

**DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY
LUCKNOW, UTTAR PRADESH**



EVALUATION SCHEME & SYLLABI

FOR

B.TECH 4th YEAR

HANDLOOM & TEXTILE TECHNOLOGY

Based on AICTE Model Curriculum & NEP2020

[Effective from the Session: 2025-26]

Effective from Session: 2025-26
B. Tech. 4th Year
Handloom and Textile Technology

SEMESTER-VII														
S. No	Subject Code	Subject Topic	Learning Mode	LTP			Evolution Scheme						Total	Credit
				L	T	P	CT	TA	Total	PS	TE	PE		
1	BHT701	Application of Computer in Color Matching & Textile Design	Offline	3	0	0	20	10	30	-	70	-	100	3
2	BHT070-072	Departmental Elective-IV	Offline	3	0	0	20	10	30	-	70	-	100	3
3	BOEM**	Open Elective-II	Offline/MOOCs	3	0	0	20	10	30	-	70	-	100	3
4	BHT751	Application of Computer in Color Matching & Textile Design Laboratory	Offline	0	0	2	-	-	-	50	-	50	100	1
5	BHT752	Mini Project or Internship Assessment*		0	0	4	-	-	-	100	-	-	100	2
6	BHT753	Project-I		0		10	-	-	-	150	-	-	150	5
7	BHT754	Start Ups & Entrepreneurial Activity Assessment #		0	0	4	-	-	-	100	-	-	100	2
Total				6		20							750	19
##Minor Degree/ Honors Degree MT-4/ HT-4				4	0	0	30	20	50	-	100	-	150	4
PC – Program Core *The Mini Project or internship (5-6 weeks) conducted during summer break after VI semester and will be assessed during VII semester. # Start Ups & Entrepreneurial Activity Assessment will be done 7 th semester under which a student will have to undergo a Start Ups & Entrepreneurial Activity of at least 60 hours till 6 th Semester. ## Those students have opted for minors and honors.														

Departmental Elective-IV

BHT070- Functional Textiles

BHT071- Apparel Marketing and Merchandising

BHT072 -Advanced Fabric Structure

The Internal Assessment of MOOCs will be done by the respective institute and the External Assessment (End Semester Examination) will be done by the University

Effective from Session: 2025-26
B. Tech. 4th Year
Handloom and Textile Technology

SEMESTER-VIII														
S. No	Subject Code	Subject Topic	Learning Mode	LTP			Evolution Scheme						Total	Credit
				L	T	P	CT	TA	Total	PS	TE	PE		
1	BOEM**	Open Elective- III	MOOCs	3	0	0	20	10	30	-	70	-	100	3
2	BOEM**	Open Elective-IV	MOOCs	3	0	0	20	10	30	-	70	-	100	3
3	BHT851	Project-II		0	0	18	0	0		100		350	450	10
Total				6		18							650	16
##Minor Degree/ Honors Degree MT-5/ HT-5				4	0	0	30	20	50	-	100	-	150	4
## Those students have opted for minors and honors.														

. The Internal Assessment of MOOCs will be done by the respective institute and the External Assessment (End Semester Examination) will be done by the University

B. Tech. 4th Year VII Semester
Handloom and Textile Technology

Detailed Syllabus

BHT701	Application of Computer in Color Matching & Textile Design	3L: 0T :0P	3 Credits
---------------	---	-------------------	------------------

Objective

1. To enable the students to define the concept of different colour theories.
2. To enable the students to analyze the applications in CCM software.
3. To enable the students to narrate about the fundamentals of CATD.
4. To enable the students to learn about transfer of designs on to point paper.
5. To enable the students to use the applications in CATD software.

Unit	Topics	Lectures
I	Colour Theory- Introduction, colour physics, sources and types of illumination, various colour theories, additive-subtractive mixing, and colour specification systems. Munsell system, colour difference, Degree of Metamerism, colour order system, colour difference formulae, Anatomy of a colour measuring Instrument, Beer – Lambert law and Kubelka – Munk theory.	9
II	Instrumentation of colour matching and assessment- Specular and diffusion reflectance, measurement of reflectance, Instruments for colour matching, , CCM software, CIE LAB color space, Application to textiles- Preparation of sample calibration, reflectance spectra of sample, Prediction of the recipes by computer and verification of result- Pass/Fail system.	9
III	Introduction of computer application in textile designing – fundamentals- different methods and advantages of CATD. Basics of computer designing, importance of CATD. Decorative effect using pattern and design theory, Application of CAD for textiles.	9
IV	Transfer of designs to point paper- various steps in transferring designs from sketch to point paper. Design calculation as per given jacquard and harness set – pixel – resolution and its relation with threads and threads per inch. Vector and raster images – X and Y in designing – different drawing tools.	9
V	Motif Scanning – scanning parameters – colours and attributes, editing tools used for graph making – scaling, rotating, reversing, dropping. Application CATD Softwares - Basic Operations, Drawing Operations, Working With Colors, Working With Contours, Using Layers, Transform Tools, Brushes, Using Filters, Cleaning Up the Picture.	9

Outcomes

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

1. Explain about the concept of different colour theories.
2. Apply the applications in CCM software.
3. Explain the fundamentals of CATD.
4. Creation of design by transferring on to point paper.
5. Apply the different tools for creating the designs by CATD.

Text Book

1. A.D. Sule, "Computer Color Analysis: Textile Application", New Age International Publication, 2008.
2. Shalini S. Patwardhan., "Instrumental Colour Matching for Textiles", Wool Research Association Publication, Bombay, 1977
3. Shalini Patwardhan, Computer Aided Textile Designing & Clothing by; Colour Publications Pvt. Ltd.
4. Winifred Aldrich, CAD in clothing and Textiles, John Wiley & Sons Second Edition

References

1. Lisa Cianci, Colour Theory: Understanding and Working with Colour, RMIT Open Press, <https://rmit.pressbooks.pub/colourtheory1> \
2. David S. Lee Mastering CAD Textile, Kindle edition.
3. Fredrick L chipkin Adobe Photoshop for Textile Design.
4. W. Aldrich CAD in clothing and textiles.
5. A magazine on Computer in the World of Textiles.
6. Ned Graphics.
7. Corel and Photoshop.
8. Wacom Digitizer with Print Software.

BHT070	Functional Textiles	3L: 0T :0P	3 Credits
---------------	----------------------------	-------------------	------------------

Objective

1. To enable the students to define the concept of technical textiles and filtration textiles.
2. To enable the students to describe the concept of geotextiles and composite materials.
3. To enable the students to describe about textiles use in defense and protective textiles.
4. To enable the students to narrate about automotive textiles and sports textiles.
5. To enable the students to explore about the medical textiles and agricultural textiles

Unit	Topics	Lectures
I	Introduction to functional textiles, definition and scope for technical textiles, brief idea about technical fibers, role of yarn and fabric construction. Filtration textiles- Definition of filtration parameters, theory of dust collection and solid liquid separation, filtration requirements, concept of pore size and particle size, role of fiber, fabric construction and finishing treatments.	9
II	Geotextiles- Brief idea about geosynthetics and their uses, essential properties of geotextiles, Geotextile structure forms, application examples of geotextiles. Introduction to composite materials- Fibre Reinforced Composites, Functions of fibre and matrix in composites, applications of composites. Introduction to Smart Textiles- Applications and Markets.	9
III	Textiles in defence- Criteria for modern military textile materials, Incompatibilities in military materials systems, Textiles for environmental protection, Thermal insulation materials, Water vapour permeable/waterproof materials. Protective Clothing- Brief idea about different type of protective clothing, functional requirement of textiles in ballistic protection materials, parachute cloth, flame retardant clothing, chemical protective clothing.	9
IV	Automotive Textiles- Application of textiles in automobiles, requirement and design for different tyres, airbags and belts, methods of production and properties of textiles used in these applications. Sportswear– apparel with performance-enhancing characteristics such as moisture management, comfort, elastomeric, soil guard, anti-microbial–sports shirts, athletic wear.	9
V	Medical textiles- Fibres used, Non-implantable materials, Extracorporeal devices, Implantable materials, Healthcare/hygiene products. Agro Textiles- Characteristics of agro-textiles, Fibers for agro-textiles, techniques for producing agro textile products, area of applications in agro textiles.	9

Outcomes

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

1. To describe the concept of technical textiles and filtration textiles.
2. To illustrate the concept of geotextiles and composite materials.
3. To describe the concept of textiles use in defense and protective textiles.
4. To explore automotive textiles and sports textiles.
5. To understand about Medical textiles and agricultural textiles.

Text Book

1. Horrocks A. R., Anand S.C., “Handbook of Technical Textiles”, Wood head Publishing, Cambridge, 2000.
2. Adanur S., “Handbook of Industrial Textiles”, Technomic Publication, Lancaster, 2001.
3. Kanna M.C., Hearle, O Hear., Design and manufacture of Textile Composites, Textile progress, Textile Institute, Manchester, April 2004.
4. Gehrke Inga, Tenner Vadim, Lutz Volker, Schmelzeisen David and Gries Thomas, Smart Textile Production, MDPI Publication, Switzerland, 2019.

References

1. Scott, Textile for production, Textile progress, Textile Institute, Manchester, 2005.
2. Shishoo, Textile in spot, Textile progress, Textile Institute, Manchester, 2005
3. Fung W., Collins & Aikman Textiles in Automotive Engineering, Woodhead Publishing Ltd., UK, 2000.
4. Kennady, Anand Miraftab, Rajandran, Medical Textile & Biomaterials for Health care, Woodhead Publishing Ltd., UK, 2005.

BHT071	Apparel Marketing and Merchandising	3L:0T:0P	3 Credits
---------------	--	-----------------	------------------

Objective

1. To acquaint the students about the concepts of Apparel Business.
2. To define the concepts of Marketing for Apparel and Textile Products.
3. To describe the concepts of merchandising, concepts and apparel product lines.
4. To acquaint the students about the concepts of sourcing, strategy and best practice in apparel and textile businesses, supply chain.
5. To know about the concepts of Export Documentation and Policies

Unit	Topics	Lectures
I	Introduction to Apparel Business- International apparel business pattern, basic business concepts in Indian apparel export house, business operations in China and other south Asian countries. Business patterns for Indian apparel retail and home textiles. Understanding from concept board to finished product and its sequence.	9
II	Marketing for Apparel and Textile Products-Defining marketing, marketing mix the objectives of marketing department, market research, different types of markets, marketing strategies with respect to a product/brand, Indian apparel houses international marketing strategies and domestic marketing strategies, marketing models, B to B marketing, B to C marketing, direct marketing, digital marketing, E-Marketing.	9
III	Merchandising-Concepts of merchandising, concepts and apparel product lines, dimensions of product change, determination and development of product line and product range. Creative and technical design in garments and accessories, new product development and seasons of sale, costing, coordination and communication with the production house and export house.	9
IV	Sourcing-Understanding the basics of sourcing, sourcing strategy and best sourcing practice in apparel and textile businesses, supply chain and demand chain understanding, sourcing negotiations, global co-ordination in sourcing, materials management and quality in sourcing, quick response and supplier partnership insourcing, JIT technology.	9
V	Export Documentation and Policies-Government policies a guide lines for apparel export and domestic trade, tax structures and government incentives in apparel trade. Export documents and its purposes, banking activities, Letter of credit, logistics and shipping, foreign exchange regulation, export risk management and insurance. Export finance, Special economic zones. Goods & Services Tax.	9

Outcomes

Upon completion of this course, the student shall be able to apply

1. The concepts of Apparel Business.
2. The concepts of Marketing for Apparel and Textile Products.
3. The concepts of merchandising, concepts and apparel product lines.
4. The concepts of sourcing, strategy and best practice in apparel and textile businesses, supply chain.
5. The concepts of Export Documentation and Policies.

Text Book

1. Philip Kotler, Kevin Lane Keller, Abraham Koshy, and MithileshwarJha , “Marketing Management A South Asian Perspective”, Pearson Education, New Delhi, 2006
2. Shivaramu S., "Export Marketing – A Practical Guide to Exporters”, Wheeler Publishing, Ohio, 1996.
3. Grace I. Kunz, Ruth E. Glock, “Apparel Manufacturing: Sewn Product Analysis”, 4th Edition. Prentice Hall, 2004

References

1. Elianstone,JeanAsamples,“FashionMerchandising”,McGrawHillBook Company, New York, 1985.
2. RuthE.Glock,GraceI.Kunz”ApparelManufacturingSewnProductAnalysis” Fourth Edition, Pearson Prentice Hall, NJ, 2005.
3. Warren. J. Keegan and Mark.C. Green, “Global Marketing”, Pearson Prentice Hall, New Delhi, 2005.

BHT072	Advanced Fabric Structure	3L: 0T :0P	3 Credits
---------------	----------------------------------	-------------------	------------------

Objective

1. To enable the students to create figured extra warp and extra weft and figured double cloth with simplified graph enlargement and punching.
2. To enable the students to develop traditional and modern tapestries and simplified graph enlargement of modern tapestry and figured terry.
3. To enable the students to create figured pique and figured patent satin and simplified graph enlargement of figured pique and figured patent satin.
4. To enable the students to established leno and gauze fabrics and traditional handloom fabrics of India.
5. To enable the students to develop design by Dobby & Jacquard through CAD creation

Unit	Topics	Lectures
I	Figuring with extra threads – extra warp and extra weft – designing and comparison. Extra warp and Extra weft figuring techniques using healds, healds with dobby and healds with jacquard. Anchoring of spot effects. Figured warp backed cloth and weft backed cloth. Damsk using pressure harness, bannister harness system and self-twilling jacquard.	9
II	Figured Patent satin- structures of cloth -use of straight tie with healds, Designing, simplified enlargement and punching techniques and use of working comber board for saving of punched cards designing and simplified enlargement technique. Figured pique- structures of cloth, Use of straight tie with healds, Designing simplified enlargement and punching technique.	9
III	Tapestry – Traditional tapestries, Simple weft faced tapestries, Modern tapestry- structure of cloth. 3 pick tapestry using jacquard and heald method. Designing and simplified enlargement and punching techniques. Figured terry 3 pick, 4 pick terry- graph designing, punching technique for straight tie, straight draft and sectional Draft and sectional tie, sectional draft with healds.	9
IV	Figured double cloth- design development and punching process for straight harnessing with sectional draft and sectional harnessing with sectional draft, Figured Leno and gauze fabrics – Salient features, Indication of leno structures, drafting plan and lifting plan of straight and pointed draft structures. Thread interlacing diagram of leno structures, Combination of Leno, Plain and Twill– Drafting plan and Lifting plan.	9
V	Study of traditional Handloom Fabrics of India – Kanchipuram Saree – Banaras, Brocades and Sarees – Jamdani Sarees – Paithani Sarees – Chanderi Sarees– Patola Sarees – Pochampalli Tie and Dye Sarees –Kota Doria- Baluchar Saree-Feature of Riha- Lysemphy-Mekhala-Woollen Shawl- Tweed-Himaroo Shawls. Quality particulars of Reserved Handloom Fabrics-Dothi-Shirting-Dress Material-Home Furnishing-Made ups-Floor coverings.	9

Outcomes

Upon completion of the course the student will be able to: -

1. Apply figured extra warp and extra weft and figured double cloth with simplified graph enlargement and punching.
2. Develop the traditional and modern tapestries and simplified graph enlargement of modern tapestry and figured terry.
3. Create the figured pique and figured patent satin and simplified graph enlargement of figured pique and figured patent satin.
4. Established design of leno and gauze fabrics.
5. Develop design on Dobby & Jacquard through CAD creation.

TextBook

1. Grosicki Z.J., "Watson's of Textile Design and Colour" Vo.1, Woodhead Publications, Cambridge England, 2004.
2. Grosicki Z. J., "Watson's Advanced Textile Design and Colour", Vol.II, Butterworths, London, 1989.
3. Wilson J., "Handbook of Textile Design", Textile Institute, Manchester, 2001
4. Singh S. K., The Sari " Styles- Patterns- History- Techniques" with over 470 Illustrations, 206 In Colour, Thames and Hudson, London, 1995
5. Varadarajan L. and Patel K. A. OF Fibre and Loom- The Indian Tradition, National Institute of Design, Manohar, Ahmedabad, 2008

References

1. Home C.E., "Geometric Symmetry in Patterns and Tilings" Textile Institute, Manchester, 2000.
2. Seyam A.M." Structural Design of Woven Fabrics, Theory and Practice" Textile Institute, Manchester, 2002.
3. Geomer D, "Woven Structure and Design, part 1: Single Cloth Construction: WIRA, U.K. 1986.
4. Geomer D, "Woven Structure and Design, Part 2: Compound Structures" WIRA, U.K., 1989.
5. Das S., Fabric Art " Heritage of India", Shakti Malik Abhinav Publication, New Delhi, 1992.
6. Dhamija J. and Jain J., Handwoven Fabrics of India, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.

BHT751	Application of Computer in Color Matching & Textile Design Laboratory	0L: 0T :2P	1 Credits
---------------	--	-------------------	------------------

S. No.	Name of Experiments
1	Calibration of spectrophotometer.
2	Colour specification (L, a, b, c, H) analysis for the given samples.
3	K/S Data Generation for the dyed/printed sample.
4	Prediction of recipe for the dyed/printed sample using CCM
5	Metamerism Analysis of different recipes using CCM.
6	Measurement of delta-E / Batch Correction Matching of shades of the given samples
7	To Study of Arahne Paint, ArahWeave, Arahne & Drape.
8	To create the dobby designs by using Computer Aided Textile Design (CATD) software.
9	To create the Jacquard designs using Computer Aided Textile Design (CATD) software.
10	To create the printing designs using Computer Aided Textile Design (CATD) software.
11	Extraction of design from the given paper painted design sample using Computer Aided Textile Design (CATD) software.
12	To enlarge of design in suitable form for electronic card punching machine using Computer Aided Textile Design (CATD) software.