

KURUKSHETRA UNIVERSITY KURUKSHETRA
SCHEME OF STUDIES/EXAMINATIONS



Bachelor of Technology (Textile Technology)
Semester – V (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-301N	Structure and Properties of Fibres	4	1		5	75	25		100	3
2	TT-303N	Yarn Manufacturing - III	4	1		5	75	25		100	3
3	TT-305N	Fabric Manufacturing - III	4	1		5	75	25		100	3
4	TT-307N	Fabric Structure & Design	4	1		5	75	25		100	3
5	TT-309N	Statistical Analyses	4	1		5	75	25		100	3
6	TT-311N	Yarn Manufacturing-III Lab			3	3		40	60	100	3
7	TT-313N	Fabric Manufacturing-III Lab			3	3		40	60	100	3
8	TT-315N	Fabric Structure & Design Lab			3	3		40	60	100	3
9	TT-317N	Industrial Training-I	1			1		100	---	100	
Total			21	5	9	35	375	245	180	900	

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TT-301N
STRUCTURE AND PROPERTIES OF FIBRES

L T P
4 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

Structure of fibres

Morphology and order in fibre structure, concept and theories of orientation, crystallization and its measurement technique such as X-ray.

Chemical and physical structure of fibres such as wool, silk, cotton and bast fibre and man-made fibre such as Nylon, PET, Acrylic and Viscose.

UNIT-II

Mechanical properties

Theory of load-elongation curve, stress-strain curve, modulus, elasticity and visco elasticity, work of rupture/toughness, yield point, creep and stress relaxation behavior of fibres and simple spring and dash pot models simulating textile fibers.

Frictional properties of fibers

Nature and measurements.

UNIT-III

Moisture properties

Relation between moisture regain and relative humidity, hysteresis, absorption in fibers, diffusion theories of moisture absorption-general view, diffusion of moisture, quantitative analysis of moisture absorption, swelling.

Optical properties of fibers

Refractive index and polarization of light, birefringence and its measurement.

UNIT-IV

Thermal properties

Molecular motion and transition phenomenon, thermal expansion behaviour, first order and second order transition phenomenon.

Electrical properties

Introduction to electrical properties such as dielectric properties such as electric properties and static charge generation

Suggested Text Books and References

1. Morton W E and Hearle J W S, "Physical Properties of Textile Fibres", The Textile Institute, Manchester(1993)
2. Meredith R, "The Mechanical Properties of Textile Fibres", North Holland co; Amsterdam(1959)

TT-303N
YARN MANUFACTURING-III

L T P
4 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

Forces acting on yarn and traveler during spinning, spinning tension in ring frame, Theory of yarn balloon, Limitations of ring spinning systems, modern developments in ring frame, Introduction to open-end spinning, Comparison of ring frame with other modern spinning technologies.

UNIT-II

Rotor Spinning: Principle of yarn formation, machine parameters, effect of machine variables and fibre properties on the rotor yarn property, raw material requirement and preparation, The opening unit.

Yarn formation: Fibre flow into the rotor, Formation of the yarn, the false twist effect, wrapping fibres. The Rotor groove, Rotor diameter, Combination of rotor dia, & rotor groove. Back doubling, Rotor revolutions, cleaning the rotor.

Yarn withdrawal and winding: The direction of withdrawal, the naval, Withdrawal tube, Requirement for the package, Economic aspects of rotor spinning, Structure and properties of different types of yarns, end uses of rotor yarns.

UNIT-III

Friction spinning : Operating principle, Technological interrelationship, Advantages & disadvantages Dref-2 process & DREF-3 process :Operating principle ,use of raw material, Study of electrostatic, air-vortex spinning, mechanism of yarn formation, properties and end uses of yarn spun on these systems.

The false-twist process: generation of false twist, Forming a yarn with the aid of false twist spinning elements.

Murata Jet spinner: operating principle, Raw material requirements, Yarn Characteristics and end uses.

UNIT-IV

Comparative analysis of yarn structure, properties and their end use application produced from rotor, air-jet, friction techniques viz a viz ring spun yarn.

Compact Spinning: principle, different methods of fibre compacting, properties of yarn. Production of fancy yarn & uses.

Production of Industrial yarn- Sewing thread.

Suggested Text Books and References

1. Klein. W., " Manual of Textile Technology", 'Short Staple Spinning Series', Vol. 1 to 5. --- Textile Institute. Manchester.
2. Chattopadhyay, R., "Advances in Technology of Yarn Production, 1st Ed., NCUTE, IIT Delhi (2002).
3. Oxtoby, E., Spun Yarn technology.
4. Khare A. R., "Elements of Ringframe and Doubling", Sai Book Centre, Mumbai.

TT-305N
FABRIC MANUFACTURING-III

L T P
4 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 Shuttleless Weaving. Advantages of Shuttleless weaving, comparison with shuttle weaving. Features of unconventional weaving. Different Selvedge: Tucked-in, Leno, fused, Stitched. Their mechanism of formation, their characteristics and uses. Weft Accumulator.

Projectile weaving Machine: Basic principle of projectile weaving. Feeding of yarn to projectile. Sequence of weft insertion. Cam driven shedding, Dwelling Sley beat-up, Torsion bar picking. Energy utilization during picking.

Unit II:

Rapier Weaving Machine: Classification based on type of rapier, system of weft insertion and number of rapiers. Sequence of weft insertion for Gabler and Dewas system, their comparison. Driving of flexible and rigid rapiers. Asynchronized rapier timing. Rapier buckling.

Air Jet Weaving Machine: Principle of weft insertion. Air requirements. Path of the yarn on loom. Sequence of weft insertion. Control of air stream by relay nozzle, confuser profile reed and suction. Design of air jet nozzle. Air drag force, factors affecting drag force.

Unit III

Water Jet Weaving Machine: Principle of weft insertion. Path of the yarn on loom. Quality of water required. Sequence of weft insertion. Water jet nozzle. Merits and demerits of water jet weaving. Fabric drying on loom.

Multiphase Weaving: Principle of multiphase weaving. Warp way and weft way multiphase looms. Circular loom.

Positive Let-off: Hunt's let-off, electronic let-off.

Positive Continuous Take-up: Sulzer take-up and Shirley take-up.

Unit IV

Nonwoven: Definition and classification. Fiber properties requirements. Parallel laid, cross laid, aerodynamic, wet laid and Spunbonded technique of web formation. Web bonding techniques: Needle punching, Spunlace, Spunbond, Meltblown Thermal bond and Chemical bonding. Application of various non woven fabrics.

Suggested Text Books and References

1. Talukdar, M., "Weaving Mechanism, Management", Mahajan Publisher, Ahmedabad.
2. Adanur, S. "Weaving Technology".
3. Swaty, "Shuttleless Weaving".
4. Madhavamurthy, "Nonwoven".

TT-307N
FABRIC STRUCTURE & DESIGN

L T P
4 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

Elements of Color:-Physical basis of color, light and color phenomenon, complementary colors and color measurements, attributes of primary and secondary color, color contrast and color harmony, application of color.

UNIT - II

Basic concepts of fabric structure, importance of fabric structure, classification of fabrics, notation of weave, weave repeat unit, drafting plan, construction of draft and lifting plans, peg plan and denting.

Simple Weaves

Plain weave and derivatives-basket, rib, repp

Twill weave and derivatives- zig-zag, herringbone, broken, steep, elongated; effect of twist on prominency of twill lines

Fabric set calculation

Yarn and cloth relationships-GSM Calculation

UNIT - III

Simple Weaves (contd.)

Sateen & Satins.

Crepe weaves, Mock-leno, Cork screw, Honey-comb, Huck-a-back, Bed ford cord, Welt and pique fabrics, Extra warp and weft figuring

UNIT -IV

Backed Cloth, Double cloth, multi-layers fabric, belting structures, label weaving-narrow fabric, velvet and velveteen.

Suggested Text Books and References

1. Watson's Textile Design and Colour : Elementary weaves and Figured fabrics, edited by Z. J. Grosicki., Woodhead Publication, Seventh edition.
2. Watson's Advance Textile Design: Compound Woven Structure edited by Z. J. Grosicki, Woodhead Publication, Series No.-2.
3. Fabric Structure and Design, by N.Gokarneshan, New Age International, 2nd Edition.

TT – 309N
STATISTICAL ANALYSES



L T P
4 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

Foundations of statistics

Basic concepts of statistics, collection sampling, classification and graphical representation of data, Measures of central tendency. Numerical problems.

Sampling Theory

Population and sample, types of sampling, sampling classification and graphical representation of data, measures of central tendency, control charts.

UNIT -II

Measures of Dispersion Range, Quartile deviation, standard deviation, moments, skewness and kurtosis (Definition, properties and associated numerical only).

Theory of Probability

Different approaches to probability, Additive and Multiplicative Laws of probability, Baye's theorem.

UNIT-III

Tests of hypothesis and significance

Definition of Statistical hypothesis, Null hypothesis. Type I and II errors and Levels of significance, Standard error and sampling distribution, Tests of significance for large and small Samples (discussion). Problems based on χ^2 -test for goodness of fit, Student's t-Test and Analysis of variance (one way and two way classifications).

UNIT-IV

Regression & correlation

Karl Pearson's coefficient of correlation, Rank correlation coefficient and lines of regression, Numerical problems, factorial design and analysis.

Suggested Text Books and References

1. Ray and Sharma, "Mathematical Statistics"
2. Bowker, A.H., and Liberman, G.J., "Engineering Statistics", Prentice Hall, N.J.1972.
3. Murray P Spiegel, "Theory & Problems of Probability & Statistics".
4. Bhattacharya, G.K., & Johnson, R.A., "Statistical Concepts and Methods", John Wiley, N.Delhi, 2002.
5. Hogg, R.V, Elliot, A.T., "Probability and Statistical Inference", Pearson Education, 6th Edition.

TT-311N
YARN MANUFACTURING-III LAB



L T P
- - 3

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

LIST OF EXPERIMENTS

1. Study of operating principle, material flow and various parts of rotor spinning.
2. Study of drafting, twisting and winding operation of rotor spinning.
3. Study of operating principle, material flow and various parts of air jet spinning.
4. Study of drafting, twisting and winding operation of air jet spinning.
5. Study of operating principle, material flow and various parts of friction (Dref II and Dref III) spinning.
6. Study of drafting, twisting and winding operation of friction (Dref II and Dref III) spinning.
7. Study of Compact spinning, methods of fibre compacting, modification and attachments.
8. Assessment and control of variability in ring, rotor and air-jet spun yarns.
9. Idea of time and motion study.

Note: 7 experiments from the above list are to be performed by each student. The above experiments should be conducted and shall be decided on factors like:

1. Facilities installed at the Institute
2. Accessibility to industry & nearby institute like IIT Delhi, NITRA Gaziabad, Textile Committee and NITRA Panipat /any other reputed establishments.
3. Trend of technological developments in National & International perspective.

TT-313N
FABRIC MANUFACTURING –III 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 study the different selvedge formation: Tuck-in, Leno, Fused and Knitted selvedge.
2. To study the working of positive let-off and electronic let-off and their advantages.
3. To study the working of Matched cam beat-up.
4. To study the working of Electronic Dobby and development of designs in electronic doobby.
5. To study the working of Flexible Rapier loom system and sequence of weft insertion.
6. To study the working of Rigid Rapier loom system and sequence of weft insertion.
7. Studies on Somet flexible rapier drive.
8. To study the working of torsion bar picking and sequence of weft insertion in projectile loom.
9. To study the working of Air jet nozzle and sequence of weft insertion in air jet weaving. Problems of Air jet loom.
10. To study the advantages and disadvantages of various shuttle less looms.

Note: 8 experiments from the above list are to be performed by each student. The above experiments 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 Gaziabad, Textile Committee and NITRA Panipat /any other reputed establishments.
- c) Trend of technological developments in National & International perspective.

TT-315N
FABRIC STRUCTURE & DESIGN LAB



L T P
- - 3

Practical / Viva: 60 Marks
Sessional: 40 Marks
Total: 100 Marks
Duration of exam: 3 Hrs.

LIST OF EXPERIMENTS

1. Basic principles of woven fabric analysis and estimation of data for cloth production.
2. Recognition of yarn and fabric and material used in their construction.

Weave analysis of:

3. Plain weave and its derivatives.
4. Twill weave and its derivatives.
5. Satins and sateens.
6. Mock-leno.
7. Honey comb and brighten Honey comb.
8. Huck-a-back.
9. Crepe weaves
10. Diamond weave

Note: Any 8 experiments from the above list are to be performed by each student.

TT-317N
INDUSTRIAL TRAINING-I

Sessional: 100 Marks
Total: 100 Marks

At the end of the 4th semester B.Tech. course, each student, individual or in group, would observe and collect the general and technical knowledge/information pertaining to machinery, raw materials used, process, yarns and fabrics produced by the textile mills, in which he/she is undertaking 6 weeks practical/industrial training with prior approval of the institute .

Each student will have to submit a computerized report duly approved/certified by the trainer/guide/industry to the Head of department & the same will be evaluated along through presentation.