

CARPET & TEXTILE TECHNOLOGY

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



EVALUATION SCHEME & SYLLABUS

FOR

B. TECH. FOURTH YEAR

CARPET & TEXTILE TECHNOLOGY

AS PER

AICTE MODEL CURRICULUM

[Effective from the Session: 2021-22]

CARPET & TEXTILE TECHNOLOGY

B.Tech. VII Semester CARPET & TEXTILE TECHNOLOGY

S. No.	Course Code	Course Title	Periods			Evaluation Scheme				End Semester		Total	Credits
			L	T	P	CT	TA	Total	PS	TE	PE		
1.	KHU701 /KHU702	HSMC -1 #/HSMC-2 #	3	0	0	30	20	50		100		150	3
2.	KCT 071 KCT-072/	Technical Textiles/ Engineering of Textile Structure	3	0	0	30	20	50		100		150	3
3.	KCT074/ KCT075/ KCT076	Quality Control in Home Textiles/ Design Management/ Advance Carpet Manufacture	3	0	0	30	20	50		100		150	3
4.		Open Elective - II	3	0	0	30	20	50		100		150	3
5.	KCT-751	Carpet & Textile Design Lab	0	0	2				25		25	50	1
6.	KCT-752	Mini Project or Internship Assessment*	0	0	2				50			50	1
7.	KCT-753	Project I	0	0	8				150			150	4
		MOOCs (Essential for Hons. Degree)											
		Total										850	18

B.Tech. VIII Semester CARPET & TEXTILE TECHNOLOGY

. No.	Course Code	Course Title	Periods			Evaluation Scheme				End Semester		Total	Credits
			L	T	P	CT	TA	Total	PS	TE	PE		
1.	KHU701/KHU702	HSMC -1 #/HSMC-2 #	3	0	0	30	20	50		100		150	3
2.		Open Elective –III	3	0	0	30	20	50		100		150	3
3.		Open Elective –IV	3	0	0	30	20	50		100		150	3
4.	KCT851	Project II	0	0	18				100		300	400	9
		MOOCs (Essential for Hons.											
		Total										850	18

**B. Tech VII Semester
Syllabus**

CARPET & TEXTILE TECHNOLOGY

KCT071	TECHNICAL TEXTILES	3L:0T:2P	3 Credits
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Course Objectives:

1. To understand scope of usage of technical textiles in various sectors.
2. To discuss the various applications of technical textiles in filtration and construction industry.
3. To understand the applications of technical textiles in transportation and defence sector.
4. To understand the applications of technical textiles in protective clothing and health care / hygiene products.
5. To understand the applications of technical textiles in composites.

Unit	Topics	Lectures
I	Introduction – Definition, classification and scope of technical textiles, present and future market trends in technical textiles, difference between traditional textiles and technical textiles with respect to raw materials, production and applications.	8
II	Filtration application – Introduction, fabric construction & finishing treatments, solid-liquid separation, liquid – liquid filtration, liquid-gas separation, mechanism of filtration. Geotextiles – scope, definition, types, advantages and disadvantages of `woven and nonwoven geotextiles	8
III	Textiles in transportation – Introduction, textiles in automobiles, aircrafts and marine application. Textiles in defence – Introduction, historical Background, application of textiles in various areas of defence such as environmental protection, thermal insulation, water proof and water vapour permeable materials, ballistic protection, biological and chemical warfare protection etc.	8
IV	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. Medical Textiles – Introduction – special fibres- Non implantable materials, Extra corporeal devices – Implantable materials - Health care / hygiene products including personal protective equipment (PPE) kit and face masks. Importance of seam sealing.	8
V	Smart textiles-definition-types-principles- manufacturing methods. Introduction to composite materials, Fibre Reinforced Composites (FRC), functions of fibre and matrix in composites, miscellaneous applications of composites such as in electrical insulation, synthetic turf and sports application, sound insulation, power transmission etc. Fibre recycling	8

Text Book:

1. Handbook of Technical Textiles by A.R. Horrocks and S. C. Anand
2. Medical Textiles by Subhash Anand
3. Wellington Sear’s Hand book of Industrial Textile by Rd. Sabit Adnur
4. NPTEL, <https://nptel.ac.in> 6 Automotive Textiles by Warner Fung

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

1. Appreciate the scope of application of technical textiles in different areas.
2. Explain the various mechanism of filtration using technical textiles.
3. Appreciate the applications of technical textiles in medical, composite and transportation industry.
4. Understand the appropriate utilization of technical textiles in military, sports and other applications

CARPET & TEXTILE TECHNOLOGY

KCT072	ENGINEERING OF TEXTILE STRUCTURE	3L:0T:0P	3 Credits
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Course Objectives:

1. Study yarn geometry in terms of fibre packing and its effect on yarn characteristic.
2. Analysis yarn twist and fibre migration within the yarn.
3. Study of fibre torsional behavior and spinnability of staple fibre yarn.
4. Study of yarn extension and phenomenon of yarn breakage.
5. Study of fabric setting theory governed by yarn diameter and determination of fabric weight and fabric firmness.
6. Study of fabric geometry w.r.t plain woven fabric and effect of yarn rigidity on fabric behavior.

Unit	Topics	Lectures
I	Yarn geometry-idealised yarn geometry, relationship of yarn number and twist factor. Twist contraction, limit of twist. Packing of fiber in yarn . Ideal packing, hexagonal close packing and to other forms. Packing factor and its measurement. Yarn diameter	12
II	Fiber migration- mechanism of migration, condition for migration to occur, frequency of migration, migration in blended yarns. Mechanics of staple fibre yarns, the practical and experimental studies. Mechanics of staple fibre yarns, Hamburger model and later modifications. Spinnability and torsional behavior of Fibres and yarns.	12
III	Translation of fibres properties into yarn properties, extension of continuous filament yarn for small strains and large strains; prediction of breakage	12
IV	Elements of fabric geometry, cloth setting theories. Fabric cover and fractional cover, fabric cover and fabric weight relationship. Fabric firmness.	12
V	Pierce concept of fabric geometry and its application, Elastic threads model, crimp interchange & crimp balance Uniaxial and biaxial tensile behavior of cloth.	12

Text Book:

1. Textile yarn by Goswami
2. Textile mathematics by J.E. Booth
3. Pierce papers in Journal of textile institute 1930, 1937
4. Watson's textile design

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

1. Analyse fibre configuration in yarn geometry and determine yarn diameter
2. Study fibre behaviour within yarn for spinnability and torsional behaviour
3. Translation of fibre properties into yarn tensile property
4. Study and analysis of fabric structural parameters
5. Derive woven fabric geometrical elements from Peirces theory
6. Understand yarn rigidity on fabric properties.

CARPET & TEXTILE TECHNOLOGY

KCT073	QUALITY CONTROL IN HOME TEXTILES	3L:0T:0P	3 Credits
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Course Objectives:

1. To explain quality and seven tools of quality control.
2. To describe inspection techniques with respect to raw material.
3. To describe in process inspection techniques and final inspection.
4. To discuss various testing involved for evaluation of home textiles.
5. To elaborate shade sorting of fabrics and care labeling of home textiles.

Unit	Topics	Lectures
I	Introduction to Quality .Importance of Quality Managing Quality through inspection, Managing Quality through testing. Seven tools Of Quality Control. Current Concepts in Quality Management. Raw Material Inspection: Fabric Inspection, 4-point system, fabric defects, sewing threads, zippers,	12
II	Inspections Techniques: - In process Inspection: Introduction, spreading, cutting, sewing, pressing/finishing, fusing, welding technique, moulding technique, screen printing, embroidery. Sewing Problems Problem of Stitch Formation, Problem of Pucker, Problems of Damage to the Fabric along the stitch line Final Inspection. How much to inspect., Selection of Inspectors.	12
III	Textile Testing & Product Evaluation. Precision & Accuracy of Test methods Atmospheric Conditions for Testing, Strength Properties of apparel, fabric stretch properties , Dimensional Changes in Soft Furnishing due to laundering , dry cleaning ,steaming and pressing , Durable press evaluation of Fabrics & Soft Furnishings. Needle cutting & Yarn severance, Sew ability of Fabrics, Bow & Skew ness, Fabric Distortion, Fabric streak, Soil / Stain Releasing Tests.	12
IV	Textile Testing & Product Evaluation Bonded & laminated furnishing Fabric, Testing of Fusible interlining. Testing of Zippers, Elastics Waist band Testing Yarn Strength & Elongation, Sewing Threads, Buttons & Snap Fastness & Wear Testing, Flammability of Clothing, Textiles Flammability Testing Methods, Factors Affecting Fabric flammability.	12
V	Shade Sorting & Care Labeling Introduction to shade Sorting. Fundamental Color and color measuring, Instrumental Shade sorting. International care labeling System.	12

Text Book:

1. Managing quality control in apparel industry by P.V.Mehta & S.K.Bharadwaj, ASQC Quality Press, New york, 1998.
2. An Introduction to quality control for the apparel industry by P.V.Mehta, ASQC Quality Press, New York.
3. Principles of textile testing by J.E. Booth, C.B.S., publishers and distributors, New Delhi,1996
4. Process control in home textile manufacturing by K Kgoswami, Abhishek Publisher Chandigarh, India.(In press)

CARPET & TEXTILE TECHNOLOGY

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

1. Explain quality and seven tools of quality control i.e. cause and effect diagram, check sheet, control chart, flow chart, histogram, pareto chart and scatter diagram.
2. Describe raw material inspection techniques of quality control i.e fabrics, sewing threads and zippers.
3. Describe in process inspection techniques of quality control i.e. spreading, cutting, sewing, pressing etc. and final home textiles inspection.
4. Explain various testing methods for evaluation of home textiles.
5. Describe shade sorting of fabrics and care labeling of home textile products.

CARPET & TEXTILE TECHNOLOGY

KCT 074	Design Management	3L:0T:0P	3 Credits
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Course Objectives:

1. To differentiate design sources of nature, industry, various phases of product life cycle.
2. To discuss stage design process, raw material, buyer involve as per market trend.
3. To describe different methods of design for manufacturing (DFM), analysis, quality function & development as per ISO and colour forecast as per market trends.
4. To elaborate about design management, manufacturing costing and creation of design future
5. To explain different methods of producing samples and recording of design catalogue through website and their presentation.
6. To evaluate design, different element and their aesthetic value as per market prospect.

Unit	Topics	Lectures
I	Difference between design and development, Aspects of home textiles design, Sources of design ideas / inputs, Design requirements pertaining to different countries, Characteristics of industry during various phases of product life cycle.	12
II	Stages in Textile Design process (Design planning): – Design output, Design inputs, Selection of raw material and accessories, Customer involvement in design process, Innovation in the design process.	12
III	Design for manufacturing (DFM), Quality function deployment (QFD), and Design and development system requirements as per ISO, designing for future, Colour forecast market trends management.	12
IV	Validation and verification of designs, Time management in designing, Basics of network analysis (PERT & CPM), Standard costing methods professional practices of designing.	12
V	Presentation of designs need and maintenance, Design related records and their maintenance, Design catalogue – preparation, Evaluation of performance of designs; Define Elements and their Aesthetic value and marketing prospect.	12

Text Book:

1. Design Management by Brigitte de Mozota
2. Design Project Management by Griff Boyle
3. Principles and Practice of Management by Prasad, L M.
4. Principle of Management by Tripathi & Reddy, P.N.
5. Production Operation Management by Heizer, Joy.
6. Export, Import Procedure & Documentation by Jain, Archarya.
7. Textile Designing: Theory & Concept by Jain, Tanya
8. Watson’s Textile Design and Colour by Grosicki, Z. J.
9. Hand book of textile design, Jacquie Wilson, wood head, publishing UK

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

1. Difference between design home sources of nature, industry, various phases of PLC.
2. Get knowledge on stage design process, raw material, buyer involved on different market test.
3. Understand different method of DFM, Analysis, and Quality function & development system requirements as per ISO.
4. Get Knowledge managing in design, manufacturing costing, verification, costing of methods & Buildup the creation of design future.
5. Different methods of producing samples presentation & records design catalogue through website & online presentation.
6. Knowledge evaluation of designs, different elements & their Aesthetic value & marketing prospect.

CARPET & TEXTILE TECHNOLOGY

KCT075	Advance Carpet Manufacture	3L:0T:0P	3 Credits
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Course Objectives:

1. To describe the types of pile fibres, yarns and its processing
2. To explain the principles of tufting and patterning systems
3. To describe different types of machine made carpets
4. To describe the concept of bonded and flocked carpets.
5. To explain carpet tiles and speciality carpets
6. To discuss the Environmental considerations and sustainable development goals

Unit	Topics	Lectures
I	Different types of pile fibres with special reference to nylon, polypropylene, acrylic polyester and wool with special reference to conductive fibres. Pile yarns –filament and spun, yarn processing-twist setting, yarn scouring and felting of yarns. Different types of backing materials.	8
II	Principles of tufting, loop and cut pile tufting, machine layout and mechanism, tufting elements, controlling carpet construction, yarn tensioning systems, crossover systems and combination of patterning attachments.	7
III	Axminster weaving with special reference to jacquard gripper and spool gripper. Wireloom weaving, loop pile without wires and textured carpet from wirelooms. Face to face weaving with special reference to loom types and popular weave structures.	8
IV	Needlefelt carpets , adhesive bonded carpets, electrostatic flocking, knitting and stitch bonded carpets, Carpet tiles	9
V	Finishing of carpets, specialty carpets. Environmental considerations and sustainable development goals.	8

Text Book:

1. G. H. Crawshaw Carpet Manufacture
2. Von Moody and Howard. L. Needles
3. Carpets- R. S. Brinton
4. Carpet Manufacture by Fred Bradbury

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

1. To remember the carpet manufacturing methods all over the world
2. To understand the pile fibres, yarns, their processing and use and apply it in manufacturing process
3. To understand and evaluate different types of finishing methods employed in different types of carpets
4. To analyse different manufacturing methods on the basis of usage area and economic reasons
5. To develop environmental temperament and understand sustainable development goals as a protective step towards future.

CARPET & TEXTILE TECHNOLOGY

KCT751	Carpet & Textile Design Lab	0L:0T:2P	1 Credit
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Course Objectives

1. To learn about various CAD tools for manufacturing of carpet designs.
2. To prepare various structures of design like geometrical, natural etc.
3. To prepare various designs of fabrics.
4. To prepare various dhurries and carpets designs.
5. To forecast colour as per market trends.

SUGGESTIVE LIST OF EXPERIMENTS:

1. Introduction to CAD Tools.
2. Geometrical structures, Exploration of forms, Shapes & line with in the natural forms or objects. Still Life drawings.
3. Stripes & Checks effect on fabric,
4. Colour & Design Creations: Dhurries- 30ct , 60ct, 80ct And Boxes & Round Compositions, Colour Wheel, Concept of shade tone,
5. Carpet designs: Tufted - Floral & Modern Designs, Tibetan – Modern geometrical & Floral, Converting Natural form of designs into Abstract, Modern & Contemporary, and Persian/Traditional Designs.
6. Colour Forecasting.

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

1. Demonstrate various CAD tools.
2. Preparation of various designs forms like geometrical, natural etc.
3. Preparation of various designs of fabrics.
4. Preparation of various designs dhurries & carpets.
5. Forecast colour as per market trends with the help of forecast series.