost. Direct material, Directlabour, Factory overheads. Cost- Fixed, variable, semi variable. Estimating and costing-

UNIT IV RAW MATERIAL AND CMT COST (9 Hrs)

Factors that determine cost of garments- material cost- cost of yarn, cost of fabric production, cost of processing. Width and design of fabric affecting cost. Accessories and their costing. Packing and labeling cost Cost of components –cutting cost – making and trim cost (CMT cost) – CMT cost for different types of garments. Shipment cost.

UNIT V GARMENT PRICING AND CVP ANALYSIS (12 Hrs)

Determining pricing of apparel products: sample costing-marginal cost, cost plus pricing methods; Full cost pricing, conversion cost pricing, differential cost pricing , absorption and variable cost pricing ,direct cost pricing. Cost calculation of apparel products- woven/knits. Ratio analysis, price / volume analysis. Break even analysis. Capital budgeting- payback period, rate of return, net present value – limitations.

Text Books:

1. Grace Kunz, —Merchandising theory, principles and practice‖, Fair Child Books, New York, 2005.
2. Jeremy A. Rosenau, Dvid L. Wilson, —Apparel Merchandising – The line starts here‖, Fairchild publications, New York, 2007
3. Grace I. Kunz , Ruth E. Glock, —Apparel Manufacturing: Sewn Product Analysis‖, 4th Edition. Prentice Hall, 2004.
4. Evelyn C Moore, —Math for Merchandising‖, Wiley Eastern Inc., India, 1999.

Reference Books:

1. Philip Kotler, Kelvin Lane Keller, Abraham Koshy and Mithileshwar Jha, “Marketing Management a South Asian Perspective”, Pearson Education India, 2006.
2. John Donnellan “Merchandise Buying and Management”, Farichild Publications, inc., NewYork, 2002.
3. M.Y.KhanandP.K.Jain“CostAccounting”,HillpublishingLtd.,New Delhi, 2007.

4. Ruth E.Glock and GraceI. Kunz,“Apparel Manufacturing Sewn Product Analysis”, Dorling Kindersley (India) Pvt.Ltd.,2005.
5. Chakraborty S K, “Cost Accounting and Financial Management”, New age International, 2004.
6. Ruth E Glockand GraceI Kunz,“Apparel Manufacturing ,Prentice Hall, New Jersey, Fourth Edition,2005.

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1. https://textileapex.blogspot.com/2020/07/apparel-merchandising-definition-process.html
2. https://www.fibre2fashion.com/industry-article/5056/role-of-sourcing-decisions-in-an-apparel-firm
3. https://www.fibre2fashion.com/industry-article/7159/garment-costing-techniques
4. https://www.textileschool.com/181/garment-costing/
5. https://www.delogue.com/blog/garment-costing-and-pricing/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	-	-	-	-	-	-	-	3	3	-	-	-	-
2	-	3	-	3	-	-	3	-	-	-	3	-	-	-	-
3	3	3	-	3	-	-	-	-	-	-	3	3	-	-	-
4	-	3	-	-	-	-	-	-	-	-	3		3	-	-
5	-	3	-	-	-	-	-	-	3	-	3	3	3	-	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

		L	T	P	C	Hrs
U20FTE506	**TECHNICAL TEXTILES**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To explain market size, scope and difference between normal and technical textiles
- To teach the manufacturing processes and important of geo textile and filtration textile.
- To describe the automotive textiles and examples
- To discuss the various applications of protective textiles.
- To explain the medical textiles

Course Outcomes

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

CO1 - Describe technical textiles and its importance. **(K2)**
CO2 -To analyze and identify required parameters of geo textile and filtration textile. **(K3)**
CO3 - Acquire knowledge on the automotive textiles and examples. (**K2**)
CO4 - To be able to explain the principle of different technical applications. **(K2)**
CO5 - To be able to explain various medical textiles. **(K5)**

UNIT I TECHNICAL TEXTILES (9Hrs)

Introduction - Definition and scope of Technical Textiles – Development stages in Technical Textiles – present market and future trends in Technical Textiles – Differentiate with traditional textiles-Raw materials used- sectors of technical textiles

UNIT II GEO TEXTILE AND FILTRATION TEXTILES: (9Hrs)

Geotextiles – scope, definition, types, advantages and disadvantages of woven and nonwoven geotextiles, Raw material, Manufacturing-Testing-Applications.

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

UNIT III AUTOMATIVE TEXTILES: (9Hrs)

Textiles in Transportation – Introduction, Textiles in passenger cars – Textiles in other road vehicles – Rail applications – Textiles.

Textiles in Defence – Introduction, Historical Background – Criteria for modern military textiles materials – various application of Textiles in various areas of defence such as environmental protection, thermal insulation, water proof water vapour permeable materials – ballistic protection – heat protection – biological and chemical warfare protection, High altitude fabrics, etc.

UNIT IV PROTECTIVE TEXTILE (9Hrs)

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

UNIT V MEDICALTEXTILES (9Hrs)

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

Text Books:

1. Sabit Adanur, —Wellington Sears Handbook of Industrial Textilesǁ, Technomic Publishing Co, USA, 1995.
2. Alagirusamy and A. Das, Technical Textile Yarns, CRC press, 2010.
3. Horrocks A R and Anand S C, —Handbook of Technical Textilesǁ, The Textile Institute, CRC Press, Woodhead publishing Ltd, Cambridge, UK, 2001.

Reference Books

1. Textiles in sport by R Shishoo, 5th edition Shishoo Woodhead Publication. ISBN: 978-1855739222
2. Intelligent Textiles and Clothing by H. Mattila Woodhead Publishing Ltd ISBN-13: 978-1845690052
3. Textiles for Industrial Applications By R. Senthil Kumar, CRC publication. ISBN-13: 978-1466566491

4. Medical and Hygiene Textile Production: A Handbook by Allison Mathews andMartin Hardingham, Practical Action publication, ISBN: 978-1853392115
5. Techno Textiles 2: Revolutionary Fabrics for Fashion and Design by Sarah E. Braddock C. ISBN : 978-0500286845
6. Geotextiles by N. W. M. John, Blackie publication, ISBN : 9780412013515

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1. https://www.technical-textiles.net/
2. https://en.wikipedia.org/wiki/Geotextile
3. https://www.fibre2fashion.com/industry-article/499/geotextile-applications
4. https://www.fibre2fashion.com/industry-article/1807/application-of-textiles-in-automobile
5. https://www.jasonmills.com/blog/medical-textiles/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	1	-	-	1	-	2	-	-	3	2	-	-
2	3	2	3	1	-	-	2	-	1	2	-	3	2	-	-
3	3	2	3	1	-	-	1	-	2	-	-	3	2	-	-
4	3	2	3	1	-	-	2	-	2	-	-	3	2	-	-
5	3	2	3	1	-	-	2	-	2	1	-	3	2	3	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

U20FTE507	ERP AND MIS IN APPAREL INDUSTRY	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- Students will know the principles and features of ERP/MIS packages.
- Students will know the applications of ERP/MIS packages.
- To enable the student in impart knowledge on management information system, its function and characteristics
- Students will know the on internet and electronic commerce and their day-to-day importance.
- To impart knowledge on enterprise resource planning and implementation in apparel.

Course Outcomes

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

CO1: Acquire knowledge on basics of ERP and MIS. **(K2)**
CO2: Acquire knowledge on the application and modules of ERP in apparel Industry. **(K3)**
CO3: Acquire Application strategy of Information Systems in apparel industry. **(K4)**
CO4: Develop knowledge on internet and electronic commerce and their day-to-day importance. **(K4)**
CO5: Describing and developing knowledge on transforming Information systems to the business Operations. **(K3)**

UNIT I INTRODUCTION (9 Hrs)

An overview and features of ERP, MIS integration, ERP drivers, Trends in ERP, ERP in India. ERP system perspective – Management Information System, Operations Support System, Transaction Processing System, Network Structure of ERP system, ERP workflow, Process modelling for ERP systems, Communication in ERP systems, OLTP, (On Line Transaction Processing), OLAP (On Line Analytical Processing), Enterprise Integration application tools for ERP.

UNIT II RESOURCE MANAGEMENT PERSPECTIVE (9 Hrs)

Business modules in ERP packages, Finance, Production, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution, Resource Management, Business Process Reengineering, Relationship between ERP and BPR, ERP Implementation Lifecycle, Implementation methodology, ERP Project Management and Monitoring.
ERP and E-Commerce, ERP Culture, ERP and CRM, ERP and SCM, ERP selection issues, ERP in Public Sector Enterprises, Pre- and Post-implementation issues, ERP Vendors, Key ERP consultants in India, Future directions in ERP

UNIT III BASICSOFINFORMATIONSYSTEM (9 Hrs)

Introduction to Information system in business, Need for Information Technology, System concept, Components of an information system, Information system resources, Information system activities, recognizing information system. Expanding role of information systems, Operating support system, Management support systems.

UNIT IV INTERNET AND ELECTRONIC COMMERCE (9 Hrs)

Introduction, Business use of internet, Interactive marketing, Business value of the internet, Customer value and the internet. Fundamentals of Electronic Commerce (EC), EC applications, Business-to-Consumer commerce, Business to Business commerce, Electronic payments and security.

UNIT V INFORMATION SYSTEMS FOR BUSINESS OPERATION: (9 Hrs)

Applications of intranets, intranet technology resources, the business value of intranets, the role of Extranets, enterprise collaboration systems. Information systems for marketing, manufacturing, human resources, accounting, financial, transaction processing, managerial and decision support, Information systems for strategic advantages, Strategic application and issues in IT, ethical and societal challenges of information technology.

Text Books:

1. R. Surjit, R. Rathinamoorthy, K. J. Vishnu Vardhini, ERP for Textiles and Apparel Industry (Woodhead Publishing India in Textiles), WPI Publishing; 1 edition, 2016
2. A. K Gupta, Management Information System, IBH Publishing, 2012
3. V.K.Garg,VenkatandN.K.Krishna, “ERP Concepts and Practices”, 1st edition, PHI Publications,1997.
4. James A.O’Brien, “Introduction to Information Systems”, Tata McGrawHill, New Delhi, 2005.

5. AlexisLeon,“ERPDemystified”,1stedition,Tata McGrawHill, New Delhi, 2000.
6. S.Sadagopan, “ERP: A Managerial Perspective”,1stedition,TataMcGraw Hill,NewDelhi,1999.
7. Langenalter,A.Gary,“Enterprise Resources Planning and Beyond”,1stedition, St.LuciePress, USA, 2000.
8. Diwan,Parag and Sharma, Sunil, “Enterprise Resource Planning: A Manager’s Guide”,1stedition,1999.
9. E.Turban, E.McLeanandJ.Wetherbe, “Information Technology for Management: Making Connections for Strategic Advantage”, John Wiley and Sons, New Jersey, 2001.
10. W.S.Jawadekar, “Management Information Systems”,TataMcGrawHill, New Delhi,2004.

Reference Books

1. Tsan-Ming Jason Choi Professor , Information Systems for the Fashion and Apparel Industry (Woodhead Publishing Series in Textiles), Woodhead Publishing, 2016
2. Girdhar Joshi, Management Information Systems 1st Edition, Oxford University Press, 2013
3. Paul Bocij, Andrew Greasley, Simon Hickie, Business Information Systems, Technology, Development and Management for the E-Business, Pearson; 5th edition, 2014

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1. https://www.slideshare.net/nemataggarwal/erp-in-apparel-industry-14174616
2. https://www.slideshare.net/anusaj/mis-management-information-system-in-fashion-textile-industry
3. https://apparelresources.com/technology-news/manufacturing-tech/erp-solutions-for-a-typical-garment-industry/
4. https://fashionarun.page.tl/ERP-IN-APPAREL-INDUSTRY.htm

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	-	-	2	-	-	-	1	-	-	-	-	2	2
2	2	1	-	-	2	-	-	-	1	2	-	-	-	2	2
3	3	2	-	-	2	-	-	-	1	2	-	-	-	2	2
4	3	2	-	-	2	-	-	-	1	2	-	-	-	2	2
5	3	2	-	-	2	-	-	-	1	2	-	-	-	2	2

Correlation Level: 1- Low, 2 - Medium, 3 - High

U20FTE508	ADVANCES IN GARMENT PRODUCTION	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To describe the new product development and application areas.
- To describe the technological advances in sewing.
- To explain technological advances in digital printing on improved apparel production.
- To explain the latest technological developments in pressing technology.
- To explain benefits of advanced automated fabric inspection system.

Course Outcomes

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

CO1 - Explain the new product development and application areas. **(K2)**
CO2 - Emphasis on the technological advances in sewing. **(K2)**
CO3 - Describe the technological advances in digital printing on improved apparel production. **(K3)**
CO4 - Understanding the latest technological developments in pressing technology. **(K3)**
CO5 - State the need and benefits of advanced automated fabric inspection system. **(K3)**

UNIT I APPAREL PRODUCT DEVELOPMENT (9 Hrs)

Introduction, process model for clothing product development, models of new product development, product development tools and application areas, product lifetime management (PLM), demand-led new product development, future trends.

UNIT II TECHNOLOGICAL ADVANCES IN SEWING GARMENTS (9 Hrs)

Introduction, development of the industrial sewing machine, advances in sewing needle design, advances in sewing thread technology, advances in sewing machine automation, semi-automated equipment, machines using computer numerical control. Future trends in clothing technology: Bonded garments, Seamless garments. Alternative method of garment production, moulding, robotics and pneumatic system.

UNIT III DIGITAL PRINTING OF GARMENTS (9 Hrs)

Introduction, advances in digital printing technology, design potential and limitations of digital textile printing, digital textile printing and its role to enhance industry apparel production, applications. Advances in embroidery technology.

UNIT IV DEVELOPMENTS IN PRESSING TECHNOLOGY (9 Hrs)

Pressing: Introduction, the pressing process, pressing with pressure, pressing without pressure, crease resistant finishes, permanent creases, recent trends in apparel pressing technology.

UNIT V AUTOMATED FABRIC INSPECTION AND EVALUATION (9 Hrs)

Fabric Inspection: Introduction, the principles of automatic fabric inspection, fabric quality, Kawabata evaluation system, fabric assurance by simple testing (FAST), automating the results of objective reporting and analysis in KES-F, development of the main analysis form.

Text Books:

1. C.Fairhurst, “Advances in Apparel Production”, Woodhead Publishing Limited, 2008

Reference Books

1. The Apparel Production Sourcebook, Asian Edition,Fashiondex, Inc., 2010.
2. Apparel Design and Production Handbook, Fashiondex, Inc., 2001

Web References

1. https://sourcemygarment.com/2019/03/21/apparel-design-vs-product-development-whats-the-difference/
2. https://www.fibre2fashion.com/industry-article/136/advanced-technologies-for-sewing-seamless-garments
3. https://www.fibre2fashion.com/industry-article/7055/digital-textile-printing
4. https://apparelresources.com/technology-news/manufacturing-tech/evolution-of-technology-pressing-finishing/
5. https://www.fibre2fashion.com/industry-article/5178/automatic-fabric-inspection

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	-	3	-	3	2	-	-	2	-	2	1	2	1	2
2	2	-	3	-	3	2	-	-	2	-	2	1	2	1	2
3	2	-	3	-	3	2	-	-	2	-	2	1	2	1	2
4	2	-	3	-	3	2	-	-	2	-	2	1	2	1	2
5	2	-	3	-	3	2	-	-	2	-	2	1	2	1	2

Correlation Level: 1- Low, 2 - Medium, 3 - High

		L	T	P	C	Hrs
U20FTE509	**APPAREL WORK STUDY**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To enable students to importance and concept of work study
- To impart the knowledge about various operation analysis in apparel industry
- To impart the knowledge of Motion analysis
- To impart the knowledge of Process improvement in apparel industry
- Analyze the concepts of work measurement

Course Outcomes

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

CO1: Acquire knowledge on of work study. **(K2)**
CO2: Acquire knowledge on various operation analysis in apparel industry. **(K3)**
CO3: Acquire Application strategy of of Motion analysis. **(K4)**
CO4: Develop knowledge on Process improvement in apparel industry. **(K4)**
CO5: Describing and developing knowledge on work measurement. **(K3)**

UNIT I WORK STUDY (9 Hrs)

WORK STUDY: Definition**,** procedure, techniques, data needed: raw material data, equipment data, job condition and working condition. **PROCESS ANALYSIS:** Purpose, procedure, various types of process charts and diagrams-application areas in apparel manufacture, development of standard operating procedure (SOP). Case studies.

UNIT II OPERATION ANALYSIS (6 Hrs)

OPERATION ANALYSIS: Objectives, procedure, operation chart, check sheet, exercises from apparel manufacture. Case studies

UNIT III MOTION ANALYSIS (9 Hrs)

MOTION ANALYSIS: Purpose, principles of motion economy – application areas in apparel manufacture, two handed process chart- procedure, examples from sewing operations. Micro motion analysis: Therbligs, equipments, procedure, development of SIMO chart for sewing operations. Evaluation of motion study data. Case studies.

UNIT IV METHOD IMPROVEMENT (9 Hrs)

METHODS IMPROVEMENT: Principles for improving operation method – cutting, sewing, pressing and packing. scientific method of training, learning curve.

UNIT V WORK MEASURMENT (12 Hrs)

WORK MEASUREMENT: Definition, techniques – time study: procedure, calculation of standard allowed minute (SAM) in apparel manufacture – Cutting, sewing, pressing and packing operations. Predetermined time standard (PMTS) - Time Measurement Unit (TMU) values, Method Time Measurement (MTM) tables, setting the standard time, advantages. Work sampling – Concept, procedure, determination of sample size, nomo gram, setting standard time. Standard data- General sewing data (GSD)- Concept, motion sequence, MTM core data, methods engineering and standard allowed minute (SAM) establishment for sewing operations, advantages. Applications **–** Capacity study, operation bulletin (OB), Incentive calculations.

Text Books:

1. Ralph M. Barnes —Motion and Time Study Design and Measurement of workǁ, John Wiley & Sons, Inc., New York, 2002.
2. Jacob Solinger, —Apparel Manufacturing Handbook, Analysis, Principles and Practiceǁ Boblin Media Corp, Columbia, 2000.
3. Johnson Maurice“Introduction of Work Study”, International Labour Organization, Geneva, 2005.

Reference Books

1. George Kanawaty, ILO, —Introduction to Work study, Universal Publishing Corporation, Mumbai, 2005.
2. Chuter A J —Introduction to Clothing Production Managementǁ, Blackwell Publishing, Oxford, UK, 2007.

3. V.Ramesh babu, —Industrial engineering in apparel production‖, Woodhead publishing India Pvt Ltd, New Delhi, 2011.
4. Kiell. B.Zandin, Maynard‘s —Industrial Engineering Hand Book‖, Mc Graw Hill, Inc., New York, 2001.

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2. https://apparelresources.com/business-news/manufacturing/industrial-engineering-apparel-manufacturing-vi-making-operational-bulletin/
3. https://apparelresources.com/business-news/manufacturing/time-study-apparel manufacturing/
4. https://work-study.info/motion-study-principles-of-motion-study/
5. https://apparelresources.com/business-news/manufacturing/ie-apparel-manufacturing-iii-work-measurement-using-time-study/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	2	-	1	1	-	-	1	2	-	1	-	1	-	1
2	1	2	-	1	2	-	-	1	2	-	1	-	1	-	1
3	1	2	2	1	2	-	-	1	2	-	2	-	1	-	2
4	1	2	2	1	3	-	-	1	2	-	3	-	1	-	2
5	1	2	2	1	3	-	-	1	2	-	3	-	1	-	2

Correlation Level: 1- Low, 2 - Medium, 3 - High

		L	T	P	C	Hrs
U20FTE510	**LEATHER TECHNOLOGY**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To know about the different types of leather and its treatments
- To understand the production and inspection techniques of leather garments
- To know about the designing leather apparels
- To know about the machineries and equipment's used in manufacture of leather apparel
- To know about properties and characteristics of leather garments

Course Outcomes

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

CO1: Understand the classification of leather materials and process of preparing leather for manufacture leather apparels **(K2)**

CO2: Understand the process of preparing leather for manufacture leather apparels. **(K1)**

CO3: Gain knowledge on designing leather apparels. **(K3)**

CO4: Gain knowledge on properties and characteristics of leather garments. **(K1)**

CO5: Gain knowledge on types of machineries and equipment's used in manufacture of leather apparel.**(K3)**

UNIT I TYPES OF LEATHER AND PRODUCTION TECHNIQUE (9 Hrs)

Types, special features, principles involved in manufacture of E.I tanned leather, sole leather, wet blue leather, full chrome upper leathers, upholstery leathers, chamois leather, fashion garment leathers, utility glove leathers, picking band leathers, light, heavy and Industrial leathers, lining leathers, harness, belting and saddlery leathers, football, hockey ball, cricket ball and other sports goods leathers.

UNIT II LEATHER TANNAGES (9 Hrs)

Leather, hide, skin, types, components and structure. preservation techniques, pre tanning processes: soaking, liming, deliming, bating, and pickling. Types of tannages: vegetable, synthetic. tannage mechanism. post tanning operations: neutralisation, fatliquoring, bleaching, dyeing and drying of leathers, combination tanned leather.

UNIT III MACHINERIES, TOOLS AND EQUIPMENTS (9 Hrs)

Machineries used in leather processing: drum, sammying machine, shaving machine, splitting machine, setting machine, spray dyeing machine, embossing, ironing and measuring machines, Tools and equipments used in leather garment preparatory and manufacturing processes : gimping scissors, wooden & iron hammer, stone slabs, skiving and spitting machines, cloth cutting machines, industrial sewing machines, button hole & button stitching machine and ironing process, types of sewing needles and sewing threads,

UNIT IV CONSTRUCTION AND DESIGNING OF LEATHER GARMENTS (9 Hrs)

Fabrication of leather garments- principle of cutting components, type of stitching and attachment, sequence of operation for assembly of components, accessories used. Shoe: parts, selection of leather, designing and fabrication of shoes, machineries.

Classification based on material design and types- grain garments, suedes, fur, chrome, semi – chrome. Designing of leather garments- leather jackets, women's wear, men's wear, preparation of sectional patterns, pattern sets, arrangements of patterns to minimize wastage of leathers,.

UNIT V CHARACTERISTICS AND QUALITY CONTROL OF LEATHER GARMENTS (9 Hrs)

General properties of leather such as feel, texture, strength, elongation, comfort, rub resistance, uniformity of shades, defects in skin, types of tests carried out, testing instruments and methods. In process and final process control of leather garments.

Text Books:

1. Dutta.S S, —An Introduction to the Principles of Leather Manufacture‖, Indian Leather Technologists Association, Calcutta, 2002.
2. Thomas C,and Thorstensen,‖Practical Leather Technology‖, Krieger Publishing Company, USA, 2001
3. Skiving Manual, First Edition, 1994 CLRI, Chennai.

4. A Course Manual on Leather Garment Pattern Designing, 2007 CLRI Chennai.
5. Matric Pattern Cutting for Menswear, Winifred Aldrich, BSP Professional Books, London, 1990.

Reference Books

1. Sandy Scrivano,‖Sewing with Leather & Suede‖, Lark Books, New York 2002.
2. Sarkar.K.T, —Theory and practice of leather manufacture, Macmillan India Press, Madras.1997.
3. Somenath Ganguly, —Comprehensive Footwear Technology‖, Indian Leather Technologists' Association, India, 2005.
4. J. H. Sharphouse —Leather Technician‘s HandBook —, Leather Producers‘ Association, Northampton, 1971.
5. Dutta.S.S. —An Introduction to the Principles of Physical Testing of Leather‖ Indian Leather Technologists' Association, India,1991.

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1. https://www.leather-dictionary.com/index.php/Leather_production
2. https://en.wikipedia.org/wiki/Tanning_(leather)
3. http://www.madehow.com/Volume-2/Leather-Jacket.html
4. https://www.fibre2fashion.com/industry-article/3055/quality-systems-for-garment-
5. https://www.intouch-quality.com/blog/leather-product-inspection-quality-control

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	-	1	-	2	-	-	-	-	-	-	-	1	1	-
2	1	-	2	-	2	-	1	-	-	-	-	-	1	1	-
3	2	-	2	-	2	-	-	-	2	-	-	-	1	1	-
4	2	-	2	-	2	-	1	-	2	-	-	-	1	2	-
5	3	-	2	-	2	-	2	-	2	-	-	-	1	1	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

U20HSO501	PRODUCT DEVELOPMENT AND DESIGN	L	T	P	C	Hrs
		3	1	0	3	45

Course Objectives

- To provide the basic concepts of product design, product features and its architecture.
- To have a basic knowledge in the common features a product has and how to incorporate them suitably in product.
- To enhance team working skills.
- To design some products for the given set of applications.
- To compete with a set of tools and methods for product design and development.

Course Outcomes

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

CO1 - Apply the concept for new product development. **(K3)**
CO2 - Validate knowledge on the concepts of product specification. **(K5)**
CO3 - Describe the principles of industrial design and prototyping. **(K2)**
CO4 - Apply knowledge on product architecture. **(K3)**
CO5 - Review the concept of product development and customer needs. **(K5)**

UNIT I: INTRODUCTION TO PRODUCT DEVELOPMENT (9 Hrs)

Product development versus design, product development process, product cost analysis, cost models, reverse engineering and redesign product development process, new product development, tear down method.

UNIT II: PRODUCT SPECIFICATIONS (9 Hrs)

Establishing the product specifications– Target specifications – Refining specifications, concept generation-Clarify the problem – Search internally – Search externally – Explore systematically - Reflect on the Results and the Process.

UNIT III: PRODUCT CONCEPTS (9 Hrs)

A: Concept generation, product configuration, concept evaluation and selection, product embodiments.
B: Quality function deployment, product design specification, physical prototypes-types and technique, dimensional analysis, design of experiments.

UNITIV: PRODUCT ARCHITECTURE (9 Hrs)

Concept selection- Screening – scoring, Product architecture – Implication of architecture - Establishing the architecture – Related system level design issues.

UNIT V: PROTOTYPING (9 Hrs)

Reliability, failure identification techniques, Poka-Yoke, Design for the environment, design for maintainability, product safety, liability and design, design for packaging.

Text Books

1. Kari T.Ulrich and Steven D.Eppinger,"Product Design and Development", McGraw-Hill International Edns.
2. Stephen Rosenthal, "Effective Product Design and Development", Business One Orwin, Homewood,
3. Otto, K. N. Product design: techniques in reverse engineering and new product development.

Reference Books

1. Ashby, M. F., & Johnson, K... *Materials and design: the art and science of material selection in product design*. Butterworth-Heinemann.
2. Kevin Otto and Kristin Wood, "Techniques in Reverse Engineering and New Product Development", Pearson Education, Chennai, Edition III.
3. Chitale A.V. and Gupta R.C., "Product Design and Manufacturing", 6th Edition, PHI.

4. Taurt Pugh,"Tool Design – Integrated Methods for Successful Product Engineering", Addison Wesley Publishing, New york, NY
5. Kumar, A., Jain, P. K., & Pathak, P. M. Reverse engineering in product manufacturing: an overview. DAAAM international scientific book,

Web References

1. http://www.worldcat.org/title/product-design-and-development/oclc/904505863
2. https://www.pdfdrive.com/product-design-and-development-e38289913.html
3. https://www.smashingmagazine.com/2018/01/comprehensive-guide-product-design/
4. https://www.smashingmagazine.com/2018/01/comprehensive-guide-product-design/
5. https://ocw.mit.edu/courses/sloan-school-of-management/15-783j-product-design-and-development-spring-2006/lecture-notes/clas1_int_crse_6.pdf
6. https://swayam.gov.in/nd1_noc20_de05/preview

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	3	-	3	-	-	-	-	-	-	2	-	-	-
2	1	-	2	-	3	-	-	-	-	-	-	3	-	-	-
3	1	-	3	-	2	-	-	-	-	-	-	2	-	-	-
4	3	-	1	-	3	-	-	-	-	-	-	1	-	-	-
5	1	-	3	-	3	-	-	-	-	-	-	2	-	-	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

		L	T	P	C	Hrs
U20HSO502	**INTELLECTUAL PROPERTY RIGHTS**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To introduce fundamental aspects of Intellectual Property Rights to students who are going to play a major role in development and management of innovative projects in industries.
- To disseminate knowledge on patents, patent regime in India and abroad and registration aspects
- To disseminate knowledge on copyrights and its related rights and registration aspects
- To disseminate knowledge on trademarks and registration aspects
- Awareness about current trends in IPR and Government steps in fostering IPR

Course Outcomes

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

CO1: Complete their academic projects, shall get an adequate knowledge on patent and copyright for their innovative research works **(K2)**
CO2: Presenting useful insight on novelty of their idea from state-of-the art search during their project work period. **(K3)**
CO3: Posting Intellectual Property as a career option like R&D IP Counsel, Government Jobs – Patent Examiner, Private Jobs, Patent agent and/or Trademark agent and Entrepreneur **(K5)**
CO4: To disseminate knowledge on Design, Geographical Indication, Plant Variety and Layout Design Protection and their registration aspects **(K1)**
CO5: Organizing their idea or innovations and analyse ethical and professional issues which arise in the intellectual property law context. **(K4)**

UNIT I OVERVIEW OF INTELLECTUAL PROPERTY (9 Hrs)

Introduction and the need for intellectual property right (IPR) - Kinds of Intellectual Property Rights: Patent, Copyright, Trade Mark, Design, Geographical Indication, Plant Varieties and Layout Design – Genetic Resources and Traditional Knowledge – Trade Secret - IPR in India : Genesis and development – IPR in abroad - Major International Instruments concerning Intellectual Property Rights: Paris Convention, 1883, the Berne Convention, 1886, the Universal Copyright Convention, 1952, the WIPO Convention, 1967,the Patent Co-operation Treaty, 1970, the TRIPS Agreement, 1994

UNIT II PATENTS (9 Hrs)

Patents - Elements of Patentability: Novelty, Non Obviousness (Inventive Steps), Industrial Application - Non - Patentable Subject Matter - Registration Procedure, Rights and Duties of Patentee, Assignment and licence, Restoration of lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties - Patent office and Appellate Board

UNIT III COPYRIGHTS (9 Hrs)

Nature of Copyright - Subject matter of copyright: original literary, dramatic, musical, artistic works; cinematograph films and sound recordings - Registration Procedure, Term of protection, Ownership of copyright, Assignment and licence of copyright - Infringement, Remedies & Penalties – Related Rights - Distinction between related rights and copyrights

UNIT IV TRADEMARKS (9 Hrs)

Concept of Trademarks - Different kinds of marks (brand names, logos, signatures, symbols, well known marks, certification marks and service marks) - Non Registrable Trademarks - Registration of Trademarks - Rights of holder and assignment and licensing of marks - Infringement, Remedies & Penalties - Trademarks registry and appellate board

UNIT V OTHER FORMS OF IP **(9 Hrs)**

Design: meaning and concept of novel and original - Procedure for registration, effect of registration and term of protection Geographical Indication (GI) Geographical indication: meaning, and difference between GI and trademarks - Procedure for registration, effect of registration and term of protection.

Text Books

1. Nithyananda, K V. Intellectual Property Rights: Protection and Management. India, IN: Cengage Learning India Private Limited, 2019
2. Neeraj, P., & Khusdeep, D. Intellectual Property Rights. India, IN: PHI learning Private Limited. 2014

Reference Books

1. Ahuja, V K. Law relating to Intellectual Property Rights. India, IN: Lexis Nexis, 2017.
2. Deborah E. Bouchoux, Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets, Cengage Learning, Third Edition, 2012.
3. Edited by Derek Bosworth and Elizabeth Webster, The Management of Intellectual Property, Edward Elgar Publishing Ltd., 2013.
4. Prabuddha Ganguli, Intellectual Property Rights: Unleashing the Knowledge Economy, McGraw Hill Education, 2011.
5. S.V. Satakar, Intellectual Property Rights and Copy Rights, Ess Ess Publications, New Delhi, 2002.
6. V. Scople Vinod, Managing Intellectual Property, Prentice Hall of India pvt Ltd, 2012.

Web References

1. Subramanian, N., & Sundararaman, M. (2018). Intellectual Property Rights – An Overview. Retrieved from http://www.bdu.ac.in/cells/ipr/docs/ipr-eng-ebook.pdf
2. World Intellectual Property Organisation. (2004). WIPO Intellectual property Handbook. Retrieved from https://www.wipo.int/edocs/pubdocs/en/intproperty/489/wipo_pub _489.pdf
3. Cell for IPR Promotion and Management (http://cipam.gov.in/)
4. World Intellectual Property Organisation (https://www.wipo.int/about-ip/en/)
5. Office of the Controller General of Patents, Designs & Trademarks (http://www.ipindia.nic.in/)
6. Journal of Intellectual Property Rights (JIPR): NISCAIR

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	-	3	-	2	-	1	2	-	-	-	2	-	-	-
2	1	-	3	-	2	-	2	2	-	-	-	2	-	-	-
3	-	-	2	-	1	-	3	3	-	-	-	2	-	-	-
4	2	-	3	-	2	-	2	2	-	-	-	2	-	-	-
5	1	-	1	-	2	-	1	2	-	-	-	2	-	-	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

U20HSO503	MARKETING MANAGEMENT AND RESEARCH	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To facilitate understanding of the conceptual framework of marketing in engineering.
- To understand the concepts of product and market segmentation for engineering services and technological products.
- Analyzing the various pricing concepts and promotional strategies for engineering and technology markets.
- Learn to focus on a research problem using scientific methods in engineering and technological enterprises.
- To be able to design and execute a basic survey research reports in in engineering and technological enterprises

Course Outcomes

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

CO1 - Analyze the fundamental principles involved in managing engineering and technological markets **(K3)**

CO2 - Understand and develop product, and Market Segmentation for engineering services and technological Products **(K4)**

CO3 - Develop pricing and promotional strategies for engineering and technology markets **(K6)**

CO4 - Analyze market problems and be capable of applying relevant models to generate appropriate solutions to meet challenges in engineering and technological enterprises **(K3)**

CO5 - Identify the interrelationships between market trends, innovation, sustainability and communication in engineering and technological enterprises **(K5)**

UNIT I MARKETING – AN OVERVIEW (9 Hrs)

Definition, Marketing Process, Dynamics, Needs, Wants and Demands, Marketing Concepts, Environment, Mix, Types, Philosophies, Selling vs Marketing, Consumer Goods, Industrial Goods.

UNIT II PRODUCT AND MARKET SEGMENTATION (9 Hrs)

Product, Classifications of product, Product Life Cycle, New product development, Branding, Segmentation factors, Demographic, Psycho graphic and Geographic Segmentation, Process, Patterns. Services marketing and Industrial marketing.

UNIT III PRICING AND PROMOTIONAL STRATEGIES (9 Hrs)

Price: Objectives, Pricing Decisions and Pricing Methods, Pricing Management. Advertising-Characteristics, Impact, Goals, Types, Sales Promotion – Point of purchase, Unique Selling Propositions, Characteristics, Wholesaling, Retailing, Channel Design, Logistics.

UNIT IV RESEARCH AND ITS FUNDAMENTALS (9 Hrs)

Research: Meaning, Objectives of Research, Types of Research, Significance of Research - Methods Vs Methodology - Research Process – Components of Research Problem, Literature Survey – Primary Data and Secondary Data, Questionnaire design, Measurement and Scaling Techniques.

UNIT V BASIC STATISTICAL ANALYSIS AND REPORT WRITING (9 Hrs)

Fundamentals of Statistical Analysis and Inference- Measures of Central Tendency -Measures of Dispersion -Measures of Asymmetry - Report Writing: Types of research reports, Techniques of Interpretation, Precautions in Interpretation, Significance of Report Writing, Different Steps in Report Writing, Layout of Research Report, Mechanics of Writing Research Report, Ethics in Research

Text Books

1. Philip Kolter & Keller, “Marketing Management”, Prentice Hall of India, 14th edition, 2012.
2. Lilien, Gary l., and Arvind Rangaswamy. “Marketing managers make ongoing decisions about product features, prices, distribution options”, The Handbook of Marketing Research: Uses, Misuses, and Future Advances (2006).

Reference Books

1. Chandrasekar. K.S., “Marketing Management Text and Cases”, 1st Edition, Tata McGraw Hill - Vijaynicole, 2010.
2. Kothari, C. “Research Methodology Methods and Techniques”, New Age International (P) Ltd., 2017
3. RajanSexena. Marketing Management: Text cases in Indian Context.(3rd edition) New Delhi, Tata McGraw hill, 2006
4. Moisander J, Valtonen A, “Qualitative marketing research: A cultural approach”, Sage Publisher, 2006.
5. Malhotra NK, Satyabhushan Dash, “Marketing Research: An Applied Orientation”, 7th ed, Pearson Education, 2019

Web References

1. https://swayam.gov.in/nd1_noc20_mg26/preview
2. https://swayam.gov.in/nd1_noc20_mg26/preview
3. https://www.entrepreneur.com/encyclopedia/market-research
4. *Journal of Consumer Research – Oxford Academics*
5. *Journal of Marketing Research - SAGE Publishing*

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	1	-	-	-	2	-	-	1	-	1	-	-	-
2	-	1	2	-	1	-	3	-	-	2	-	1	-	-	-
3	-	-	1	-	1	-	-	-	2	1	-	1	-	-	-
4	-	3	2	2	-	1	-	1	1	2	-	1	-	-	-
5	-	2	2	1	2	2	-	2	2	2	-	1	-	-	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

U20HSO504	PROJECT MANAGEMENT	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To understand the various concepts and steps in project management.
- To familiarize the students with the project feasibility studies and project life cycle
- To enable the students to prepare a project schedule
- To understand the risk management and project Control process.
- To learn about the closure of a project and strategies to be an effective project manager.

Course Outcomes

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

CO1 - Interpret the different concepts and the various steps in defining a project. **(K2)**
CO2 - Examining the feasibility of a project. **(K3)**
CO3 - Build a schedule for a Project. **(K6)**
CO4 - Predict the risk associated with a project and demonstrate the project audit. **(K2)**
CO5 - Analyse the project team and outline the Project closure. **(K4)**

UNIT I PROJECT MANAGEMENT CONCEPTS (9 Hrs)

Project: Meaning, Attributes of a project, Project Life cycle, Project Stakeholders, Classification, Importance of project management, Project Portfolio Management System, Different Project Management Structure, Steps in Defining the Project, Project Rollup – Process breakdown structure – Responsibility Matrices – External causes of delay and internal constraints

UNIT II PROJECT FEASIBILITY ANALYSIS (9 Hrs)

Opportunity Studies, Pre-Feasibility studies, and Feasibility Study: Market Feasibility, Technical Feasibility, Financial Feasibility and Economic Feasibility. Financial and Economic Appraisal of a project, Social Cost Benefit Analysis in India and Project Life Cycle.

UNIT III PROJECT SCHEDULING & NETWORK TECHNIQUES (9 Hrs)

Scheduling Resources and reducing Project duration: Types of project constraints, classification of scheduling problem, Resources allocation methods, Splitting, Multitasking, Benefits of scheduling resources, Rationale for reducing project duration, Options for accelerating Project completion
Developing and Constructing the Project Network (Problems), PERT, CPM; Crashing of Project Network,

UNIT IV PROJECT RISK MANAGEMENT AND PROJECT CONTROL (9 Hrs)

Project Risk management; Risk concept, Risk identification, Risk assessment, Risk response development, Contingency planning, Contingency funding and time buffers, Risk response control, and Change control management
Budgeting and Project Control Process, Control issues, Tendering and Contract Administration. Steps in Project Appraisal Process and Project Audits

UNIT V PROJECT CLOSURE AND MANAGING PROJECT (9 Hrs)

Project Closure: Team, Team Member and Project Manager Evaluations. Managing versus Leading a Project: Qualities of an Effective Project Manager, Managing Project Stakeholders, Managing Project Teams: Five Stage Team Development Model, Situational factors affecting team development and project team pitfalls.

Text Books

1. Erik Larson and Clifford Gray. “Project Management: The Managerial Process”. 6th Edn. McGraw Hill Education; 2017.
2. Harold Kerzner. “Project Management: A systems approach to Planning, Scheduling and Controlling. 12th Edn. John Wiley & Sons; 2017

Reference Books

1. Meredith, J.R. & Mantel, S. J. “Project Management- A Managerial Approach”. John Wiley.:2017
2. Prasanna Chandra. “Projects: Planning, Analysis, Selection, Financing, Implementation, and Review”. 9th Edn. McGraw Hill Education; 2019.
3. B C Punmia by K K Khandelwal. “Project Planning and Control with PERT and CPM”. 4th Edn. Laxmi Publications Private Limited; 2016.
4. Hira N Ahuja, S.P.Dozzi, S.M.Abourizk. “Project Management”. 2nd Edn. Wiley India Pvt Ltd; 2013.
5. “A guide to Project Management Body of Knowledge”. 6th Edn. Project Management Institute; 2017

Web Resources

1. www.pmi.org
2. www.projectmanagement.com
3. https://www.sciencedirect.com/journal/international-journal-of-project-management
4. https://nptel.ac.in/courses/110/107/110107081/
5. https://nptel.ac.in/courses/110/104/110104073/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	-	1	-	-	-	-	-	2	-	2	2	-	-	-
2	-	2	1	-	-	1	-	-	1	1	1	1	-	-	-
3	-	1	3	-	-	-	-	-	-	-	1	-	-	-	-
4	3	1	1	-	-	1	1	-	-	1	1	3	-	-	-
5	3	-	3	-	-	-	-	3	3	2	3	2	-	-	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

U20HSO505	FINANCIAL KNOWHOW FOR ENGINEERS	L	T	P	C
		2	1	0	3

Course Objectives

- To develop a deeper understanding of the fundamentals of Accounting and Finance
- To learn how to apply mathematical principles in Finance and the concepts of Risk and Return
- To understand the need and procedure for conducting Financial Analysis for better decision-making
- To be familiar with the modes of generating funds for business and their implications
- To understand the scientific ways to determine deployment of funds in business

Course Outcomes

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

CO1: Understand basic concepts in accounting and finance and their importance for engineers **(K2)**

CO2: Demonstrate knowledge and understanding of the applications of mathematics in finance **(K3)**

CO3: Conduct Financial Analysis and use the outcome in making informed decisions in investing **(K4)**

CO4: Identify and Appreciate various sources of procurement of funds in business and their critical evaluation **(K2)**

CO5: Know how to scientifically determine the investing in long-term and short-term assets in business **(K3)**

UNIT I: UNDERSTANDING THE FUNDAMENTALS (9 hrs)

Assets – Need and Functions of Assets – Types of Assets – Factors determining Investments in Assets. Liabilities – Meaning and Functions of Liabilities – Types of Liabilities – Capital as a Liability: Why and How – The Accounting Equation – Balance Sheet Approach – Concept and Meaning of Finance – Financial Planning – Funds Procurement – Funds Deployment – Handling Surplus or Deficit of Funds – Distinction between Accounting and Finance – Significance of Accounting and Finance for Engineers – Financial Decisions.

UNIT II: MATHEMATICS OF FINANCE (9 hrs)

Time Value of Money – Principles of Compounding and Discounting – Computation of Present Value and Future Value – Implications of TVM in Financial Decisions – Concept of Risk and Return – Measuring Risk and Return – Concept of Required Rate of Return and its significance in Investment Decisions – Risk-Return Trade-off – Concepts of Debt and Equity – Need for Equity in Business – Pros and Cons of Debt Capital – Concept of Tax Benefit in Debt – Concept of Inflation - How to factor Inflation in Financial Decisions.

UNIT III: FINANCIAL ANALYSIS (9 hrs)

Meaning and Objectives of Financial Analysis – Annual Report As an Input for Analysis – Basic Understanding of Annual Reports - Tools of Financial Analysis – Horizontal Analysis – Vertical Analysis – Trend Analysis – Accounting Ratios – Significance of Ratio Analysis in Decision-making – Snap-shot of the Past to predict the Future – Computation of Key Ratios – Liquidity Ratios – Profitability Ratios – Performance Ratios – Ratios that are helpful for Potential Investors.

UNIT IV: FUNDS PROCUREMENT (9 hrs)

Meaning of Funds – Sources of Funds – Long-Term Sources – Short-Term Sources – Spontaneous Sources – Financing Decisions in Business – Approaches to Financing – Hedging, Conservative and Aggressive Approaches – Capitalisation – Dangers of Undercapitalisation and Overcapitalisation in Business – Capital Structure – Need and Importance of Capital Structure – Determining Optimum Capital Structure – Concept and Computation of Earnings Before Interest and Tax (EBIT), Earnings Before Tax (EBT), and Earnings After Tax (EAT) - Leverage in Finance – Types and Computation of Leverages – Operating Leverage, Financial Leverage, and Combined Leverage.

UNIT V: FUNDS DEPLOYMENT (9 hrs)

Investment Decisions – Meaning and Significance in Finance – Types of Investment Decisions: Long-Term Investment Decisions, Short-Term Investment Decisions, Decisions to invest Surplus Funds. Long-Term Investment Decisions: Significance – Methods: Pay-Back Period Method, Net Present Value Method and Benefit-Cost Ratio Method. Short-Term Investment Decisions – Concept of Working Capital – Need and Importance of Working Capital in Business – Determinants of Working Capital in a Business – Working Capital Financing. Components of Working Capital – Cash, Receivables and

Inventory – Need to focus on Components. Dividends: Concept and Meaning – Implications of Dividend Decisions on Liquidity Management – Investing the Surplus: Principles and Methods.

Text Books

1. R. Narayanaswamy, Financial Accounting – A managerial perspective, PHI Learning, New Delhi. (2015 or later edition)
2. C. Paramasivan and T. Subramanian. Financial Management. New Age International, New Delhi. (2015 or later edition)

Reference Books

1. S.N. Maheswari, Sharad K. Maheswari & Suneel K. Maheswari. Accounting For Management. Vikas Publishing (2017 or later edition)
2. Varun Dawar & Narendar L. Ahuja. Financial Accounting and Analysis. Taxmann Publications. (2018 or later edition)
3. Athma. P. Financial Accounting and Analysis. Himalaya Publishing House. (2017 or later edtion)
4. Prasanna Chandra. Financial Management. Tata-McGraw Hill Publishers, New Delhi. (2019 or later edition)
5. S.C. Kuchhal. Financial Management. Chaitanya Publishing House, Allahabad. (2014 or later edition)

Web Resources

1. http://www.annualreports.com/
2. http://www.mmachennai.org/
3. https://finance.yahoo.com/
4. https://icmai.in/icmai/
5. https://nptel.ac.in/courses/110/107/110107144/
6. https://web.utk.edu/~jwachowi/wacho_world.html
7. https://www.icai.org/indexbkp.html
8. https://www.icsi.edu/home/
9. https://www.investopedia.com/
10. https://www.moneycontrol.com/
11. https://www.rbi.org.in/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	1	-	-	-	2	-	-	1	2	1	-	-	-
2	-	1	2	-	1	-	3	-	-	2	2	1	-	-	-
3	-	-	1	-	1	-	-	-	2	1	2	1	-	-	-
4	-	3	2	2	-	1	-	1	1	2	2	1	-	-	-
5	-	2	2	1	2	2	-	2	2	2	2	1	-	-	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

		L	T	P	C	Hrs
U20HSP502	**GENERAL PROFICIENCY -II**	**0**	**0**	**2**	**1**	**30**

Course Objectives

- To examine various standardized test in English language
- To recognize the key features of various technical writing
- To integrate LSRW skills to endorse multifarious skill set in practical situation
- To understand the factors that influence the usage of grammar
- To understand the basic concepts of logical reasoning skills

Course Outcomes

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

CO1 - Infer ideas to attend international standardized test by broadening receptive and productive skills.(**K2**)

CO2 - Interpret the types of writing in different state of affairs (**K2**)

CO3 - Develop language skills professionally to groom the overall personality through sensitizing various etiquettes in real time situation (**K3**)

CO4 - Identify the rules of grammar in academic discourse settings (**K3**)

CO5 - Extend the skills to compete in various competitive exams like GATE, GRE, CAT, UPSC, etc.(**K2**)

UNIT I -CAREER SKILLS (6Hrs)

Listening: Listening at specific contexts **Speaking:** Mock interview (Personal & Telephonic)-**Reading**: Read and Review -Newspaper, Advertisement, Company Handbooks, and Guidelines (IELTS based) **Writing:** Essay Writing (TOEFL) **Vocabulary:** Words at specified context (IELTS)

UNIT II - CORPORATE SKILLS (6Hrs)

Listening: Listening and replicating **Speaking**: Team Presentation (Work Place Etiquettes) **Reading:** Short texts (signs, emoticons, messages) **Writing:** E-mail writing- Hard skills -Resume' Writing, Job Application Letter, Formal Letter **Vocabulary:** Glossary (IELTS)

UNIT III - FUNCTIONAL SKILLS (6Hrs)

Listening: Listening TED Talks – **Speaking:** Brainstorming &Individual Presentation, Persuasive Communication –- **Reading:** Text Completion (GRE Based) **Writing:** Expansion of Compound Words **Vocabulary:** Expansion of vocabulary (IELTS)

UNIT IV - TRANSFERABLE SKILLS (6Hrs)

Listening: Listening Documentaries and making notes –**Speaking:** Conversation practice at formal & informal context **Reading:** Read and transform- report, memo, notice and advertisement, **Writing:** Euphemism, Redundancy, and Intensifiers **Vocabulary:** Refinement of vocabulary (IELTS)

UNIT V –APTITUDE (6 Hrs)

Transformational Grammar: Phrases & Clauses, Concord, Conditional Clauses, Voice, Modals
Verbal Ability Enhancement: Letter Series, Coding &Decoding**,** Sentence Completion (GATE), Critical Reasoning & Verbal Deduction (GATE), Syllogism

Reference Books

1. Lougheed, Lin. "Barron's Writing for the TOEFL IBT: With Audio CD". Barron's Educational series, 2008.
2. Tulgan, Bruce**.** "Bridging the soft skills gap: How to teach the missing basics to today's young talent". John Wiley & Sons, 2015.
3. Sherfield, Robert M. "Cornerstone: Developing Soft Skills". Pearson Education India, 2009.
4. Cullen, Pauline, Amanda French, and Vanessa Jakeman**.** "The official Cambridge guide to IELTS for academic & general training".Cambridge, 2014.
5. Ramesh, Gopalaswamy. "The ace of soft skills: attitude, communication and etiquette for success". Pearson Education India, 2010.

Web References

1. https://www.englishclub.com/grammar/nouns-compound.htm
2. https://lofoya.com/Verbal-Test-Questions-and-Answers/Sentence-Completion/l3p1
3. https://www.grammarwiz.com/phrases-and-clauses-quiz.html
4. https://www.clarkandmiller.com/25-english-euphemisms-for-delicate-situations/
5. http://www.englishvocabularyexercises.com/general-vocabulary/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	-	-	-	-	-	-	1	-	3	-	1	-	1	-
2	1	-	-	-	-	-	-	1	-	3	-	1	-	1	-
3	1	-	-	-	-	-	-	-	-	3	-	1	-	1	-
4	1	-	-	-	-	-	-	1	-	3	-	1	-	1	-
5	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

		L	T	P	C	Hrs
U20FTP510	**GARMENT CONSTRUCTION - II LAB**	**0**	**0**	**2**	**1**	**30**

Course Objectives

- To demonstrate skills in sewing different types of seams.
- To demonstrate fundamental concepts of preparing sample seams
- To demonstrate skills in constructing commercial garment categories
- To demonstrate skills in finishing garment samples
- To train the students in garment construction

.

Course Outcomes

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

CO1 – Explain the various sewing and seam techniques **(K4)**
CO2 - Organize the seam specification parameters for preparing samples**(K3)**
CO3 - Construct samples making use of garmenting techniques**(K4)**
CO4 - Predict the technical problems faced in seam sample preparation. (**K3)**
CO5 - the students will be able to construct various garments for men, women and children. **(K4)**

LIST OF EXPERIMENTS

1. Pattern making of men's / women's jeans
2. Construction of layout of men's / women's jeans
3. Stitching of men's / women's jeans
4. Study of Operation breakdown of jeans
5. Pattern making of men's / women's vest-coat
6. Construction of layout of men's / women's vest-coat
7. Stitching of men's / women's vest-coat
8. Study of Operation breakdown of vest-coat
9. Draping of flounces and peplum
10. Draping of different types of skirt
11. Block development of trouser by draping method.
12. Pattern alteration of various body defects

Reference Book

1. Laboratory Manual prepared by the Department of Fashion Technology, 2020.
2. Jacob Solinger, "Apparel Production Handbook", Reinhold Publications,1998
1. Carr H and Latham B., "The Technology of Clothing Manufacturing", Blackwell Science, U.K.,1994

Web References

1. https://ncert.nic.in/vocational/pdf/ivsm103.pdf
2. https://www.slideshare.net/sarwatshabbir/1-garments
3. https://www.cottonworks.com/topics/sourcing-manufacturing/garment-manufacturing/the-art-of-garment-manufacturing-garment-construction/
4. https://www.textileschool.com/258/garment-construction-techniques/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
1	3	3	-	-	2	-	-	-	2	2	-	-	2	-	-
2	3	3	-	-	2	-	-	-	2	2	-	-	2	-	-
3	3	3	-	-	2	-	-	-	2	2	-	-	2	-	-
4	3	2	-	-	2	-	-	-	2	2	-	-	2	-	-
5	3	2	-	-	2	-	-	-	2	2	-	-	2	-	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

U20FTP511	FASHION FORECASTING AND ACCESSORIES LAB	L	T	P	C	Hrs
		0	0	2	1	30

Course Objectives

- Describe forecasted colors, fabrics and trends according to seasons and market.
- Discuss various forecasting methods used by reputed forecasting companies to
- develop current trend for the local market.
- Describe and classify different fashion accessories
- To learn the concepts of story / mood board / colour board.

Course Outcomes

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

CO1 - Evaluate the forecasted colors, fabrics and trends according to seasons and market type as a member of team and present the same.

CO1 - Apply various forecasting methods used by reputed forecasting companies to develop current trend for the local market

CO1 - Gain knowledge on the selection of the suitable raw materials and accessories.

CO1 - To describe and classify different fashion accessories

CO1 - To explain material selection for various garment.

LIST OF EXPERIMENTS

1. Study the Fashion forecasting and Fashion styling.
2. Study the fashion forecasting process,
3. study of colour and fabric forecasting.
4. Study of concept of mood, theme, inspiration and story board.
5. Previous decade study for colors, silhouettes, fabrics, styles and influences of socio-political and lifestyle causes on fashion: World scenario and Indian scenario.
6. To prepare research work sheet based on the selected theme.
7. To prepare forecasting sheet for colors, pattern and fabric for the ensuing seasons based on international forecast.
8. Preparation of Inspiration/Story boards/Mood boards.
9. Collections of fabric swatches, laces, braids, linings, wadding, Surface Ornamentations based on forecast done/ existing market trends
10. To prepare fabric swatch board foe the selected theme.
11. Illustrating Fashion Models for collection development.
12. To prepare client's brief sheet, cost sheet and design development sheet.
13. Design development process: Selection of Seams, Necklines, Collars, Sleeves, cuffs, pockets, Accessories etc
14. Development of garment specification sheet for a selected garment.
15. Pattern Development for a garment out of developed collection.
16. Window Display.

Reference Books:

1. Laboratory Manual prepared by the Department of Fashion Technology, 2020.
2. Fashion Forecasting by Brannon, Evelyn L., Bloomsbury Publishing PLC, ISBN: 9781563678202
3. Fashion Forward: A Guide to Fashion Forecasting by Rousso Chelsea, Paperback Publications, ISBN: 9781563679247
4. Fashion Illustration for Designers by Kathryn Hagen, Paperback Publications, ISBN: 9780130983831
5. Illustrating Fashion: Concept to Creation by Steven Stipelman, Fairchild Books,ISBN: 9781563678301
6. Apparel Costing by M. Krishnakumar, Abhishek Publication, ISBN:9788182473928
7. Pattern making for fashion design by Helen Joseph Armstrong fifth edition, Pearson Education, Inc. ISBN-10: 0-13-606934-7

Web References

1. https://www.fibre2fashion.com/industry-article/83/fashion-forecasting
2. https://colormarketing.org/2018/06/06/what-is-color-forecasting/
3. https://demand-planning.com/2019/10/02/how-to-present-forecasts-properly/

4. https://www.slideshare.net/aslikarabulut/sales-forecasting
5. https://trendzoom.com/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	-	-	1	3	-	-	-	-	-	-	2	-	-
2	3	3	-	-	2	2	-	-	-	-	-	-	3	-	-
3	2	3	-	-	2	3	-	-	-	-	-	-	2	-	-
4	3	3	-	-	2	3	-	-	-	-	-	-	2	-	-
5	2	2	-	-	2	3	-	-	-	-	-	-	4	-	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

		L	T	P	C	Hrs
U20FTP512	**TESTING OF TEXTILE AND APPARELS LAB**	**0**	**0**	**2**	**1**	**30**

Course Objectives

- To understand working principles/ procedures of various textile testing instruments
- To test the fibre, yarn, fabric and accessories.
- To test and interpret the data obtained from the testing instruments
- To understand and concluded the standards and present the results
- To understand the computerized colour matching instrument

Course Outcomes

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

CO1 - Acquire knowledge in basic working principles of testing instruments. **(K1)**
CO2 - Develop skills in preparing samples for various types of experiments as per standards. **(K1)**
CO3 - Analyze and interpret the data obtained from the testing instruments. **(K4)**
CO4 - Conclude based on the standards and present the results. **(K4)**
CO5 - Acquire knowledge in computerized colour matching instrument. **(K1)**

LIST OF EXPERIMENTS

1. Determination of Yarn Count and Lea Strength
2. Determination of Single / Ply Yarn Twist
3. Determination of Yarn Appearance Grade
4. Determination of Fabric Abrasion Resistance
5. Determination of Fabric Tensile Strength
6. Determination of Color Fastness to Rubbing - Crock meter
7. Determination of Fabric Stiffness and Crease Recovery Angle
8. Determination of Fabric bursting strength and fabric Drape.
9. Determination of fabric pilling.
10. Determination of fabric tear strength.
11. Determination of colorfastness to perspiration.
12. Determination of shrinkage of woven and knitted fabrics.
13. Determination of Seam Strength and Seam Slippage
14. Determination of Zipper strength
15. Determination of Button Pull Strength
16. Determination of Peel bond strength of fusible interlinings
17. Determination of Wickability of fabric
18. Determination of Spirality and Course length of Knitted fabrics
19. Classification of Fabric defects and evaluation using 4 point system.
20. Determination of Wettability of fabrics.
21. Determination of sublimation fastness and stretch & recovery of fabric.
22. Analysis of Seam puckers.
23. Determination of garment dimensional stability.
24. Color measurement of fabrics with computerized colour matching.

Reference Books

1. Laboratory Manual prepared by the Department of Fashion Technology, 2020.
2. Booth J.E., “Principle of Textile Testing”, Butterworth Publications, London, 1989
3. Kothari V. K., “Testing and Quality Management”, Progress in Textile Technology Vol.1, IAFL Publications, New Delhi, 1999
4. Sara J. Kadolph., “Quality Assurance for Textiles and Apparels”, Fair Child Publications, New York, 1998
5. Saville,B.P. “Physical Testing of Textiles”, Woodhead Publishing Ltd., England,2004.
6. Grover E G and Hamby D. S “Hand Book of Textile testing and quality Control”, Wiley Eastern Pvt. Ltd., New Delhi, 1969.
7. Ruth clock and Grace Kunz., “Apparel Manufacture – Sewn Product Analysis”, Upper Sadle River Publications, New York, 2000
8. Pradip V. Mehta., “Managing Quality in the Apparel Industry”, NIFT Publication, India, 1998
9. Slater K., “Physical Testing and Quality Control”, The Textile Institute, Vol.23, No.1/2/3 Manchester, 1993
10. Arindam Basu, "Textile Testing-Fiber, Yarn & Fabric", SITRA, India, 2001.

Web References

1. https://textilevaluechain.in/textile-articles/textile-testing-and-quality-control/
2. https://www.qima.com/testing/garments-apparel
3. https://www.fibre2fashion.com/industry-article/4345/quality-control-in-apparel
4. https://www.hqts.com/textile-and-apparel/
5. https://www.intouch-quality.com/blog/5-packaging-quality-control-checks-no-importer-can-afford-to-skip

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	-	3	-	-	-	-	-	-	-	-	-	-	-
2	-	3	-	3	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
4	-	3	-	3	-	-	-	-	-	-	3	-	3	-	-
5	-	-	-	3	2	-	-	-	-	2	-	-	3	-	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

		L	T	P	C	Hrs
U20FTC5XX	**CERTIFICATION COURSE - V**	**0**	**0**	**4**	**-**	**50**

Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence.

Pass /Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate Fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree

U20FTS504	SKILL DEVELOPMENT COURSE 4: FOREIGN LANGUAGE/ IELTS - I	L	T	P	C	Hrs
		0	0	2	-	30

Student should choose the Foreign Language/IELTS course like Japanese/French/ Germany/IELTS, etc. approved by the Department committee comprising of HoD, Programme Academic Coordinator, Class advisor and language Experts. The courses are to be approved by Academic Council on the recommendation of HoD at the beginning of the semester if necessary, subject to ratification in the next Academic council meeting. Students have to complete the courses successfully. The Committee will monitor the progress of the student and recommend the grade (100% Continuous Assessment pattern) based on the completion of course. The marks attained for this course is not considered for CGPA calculation

U20FTS505	SKILL DEVELOPMENT COURSE 5: PRESENTATION SKILL USING ICT	L	T	P	C	Hrs
		0	0	2	-	30

The methodology used is “learning by doing”, a hands-on approach, enabling the students to follow their own pace. The teacher, after explaining the project, became a tutor, answering questions and helping students on their learning experience.

CT skills

- Understand ICT workflow in cloud computing.
- Manage multitasking.
- Deal with main issues using technology in class.
- Record, edit and deliver audio and video.
- Automate assessments and results.

Teaching tools

- Different ways to create audiovisual activities.
- Handle audiovisual editors.
- Collaborative working.
- Individualize learning experience.
- Get instant feedback from students.

Each one of the students will be assigned an ICT Topic and the student has to conduct a detailed study and have to prepare a report, running to 15 or 20 pages for which a demo to be performed followed by a brief question and answer session. The demo will be evaluated by the internal assessment committee for a total of 100 marks. The marks attained for this course is not considered for CGPA calculation.

		L	T	P	C	Hrs
U20FTM505	**INDIAN CONSTITUTION**	**2**	**0**	**0**	**-**	**30**

Course Objectives

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties

Course Outcomes

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

CO1 - Understand historical background of the constitutional making and its importance for building a democratic India, the structure of Indian government, the structure of state government, the local Administration

CO2 - Understand knowledge on directive principle of state policy, the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy

UNIT I INDIAN CONSTITUTION

Salient Features - Preamble - Fundamental Rights – Directive Principles of State Policy - Fundamental Duties

UNIT II PARLIAMENTRY SYSTEM

Powers and Functions of President and Prime Minister - Council of Ministers - The Legislature Structure and Functions of Lok Sabha and Rajya Sabha – Speaker

UNIT III THE JUDICIARY

Organization and Composition of Judiciary - Powers and Functions of the Supreme Court - Judicial Review – High Courts.

UNIT IV STATE GOVERNMENTS

Powers and Functions of Governor and Chief Minister – Council of Ministers - State Legislature

UNIT V LOCAL GOVERNMENTS

73rd and 74th Constitutional Amendments – Federalism - Center – State Relations

Text Books

1. Basu D.D," Introduction to Indian Constitution", Prentice Hall of India, New Delhi, 2015.
2. Gupta D.C, "Indian Government and Politics", Vikas Publishing House, New Delhi, 2010.

Reference Books

1. Pylee M.V, "Introduction to the Constitution of India", Vikas Publishing House, New Delhi, 2011.
2. Kashyap S, "Our Constitution", National Book Trust, New Delhi, 2010

		L	T	P	C	Hrs
U20FTT618	**GARMENT PROJECT PLANNING**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To explain project planning.
- To explain the selection of sewing machine for various operations
- To estimate the production capacity and machine requirement for the garment manufacturing processes.
- To formulate the project report for the garment unit.
- To describe the material handling and labour compliments for the garment industry.

Course Outcomes

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

CO1 - Describe project planning and describe the phases of capital budgeting process. **(K2)**
CO2 – Describe the sewing machine for various operations (K3)
CO3 - Estimate production capacity and machine requirement for the garment manufacturing. **(K2)**
CO4 - Formulate the project report for the garment unit by doing the techno economic viability. **(K3)**
CO5 - Understand the material handling, and labour compliments for the garment units. **(K2)**

UNIT I PROJECT PLANNING (9 Hrs)

Introduction, Capital investment required for project, Phases of Capital Budgeting, Difficulties in Capital expenditure, Phases involved

UNIT II SELECTION OF MACHINES (9 Hrs)

Selection of machines & machinery specifications required for the product in Shirts, trousers, knit goods, made-ups, suits, ladies dress material etc. material handling equipment and labour requirements in the apparel industry.

UNIT III ANALYZE OF THE PLANNING, LAYOUT AND LOGISTICS IN GARMENT MANUFACTURING (9 Hrs)

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

UNIT IV FORMULATION OF A PROJECT REPOR (9 Hrs)

Assumptions, Machinery Organizations, Requirement of Miscellaneous Fixed Assets & Machinery Stores & Spares, Requirement & Calculations related to Electrical Power, Lighting, Water, Steam etc.

UNIT V TECHNO-ECONOMIC VIABILITY (9 Hrs)

Calculations of cost of project – Means of Finance – Estimates of sales & production – cost of production – working capital requirement – Profitability Projection – Breakeven point – Projected cash flow statements

TEXT BOOKS:

1. Jacob Solinger., “Apparel Manufacturing Handbook ", Vannostrand Reinhold Company (1980).
2. Gordana Colovic, “Management of Technology Systems in the Garment Industry”, Woodhead Publishing.
3. Bethel, Tann, Atwater and Rung, " Production Control ", McGraw Hill Book Co., New York, (1948).
4. Apple. J. M., “Plant Layout and Materials Handling ", The Ronald Press Co. New York (1950).

REFERENCES:

1. Project, Planning Analysis, Selection Implementation & Review by Prasanna Chandra, Tata McGraw Hill Publishing Co. Ltd.,

Web References

1. https://www.textileblog.com/project-management-in-textile-and-apparel-industry/
2. https://www.fibre2fashion.com/industry-article/6444/making-of-garments
3. https://www.fibre2fashion.com/industry-article/5837/the-logistics-management-in-textile-industry
4. http://worldapparelstore.blogspot.com/2020/01/apparel-manufacturing-project-report.html
5. https://www.fibre2fashion.com/industry-article/5551/techno-economics-of-garment-industry

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	-	3	-	2	-	-	-	1	-	3	-	-	2	-
2	2	-	3	-	2	-	-	-	2	-	3	-	-	2	-
3	2	-	3	-	2	-	-	-	2	-	3	-	-	2	-
4	2	-	3	-	2	-	-	-	2	-	3	-	-	2	-
5	2	-	3	-	2	-	-	-	3	-	3	-	-	2	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

		L	T	P	C	Hrs
U20FTT619	**CAD – CAM FOR APPARELS**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To define the concepts of CAD-CAM and its usage in garment manufacturing.
- To understand the computerized pattern making process.
- To explain the CAD production planning
- To explain the computerized production planning and 3D technology in garment manufacturing.
- To explain the latest developments of CAD-CAM in apparel industry.

Course Outcomes

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

CO1 - Illustrate the concepts of CAD-CAM and its usage in garment manufacturing. **(K2)**
CO2 - Discuss the computerized pattern making process. **(K3)**
CO3 - Describe the computerized production planning
CO3 - Describe the 3D Technology in garment manufacturing. **(K4)**
CO4 - Interpret the latest developments of CAD-CAM in apparel industry. **(K4)**

UNIT I INTRODUCTION TO COMPUTER: INTRODUCTION TO COMPUTER (9 Hrs)

Introduction - concepts of CAD / CAM. Usage of CAD/CAM in Garment Manufacturing. Principles of computer graphics, abbreviations and symbols used in CAD systems.

UNIT II COMPUTERIZED PRODUCTION PATTERN MAKING (9 Hrs)

Comparison of manual and CAD systems. Computerized production pattern making – Hardware and software selection for CAD systems. How to produce a sample production pattern. Computer aided manipulation of pattern pieces to create individual styles. Operation of garment CAD software. Input and output reports for CAD

UNIT III COMPUTER AIDED PRODUCTION PLANNING (9 Hrs)

Reports generated by production planning software – production output reports by customer/location/delivery date. Use of microcomputers for production control in garment industry.

UNIT IV 3-D MODELLING: INTELLIGENT SYSTEMS (9 Hrs)

3D scanning technology. 3D body scanners, Imaging techniques for various designs. Automatic Pattern Generation Systems. 2D to 3D conversion technology. Draping 2D patterns on 3D body forms. Digitizing a pattern and grading of patterns. Drape evaluation of 3D garment simulation.

UNIT V. COMPUTER AIDED MANUFACTURING (9 Hrs)

Computer controlled machinery for garment manufacturing - automated layout planning by various techniques - Algorithm for computer production garment parts, Development of robotics for CAM. Creating marker plan and plotting markers. And developments in the 3D pattern making systems, WIP control using CAD software, 3D virtual clothing and simulation software.

TEXT BOOKS:

1. Winfred Aidrich, “CAD in Clothing and Textiles”, Blackwell Science Ltd., 1994.
2. Patric Taylor, “Computer in the Fashion Technology”, Om Book Service, 1997.
3. Stephen Gray “CAD / CAM in clothing and Textiles ", Gower Publishing Limited, 1998, ISBN 0-566-07673X.
4. Compilation of papers presented at the Annual world conference Sep 26 -29, 1984

REFERENCES:

1. Hongkong, “Computers in the world of textiles ", The textile Institute ISBN: 0- 0900739-69X.
2. Winifred. Aldrich, " CAD in clothing and Textiles ", Blackwell Science 2nd edition,1992, ISBN: 0-63 -3893 – 4
3. Jacob Solinger, “Apparel Manufacturing Handbooks ", Van no strand and Reinhold Company, 1980,ISBN:0-442-21904-0.

Web References

1. http://www.designamid.com/magazine.php?pageno=221
2. https://en.wikipedia.org/wiki/Textile_design
3. https://www.slideshare.net/AniketSuryawanshi/sections-of-solids
4. https://www.slideshare.net/kashyapshah11/development-of-surfaces-of-solids
5. https://www.fibre2fashion.com/industry-article/5085/computer-aided-textile-designing

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
2	2	3	-	-	3	-	-	-	-	-	-	-	2	2	-
3	2	3	3	-	3	-	-	-	-	-	-	-	3	-	-
4	3	3	-	-	2	-	-	-	-	-	-	-	3	2	-
5	1	3	-	-	2	-	-	-	-	-	-	-	3	-	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

U20FTT620	APPAREL DESIGN DEVELOPMENT AND SIZE FIT ANALYSIS	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To describe development of children's wear
- To describe development of Men's wear
- To describe development of Women's wear
- To explain Sizing system and size standardisation
- To explain the fitting and evaluation

Course Outcomes

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

CO1 - Discuss the various development of children's wear. **(K2)**
CO2 - Discuss the various development of Men's wear. **(K3)**
CO3 - Discuss the various development of Women's wear**. (K3)**
CO4 - Illustrate the concepts of Sizing system and size standardisation. **(K3)**
CO5 - Illustrate fitting and evaluation of apparel. **(K4)**

UNIT I CHILDREN'S WEAR (9 Hrs)

Measurement required for the construction of children's wear, selection of thread, colour, material, trimmings and accessories for children's wear, pattern making and construction procedure – baba suit, baby's frock, shorts, rompers, pedal pusher, sleep suits, trouser blocks, snow suits, gathered knickers, a-line dress, pinafore.

UNIT II MEN'S WEAR (9 Hrs)

Measurement required for the construction of men's wear, selection of thread, colour, material, trimmings and accessories for men's wear, pattern making and construction procedure – formal trouser, (pleated and flat front), leisure wear, boxer shorts, track suits, jean jacket, over jackets, tailored jacket with notched collar; notched collar in an unlined jacket, dungarees, anoraks, coats, night wear, weather wear, trousers, shirts, blazers, sizing and fit.

UNIT III WOMEN'S WEAR (9 Hrs)

Measurement required for the construction of men's wear, selection of thread, colour, material, trimmings and accessories for men's wear, pattern making and construction – nighties, blouses, midi, skirts and tops, salwar kameez, trousers, skirts, a-line, umbrella, 6-gore skirt, circular skirt, skirt construction, ladies blouse construction, fashion jacket construction, ladies tailored jacket and overcoat, ladies vest, ladies jumper with all in one facing, lined bustier, one-piece garments, outerwear, coats, fitting and grading, achieving the perfect fit

UNIT IV SIZING SYSTEMS AND SIZE STANDARDISATION (9 Hrs)

Existing sizing systems- strength and weakness, sizing system development- importance, size and shape surveys, anthropometric analysis, size analysis, key or control measurements, developing and validating sizing system, statistics used in sizing system development, apparel size designation and labeling, international sizing system development, size categories in men's, women's and children's wear.

UNIT V METHODS OF FITTING AND EVALUATION (9 Hrs)

METHODS OF FITTING AND EVALUATION: Fit **-**Definition**,** Importance, standards, influences of clothing fit, Methods of testing fit- fit models, fitting futures, measured methods, pinned pattern / tissue methods, trial garment, guide to fitting problems. Alternative methods for evaluating fit-using structural line, grain line, wrinkles, pinch test, inside measurement. Evaluating fit: subjective, objective, rating scales, subjective fitting guide, Objective method- moiré optics, algebraic evaluation of clothing fit, clothing waveform, pressure evaluation of clothing fit , 3D modelling of pressure fit.

TEXT BOOKS:

1. Marie Clayton, ―Ultimate Sewing Bible – A Complete Rference with Step-by-Step Techniques‖, Collins & Brown, London, 2008.
2. Laing R M and Webster J, ―Stitches and Seams‖, Textile Progress, The Textile Institute, Manchester,1998.
3. Deepti gupta and Norsaadah Zakaria, ―Anthropometry, sizing and design‖ Textile Institute, Wood head Publishing Limited, England, 2004.

4. FanJ, Yu W and Hunter L, —Clothing Appearance and Fit‖, Textile Institute, Wood head Publishing Limited, England , 2004

REFERENCES:

1. Harold Carr and Barbara Lathon, —The Technology of Clothing Manufacture‖, Blackwell Sciences, UK, 1996.
2. Ukponmwan J O, Chatterjee K N and Mukhopadhyay A, —Sewing Threads‖, Textile Progress Vol. 30, The Textile Institute, Manchester, 2001.
3. Connie Amaden Crawford, —A Guide to Fashion Sewing‖, Fairchild Publications, New York, 1999.
4. Sandra Betzina, —Fast fit – Easy pattern alterations for every figure‖ The Taunton Press, Newtown, USA, 2001.

Web References

1. https://www.fibre2fashion.com/industry-article/7264/keeping-up-with-the-boom-in-the-kids-wear-segment--a-basic-know-how
2. https://www.fibre2fashion.com/industry-article/7562/men-on-a-shopping-spree-menswear-gets-a-boost
3. https://www.slideshare.net/sheshir/fashion-33039857
4. https://fashionandtextiles.springeropen.com/articles/10.1186/s40691-019-0187-z
5. https://www.slideshare.net/sirleygripal/137-evaluating-garment-quality

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	-	3	-	2	-	-	-	-	1	2	-	-	2	1
2	2	-	3	-	2	-	-	-	-	1	2	-	-	2	1
3	2	-	3	-	2	-	-	-	-	1	2	-	-	2	1
4	2	-	3	-	2	-	-	-	-	1	2	-	-	2	1
5	2	-	3	-	2	-	-	-	-	1	2	-	-	2	1

Correlation Level: 1- Low, 2 - Medium, 3 – High

U20FTT621	ENVIRONMENT ENGINEERING AND SUSTAINABILITY	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To enable students to importance and concept of sustainability
- To impart the knowledge about product and process design with focus on sustainability
- To describe importance of sustainable manufacturing of apparel and reuse and recycling in the apparel manufacturing
- To explain Corporate Social Responsibility and mandatory certification towards sustainability.
- To explain concepts norms for technical and social compliance requirements for apparel industry in domestic and international context.

Course Outcomes

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

CO1: Gain knowledge importance and concept of sustainability **(K2)**
CO2: Understand features of product and process design with focus on sustainability **(K3)**
CO3: Learn about sustainable manufacturing of apparel and reuse and recycling in the apparel manufacturing to achieve sustainability **(K4)**
CO4: Gain knowledge on Corporate Social Responsibility and mandatory certification towards sustainability. **(K3)**
CO5: Understand the concepts norms for technical and social compliance requirements for apparel industry in domestic and international context. **(K3)**

UNIT I SUSTAINABLE DESIGN (11 Hrs)

Definition of Sustainability – need for sustainability. Factors influencing sustainability. Impact of ecology, economy, and culture on sustainability. Product Life Cycle. Product design sustainability using low - impact materials, recyclable material content. Energy efficient product design, design for longer-lasting and better-functioning products, product design for reuse and recycling. Assessing the product sustainability. Sustainable fibres – organic cotton, recycled polyester, alternative sustainable fibers.

UNIT II SUSTAINABLE PROCESS DEVELOPMENT (9 Hrs)

Sustainability through Manufacturing Resource Efficiency - raw material, plant and machinery, human resource, financial resource. Sustainable manufacture through application of alternative energy source, reuse and recycle of energy. Sustainable process through technology innovation – application of CAD / CAM / CIM in process innovation and improvement. Extending product life cycle through reuse and recycle of process waste. Assessing process sustainability

UNIT III SUSTAINABLE MANUFACTURE (9 Hrs)

Sustainable elements in manufacture – cost of production, power consumption, and waste creation – process waste and defects, operational safety and ergonomics, environmental friendliness. Sustainability in supply chain - supplier sustainability assessment. Safe and efficient care method for apparels to increase sustainability.

UNIT IV REUSE AND RECYCLE OF WASTE (7 Hrs)

Types of wastes in textile and apparel manufacture – material waste, human resource waste, energy waste. Scope of reuse and recycle of waste in textile and apparel manufacture. Waste elimination at source in textile and apparel manufacturing.

UNIT V COMPLIANCE FOR SUSTAINABILITY (9 Hrs)

Role of National and international regulating organizations in sustainability –,Worldwide Responsible Accredited Production (WRAP). mandatory requirements – benefits to company, labour and society.

Text Books

1. Dalcacio.R, Julius.W, 'Product Design in the Sustainable Era', Taschen Publication. 2000
2. Cynthia.L**, '**Apparel Product Design and Merchandising Strategies**',** Prentice Hall, 2007.
3. Marsha.A, Dickson, Suzanne.L, Molly.E, "Social Responsibility in the Global Apparel Industry", Bloomsbury Publishing Plc. 2011
4. Subramanian Senthilkannan Muthu, Miguel Angel Gardetti Sustainability in the Textile and Apparel Industries, ISBN 978-3-030-38545-3, Springer International Publishing, 2020

Reference Books

1. Lewis, H. and Gertsakis, J. Design and Environment: A Global Guide to Designing Greener Goods, Greenleaf Publishing, Sheffield, 2001.
2. Janet Hethorn, Connie Ulasewicz, 'Sustainable Fashion: Why Now? A conversation exploring issues, practices, and possibilities', Fairchild Books, 2007.
3. Ann Paulins and Julie L. Hillery, Ethics in the Fashion Industry New York, Fairchild Books, 2009.
4. Bartlett N., Mc Gill I. and Morley N., Maximising the Reuse and Recycling of UK Clothing & Textiles, UK: Oakdene Hollins, 2009.
5. Liz Parker and Marsha A. Dickson, 'Sustainable Fashion: A Handbook for Educators' Labour Behind the Label, 2009.

Web References

1. https://en.wikipedia.org/wiki/Sustainable_fashion
2. https://www.fibre2fashion.com/industry-article/8442/top-5-sustainability-trends-for-apparel-and-fashion-industry
3. https://www.sgtgroup.net/textile-quality-management-blog/sustainable-fashion-transformation-recycling-and-reuse
4. https://www.fibre2fashion.com/industry-article/5914/environmental-compliance-in-textile-industry

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	-	1	-	-	3	3	-	2	-	-	2	-	1	2
2	2	-	3	-	-	3	3	-	3	-	-	2	-	1	2
3	2	-	3	-	-	3	3	-	3	-	-	2	-	2	2
4	2	-	3	-	-	3	3	-	3	-	-	2	-	2	2
5	2	-	3	-	-	3	3	-	3	-	-	2	-	2	2

Correlation Level: 1- Low, 2 - Medium, 3 – High

		L	T	P	C	Hrs
U20FTP613	**GARMENT PROJECT PLANNING LAB**	**0**	**0**	**2**	**1**	**30**

Course Objectives

- To describe importance of project planning,
- To estimate the production capacity and machine requirement for the garment manufacturing processes.
- To explain formulate the project report for the garment unit.
- To explain material handling and labour compliments for the garment industry.
- To explain planning and construction of garment industry.

Course Outcomes

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

CO1 - Describe the project planning.**(K4)**
CO2 - Describe project planning and describe the phases of capital budgeting process.**(K4)**
CO3 - Estimate production capacity and machine requirement for the garment manufacturing.**(K4)**
CO4 - Formulate the project report for the garment unit by doing the techno economic viability.**(K5)**
CO5 - understand the material handling, and labour compliments for the garment units.**(K4)**

LIST OF EXPERIMENTS

1. Study for Selection of the product, operation breakdown and machine requirement
2. Study of different norms of garment industry
3. Study of Machinery selection and specification for particular product
4. Study of Machinery requirement according to production capacity
5. Study of Interdepartmental relationship chart for the apparel industry
6. Study of Final Layout of apparel manufacturing industry.
7. Study for Area calculation for different departments of garment industry
8. Study for site selection for the apparel industry
9. Study for Construction of building of garment industry.
10. Study of material handling equipment in apparel industry
11. Study for Estimation of labour compliment in apparel industry
12. Formulation of project report for knit goods

Reference Books:

1. Laboratory Manual prepared by the Department of Fashion Technology, 2020
2. Jacob Solinger., “Apparel Manufacturing Handbook ", Vannostrand Reinhold Company (1980).
3. Gordana Colovic, “Management of Technology Systems in the Garment Industry”, Woodhead Publishing.
4. Bethel, Tann, Atwater and Rung, " Production Control ", McGraw Hill Book Co., New York, (1948).
5. Apple. J. M., “Plant Layout and Materials Handling ", The Ronald Press Co. New York (1950).
6. Project, Planning Analysis, Selection Implementation & Review by Prasanna Chandra, Tata McGraw Hill Publishing Co. Ltd.,

Web References

1. https://www.textileblog.com/project-management-in-textile-and-apparel-industry/
2. https://www.fibre2fashion.com/industry-article/6444/making-of-garments
3. https://www.fibre2fashion.com/industry-article/5837/the-logistics-management-in-textile-industry
4. http://worldapparelstore.blogspot.com/2020/01/apparel-manufacturing-project-report.html
5. https://www.fibre2fashion.com/industry-article/5551/techno-economics-of-garment-industry

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	-	3	-	2	-	-	-	1	-	3	-	-	3	1
2	2	-	3	-	2	-	-	-	2	-	3	-	-	3	1
3	2	-	3	-	2	-	-	-	2	-	3	-	-	3	1
4	2	-	3	-	2	-	-	-	2	-	3	-	-	3	1
5	2	-	3	-	2	-	-	-	3	-	3	-	-	3	1

Correlation Level: 1- Low, 2 - Medium, 3 – High

		L	T	P	C	Hrs
U20FTP614	**CAD – CAM FOR APPARELS LAB**	**0**	**0**	**2**	**1**	**45**

Course Objectives

- To define the concepts of CAD-CAM and its usage in garment manufacturing.
- To understand the Computer aided pattern drafting for different apparels.
- To explain the skill of grading various apparel patterns using CAD
- To construct specification sheets for garments as per requirements
- To explain Estimate the fabric consumption.

Course Outcomes

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

CO1 Develop Computer aided pattern drafting for different apparels (**K3**)
CO2 Develop the skill of grading various apparel patterns using CAD (**K3**)
CO3 Create and manipulate efficient marker plans (**K4**)
CO4 Construct specification sheets for garments as per requirements (**K3**)
CO5 Estimate the fabric consumption (**K3**)

LIST OF EXPERIMENTS

1. To understand the usage of the basic tools available for pattern making in any of the CAD software.
2. Draft the basic block using the tools available in the CAD software
3. Grade the basic block using grading tools available in CAD software
4. Measure and Check the correctness of seams in the patterns
5. To add darts/pleats/notches/folds in the patterns
6. Create marker plan for a set of patterns drafted in CAD
7. To understand the usage of the tools available in fashion designing software
8. To drape a one-piece garment on the models available with the tools available in fashion designing software
9. To drape any party-wear garment on the models available with the tools available in fashion designing software
10. Digitize a manually drafted pattern with the help of digitizer and grade the digitized pattern for all sizes
11. Create a mixed marker plan for all the sizes drafted/graded and plot the pattern with the plotter
12. To make a textile print (sari border / bedsheet / curtain print) with the tools available in Wonder weaves Tex Print

Reference Books:

1. Laboratory Manual prepared by the Department of Fashion Technology, 2020
2. Winfred Aidrich, “CAD in Clothing and Textiles”, Blackwell Science Ltd., 1994.
3. Patric Taylor, “Computer in the Fashion Technology”, Om Book Service, 1997.
4. Stephen Gray “CAD / CAM in clothing and Textiles ", Gower Publishing Limited, 1998, ISBN 0-566-07673X.
5. Compilation of papers presented at the Annual world conference Sep 26 -29, 1984
6. Hongkong, “Computers in the world of textiles ", The textile Institute ISBN: 0- 0900739-69X.
7. Winifred. Aldrich, " CAD in clothing and Textiles ", Blackwell Science 2nd edition,1992, ISBN: 0-63 -3893 – 4
8. Jacob Solinger, “Apparel Manufacturing Handbooks ", Van no strand and Reinhold Company, 1980,ISBN:0-442-21904-0.

Web References

1. http://www.designamid.com/magazine.php?pageno=221
2. https://en.wikipedia.org/wiki/Textile_design
3. https://www.slideshare.net/AniketSuryawanshi/sections-of-solids
4. https://www.slideshare.net/kashyapshah11/development-of-surfaces-of-solids
5. https://www.fibre2fashion.com/industry-article/5085/computer-aided-textile-designing

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	3	-	-	3	-	-	-	3	2	-	-	3	3	-
2	-	3	-	-	3	-	-	-	3	2	-	-	3	3	-
3	-	3	-	-	3	-	-	-	3	2	-	-	2	2	-
4	-	2	-	-	3	-	-	-	-	-	-	-	2	2	-
5	-	-	-	-	2	-	-	-	3	2	-	-	2	2	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

U20FTP615	APPAREL DESIGN DEVELOPMENT AND SIZE FIT ANALYSIS LAB	L	T	P	C	Hrs
		0	0	2	1	30

Course Objectives

- To development of children's wear
- To development of Men's wear
- To development of Women's wear
- To explain prototyping of possible solutions
- To explain the products as a solution

Course Outcomes

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

CO1 - Develop Computer aided pattern drafting for different apparels (**K3**)
CO2 - Develop the skill of grading various apparel patterns using CAD (**K3**)
CO3 - Create and manipulate efficient marker plans (**K4**)
CO4 - Carryout ideation and prototyping of possible solutions for the developed brief. (**K3**)
CO5 - Develop products as a solution for the defined problems and present them visually (**K3**)

LIST OF EXPERIMENTS

1. Preparation of colour palette from various sources.
2. Collection of different textures
3. Develop a presentation board and a broacher highlighting your product and its features
4. Develop prototypes of possible design solution selected from the 25 ideas and document the same.
5. Develop a technical specification sheet for the final chosen design.
6. Develop a Men's wear – Formal, casual and party wears and 3D modelling of pressure fit
7. Develop a Women's wear – Formal, casual and party wears and 3D modelling of pressure fit
8. Develop a Kids wear – Formal, casual and party wears and 3D modelling of pressure fit
9. Collection of Indian designer 's profile and designs.
10. Collection of International designer 's profile and designs.
11. Collection of fashion accessories
12. Portfolio styles and presentation

Reference Books:

1. Laboratory Manual prepared by the Department of Fashion Technology, 2020
2. Winfred Aidrich, "CAD in Clothing and Textiles", Blackwell Science Ltd., 1994.
3. Patric Taylor, "Computer in the Fashion Technology", Om Book Service, 1997.
4. Stephen Gray "CAD / CAM in clothing and Textiles ", Gower Publishing Limited, 1998, ISBN 0-566-07673X.
5. Compilation of papers presented at the Annual world conference Sep 26 -29, 1984
6. Hongkong, "Computers in the world of textiles ", The textile Institute ISBN: 0- 0900739-69X.
7. Winifred. Aldrich, " CAD in clothing and Textiles ", Blackwell Science 2nd edition,1992, ISBN: 0-63 -3893 – 4
8. Jacob Solinger, "Apparel Manufacturing Handbooks ", Van no strand and Reinhold Company, 1980,ISBN:0-442-21904-0.

Web References

1. http://www.designamid.com/magazine.php?pageno=221
2. https://en.wikipedia.org/wiki/Textile_design
3. https://www.slideshare.net/AniketSuryawanshi/sections-of-solids
4. https://www.slideshare.net/kashyapshah11/development-of-surfaces-of-solids
5. https://www.fibre2fashion.com/industry-article/5085/computer-aided-textile-designing

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	3	-	1	3	-	-	-	3	2	-	-	3	3	-
2	-	3	-	1	3	-	-	-	3	2	-	-	3	3	-
3	-	3	-	1	3	-	-	-	3	2	-	-	2	2	-
4	-	2	-	1	3	-	-	-	-	-	-	-	2	2	-
5	-	-	-	1	2	-	-	-	3	2	-	-	2	2	-

Correlation Level: 1- Low, 2 - Medium, 3 – High

U20FTC6XX	CERTIFICATION COURSE - VI	L	T	P	C	Hrs
		0	0	4	-	50

Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence.

Pass /Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate Fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree

U20FTS606	SKILL DEVELOPMENT COURSE 6: FOREIGN LANGUAGE/ IELTS - II	L	T	P	C	Hrs
		0	0	2	-	30

Student should choose the Foreign Language/IELTS course like Japanese/French/ Germany/IELTS, etc. approved by the Department committee comprising of HoD, Programme Academic Coordinator, Class advisor and language Experts. The courses are to be approved by Academic Council on the recommendation of HoD at the beginning of the semester if necessary, subject to ratification in the next Academic council meeting. Students have to complete the courses successfully. The Committee will monitor the progress of the student and recommend the grade (100% Continuous Assessment pattern) based on the completion of course. The marks attained for this course is not considered for CGPA calculation

U20FTS607	SKILL DEVELOPMENT COURSE 7 (Technical Seminar)	L	T	P	C	Hrs
		0	0	2	-	30

Course Objectives

- To encourage the students to study advanced engineering developments
- To prepare and present technical reports.
- To encourage the students to use various teaching aids such as over head projectors, power point presentation and demonstrative models.

Course Outcomes

After completion of the course, the students will be able to
CO1 - Review, prepare and present technological developments.
CO2 - Face the placement interviews.

Method of Evaluation:

- During the seminar session each student is expected to prepare and present a topic on engineering/ technology, for duration of about 20 minutes.
- In a session of three periods per week, 8 to 10 students are expected to present the seminar.
- Each student is expected to present atleast twice during the semester and the student is evaluated based on that.
- At the end of the semester, he / she can submit a report on his / her topic of seminar and marks are given based on the report.
- A Faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain attendance also.
- Evaluation is 100% internal. The marks attained for this course is not considered for CGPA calculation.

		L	T	P	C	Hrs
U20FTS608	**SKILL DEVELOPMENT COURSE 8** (NPTEL / MOOC - I)	**0**	**0**	**2**	**-**	**30**

Student should register online courses like MOOC / SWAYAM / NPTEL etc. approved by the Department committee comprising of HoD, Programme Academic Coordinator, Class advisor and Subject Experts. Students have to complete the relevant online courses successfully. The list of online courses is to be approved by Academic Council on the recommendation of HoD at the beginning of the semester if necessary, subject to ratification in the next Academic council meeting. The Committee will monitor the progress of the student and recommend the grade (100% Continuous Assessment pattern) based on the completion of course / marks secured in online examinations. The marks attained for this course is not considered for CGPA calculation.

		L	T	P	C	Hrs
U20FTM606	**ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**	**2**	**0**	**0**	**-**	**30**

Course Objectives

The course will introduce the students to

- To get a knowledge in Indian Culture
- To Know Indian Languages and Literature and the fine arts in India
- To explore the Science and Scientists of Medieval and Modern India

Course Outcomes

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

CO1- Understand philosophy of Indian culture.
CO2 -Distinguish the Indian languages and literature.
CO3 -Learn the philosophy of ancient, medieval and modern India.
CO4 - Acquire the information about the fine arts in India.
CO5 - Know the contribution of scientists of different eras.

UNIT - I Introduction to Culture:

Culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian Culture, Ancient India, Medieval India, Modern India

UNIT - II Indian Languages, Culture and Literature:

Indian Languages and Literature-I: the role of Sanskrit, significance of scriptures to current society, Indian philosophies, other Sanskrit literature, literature of south India Indian Languages and Literature-II: Northern Indian languages & literature

UNIT - III Religion and Philosophy:

Religion and Philosophy in ancient India, Religion and Philosophy in Medieval India, Religious Reform Movements in Modern India (selected movements only)

UNIT – IV Fine Arts in India (Art, Technology& Engineering):

Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science and Technology in India, development of science in ancient, medieval and modern India

UNIT – V Education System in India:

Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Science and Scientists of Medieval India, Scientists of Modern India

Reference Books

1. Kapil Kapoor, “Text and Interpretation: The India Tradition”,ISBN: 81246033375, 2005
2. “Science in Samskrit”, Samskrita Bharti Publisher, ISBN 13: 978-8187276333, 2007
3. NCERT, “Position paper on Arts, Music, Dance and Theatre”, ISBN 81-7450 494-X, 200
4. S. Narain, “Examinations in ancient India”, Arya Book Depot, 1993
5. Satya Prakash, “Founders of Sciences in Ancient India”, Vijay Kumar Publisher, 1989
6. M. Hiriyanna, “Essentials of Indian Philosophy”, Motilal BanarsidassPublishers, ISBN 13: 978-8120810990, 2014

		L	T	P	C	Hrs
U20FTE611	**APPAREL PRODUCT ENGINEERING**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To identify and analyze fabric, prints/embroidery, trims and sources of raw materials
- To develop branding techniques for apparels.
- To explain the product appraisal.
- To develop the prototype and control the quality of garment by using correct and effective information of patterns and construction.
- To develop and analyze pattern making and construction skill.

Course Outcomes

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

CO1 - Identify and analyze fabric, prints/embroidery, trims and sources of raw materials. **(K3)**
CO2 - Develop branding techniques for apparels. **(K2)**
CO3 - Know the product appraisal. **(K2)**
CO4 - Develop the prototype and control the quality of garment by using correct and effective information of patterns and construction**(K4)**
CO5 - Develop and analyze pattern making and construction skill. **(K4)**

UNIT I PRODUCT ENGINEERING (9 Hrs)

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

UNIT II APPAREL PRODUCT BRANDING (9 Hrs)

Introductions, Review branding and the marketing mix, Review of brand management and brand leadership ideas, Marketing communications overview, developing marketing and communication programs for brands, Social Media and the branded customer Experience, Measuring brand performance, brand audit, the role of emotion and affect in brand building, Brand extensions, Management of brand equity for long-term success.

UNIT III PRODUCT APPRAISAL (9 Hrs)

Functional, aesthetic, Manufacturing and economic analysis, Market Research, Material Research, Equipment and process research

UNIT IV TRIMS USED AND DEVELOPMENT OF SPECIFICATION SHEET (9 Hrs)

Thread: Cotton/blend/nylon, count, color, brand etc. **Button**: Thermoplastic/metallic/MOP, button size etc., **Interlining**: Fusible /Non-Fusible, Type of base fabric used, Type of Resin used etc., **Zipper**: Nylon/metallic, Teeth size, type slider etc. **Label** : Printed/ Woven, no. of color used, etc.

UNIT V SIMULATION OF SPECIFIED PROPERTIES OR SPECIFICATION (9 Hrs)

Color fastness and strength test of sewing thread, loop test and flexural rigidity test of sewing thread, Breakage and melting point test of buttons, strength and bending test of zipper, Elastomeric (ZWICK/INSTRON)) test of Elastic similar analysis and tests of any other trim used in the trims.
Development of Measurement Specification Chart with Flat Sketch and with important Construction Details Development of Flow Process Chart with Stitch Type, Seam Diagram and M/C details Development of Pattern Construction of Prototype. Determination of CMT

Text Books

1. Handbook of Textile Design: Principles, Processes, and Practice by Jacquie Wilson, Paperback Publications, ISBN: 978-0849313127
2. The Design Logic of Textile Products by Tsuyoshi Matsuo, Paperback Publications, ISBN: 978-1870372015

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

Reference Books

1. Jacob Solinger., "Apparel Manufacturing Handbook ", Vannostrand Reinhold Company (1980).
2. Gordana Colovic, "Management of Technology Systems in the Garment Industry", Woodhead Publishing.

Web References

1. https://apparelresources.com/business-news/manufacturing/ie-in-apparel-manufacturing-xii/
2. https://www.fibre2fashion.com/industry-article/3768/brand-building-in-the-apparel-industry
3. https://www.slideshare.net/garymobile15/apparel-designer-performance-appraisal
4. https://www.onlineclothingstudy.com/2018/02/apparel-product-specification-sheet-and.html
5. https://apparelresources.com/technology-news/manufacturing-tech/3d-garment-simulation/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	-	3	-	-	3	3	-	2	-	-	2	-	1	2
2	2	-	3	-	-	3	3	-	3	-	-	2	-	1	2
3	2	-	3	-	-	3	3	-	3	-	-	2	-	2	2
4	2	-	3	-	-	3	3	-	3	-	-	2	-	2	2
5	2	-	3	-	-	3	3	-	3	-	-	2	-	2	2

Correlation Level: 1- Low, 2 - Medium, 3 – High

		L	T	P	C	Hrs
U20FTE612	**ADVANCES IN GARMENT FINISHING**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- Ability to describe working principle & procedure of machines used in garment industry.
- Ability to Summarize the various specialty finishes used in garment industry
- Ability to compare the effects given to garment by various wash down processes
- To describe the effect of fibre characteristics, water, detergent, stain removal, laundry and dry-cleaning process on apparel.
- To analyse the effect on colour fastness to various agencies like washing, rubbing, etc. on garments in concern with care labels

Course Outcomes

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

CO1 - Describe working principle & procedure of machines used in garment industry. **(K4)**
CO2 - Summarize the various specialty finishes used in garment industry**(K3)**
CO3 - Summarize to compare the effects given to garment by various wash down processes **(K4)**
CO4 - Explain effect of fibre characteristics, water, detergent, stain removal, laundry and dry cleaning process on apparel. **(K2)**
CO5 - Describe the effect on colour fastness to various agencies like washing, rubbing, etc. on garments in concern with care labels**(K3)**

UNIT I APPAREL FINISHING (9Hrs)

Introduction – Objects of finishing, Importance of finishing, classification of finishes, Difference between finishing of woven fabric, Knit goods, and Readymade garments. Finishing machinery such as stenter, compressive shrinkage range, calendar, drum washing machine, hydro extractor, Tumble drier. **Resin Finishing –** Mechanism of resin finishing, concept of anti-crease, wash-n-wear and durable press finish. **Finishing of Synthetic Materials –** Heat setting and weight reduction of polyester

UNIT II FUNCTIONAL FINISHES FOR GARMENTS (9Hrs)

Concept of garment finishing, Difference between pre-garment stage and readymade garment stage finishing, Anti-static finish, antimicrobial finish, flame retardant finish, various softening and stiffening treatments, water repellent finish, water resistant breathable finish, Bio polishing, etc.

UNIT III WASH DOWN EFFECTS ON DENIM (9Hrs)

Regular wash, Bleach wash, Stone Wash, Enzyme Wash, Combined enzyme and stone wash, Sand Blasting, Monkey Wash, Grinding, Whiskering, Ozone Fading, Acid wash.

UNIT IV CONCEPT OF WOVEN AND KNIT CLOTHING CARE (9Hrs)

Characteristics of various textile fibers, Introduction to laundry process, Laundering and dry cleaning process for garment, various laundry agents like soap, detergent, bleaching agent, optical whitening agents, stiffeners, softeners, Nature and classification of stains, Principle and classification of stain removals, Common stains and their removal

UNIT V CARE LABELS AND ENVIRONMENTAL ASPECTS(9Hrs)

Importance of care label. Various systems of care labeling, instructions for washing, drying, ironing, dry cleaning and bleaching.
Concept of banned dyes, formaldehyde, PCP, pesticides, heavy metals, their eco-norms and eco-label.

Text Books:

1. Garment Finishing and Care Labelling by S.S.Satsangi, Usha Publishers,53-B/AC-IV, Shalimar Bagh, New Delhi.
2. Stain Removing Techniques byS.S.Satsangi, Usha Publishers,53-B/AC-IV, Shalimar Bagh, New Delhi.
3. Know All About Denim by Dinkar Mahajan Publishers Private Limited, Ahmadabad.
4. Denim - Manufacture, Finishing and Applications, Edited by Roshan Paul, Woodhead Publishing Series in Textiles
5. Fabric Care by Noemia D' Souza, New Age International Publications
6. Introduction to Clothing Production Management, by Chutler A J, Blackwell science, UK, 1998

Reference Books:

1. AATCC Technical Manual 2007
2. Textile Finishing,edited by Derek Heywood, Society of Dyers and Colourists

Web References

1. https://www.fibre2fashion.com/industry-article/1709/impact-of-textiles-and-clothing-industry-on-environment-approach-towards-eco-friendly-textiles
2. https://www.slideshare.net/sheshir/denim-washing-34238420
3. https://www.slideshare.net/nabaneeta1997/functional-finishes-of-garments
4. https://revolutionfabrics.com/blogs/gotcha-covered/when-to-choose-a-woven-fabric-over-a-knit-fabric

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	-	3	-	-	3	-	-	-	-	-	2	2	3	-
2	2	1	3	-	-	3	-	-	-	-	-	2	2	3	-
3	-	1	3	-	-	3	3	-	-	-	-	2	2	3	-
4	-	-	3	-	-	3		-	-	-	-	2	2	3	-
5	-	1	3	3	-	3	3	2	-	-	3	2	2	3	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

		L	T	P	C	Hrs
U20FTE613	**FUNDAMENTALS OF NANOSCIENCE**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To acquire knowledge in nano science.
- To learn the basic of nano material preparation.
- To learn how to design nano material.
- To acquire knowledge in characterise and technics of nano materials.
- To develop the application of nano material

Course Outcomes

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

CO1 - Will familiarize about the science of nanomaterials. (**K2**)
CO2 -Will demonstrate the preparation of nanomaterials. (**K1**)
CO3 - Illustrate the concepts of design of nano materials. (**K3**)
CO4 - Will develop knowledge in characteristic nanomaterial. (**K2**)
CO5 - Will demonstrate the application of nano materials. (**K4**)

UNIT I INTRODUCTION (8 Hrs)

Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots, nano wires ultra – thin films – multi layered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to
properties and motivation for study (qualitative only).

UNIT II GENERAL METHODS OF PREPARATION (9Hrs)

Bottom-up Synthesis-Top-down Approach: Co-Precipitation, Ultrasonication, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III NANOMATERIALS (12 Hrs)

Nanoforms of Carbon - Buckminster fullerene- graphene and carbon nanotube, Single wall carbon Nanotubes (SWCNT) and Multi wall carbon nanotubes (MWCNT)- methods of synthesis(arcgrowth, laser ablation, CVD routes, Plasma CVD), structure-property Relationships applications- Nanometal oxides-ZnO, TiO2,MgO, ZrO2, NiO, nanoalumina, CaO, AgTiO2, Ferrites, Nanoclaysfunctionalization and applications-Quantum wires, Quantum dots-preparation, properties and applications.

UNIT IV CHARACTERIZATION TECHNIQUES (9Hrs)

X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation.

UNIT V APPLICATIONS (7Hrs)

NanoInfoTech: Information storage- nanocomputer, molecular switch, super chip, nanocrystal, Nanobiotechlogy: nanoprobes in medical diagnostics and biotechnology, Nano medicines, Targetted drug delivery, Bioimaging - Micro Electro Mechanical Systems (MEMS), Nano Electro Mechanical Systems (NEMS)- Nanosensors, nano crystalline silver for bacterial inhibition, Nanoparticles for sunbarrier products - In Photostat, printing, solar cell, battery.

TEXT BOOKS:

1. A.S. Edelstein and R.C. Cammearata, eds., “Nanomaterials: Synthesis, Properties and Applications”, Institute of Physics Publishing, Bristol and Philadelphia, 1996.
2. N John Dinardo, “Nanoscale Charecterisation of surfaces & Interfaces”, 2nd edition Weinheim Cambridge, Wiley-VCH, 2000.

REFERENCES:

1. G Timp, “Nanotechnology”, AIP press/Springer, 1999.
2. Akhlesh Lakhtakia,“The Hand Book of Nano Technology, Nanometer Structure, Theory, Modeling and Simulations”. Prentice-Hall of India (P) Ltd, New Delhi, 2007.

Web References

1. https://www.worldscientific.com/worldscibooks/10.1142/8433
2. https://www.worldscientific.com/worldscibooks/10.1142/8433
3. https://en.wikipedia.org/wiki/Characterization_of_nanoparticles
4. https://www.niehs.nih.gov/health/topics/agents/sya-nano/index.cfm
5. https://en.wikipedia.org/wiki/Applications_of_nanotechnology

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	-	2	-	1	-	-	-	-	-	-	1	-
2	3	2	2	-	2	-	1	-	-	-	-	-	-	1	-
3	3	2	2	-	2	-	1	-	-	-	-	-	-	1	-
4	3	2	2	-	2	-	1	-	-	-	-	-	-	1	-
5	3	2	2	-	2	-	1	-	-	-	-	-	-	1	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

U20FTE614	DENIM GARMENT MANUFACTURING TECHNOLOGY	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To acquire denim fabrics.
- To enable the students analyze designs in denim fabrics and garments
- To acquire denim dyeing and finishing
- To enable the student's denim garment techniques
- To enable the student's various denim washing

Course Outcomes

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

CO1 - Acquire knowledge on fabrics(**K1**)
CO1 -Acquire knowledge on designs in denim fabrics and garments (**K2**)
CO1 -Explain denim dyeing processes and the final finishes achieved in them. (**K2**)
CO1 -Will knowledge on Denim garment techniques(**K3**)
CO1 -Explain washing treatments for denim fabrics and denim garments. (**K3**)

UNIT I DENIM (7 Hrs)

DENIM: Overview of denim production, market potential, product ranges, manufacturers & brands

UNIT II YARNS AND FABRICS FOR DENIM (9 Hrs)

YARNS AND FABRICS FOR DENIM: Yarn: characteristics, pre-requisites, quality requirements, spinning, yarn dyeing and sizing. Lycra: properties, yarn parameters influencing denim manufacturing. Fabric: characteristics, types, fabric parameters, factors influencing denim manufacturing, fabric faults, manufacture of lycra denim, knit denims

UNIT III DENIM PROCESSING (9 hrs)

Dyes: properties and characteristics, conditions, requirements for dyeing & chemistry of dyeing, Machineries: Types of machines, process variables and parameters, factors influencing dyeing. Precautions & developments, assessment of dyed fabrics, processing parameters influencing knitted denims, problems and troubleshooting. Finishing: permanent press, preshrinking, integrated finishing and shrinking range, sanforizing, pre-drying, ammoniation & skewing. Coating and embossing techniques for denims.

UNIT IV DENIM GARMENTING (8 Hrs)

Men‘s wear, women‘s wear, children‘s wear, style variations, construction sequence, sewing parameters, machineries used, special attachments, sewing threads, seam & stitch parameters, trims, accessories, size & fit requirements, care labelling.

UNIT V DENIM WASHING (12 Hrs)

Process conditions, machineries, chemicals used for special effects - pumice stones, acid and enzyme wash, denim bleaching, biopolishing & biostoning, sand blasting, PP spray, grinding, whiskering, ozone and laser fading

UNCONVENTIONAL DENIMS: Tinted denim, over dyed denim, reverse denim, pseudo denim, stretch denim, peach skin effect, quick wash denim, vintage wash, enzyme- soda wash, dextrose- caustic wash, sueding wash, golf ball wash, tie _n‘ wash, marble wash and crush finish

TEXT BOOKS:

1. Parmar M S, Satsangi S S & Jai Prakash, —Denim – A fabric for all‖, NITRA Publications, 1996.
2. Li Y, —Denim Apparel Design, Manufacture and Finishing‖, CRC Press, 2005.

REFERENCES:

1. Michael Harris, —Jeans of the Old West- A History‖, 2010.
2. Graham Marsh, Paul Trynka & June Marsh, —Denim: From Cowboys to Catwalks: A History of the World's Most Legendary Fabric‖, Samurai Publications, 2005.
3. Emily Current & Meritt Elliott, —A Denim Story- Inspirations from bellbottoms to boyfriends, Fairchild Publications, 2014.

Web References

1. https://en.wikipedia.org/wiki/Denim
2. https://www.textileschool.com/298/denim-fabrics/
3. https://www.fibre2fashion.com/industry-article/6835/denim-processing
4. https://www.fibre2fashion.com/industry-article/3219/denim-in-the-perspective-of-a-fashion-garment
5. https://garmentsmerchandising.com/flow-chart-of-denim-washing-process/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	3	-	-	-	2	-	-	-	-	1	-	2	1
2	2	2	3	-	-	-	2	-	-	-	-	1	-	2	1
3	2	2	3	-	-	-	2	-	-	-	-	1	-	2	1
4	2	2	3	-	-	-	2	-	-	-	-	1	-	2	1
5	2	2	3	-	-	-	2	-	-	-	-	1	-	2	1

Correlation Level: 1- Low, 2 - Medium, 3 - High

		L	T	P	C	Hrs
U20FTE615	**HOME TEXTILES IN FASHION**	**3**	**0**	**0**	**3**	**45**

Course Objectives

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

Course Outcomes

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

CO1 - Explain textiles for seating, its application and its scope. (**K2**)
CO2 - Describe bed textiles with its types (**K3**)
CO3 - Classify various types of window textile, towels and kitchen textiles. (**K3**)
CO4 - Describe manufacturing processes of floor covering. (**K2**)
CO5 - Describe finishes and test evaluation for home textiles. (**K4**)

UNIT I TEXTILE FOR SEATING (9 Hrs)

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

UNIT II BED TEXTILES (9 Hrs)

Sheets & Pillow Cases, Quilted Textile, Blankets & Rugs - Jacquard blankets, Printed blankets, Fire proof blankets, Baby blankets. Bed Spreads, Mattress covers, (Ticking), Table Textiles – Tablecloths – Colour – Woven & Printed type, jacquard types, embroidered types, non-woven types. Table mats – Colour -woven, Printed jacquard, embroidered.

UNIT III WINDOW TEXTILES (12 Hrs)

Sun filters (Sheers and nets), Semi-sheers, Reflective textiles, curtain fabrics & drapes, Blinds.Fabrics for Wall Covering, Textile Art – Tapestries, Wall hangings, Textiles for screens & Room Dividers

Towels: - Types of towels, Bath robes, Beech Towels, Kitchen Towels, Terry towels, Napkins - Construction, weave, pile height, patterning, production, dyeing, finishing, etc. Bathroom Textiles - General shower curtains, Terry Towelling, Kitchen Textiles:-Aprons, Dish cloth, Teacosy, Bread bag, Mittens, Pot Holders, Table Mats – Construction & manufacturing details.

UNIT IV TEXTILE FLOOR COVERINGS (6 Hrs)

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

UNIT V FINISHES AND EVALUATION IN HOME TEXTILES (9 Hrs)

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

TEXT BOOKS:

1. Brian. D Colemen, "Luxurious Home Interiors‖, Gibbs Smith Publication, Hong Kong, 2004.
2. Premavathy Seetharaman and Parveen Pannu, —Interior Design and Decoration‖, CBS Publishers and Distributors, New Delhi, India, 2005.
3. Jay Diamond and Ellen Diamond, —Fashion Apparel, Accessories and Home Furnishings‖, Prentice Hall, New Delhi,2007.
4. Charles Randall and Sharon Templeaton, "Dream Windows", Randall International Orange, California, 2003.
5. Katrin Cargill, —Simple Curtains‖, Ryland Peters and Small, London, 2002.
6. Wendy Baker, —Curtain and Fabric Selector‖, Collins and Brown, London, 2000.

REFERENCES:

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

Web References

1. https://technicaltextile.net/articles/upholstery-in-automobiles-3100
2. https://byzara.com/en/portfolio/bedroom-textiles/
3. https://www.standardtextile.com/products/window-treatments/
4. https://study.com/academy/lesson/textile-floor-covering-standards.html
5. https://www.fibre2fashion.com/industry-article/7150/special-finishes-for-functional-home-textiles

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	-	-	-	-	-	-	-	-	-	-	-	1	-
2	3	2	1	-	-	-	-	-	-	-	-	-	-	1	-
3	3	2	1	-	-	-	-	-	-	-	-	-	-	1	-
4	3	2	1	-	-	-	-	-	-	-	-	-	-	1	-
5	3	2	-	-	-	-	-	-	-	-	-	-	-	1	-

Correlation Level: 1- Low, 2 - Medium, 3 - High

		L	T	P	C	Hrs
U20MCO601	**INDUSTRIAL AUTOMATION FOR TEXTILE**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To define the concepts of automation in fabric inspection.
- To explain the developments in spreading and cutting.
- To Understand the developments in sewing and finishing machines used in apparel industries
- To explain the developments in material handling
- To explain the robotics and its application in apparel industry.

Course Outcomes

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

CO1 - Acquire knowledge in automation in fabric inspection (**K1**)
CO2 - Discuss the developments in spreading and cutting (**K4**)
CO3 - Understand the developments in sewing and finishing machines used in apparel industries (**K2**)
CO4 - Acquire knowledge in the developments in material handling (**K1**)
CO5 - Acquire knowledge on robotics and its application in apparel industry(**K1**)

UNIT I AUTOMATION IN FABRIC INSPECTION (9 Hrs)

Definition – importance and role of automation in apparel industry. Principles of automatic fabric inspection and defect checking. Machine vision system – image acquisition, feature enhancement; Image segmentation – feature extraction, image understanding.

UNIT II AUTOMATION IN SPREADING AND CUTTING (9 Hrs)

Spreading- types, requirements of spreading. Automated elements in spreading machines. Cutting – types, requirements of cutting. Automated elements in cutting of textile materials – water jet, laser and plasma and computerized cutting machine.

UNIT III AUTOMATION IN SEWING AND FINISHING (9 Hrs)

Advanced sewing – Automatic placket feeder – Automatic pocket maker – Auto button sewer – Electronic sewing machines – Automation in special sewing machines- bar tack, button holing and button fixing. Advanced garment finishing, folding and packing machines – CNC pressing machines.

UNIT IV AUTOMATION IN MATERIAL HANDLING (9 Hrs)

Types of equipment- Automated storage and retrieval systems- Overview of conceptions of “Work Robots” and “Manipulators”. Conveyor systems – Unit production systems. Ply separation; Transportation - position and orientation, pick and place – clamping grippers and pinch grippers.

UNIT V ROBOTICS IN APPAREL INDUSTRY (9 Hrs)

Robotics in spreading and cutting; Robotics in sewing – double lock stitching, one side stitching, Tufting; Robotics for material handling; Robots as 2D and 3D folding machines; Robot control and simulation. Return on investment on automation.

Text Books:

1. Berkstresser, G.A. & Buchanan, E.M., Automation and Robotics in the Textile and Apparel Industries, Noyes Publications, 1986.
2. M.G.Mahadevan, “Textile Robotics and Automation”, Abhishek Publications, Chandigarh, 2001.
3. A.Gordan, et al., “Automation and Robotics in the Textile and Apparel Industries (Textile series)”, Noyes Publication, UK, 1986.
4. G.A.Berkstresser, “Automation in the Textile Industry: From Fibers to Apparel”, 1st Edition, Technomic Publishing Co., Inc, UK, 1995.

Reference Books:

1. M.Acar, “Mechatronic Design in Textile Engineering”, NATO Science Series, 1st edition, Springer, USA, 1994.
2. Carr, H. and Latham, B., ‘The Technology of Clothing Manufacture’, Wiley-Blackwell, 2009.
3. Relis, N. & Strauss, G, ‘Sewing for Fashion Design’, Upper Saddle River, NJ: Prentice Hall, 1997.
4. Stylios G, ‘Textile Objective Measurement and Automation in Garment Manufacture’ Ellis Horwood Ltd., U.K., 1991
5. Solinger, J, ‘Apparel Manufacturing Handbook’, 2nd Ed., Van Nostrand Reinhold, New York, 1995
6. Crum, R.J, ‘Methods of Joining Fabrics’, Shirley Institute, 1983.

7. V.Jayakumar, " Applied Hydraulics & Pneumatics", Lakshmi Publications, Chennai, June 2010.
8. Tain kok Kiong, Andi Sudjana Putra " Drives and Control for Industrial Automation", Springer – Verlag London Limited 2011.
9. Dave Polka, "Motors and Drives – A Practical Technology Guide", ISA – The Instrumentation Systems and Automation Society, 2003
10. P. Khanna, "Industrial Engineering and Management", Dhanpat. Rai Publications, New Delhi, 1999.

Web References

1. https://www.fibre2fashion.com/industry-article/7252/automated-fabric-inspection-used-in-garment-industry
2. https://www.textileworld.com/textile-world/features/2020/03/automated-cutting-sewing-developments/
3. https://www.textileblog.com/automation-and-robotic-in-sewing-technology/
4. https://galecia.com/content/automated-materials-handling
5. https://www.fibre2fashion.com/industry-article/7183/use-of-robots-automation-in-the-garment-industry

COs/POs/PSOs Mapping

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1	3	-	-	-	3	-	-	-	-	-	-	-	-	3	-
2	-	-	-	-	3	-	-	-	-	-	-	-	-	3	-
3	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-

Correlation Level: 1- Low, 2 - Medium, 3 – High