

KURUKSHETRA UNIVERSITY KURUKSHETRA
SCHEME OF STUDIES/EXAMINATIONS



Bachelor of Technology (Textile Technology)
Semester – VI (w.e.f. 2017-18)

S N	Course No.	Course Title	Teaching Schedule (hrs)				Allotment of Marks				Duration of Exam (hrs)
			L	T	P/D	H/wk	Theory	Sessional	Practical	Total	
1	TT-302N	Theory of Textile Structure	3	1		4	75	25		100	3
2	TT-304N	Textile Testing-II	3	1		4	75	25		100	3
3	TT-306N	Garment Technology	3	1		4	75	25		100	3
4	TT-308N	Knitting Technology	3	1		4	75	25		100	3
5	TT-310N	Computer Aided Fabric Manufacturing	3	1		4	75	25		100	3
6	TT-312N	Multi Fibre Spinning	3	1		4	75	25		100	3
7	TT-314N	Garment Technology Lab			3	3		40	60	100	3
8	TT-316N	Knitting Technology Lab			2	2		40	60	100	3
9	TT-318N	Computer Aided Fabric Manufacturing Lab			3	3		40	60	100	3
10	TT-320N	Textile Testing-II Lab			3	3		40	60	100	3
Total			18	6	11	35	450	310	240	1000	

Note: The students will have to undergo an Industrial Training after VI sem and it will be completed during VII sem through submission of certified computerized report to the Head of the Department followed by a seminar/presentation.

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TT-302N
THEORY OF TEXTILE STRUCTURE



L T P
3 1 -

Sessional: 25 Marks
Exam: 75 Marks
Total: 100 Marks
Time: 3 hrs

Note:

Nine questions each of 15 marks will be set in the question paper i.e. two from each unit. The student will be required to attempt one question from each unit. Question No.1 is compulsory. It is objective type 15 questions of multiple choice covering all the four units.

UNIT-I

Yarn geometry: Coaxial helix model, idealized yarn geometry relationship of yarn number and twist factor. Twist contraction and retraction, ideal and real yarns.

Packing of fibre in yarn. Ideal packing, hexagonal close packing and other forms. Deviation from ideal forms- concentrating and disturbing features, specific volume of yarns, relation between twist, diameter and twist angle.

UNIT-II

Introduction to fibre migration, Ideal migration, Mechanisms of migration- tension variation, geometric mechanism, combined mechanism, Tracer fibre technique, Parameters of migration, Migration in blended yarns.

UNIT-III

Extension of continuous filament yarn for small and large strains, Prediction of breakage, mechanics of staple fibre yarns – traditional view, modified approach by Hearle & El-Sheikh. Mechanics of blended yarn, Hamburger model.

UNIT-IV

Elements of fabric geometry. Cloth setting theories, Fabric cover, fractional and total cover. Fabric cover and fabric weight relationship, Pierce's fabric geometry, flexible and elastic thread model, jammed structure, square fabric, crimp interchange, Relationship between h, p, c, Kemp's Race Track Model.

Suggested Text Books and References

1. Hearle, J. W. S., Grosberg, P., and Backer, S., "Structural mechanics of fibre, yarn and fabrics", Wiley Interscience Publication.
2. "Textile Yarn, Technology, Structure & Application" – Goswami B.C., Martindale, J.G., Scardino F.L., Wiley Interscience publication, 1977, U.S.A.
3. Zurek, W., "Structure of Yarn", Foreign Scientific Publications.
4. Cloth Geometry, F.T Pierce.
5. Woven Textile Structure: Theory & Application, B. K. Behera & P. K. Hari, Woodhead Textiles Series No. 115.

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TT-304N
TEXTILE TESTING - II



L T P
3 1 -

Sessional: 25 Marks
Exam: 75 Marks
Total: 100 Marks
Time: 3 hrs

Note:

Nine questions each of 15 marks will be set in the question paper i.e. two from each unit. The student will be required to attempt one question from each unit. Question No.1 is compulsory. It is objective type 15 questions of multiple choice covering all the four units.

UNIT-I

Fabric Testing

Importance of fabric testing, scope of fabric testing.

Methods of tests for fabric dimensions and other physical properties; thickness, weight, crimp, shrinkage, air permeability, moisture permeability, Water-vapour permeability, wettability, shower-proofness, water-proofness and flame-resistance.

Aesthetic properties of fabric: drape, stiffness, bending, shearing, compression, crease recovery

UNIT-II

Fabric Tensile Testing

Fabric Strength Testing: Tensile, tearing and bursting strength tests; principles and operation of equipment, Fabric bending, shearing and draping properties: terminology, quantities and units. Experimental method.

Factors affecting the results of tensile testing. Evaluation and interpretation of tensile test results.

UNIT-III

Comfort and Handle

Fabric comfort: introduction, importance and classification of comfort. Thermal comfort, Moisture Transport, sensorial comfort, Moisture absorption and water repellency.

Objective assessment of fabric handle; KES and FAST system.

UNIT-IV

Testing of Technical Textiles

Testing of filtration characteristics, test for geotextiles, test for protective clothing, test of various form of medical textiles, moisture transmission through breathable fabrics, Special tests for carpets and nonwoven fabrics.

Mechanical behaviour of textiles. Terms and definitions, expressing the results, quantities and units.

Statistical Quality control in Textiles: tolerance limit, their setting, Control charts, Types of control charts – X-R chart, P chart, nP chart.

Suggested Text Books & References

1. Booth, J.E., "Principles of Textile Testing", Butterworths, London
2. Kothari, V.K., "Physical Testing of Textiles"
3. Fabric testing, ED. Jinlian HU, Woodhead publication CRC Press, 2008.
4. Saville, BP, Physical testing of textiles, Woodhead publication CRC Press 1999.
5. Slater, "Textile Progress – Physical Testing and Quality Control", Textile Institute, Manchester.

TT-306N
GARMENT TECHNOLOGY



L T P
3 1 -

Sessional: 25 Marks
Exam: 75 Marks
Total: 100 Marks
Time: 3 hrs

Note:

Nine questions each of 15 marks will be set in the question paper i.e. two from each unit. The student will be required to attempt one question from each unit. Question No.1 is compulsory. It is objective type 15 questions of multiple choice covering all the four units.

UNIT-I

Introduction to clothing manufacturing. The structure of clothing industry. Organization chart of clothing factory. Raw materials and accessories for garment industry. Relationship between fabric properties and making up process. Fabric quality requirement for garment industry. Trimming and garment accessories: definition, types, trimming methodologies accessories application. Evaluation of sewability.

UNIT-II

Pattern Making: Introduction to pattern making and garment construction. Different terminologies, Drafting, Basic bodies, blocks. CAD for pattern making.
Spreading and Lay Planning: introduction to symmetrical and asymmetrical fabrics. Criteria for spreading, methods of spreading, spreading machines. Principles of lay plan, types of lay plan.

UNIT-III

Planning, drawing and reproduction of marker. Methods of marker planning and marker used – normal marker planning and computerized marker planning. Cutting by straight knife, band knife, notches, drills. Computer controlled knives, die cutting, laser cutting, plasma cutting.

UNIT-IV

Sewing: Properties of seams, seam types, stitch types, sewing machine feed mechanism, sewing machine needles, sewing threads, sewing problems.
Introduction to Sewing Machinery: Basic sewing machines and associated work aids.
Pressing: Purpose of pressing, pressing equipment and methods.
General description to alternative methods of joining materials. The use of components, trimmings to care labeling in Garment manufacturing.

Suggested Text Books and References

1. Coochlin Gerry, "Garment Technology for Fashion Designer", Om Book Service, New Delhi.
2. Emilio Pucu, "Fashion from Concept to Consumer".
3. Harold Carr & Barbar Lantham, "The Technology of Clothing Manufacture", Om Book Service, New Delhi.
4. Aldrich W, "Metric Pattern Cutting", Om Book Service, New Delhi.
5. Mehta P V and Bhardwaj S K, "managing Quality in Apparel Industry" Om Book Service, New Delhi

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TT-308N
KNITTING TECHNOLOGY



L T P
3 1 -

Sessional: 25 Marks
Exam: 75 Marks
Total: 100 Marks
Time: 3 hrs

Note:

Nine questions each of 15 marks will be set in the question paper i.e. two from each unit. The student will be required to attempt one question from each unit. Question No.1 is compulsory. It is objective type 15 questions of multiple choice covering all the four units.

UNIT-I

Introduction to Knitting: Difference between woven and knitted products and process. Classification of Knitting Machines. Terms and Definitions used in knitting. Elements of knitting: needles, sinker and cam.

UNIT -II

Basic weft knitted structures. Structure and properties of Plain, Rib, Purl & Interlock. Knit. Machine and mechanism of plain, rib, purl and interlock fabric production. Tuck & Float loops. Derivatives of some Knitted structure.

UNIT -III

Production calculation. Calculation of Areal density, Fabric width, Fractional cover, Tightness factor and mass per running meter. Knitted fabric relaxation and shrinkage, Values of Kc, Kw & Ks. Yarn property required for knitting. Control of yarn tension during knitting. Knitted fabric defects.

UNIT -IV

Warp Knitting

Comparison between warp knits, weft knits and woven. Basic warp knit structures: over lap, under lap, closed lap, open lap. Knitting cycle in Tricot Knitting machine and Raschel knitting machine, Five Basic overlap, under lap variations, some warp knitted structures like, loop raised, satin, lock knit, two bar tricot, reverse lock nit, shark skin, queens cord, Open Atlas, Closed Atlas, etc.

Suggested Text Books and References

1. Spencer D. J., "Knitting Technology" Woodhead Publishing Ltd. Cambridge, England.
2. Ajgaonkar, D. B. "Knitting Technology".
3. "Knitting Technology" NCUTE Publication.
4. Booth J. E., "Textile Mathematics Vol-3" The Textile Institute Manchester Publication.

TT-310N
COMPUTER AIDED FABRIC MANUFACTURING



L T P
3 1 -

Sessional: 25 Marks
Exam: 75 Marks
Total: 100 Marks
Time: 3 hrs

Note:

Nine questions each of 15 marks will be set in the question paper i.e. two from each unit. The student will be required to attempt one question from each unit. Question No.1 is compulsory. It is objective type 15 questions of multiple choice covering all the four units.

Unit-I

Basic Concepts

Overview of CAD and CAM, their application in various fields of textiles and benefits.
Concepts of image processing.

Design Fundamentals

Development of printable designs for screen printing through CAD- ArahPaint; tools of ArahPaint software module; scanning of pictures and editing.
Calculation of Fabric parameters through CAD.

Unit-II

Electronic Dobby

Working principle, machine parameters.
Design features, drive arrangement, system for pattern data transfer and design development.

Electronic Jacquard

Working principle, constructional variants, various electronic jacquard systems.
Selection system, pattern data transfer and management.

Unit-III

CAD for Dobby, Jacquard

Development of Dobby Designs through ArahWeave,
Development of jacquard designs-modes of weaving in ArahWeave software, other features of ArahWeave – Weave Simulation, Fabric Simulation, Yarn and Fabric Parameters.

Unit-IV

Development of figures, geometric ornamentations, arrangement of figures.
Narrow fabric production through CAD, Carpet designing through CAD.
Embroidery Designing through CAD, 3-D draping-Application and tools.

Suggested Text Books and References

1. Phiroz Dastoor, "Application of CAD in the Industrial Fabrics", Journal of the Textile Institute Part - 111, Manchester, 1993.
2. Aldrich, W. (Ed.), " CAD in clothing and textiles: A collection of experts view ", Blackwell, Science, 2nd Edition, U.K., 1994.
3. Jayaraman, S, "Computer Science and Textile Science ", T.P. Vol.26 No.3, Textile Inst.,Manchester, 1995.
4. Sigmon D.M. Grady, P.L. and Winchester S.C. " Computer integrated manufacturing and total quality management ", Textile Progress Vol 27, No 4, Textile Institute, Manchester, 1998. ISBN: 1870372166.
5. Gray S., "CAD/CAM in clothing and textiles ", Gower, U.K, 1998, ISBN: 056607673X.
6. Lab Manuals of ArahPaint, ArahWeave and ArahDrape.

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TT-312N
MULTI FIBRE SPINNING



L T P
3 1 -

Sessional: 25 Marks
Exam: 75 Marks
Total: 100 Marks
Time: 3 hrs

Note:

Nine questions each of 15 marks will be set in the question paper i.e. two from each unit. The student will be required to attempt one question from each unit. Question No.1 is compulsory. It is objective type 15 questions of multiple choice covering all the four units.

Unit I

Characteristics of man-made fibres, objectives of blending, selection of fibre specification for blending, processing of short, medium and long staple man made fibres on cotton system, measures of blend intimacy, factors influencing blend intimacy, structure and properties of blend yarns, Effect of blend composition & fibre characteristics on properties of blended yarn. Blend mechanics. Advantages & disadvantages of different blending technique. Tinting for a blend spinning of dyed fibres.

Unit II

Woolen, semi-worsted and worsted systems of spinning. Wool blending, wool sorting, wool contamination and its removal, wool scouring, drying, back washing. Woollen carding, intermediate gilling, auto leveler in gillbox, rectilinear combing, rubbing frame, and spinning.

Unit III

Jute Spinning: Basic concepts of the spinning process and the machinery. Jute retting, stripping, jute grading, jute batching, fibre defects. Jute carding; breaker and finisher card. Drawing and Spinning.

Unit IV

Silk Spinning: Introduction to twisting and spinning of silk fibres, Spun silk processing – Spreader, Sett Frame, Drawbox, Rover.

Waste Spinning: Cotton waste and its varieties, classification and possible end uses, machines and processes to produce waste yarns e.g. condenser system, coiled system.

Suggested Text Books and References

1. Salhotra K R, "Spinning of man-mades and blends on cotton system".
2. Oxloby, E. "Spun Yarn Technology". Butterworths, London.
3. Goswami, B.G. "Textile Yarns; Technology , Structure & Applications". Textile Institute, Manchester.
4. Wool Hand Book Vol II , Werner von Bergei.
5. Jute- Fibre to yarn by R R Atkinson.
6. British Wool Manual by H Spibei.
7. Wool Spinning vol I & II by Lipenkov.
8. Manual of Silk Reeling – F.A.O.
9. Fundamentals of Spun Yarn Technology, Lawrence, 1st Ed., CRC Press, LLC, Florida, USA, 2003.
10. Manual of Technology: Woolen Yarn Manufacture – Richards R.T., Dand Sykes A.B. The Textile Institute, Manchester, 1994.

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TT-314N
GARMENT TECHNOLOGY LAB

L T P
- - 3

Practical/viva: 60 marks
Sessional: 40 marks
Total: 100 marks
Duration of Exam: 3 hours

S. No.	Title of Experiment	No. of Turns
1.	Developments of patterns based on anthropometric data.	4
2.	Working on Sewing Machines.	2
3.	Production of different types of stitches (Chain stitch, Lock stitch & Overlock stitch).	3
4.	Determination of seam strength.	2
5.	Determination of seam pucker.	1

TT-316N
KNITTING TECHNOLOGY LAB

L T P
- - 2

Practical/viva: 60 marks
Sessional: 40 marks
Total: 100 marks
Duration of Exam: 3 hours

List of Experiments

1. Working on Flat Knitting Machine.
2. Development of Plain, Rib, and Interlock fabric samples.
3. Setting of knitting Cam.
4. Development of derivative knitted structures on flat bed knitting machine.
5. Analysis of knitted structures.
6. Determination of K_s , K_c and K_w values.
7. Effect of stitch length, stitch density, course count, wale count on fabric arial density.

TT-318N
COMPUTER AIDED FABRIC MANUFACTURING LAB

L T P
- - 3

Practical/viva: 60 marks
Sessional: 40 marks
Total: 100 marks
Duration of Exam: 3 hours

S. No.	Title of Experiment	No. of Turns
1.	Working with Paint Module of the software	3
2.	Scanning and editing a fabric artwork.	2
3.	Development of Dobby design on system.	1
4.	Development of Jacquard design on system.	2
5.	3D draping and its tools.	1
6.	Weave simulation on CAD.	2
7.	Development of label design through CAD.	1
8.	Production of sample in print format	2

TT-320N
TEXTILE TESTING-II LAB

L T P
- - 3

Practical/viva: 60 marks
Sessional: 40 marks
Total: 100 marks
Duration of Exam: 3 Hrs

List of Experiments

1. To determine the stiffness property of the fabric.
2. To determine the tensile strength of the fabric.
3. To determine the tearing strength of the fabric.
4. To determine the bursting strength of the fabric.
5. To determine air permeability of fabrics.
6. To determine the shower proof property of a fabric.
7. To determine the drape property of fabrics.
8. To determine the crimp and Areal density of fabrics.
9. To determine crease resistance property of the fabric.
10. To determine the pilling property of the fabric.
11. To determine water vapor permeability of the fabric.
12. To determine the thermal comfort property of the fabric.

Note: 8 experiments from the above list are to be performed by each student. The above experiment should be conducted and shall be decided on factors like:

- a) Facilities installed at the Institute.
- b) Accessibility to industry & nearby institute like IIT Delhi, NITRA Ghaziabad, Textile Committee and NITRA Panipat/any other reputed establishment.
- c) Trend of technological developments in National & International perspective.

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