

Bachelor of Technology (Textile Technology)
SCHEME OF STUDIES/EXAMINATIONS (KUK)

Semester – III (w.e.f. Session 2016-2017)											
S N	Course No.	Course Title	Teaching Schedule (hrs)				Allotment of Marks				Dur.of Exam (hrs)
			L	T	P	Hrs/ Wk	The ory	Session al	Practical	Tota l	
1	TT-201N	Introduction to Textiles	3	1	-	4	75	25	--	100	3
2	TT-203N	Textile Fibre - I	3	1	-	4	75	25	--	100	3
3	TT-205N	Yarn Manufacturing-I	3	1	-	4	75	25	--	100	3
4	TT-207N	Fabric Manufacturing-I	3	1	-	4	75	25	--	100	3
5	TT-209N	Textile Chemical Processing-I	3	1	-	4	75	25	--	100	3
6	TT-211N	Textile Fibre - I Lab	-	-	3	3	--	40	60	100	3
7	TT-213N	Yarn Manufacturing-I Lab	-	--	3	3	--	40	60	100	3
8	TT-215N	Fabric Manufacturing-I Lab	-	--	3	3	--	40	60	100	3
9	TT-217N	Textile Chemical Processing-I Lab	-	--	3	3	--	40	60	100	3
Total			15	5	12	32	375	285	240	900	
10	MPC-201N	Environmental Studies*	3	0	0	3	75	25	0	100	3

*MPC-201N is a mandatory course and student has to get passing marks in order to qualify for the award of degree but its marks will not be added in the grand total.

Semester – IV (w.e.f. Session 2016-2017)											
S N	Course No.	Course Title	Teaching Schedule (hrs)				Allotment of Marks				Dur.of Exam (hrs)
			L	T	P	Hrs / Wk	Theory	Session al	Practical	Total	
1	TT-202N	Yarn Manufacturing-II	3	1	---	4	75	25	---	100	3
2	TT-204N	Fabric Manufacturing-II	3	1	---	4	75	25	---	100	3
3	TT-206N	Textile Chemical Processing-II	3	1	---	4	75	25	---	100	3
4	TT-208N	Textile Testing-I	3	1	---	4	75	25	---	100	3
5	TT-210N	Textile Fibre - II	3	1	-	4	75	25	---	100	3
6	TT-212N	Yarn Manufacturing-II Lab	---	-	3	3	---	40	60	100	3
7	TT-214N	Fabric Manufacturing-II Lab	---	-	3	3	---	40	60	100	3
8	TT-216N	Textile Chemical Processing-II Lab	---	--	3	3	---	40	60	100	3
9	TT-218N	Textile Testing-I Lab	---	--	3	3	---	40	60	100	3
Total			15	5	12	32	375	285	240	900	
10	MPC-202N	Energy Studies*	3	---	---	3	75	25	---	100	3

*MPC-202N is a mandatory course and student has to get passing marks in order to qualify for the award of degree but its marks will not be added in the grand total.

Note: All the students have to undergo six weeks industrial training after IV semester and it will be evaluated in V semester.

TT-201N

INTRODUCTION TO TEXTILES

L T P
3 1 -

Sessional: 25 Marks

Exam: 75 Marks

Total: 100 Marks

Time: 3Hrs

Note: Nine questions will be set in the question paper i.e. two from each unit. The students 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

Textile Industry

Sectors of textile industry viz, organized mill sector, decentralized small-scale sector. Sectors based on technology: Handloom, Powerloom, Garment, Cotton, Silk, Wool, Jute and Synthetic Fibers. Indian cotton: production, quality and global competition.

UNIT-II

Changing scenario of Indian Textile Industry in the wake of WTO Agreement. Strengths and weaknesses of the Indian Textile Industry in the global scenario. Research and technology support to the Indian Textile Industry.

UNIT-III

Textile Technology

Introduction to fiber, yarn, fabrics. Sequence of operation for conversion of natural and manmade fibers into finished fabrics. Fabric construction technology: knitting, weaving and production of non-wovens.

UNIT-IV

Fabric to garment, Importance of Design. Quality aspects of yarns, fabrics and garments. Processing and finishing of fabric and garments.

Suggested Text Books & References:

1. Corbmann, "Textiles Fibre to Fabric", New York Mc Graw Hill Book Co., 1983.
2. "Cotton Spinning", ATIRA Publication, Ahmedabad.
3. Aswani, K.T., "Plain Weaving Motions", Mahajan Book Publishers, 1996.
4. Shenai, V.A., "Fundamental Principles of Textile Processing", Sevak Publisher.

TT-203N
TEXTILE FIBRE – I

L T P
3 1 -

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

Note: Nine questions will be set in the question paper i.e. two from each unit. The students 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

Fibre, textile fibre, Classification of textile fibres, Essential and desirable properties of textile fibres, Cotton - cultivation and harvesting Practices, ginning, grading, baling, Physical and chemical properties of cotton fibre.

UNIT II

Cultivation, Production, morphological structure, physical and chemical properties and end uses of: Flax, Jute and Ramie.

UNIT III

Production of silk (raw), Morphological structure of silk, chemical composition, physical and chemical properties of silk, various varieties of silk with brief description.

Wool - Sheep rearing, wool shearing, grading baling, Morphological structure, physical and chemical properties of wool.

UNIT IV

Polymer system, physical and chemical properties and application of various man-made and regenerated fibres such as: viscose, polyester, polyamide, acrylic, polypropylene, elastomeric fibres (Spandex).

Suggested Text Books & References:

1. Moncriff, W., "Textile Fibres".
2. Murthy, H.V.S., "Textile Fibres".
3. Morton, M. and Hearle, J.W.S., "Physical properties of Textile Fibres", Textile Institute, Manchester.
4. Marjory Joseph, 'Introduction of Textiles".

TT-205N
YARN MANUFACTURING-I

L T P
3 1 -

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

Note: Nine questions will be set in the question paper i.e. two from each unit. The students 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

Mixing & Blending

Objectives of mixing and blending, Formulation of cotton mixing – scientific bale management, Different Blending methods with their advantages and disadvantages, Tinting & Application of additional spin finish for manmade fibres.

UNIT-II

Opening and Cleaning

Need for opening and cleaning, Objective of blowroom, Various types of opener and cleaner – construction and working, Lap forming mechanism, Blow room accessories, Selection of blow room line for different cotton and man-made fibres, Production and cleaning efficiency level attainable in blowroom, Causes of lap defects and their remedies, Modern developments in blowroom.

UNIT-III

Carding

Objective, Comparison of lap feed and flock feed system. Principle of carding, stripping and brushing action, Design and construction of carding machine, Flexible and metallic card clothing, Processing of man-made fibres on carding, Optimization of process and machine parameters of carding, Autolevelling in card. Modern developments in carding, Calculations pertaining to draft and production.

UNIT-IV

Drafting

Objective, Fundamental concept of Ideal drafting, Actual drafting, Working principles of draw frame including constructional details, Weighting in draw frame, Draft distribution, Different types of drafting roller arrangements, Relation between drafting & doubling, Drafting irregularities, Autolevelling, modern developments in draw-frame, Calculations pertaining to draft and production.

Suggested Text Books & References:

1. Klein, W., "Manual of Textile Technology: Vol. I. Technology of Short Staple Spinning", – Textile Institute, Manchester, 1998.
2. Klein, W., "Manual of Textile Technology: Vol. II. A practical Guide to Blowroom & Carding", – Textile Institute, Manchester, 2000.
3. Klein, W., "Manual of Textile Technology: Vol. III. A practical Guide to Combing & Drawing", – Textile Institute, Manchester, 1995.
4. Klein, W., "Manual of Textile Technology: Vol. VI. Manmade Fibres and their Processing", – Textile Institute, Manchester, 1994.
5. Oxtoby E, "Spun Yarn Technology", Butterworths, London, 1987.

6. Salhotra, K.R.and Chattopadhyay (Eds.), R., "Course Material of Pilot Programme on Spinning : Blowroom and Card", NCUTE Publication, 1998.
7. Salhotra K R, "Spinning of Man Made Fibres and Blends on Cotton Spinning System",The Textile Association, Mumbai, 1989.
8. Foster G A R, "Manual of Cotton Spinning", Vol. I –IV, The Textile Institute,
9. Manchester, 1958.
10. Khare A R, "Elements of Blowroom, Carding and Drawframe", Sai book Centre,
11. Mumbai,1999.
12. Zaloski, S., "The Institute of Textiles Technology USA series on Textile Processing – Vol. I. Opening, Cleaning and Picking".
13. Taggart, W., "Handbook of Cotton Spinning" Universal Publishing Corporation, 1979.
14. Coulson (Ed.), A.F.W., "Manual of Cotton Spinning, Vol. I to IV", Textile Institute, Manchester, 1989.
15. Happey (Ed.), F., "Contemporary Textile Engineering", Academic Press, New York, 1981.
16. Lawrence C A, "Fundamental of Spun Yarn Technology" CRC Press, USA, 2003.
17. Booth J E, "Textile Mathematics", Part II, Textile Institute, Manchester, 1978.

TT-207N
FABRIC MANUFACTURING-I

L T P
3 1 -

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

Note: Nine questions will be set in the question paper i.e. two from each unit. The students 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-1

Warp Winding: Object of warp winding, requirement of a good package, Basic features of a winding machine, Yarn withdrawal-side withdrawal, overend withdrawal, yarn tensioner, additive type tensioner, multiplicative type, combined type, yarn clearers, mechanical yarn clearer, electronic yarn clearer, yarn faults, uster classmate yarn fault measuring system, yarn rejoining techniques- knotting, splicing, classification of splicing, pneumatic splicing, classification of winding machines, random winding machine, principle, advantage and disadvantage of random winding, precision winding, principle, advantage and disadvantage of precision winding, angle of wind, coil angle, traverse ratio, coil pattern on the package, patterning and its remedy basic features of automatic winding machines, stop motions in winding machine, types of warp packages, types of package build calculation related to production and efficiency,

Pirn Winding : Objectives, Difference between warp winding and weft winding, yarn path on pirn winding machine, basic feature of pirn winding, difference in traverse mechanism in warp and weft winding , calculation related to production and efficiency

UNIT-2

Warping: Object of warping process, classification of warping, creels used for warping process, beam warping, calculation related to beam warping, sectional warping, beaming, head stock, relation between section height and cone angle, drum storage capacity, calculations related to sectional warping, various controls on warping machines, calculations related to production and efficiency

UNIT-3

Sizing: Objectives, stresses on warp yarn during weaving, classification of sizing process, sizing parameters-size concentration, size percentage, size add-on, features of conventional slasher sizing machine, creels for sizing process, size boxes, drying section- single cylinder dryer and multi cylinder dryer, infrared dryers, head stock, controls on sizing machine, sizing materials, size preparation. Starch, modification of starch, polyvinyl alcohol, carboxyl methyl cellulose, acrylics, binders, lubricants and other additives, sizing of spun yarns, sizing of filament yarn, developments in sizing, single end sizing, cold and pre wet sizing, foam sizing, sinter roller sizing. Calculation related to sizing parameters, production and efficiency

UNIT-4

Drawing-In: Object of drawing in, different types of heald wires, different types of drop wires, reed, reed count, drawing in order of plain weave, drawing in order of twill weave, drawing in order of satin weave, automation in drawing in, knotting and gaiting. Calculation related to reed count and drafting plan.

Suggested Text Books & References:

1. Talukdar, M.K., "An Introduction to Winding and Warping", Textile Trade Press, Mumbai.
2. Ajgaonkar, D.B., "Sizing, Materials, Methods and Machines", Textile Trade Press, Mumbai, 1982.
3. Banerjee, P.K., "Industrial Practices in Yarn winding", NCUTE Publication, 1999.
4. Ramsbottom, "Warp Sizing Mechanisms", Columbia Press, Manchester, 1965.
5. Ormerod, A., "Modern Preparation and Weaving Machinery", Butterworths, 1983.
6. Aitken, "Automatic Weaving", Columbia Press, Manchester, 1969.
7. Bennet, G.A., "An Introduction to Automatic Weaving", Columbia Press, Manchester, 1958.

8. Gorder, V and Volkov, P., "Cotton Weaving", Mir Publications, Moscow, 1987.
9. Sengupta, R., "Yarn Preparation Vol.-I & II", Mahajan Publishers, Ahmedabad, 1970.
10. Singh, R.B., "Modern Weaving Calculation, Vol-I Preparatory", Mahajan Book Distributor, Ahmedabad, 1994.
11. SITRA Report on Work Methods of Conewinder Tenters.
12. BTRA Report on Winding.
13. BTRA Report on Warping and sizing.
14. Lord and Mohemad, "Conversion of Yarn to Fabric".
15. Houghton, " Hand Book of Cotton Warp Sizing".

TT-209N
TEXTILE CHEMICAL PROCESSING - I

L T P
3 1 -

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

Note: Nine questions will be set in the question paper i.e. two from each unit. The students 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-1

Introduction: Sequence of chemical processing of textiles. Natural and added impurities in textiles.

Preparatory Processes:

Singeing: Objective, types of singeing, details of various singeing methods with advantages and disadvantages. Evaluation method. Singeing machines.

Desizing: Objective, types, method details and mechanism of removal of starch in various methods. Efficiency of desizing.

Scouring: Objectives, mechanism of removal of impurities, recipe and controlling parameters involved. Scouring of natural, manmade and blended textiles. Evaluation of scouring efficiency. J-Box and kier machines.

UNIT-2

Bleaching: Objectives of bleaching. Hypochlorite, peroxide, chlorite and peracetic acid bleaching methods and their mechanism of action. Controlling parameter involved. Efficiency of bleaching.

Mercerization: Objectives, mechanism related to various physical and chemical changes in cotton during mercerisation. Process parameters involved in each method. Assessment of efficiency of mercerization: Barium activity number, its determination and interpretation. Different types of Mercerising machines.

Heat setting: Objectives and mechanism of heat setting. Different methods of heat setting and their effectiveness. Heat setting conditions and controls. Heat setting of polyester, nylon, acetate and their blends. Evaluation of degree of heat setting.

UNIT-3

Dyeing of textiles: Dyeing technology of natural and manmade textiles with Direct, Reactive, Vat, Insoluble Azoic, Sulphur, Solubilised vat, Acid, Metal-complex, Basic and Disperse dyes.

Dyeing machineries: Loose fibre, yarn and package dyeing machines. Jigger, winch, jet and HTHP beam dyeing m/cs. Padding mangles.

UNIT-4

Wool Processing: Wool setting and milling. Mildew, rot and moth proofing of wool.

Silk Processing: Degumming, Silk Finishing: Weighting of silk and Scroop finish.

Suggested Text Books & References:

1. Shenai, V.A., "Technology of Textile Processing Vol. 2,3,4,6 and 10", Sevak Publisher, Bombay.
2. Marsh, J.T., "Mercerising", Chapman Publication, London.
3. Marsh, J.T., "An Introduction to Textile Finishing", Chapman Publication, London.
4. Trotman, E.R., "Textile Technology and Dyeing of Textile Fibres", Griffin Publication, London.
5. Shenai, V.A., "Principle and practice of Dyeing", Sevak Publisher, Bombay.
6. Shenai, V.A., "Fundamentals of Principles of Textile Wet processing", Sevak Publisher, Bombay.
7. Datye, K.V. and Vaidya, A.A., "Chemical processing of Synthetic Fibres and Blends", Wiley Publication, New York.
8. Peter, R.H., "Textile Chemistry Vol.2", Elsevier Publishing London.
9. Marsh, J.T. "Textile Science", Chapman London.
10. Garde, A.R. and Modi, "Chemical Processing of Cotton and polyester Blend", ATIRA, Ahmadabad.
11. "Wet processing", ATTA Set, Textile Association of India.
12. Prayag, C.R., "Dyeing of silk and Manmade Fibre".
13. Prayag, C.R., "Bleaching, Mercerising and Dyeing of Cotton".

TT-211N
TEXTILE FIBRE - I LAB

L T P
- - 3

Practical/viva: 60 Marks
Sessional: 40 Marks
Total: 100 Marks
Time: 3 Hrs

1. Identification of Cotton / Silk / Wool / Jute / Others Fibres using relevant instrument by physical methods.
2. Identification of Cotton / Silk / Wool / Jute / Others Fibres using relevant instrument by Chemical Methods.
3. Identification of Man made Fibres by Physical Methods
4. Identification of Man made Fibres by Chemical Methods.
5. Study and determine the TRASH contamination in the raw materials namely cotton.
6. Identification of different type of Dyes and Finishes from application technique & properties point of view.
7. A report on the sourcing & procurement of the textile raw material.
8. Prepare a cost comparison statement of at least
 - (a) six fibres
 - (b) six dyes
 - (c) six textile auxiliaries
 - (d) six chemicals.
9. Determination of Moisture Content & Moisture Regain of Material.
10. Determination of vegetable matter content, wax & Greece content of wool by Soxhlet method.
11. Determination of fiber length properties of cotton by using Comb Sorter & compare with the manual grading from ginning.
12. Determination % of medullation of wool using projection microscope.
13. Study the longitudinal & cross-sectional view of fiber.

Note: The above experiment should be conducted and shall be decided on factors like:

1. Facilities installed at Institute
2. Accessibility to industry & nearby institute like IIT Delhi, NITRA Ghaziabad, Textile Committee and NITRA Panipat.
3. Trend of technological developments in National & International perspective.

TT-213N
YARN MANUFACTURING-I LAB

L T P
- - 3

Practical/viva: 60 Marks
Sessional: 40 Marks
Total: 100 Marks
Time: 3 Hrs

Mixing

1. To study the different techniques of Mixing and Blending.

Opening & Cleaning

2. Study of general outline of opener and clearer machine employed in a modern Blowroom line.
3. Calculation of speeds of different machine parts for Cotton and Synthetic fibres, Blow/inch of Kirschner beater, Production calculation of blow room.

Carding

4. To illustrate the working principle of carding machine.
5. To study the change places and speed of different parts of a carding machine for Cotton and Synthetic fibres.
6. Calculation of the speed, individual draft & total draft and production of carding machine.

Drawframe

7. To study the working principle and important settings of drawframe machine.
8. Calculation of the total draft and its distribution in draw frame machine.
9. Study of drafting arrangement and top roller weighting system of draw frame machine.

Note: The above experiment should be conducted and shall be decided on factors like:

1. Facilities installed at Institute
2. Accessibility to industry & nearby institute like IIT Delhi, NITRA Ghaziabad, Textile Committee and NITRA Panipat.
3. Trend of technological developments in National & International perspective.

TT-215N
FABRIC MANUFACTURING –I LAB

L T P
- - 3

Practical/viva: 60 Marks
Sessional: 40 Marks
Total: 100 Marks
Time: 3 hrs

Winding

1. To show different types of winders for single and Ply Yarn Final Packages.
2. Specification for all count range and material range, functions of all parts.
3. Cheese windings-Need and working.
4. To show the difference in packages needed for warping machines.

Warping

5. To show different type of warping machines used for different type of material and quality of fabric to be prepared. Functions of all parts.

Pirn Winding

6. To show working, functions of different types of Pirn Winding Machine.
7. Difference between cone winding and pirn winding.

Sizing

8. To show working explaining functions of different parts.
9. Different types of sizing materials used for different fibers.

Drawing In

10. To show different type of machines and use for different fabric design.

Calculation

11. To demonstrate actual use of weaving calculations in day-to-day use in different machines.

Note: The above experiment should be conducted and shall be decided on factors like:

1. Facilities installed at Institute
2. Accessibility to industry & nearby institute like IIT Delhi, NITRA Ghaziabad, Textile Committee and NITRA Panipat.
3. Trend of technological developments in National & International perspective.

TT-217N
TEXTILE CHEMICAL PROCESSING- I LAB

L T P
- - 3

Practical/viva: 60 Marks
Sessional: 40 Marks
Total: 100 Marks
Time: 3hrs

1. Desizing of cotton fabric using various types of desizing agents.
2. Scouring of Natural fibre in the form of yarn and fabric and find the scouring loss.
3. Scouring of Polyester/ Cotton /Blends and Wool.
4. Degumming of Silk and calculation of weight loss percentage.
5. Bleaching of Natural fibre namely Cotton, jute with
 - (a) Hyperchloride Bleaching
 - (b) Peroxide Bleaching
6. Bleaching of Polyester /Cotton Blend.
7. Determination the pH value of a given material.
8. Determination of transmittance, absorbance and concentration of given dye liquor by visible spectrophotometer.
9. Dyeing of cotton yarn with direct dyes, reactive dyes and basic dyes
10. Dyeing of wool with direct dyes, basic dyes, and acid dyes.
11. Method of mordanting in respect of application of different fibre.
12. Extraction method of color from different color dyes.
13. Study the mechanical finishing and understand the mechanism of mechanical finishing.
14. Understand the color difference in AATCC grey scale (1-5) between standard and batches
 - (I) Manully with the comparison of grey scale, and
 - (II) by computer color matching machine and interpretation of color sprectograph.
15. Print Different Material with relevant methods and style.
16. To do finishing of all type of materials using different chemicals and methods.
17. Effect to Heat Setting on Synthetic Materials.
18. To conduct practicals as per latest technology/material.

Note: The above experiment should be conducted and shall be decided on factors like:

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

MPC- 201N			ENVIRONMENTAL STUDIES		
L	T	P	Sessional	Exam	Time
3	-	-	25	75	3H

UNIT I

The multidisciplinary nature of environmental studies. Definition, Scope and Importance. Need for public awareness. Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources- Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources- Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources- World Food Problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources- Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

(f) Land Resources- Land as a resource, land, degradation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyle.

UNIT II

Ecosystem- Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Ecological succession, Food Chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem.

a. Forest Ecosystem

b. Grassland Ecosystem

c. Desert Ecosystem

d. Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/ hill/ mountain. Visit to a local polluted site- Urban /Rural/Industrial/Agricultural. Study of common plants, insects and birds. Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

Biodiversity and its conservation. Introduction, Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity of global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity. Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts. Endangered and endemic species of India. Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution: Definition, Cause, effects and control measures of- (a) Air Pollution (b) Water Pollution (c) Soil Pollution (d) Marine Pollution (e) Noise Pollution (f) Thermal Pollution (g) Nuclear Hazards

Solid waste management- cause, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides

UNIT IV

Social Issues and the Environment, From unsustainable to sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management.

Resettlement and rehabilitation of people: Its problems and concerns. Case Studies. Environmental ethics-issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies.

Wasteland Reclamation, Consumerism and waste products, Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public Awareness, Human population and the Environment, Population growth, variation among nations. Population explosion-Family Welfare Programme, Environment and human health, Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies.

Suggested Text Books & References:

1. Environmental Studies- Deswal and Deswal. Dhanpat Rai & Co.
2. Environmental Science & Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India
3. Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
4. Environmental Science- Botkin and Keller. 2012. Wiley, India.

TT-202N
YARN MANUFACTURING-II

L T P
3 1 -

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

Note : Nine questions will be set in the question paper i.e. two from each unit. The students 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

Combing

Objective, Different combing preparatory process for lap preparation – Sliver lap, Ribbon lap and Unilap machine, Different types of comber, Combing cycle of rectilinear cotton comber, Timing diagram for combing operation, Configuration of fibre feed and its effect on quality of product, noil percentage and fractionation efficiency of comber, Influence of type of feed on noil extraction and cleanliness of sliver, Calculation pertaining to draft, production and noil percentage.

UNIT-II

Speed frame

Objective, Working principle of speed frame, Construction and working of important parts, Mechanism of drafting, twisting and winding, Basic principle of designing of cone drum, Differential motions & Building motions, Common defects in roving packages, their causes and remedies, Processing of man-made fibres on speed frame, Recent development in speed frame. Calculations pertaining to draft, TPI and production, twist multiplier and roving twist.

UNIT-III

Ring frame

Objective, Principle and mechanism involved in drafting, twisting and winding, Ordinary and high draft systems, Rising and falling lappets, balloon control rings, Design and types of spindle, ring and traveler, Concept of twist multiplier and yarn contraction due to twisting, types of builds, Mechanism of package formation, Causes and remedies to control end breaks, Recent developments in ring frame, Concept of average mill count and 20's conversion.

UNIT-IV

Doubling

Objective and terminology, Requirement of feed package for yarn plying, Systems of doubling (dry & wet) study of ring doublers, Two for one twister (TFO)- objective & working principle, Calculation of draft, TPI and production of ring frame & doubling frame.

Suggested Text Books and References:

1. Klein, W., "Manual of Textile Technology: Vol. I. Technology of Short Staple Spinning", – Textile Institute, Manchester, 1998.
2. Klein, W., "Manual of Textile Technology: Vol. III. A practical Guide to Combing & Drawing", – Textile Institute, Manchester, 1995.
3. Klein, W., "Manual of Textile Technology: Vol. IV. A practical Guide to Ring Spinning", – Textile Institute, Manchester, 1995.
4. Klein, W., "Manual of Textile Technology: Vol. VI. Manmade Fibres and their Processing", – Textile Institute, Manchester, 1994.
5. Salhotra K R, "Spinning of Man Made Fibres and Blends on Cotton Spinning System", The Textile Association, Mumbai, 1989.
6. Salhotra, K.R., Alagirusamy, R. and Chattopadhyay (Eds.), R., "Course Material of Pilot Programme on Spinning: Ring Spinning, Doubling and Twisting", NCUTE Publication, 2000.

7. Chattopadhyay, R., and Rengasamy(Eds.), R., "Course Pilot Programme on Spinning: Drawing Combing and Roving", NCUTE Publication, 1999..
8. Oxtoby, E. "Spun Yarn Technology". Butterworths, London.
9. Khare A R, "Elements of Combing", Sai book center, Mumbai, 1999.
10. Khare A R "Elements of Ring Frame and Doubling", Sai book Centre, Mumbai, 1999.
11. Lawrence C A, "Fundamental of Spun Yarn Technology" CRC Press, USA,2003.
12. Booth J E, "Textile Mathematics", Part II, Textile Institute, Manchester, 1978.

TT-204N

FABRIC MANUFACTURING – II

L T P
3 1 -

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

Note : Nine questions will be set in the question paper i.e. two from each unit. The students 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: General loom elements, classification of looms, primary motions of loom.

Tappet shedding: Negative tappet shedding, eccentric motion of shedding, designing of a shedding tappet, movements of healds, geometry of warp shed, calculation of the stroke of shedding tappet, Positive tappet shedding-link mechanism, Heald reversing motion, shedding motion principles-open shed, closed shed, semi open shed, Loom timing diagram, early shedding, late shedding, split shedding or stragerring of shed, Asymmetric shedding, lease rods, back rest, effect of shed timing and back rest settings on properties of fabrics.

Shuttle Picking : Function of picking, essential features of good picking, over picking, under picking- cone under picking mechanism, disadvantages of shuttle picking, Shuttle box and shuttle checking device.

Velocity and acceleration of picking elements, energy consumed, power of picking

Factors affecting the initial speed of shuttle, nominal movement of shuttle, theory of picking, picking cams- linear cam, parabolic cam, Factors affecting retardation of shuttle, Weft tension during propulsion and retardation of shuttle.

Beating: Function of beating, kinematics of sley, sley eccentricity ratio, reed drive by matched cams, accelerating force on sley, mechanics of beat up, relation between cloth fell position & beat up force, relation between pick spacing & beat up force, relation between cloth fell position & pick spacing, bumping of loom, effect of yarn irregularity on pick spacing.

UNIT-II

Secondary and auxiliary motions of loom, Secondary motion, Take up motion- negative take up, positive take up, five wheel take up motion, seven wheel take up motion, electronic take up.

Let Off Motion: Objective, negative let off motion, positive let off motion- basic requirements, tension control mechanism, electrical let off motion, warp tension variation. Auxiliary motions of loom, Objective, classification

Weft Stop motion: objective, side weft fork motion, centre weft fork motion

Warp Stop motion: objective, mechanical warp stop motion, electrical warp stop motion,

Warp Protecting motion: objective, loose reed warp protecting motion, fast reed warp protecting motion, electromagnetic warp protecting motion.

Unit III

Automatic looms- basic features, advantages over plain looms, classification of automatic looms, weft feeling mechanism, mechanical weft feeler, electronic weft feeler, optical weft feeler, pirn changing mechanism, shuttle changing mechanism, bobbin loader mechanism.

Weft mixing motion, Multiple box motion, 4X1 drop box motion, preparation of pattern cards, pick at will motion.

Unit IV

Dobby Shedding: Main parts of dobby loom, types of Dobby, negative dobby, single, double lift single jack dobby, double lift double jack dobby, design & peg plan for dobbies, positive dobby, electronic dobby, types of shed formed in dobby

Jacquard Shedding:

Principle parts of jacquard machine, types of jacquard, types of shed formed in jacquard, single lift single cylinder jacquard, double lift single cylinder jacquard, double lift double cylinder jacquard, harness building, harness ties, design ties, card cutting, card lacing.

Suggested Text Books & References

1. Marks and Robinson, "Principles of Weaving". Textile Institute, Manchester, 1986.

2. Thomas fox,"Mechanism of Weaving",Bombay Universal Publishing Co,1993.
3. Lord and Mohemad,"Conversion of Yarn to Fabric",Merrow Publishing Co.Ltd, England,1988.
4. Aswani,K.T.,,"Plain Weaving Mechanism",Mahajan Publishers,Ahmedabad,1996.
5. Aswani,K.T.,,"Fancy Weaving Mechanism",Mahajan Publisher,Ahmedabad,1990.
6. Sengupta,R.,,"Weaving Calculations",Taraporwala Sons,Bombay 1990.
7. Banerjee,N.N.,,"Weaving Mechanism Vol,-I & Vol.II",West Bengal,1994.
8. Rai,Hasmukh,"Fabric Forming",S.S.M.Institute,Kuomarapalyam Tamil Nadu,1996.
9. Talukdar,M.K.,,"Modern Weaving Technology",NICTAS,Ahmedabad,1998.
10. Rapier Looms,WIRA Research & Technical Service Manual for industry.
11. Kharwani,P.A.,,"Weaving I shuttle looms",NCUTE Publication,1999.
12. Khatwani,P.A.,,"Weaving II Shuttleless Looms",NCUTE Publication,1999.
13. Khatwani,P.A."Filament Weaving",NCUTE Publication,2000.

TT-206N
TEXTILE CHEMICAL PROCESSING - II

L T P
3 1 -

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

Note: Nine questions will be set in the question paper i.e. two from each unit. The students 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-1

Printing: Introduction to printing methods Block, screen and roller printing. Advantages and disadvantages of each method. Various styles of printing like Direct, Discharge and Resist styles on natural, man-made and blended textiles. Ingredients of print paste with their details. Classification and mechanism of working of thickeners.

Transfer Printing: Types, mechanism of transfer printing and machineries.

Pigment Printing: Mechanism and recipe details of pigment printing.

UNIT-2

Finishing:

Mechanical Finishes: Calendaring - its types, construction and function of various calendaring m/cs. Sanforizing - method, mechanism and machineries involved. Sueding /raising, Napping and Shearing finishes. Foam finishing technology.

Chemical Finishes: Problem of creasing, anti-crease finish on cotton. Drawback and advantages associated with use of various anti-crease chemicals. Water repellency and water repellent finishes on cotton. Evaluation of water repellency. Flame proofing and its evaluation. Softeners and their application.

UNIT-3

Developments in preparatory and dyeing: Continuous pre-treatment and Continuous dyeing. Mass coloration principle, technology and different methods. Problems in dyeing and their solutions. Tie and dye, Batik printing.

UNIT-4

Identification of dye on dyed natural and manmade textiles.

Ecofriendly processing and Effluent generated from textile processing and its treatment.

Fastness properties: Light fastness, Rubbing fastness, Sublimation fastness, Perspiration fastness, Washing fastness properties evaluation.

Suggested Text Books and References

1. Shenai, V.A., "Technology of Textile Processing Vol. 2,3,4,6, and 10", Sevak Publisher, Bombay.
2. Marsh, J.T., "Mercerising", Chapman Publication, London.
3. Marsh, J.T., "An Introduction to Textile Finishing", Chapman Publication, London.
4. Trotman, E.R. "Textile Technology and Dyeing of Textile Fibres". Griffin Publication, London.
5. Shenai, V.A. "Principle and Practice of Dyeing", Sevak Publisher, Bombay.
6. Shenai, V.A. "Fundamentals of Principles of Textile Wet Processing", Sevak Publisher, Bombay.
7. Datye, K.V. and Vaidya, A.A., "Chemical Processing of Synthetic Fibres and Blends", Wiley Publication, New York
8. Peter, R.H., "Textile Chemistry Vol. 2", Elsevier Publishing, London.
9. Marsh, J.T., "Textile Science", Chapman, London
10. Garde, A.R. and Modi, "Chemical Processing of Cotton and Polyester Blend", ATIRA, Ahmedabad.
11. Prayag, C.R., "Dyeing of Sild and Manmade Fibre".
12. Prayag, C.R., "Bleaching, Mercerising and Dyeing of Cotton".
13. Vankar, Padma, "Textile Effluents", NCUTE Publication, 2001.

TT-208N

TEXTILE TESTING -I

L T P
3 1 -

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

Note: Nine questions will be set in the question paper i.e. two from each unit. The students 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:

Sampling Methods and Moisture Calculation

Introduction of textile testing, Reason for Testing, standardization of testing, sampling, sampling techniques, square, cut square, zoning technique, Routine sampling techniques used in the textile industry

Moisture: - effect of moisture on physical properties regain and content, correct invoice wt, Atmospheric conditions for testing, Control of testing room atmosphere, moisture regain & moisture content, importance of moisture in textiles, measurement of moisture regain & content, effect of moisture on properties (physical & mechanical) of textile material, factors affecting the regain, Shirley moisture meter.

Unit II:

Cotton Fibre Testing

Fibre Dimension: fibre fineness, fineness measurement, fibre length, method of measurement: direct method high volume instrument, advance fibre information system Grading of cotton fibre with respect to staple length, laboratory measurement of fibre length, span length, Baer sorter, servo fibre graph, maturity coefficient measurement by NaOH method, fibre fineness by airflow meter. Fibre bundle strength by Pressley, stelometer, determination of trash content: Shirley trash analyzer.

Fibre quality index, salient features of HVI, AFIS, Nep count.

Wrapping test for lap, sliver and roving.

Unit III:

Yarn Evenness Testing

Yarn testing, Linear density,

Yarn numbering systems, conversion methods, and measurement of yarn number.

Twist, classification of twist, twist measurement, Twist, Measurement of twist in continuous filament spun and plied yarns.

Evenness testing of yarns. Nature and causes of irregularities, principles and methods of evenness testing: evaluation and interpretation of evenness measurements. Measurement of sliver and yarn unevenness, Capacitative and optical principle of measuring unevenness, salient features of Uster evenness tester, yarn imperfections and classimat yarn faults.

Unit IV:

Yarn Tensile Testing

Strength and elongation test, Definition, force- elongation curve, Factor affecting tensile testing, Fibre strength and Yarn strength.

Various terms related to tensile testing, stress-strain curve, various methods for finding the yield point, Application of tensile force by CRL, CRE and CRT method, various principles (pendulum lever, balance principle, inclined plane, strain gauge principle, etc) to apply tensile load on textile specimen.

Yarn testing machines- single yarn strength tester, Uster, Instron testing machine, lea strength testing.

Hairiness: Determination of yarn hairiness.

Suggested Text Books & References:

1. Booth, J.E., "Principles of Textile Testing", Butterworths, London
2. Quality control and testing management by Dr. V.K. Kothari
3. Slater, "Textile Progress – Physical Testing and Quality Control", Textile Institute, Manchester

4. "Handbook of Methods of Tests for Cotton Fibres, Yarns and Fabrics", CTRL, Bombay
5. "Cotton Assessment and Appreciation", SITRA Report, Coimbatore.
6. Savile, B.P., "Physical testing of textiles"
7. Grover, E. and Hamby, D.S., "Handbook of Textile Testing and Quality Control", Wiley Eastern, New Delhi, 1969.

TT-210N
TEXTILE FIBRE -II

L T P
3 1 -

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

Note: Nine questions will be set in the question paper i.e. two from each unit. The students 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

Polymerization:

Introduction of polymerization, monomer, oligomer, comonomer, polymer, classification of polymers, homopolymers and copolymers, Thermo sets, Thermoplastic, Elastomers, T_g, T_m, Polymerization techniques- bulk polymerization, solution polymerization, suspension polymerization and emulsion polymerization, New polymerization techniques-Gas Phase polymerization, Polymerization mechanisms addition polymerization, condensation polymerization. Criteria for fibre forming polymers

UNIT-II

Polymerization of different fibers:

Polymerization of polyester by DMT and TPA route, Polymerization of Nylon-6 and Nylon-6,6

Polymerization of polyacrylonitrile by suspension and solution polymerization, polymerization of polypropylene by suspension and gas phase polymerization.

UNIT-III

Melt Spinning:

Melt Spinning Line and its equipment, cooling system, General principle of spinning, fluid flow through a capillary, die-swell effect, melt extrusion, spinning conditions such as spinneret size, rate of extrusion, spinning stretch and its effect on filament structure and properties with reference to polyester, polyamide and polypropylene fibers

UNIT-IV

Solution Spinning:

Solution Spinning, Classification of solution spinning-dry spinning, wet spinning, dry jet wet spinning, wet and dry spinning of viscose and acrylic fiber, effect of spinning variables on structure and properties in gel and final fibers, high shrinkage acrylic fiber. Drawing and heat setting.

Suggested Text Books & References:

1. Gupta, V.B. & Kothari, V.K., "Manufactured Fibre Technology". Chapman & Hall, London, 1977
2. Mukhopadhyay, S. "Advances in Fibre science", Textile institute, Manchester.
3. Deopura, B.L., "Course Material of Pilot Programme on Manmade Fibres", NCUTE Publication, 1999.
4. Mishra, S.P., "A Textbook of Fibre Science & Technology", New Age International Publishers, New Delhi, 1999.
5. Pajart & Oldrich "Textile Science & Technology- Processing of Polyester Fibres", Elsevier Scientific Publishing Co., 1979.
6. Robinson. J.S., "Spinning & Extruding of Fibres".
7. Pattabhiram, T.K., "Spinning Fundamentals of Manmade Fibres", Mahajan Publishing Pvt. Ltd., Ahmedabad, 1996.

TT-212N

YARN MANUFACTURING-II LAB

L T P
- - 3

Practical/viva: 60 Marks
Sessional: 40 Marks
Total: 100 Marks
Time: 3 Hrs

Combing

1. To study the different methods of lap formation in combing preparatory.
2. To study the combing cycle of a rectilinear cotton comber.

Speedframe

3. To study the drafting, twisting and winding zone of speed frame.
4. To study the building motion in speed frame.
5. To study the differential motion of speed frame and calculation of bobbin speed.
6. Calculation of break draft constant, draft constant and twist constant and production of speed frame.

Ringframe

7. To demonstrate the working principle of a ringframe.
8. To study the different components of drafting system and twisting system.
9. Calculation pertaining to gearing, speed, constant, draft and production.

Note: The above experiment should be conducted and shall be decided on factors like:

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

TT-214N
FABRIC MANUFACTURING-II LAB

L T P
- - 3

Practical/viva: 60 Marks
Sessional: 40 Marks
Total: 100 Marks
Time: 3 Hrs

Basic Concept

1. To show actual working of all motions of simple loom & with multiple boxes.

Automatic Loom

2. To show and compare all mechanisms of automatic loom with plan loom.

Introduction to Dobby, Jacquard and Terry Weaving

3. To show all type of mechanisms (Mechanical/Electronic) used for producing fabrics with different structures & designs.

Principles of Weft Insertion

4. To show all latest weft insertion methods -difference, comparison, need.

Shuttleless Looms

5. To show actual working of all latest looms- Advantages, Comparison.

Special Weaves

6. To analyze all type of weaving fabrics with different weaves.

Weaving Calculations

7. To do all types of calculations needed for all type of weaving machines.

Note: The above experiment should be conducted and shall be decided on factors like:

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

TT-216N
TEXTILE CHEMICAL PROCESSING – II LAB

L T P
- - 3

Practical/viva: 60 Marks
Sessional: 40 Marks
Total: 100 Marks
Time: 3 Hrs

1. Conduct practicals on Conventional and latest machines (Preparatory / dyeing / Finishing).
2. Conduct practicals on Recent developed methods of dyeing using different type of dyes
 - (a) Natural
 - (b) Synthetic
 - (c) Blends
3. Dyeing of cotton yarn with vat, reactive and sulphur in a sample pot dyeing machine.
4. Dyeing of cotton fabric with vat, reactive and sulphur dyes in laboratory jigger machine.
5. Calibration of dyeing and recipe prediction with the help of CCM.
6. Study of fastness to washing and rubbing with the help of CCM.
7. Reproduction of shade with the aid of computer as well as visual methods.
8. Printing with kerosene and synthetic based thickeners. Evaluate the printing with qualitative and quantitative methods on different materials.
9. Conduct practical with transfer printing technique on different materials.
10. Compare the solvent dyeing and solvent assisted dyeing on a chosen piece of material.
11. Quantitative analysis of different textile blends in fibre, yarn and fabric form.

Note: The above experiment should be conducted and shall be decided on factors like:

1. Facilities installed at Institute
2. Accessibility to industry & nearby institute like IIT Delhi, NITRA Ghaziabad, Textile Committee and NITRA Panipat.
3. Trend of technological developments in National & International perspective.

TT-218N
TEXTILE TESTING - I LAB

L T P
- - 3

Practical/viva: 60 Marks
Sessional: 40 Marks
Total: 100 Marks
Time: 3 Hrs

1. To determine moisture parameters of the fibers.
2. To determine the staple length of Natural Fibers.
3. To determine the fineness of Natural Fibers.
4. To determine the maturity of the Fibers.
5. To find the strength and elongation of Natural, Manmade & synthetic fiber.
6. To determine the linear density of fibers.
7. To determine the spin finish percentage in manmade fibers.
8. To determine blend percent of the material.
9. To determine the linear density of a given Yarn.
10. To determine the twist per inch of the yarn.
11. To determine the hairiness of the yarn.
12. To determine the strength & elongation of a given Yarn.
13. To determine the count strength product of the yarn.
14. To determine the hairiness of the given yarn.

Note: The above experiment should be conducted and shall be decided on factors like:

1. Facilities installed at Institute
2. Accessibility to industry & nearby institute like IIT Delhi, NITRA Ghaziabad, Textile Committee and NITRA Panipat.
3. Trend of technological developments in National & International perspective.

MPC-202N ENERGY STUDIES

L T P
3 - -

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

UNIT-I

Introduction: Types of energy, Conversion of various forms of energy, Conventional and Nonconventional sources, Need for Non-Conventional Energy based power generation.

Energy Management: General Principles of Energy Management, Energy Management Strategy.

Energy Audit & Tariffs: Need, Types, Methodology and Approach.

UNIT-II

Conventional Energy sources: Selection of site, working of Thermal, Hydro, Nuclear and Diesel power plants and their schematic diagrams & their comparative advantages- disadvantages.

UNIT-III

Non Conventional Energy sources: Basic principle, site selection and power plant layout of Solar energy, photovoltaic technologies, PV Systems and their components, power plant layout of Wind energy, layout of Bio energy plants, Geothermal energy plants and tidal energy plants.

UNIT-IV

Energy Scenario: Lay out of power system, Role of Energy in Economic development, energy demand, availability and consumption, Commercial and Non-commercial energy, Indian energy scenario, long term energy scenario, energy pricing, energy sector reforms in India, energy strategy for the future.

Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.

Suggested Text Books & References:

1. Energy Studies-Wiley and Dream tech India
2. Soni, Gupta, Bhatnagar: Electrical Power Systems – Dhanpat Rai & Sons
3. NEDCAP: Non Conventional Energy Guide Lines
4. G.D. Roy: Non conventional energy sources
5. B H Khan: Non Conventional energy resources - - McGraw Hill
6. Meinel A B and Meinal M P, Addison : Applied Solar Energy- Wesley Publications
7. George Sutton: Direct Energy Conversion - McGraw Hill

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	

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 another six weeks Industrial Training after VI sem and it will be evaluated during VII sem through submission of certified computerized report to the Head of the Department followed by viva-voce, seminar/presentation.

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 dobby.
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.

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.

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

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.

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.

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.

7th Semester BACHELOR OF TECHNOLOGY (TEXTILE TECHNOLOGY) w.e.f. 2018-19

S. No.	Subject Code and Name	Teaching Schedule (hrs)				Examination Schedule (Marks)			Total Marks	Duration of Exam (hrs)
		L	T	P/D	Total	Sessional	Theory	Practical/Viva-voce		
1	TT- 401N: Technical Textiles I	4	1	---	5	25	75	---	100	3
2	TT- 403N: Fundamentals of Management	4	1	---	5	25	75	---	100	3
3	TT- 405N: Advanced Chemical Processing	4	1	---	5	25	75	---	100	3
4	Elective I	3	1	---	4	25	75	---	100	3
5	Elective II	3	1	---	4	25	75	---	100	3
6	TT- 407N: Advanced Chemical Processing Lab	---	---	3	3	40	---	60	100	3
7	TT- 409N: Project I	---	---	6	6	100	---	100	200	3
8	TT- 411N: Seminar	---	---	3	3	100	---	---	100	3
9	TT- 413N: Summer Training Report	---	---	---	---	100	---	---	100	3
Total		18	5	12	35	465	375	160	1000	

Elective I

S. No.	Subject Code and Name	Teaching Schedule (hrs)				Examination Schedule (Marks)			Total Marks	Duration of Exam (hrs)
		L	T	P/D	Total	Sessional	Theory	Practical/Viva-voce		
1	TT-415N: Process Control in Spinning	3	1	---	4	25	75	---	100	3
2	TT- 417N: Process Control in Chemical Processing	3	1	---	4	25	75	---	100	3

Elective II

S. No.	Subject Code and Name	Teaching Schedule (hrs)				Examination Schedule (Marks)			Total Marks	Duration of Exam (hrs)
		L	T	P/D	Total	Sessional	Theory	Practical/Viva-voce		
1	TT- 419N: Process Control in Garment	3	1	---	4	25	75	---	100	3
2	TT- 421N: Process Control in Weaving	3	1	---	4	25	75	---	100	3

8th Semester BACHELOR OF TECHNOLOGY (TEXTILE TECHNOLOGY) w.e.f. 2018-19

S. No.	Subject Code and Name	Teaching Schedule (hrs)				Examination Schedule (Marks)			Total Marks	Duration of Exam (hrs)
		L	T	P/D	Total	Sessional	Theory	Practical/ Viva-voce		
1	TT-402N: Technical Textile II	4	1	---	5	25	75	---	100	3
2	TT-404N: Textile Costing	4	1	---	5	25	75	---	100	3
3	TT-406N: Management of Textile Production	4	1	---	5	25	75	---	100	3
4	Elective III	3	1	---	4	25	75	---	100	3
5	Elective IV	3	1	---	4	25	75	---	100	3
6	TT-408N: Project II	---	---	9	9	100	---	100	200	3
7	TT-410N: Seminar	---	---	3	3	100	---	---	100	3
8	TT- 412N: Comprehensive Viva-voce	---	---	---	---	100	---	---	100	---
9	TT-414N: General Fitness for the Profession	---	---	---	---	---	---	100	100	3
Total		18	5	12	35	425	375	200	1000	

Elective III

S. No.	Subject Code and Name	Teaching Schedule (hrs)				Examination Schedule (Marks)			Total Marks	Duration of Exam (hrs)
		L	T	P/D	Total	Sessional	Theory	Practical/ Viva-voce		
1	TT-416N: High Performance Fibres	3	1	---	4	25	75	---	100	3
2	TT-418N: Industrial Engineering	3	1	---	4	25	75	---	100	3

Elective IV

S. No.	Subject Code and Name	Teaching Schedule (hrs)				Examination Schedule (Marks)			Total Marks	Duration of Exam (hrs)
		L	T	P/D	Total	Sessional	Theory	Practical/ Viva-voce		
1	TT-420N: Nonwoven Technology	3	1	---	4	25	75	---	100	3
2	TT-422N: Processing of Man Made Fibres and Blended Textiles	3	1	---	4	25	75	---	100	3

TT-401N
TECHNICAL TEXTILES - I

L T P
4 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

Unit I:

Introduction, definition and growth of technical textiles, Classification of Technical Textiles. Brief idea about technical fibres. Role of yarn construction, fabric construction and composite materials.

Unit II:

Filtration:

Textile and other filter media for dry and wet filtration. Filtration parameters. Theory of dust collection and solid liquid separation. Filtration requirements. Role of fibre, fabric construction and finishing treatments. Concept of pore size and particle size. Mathematical models. Nano filters.

Unit III:

Geotextiles:

Types of geosynthetic and their uses. Functions and application areas of Geotextiles. Essential properties. Fibre and fabric selection criteria for geotextile applications. Mechanics of reinforcement, filtration and drainage by Geotextiles.

Natural fibre Geotextiles.

Methods of long term prediction of geotextile life and survivability in soil. Geotextile testing.

Unit IV:

Textiles in Transportation:

Introduction to automotive textile. Application of textiles in automobiles. Fibre requirements. Textile in passenger cars – tyres, airbags, seat belts, hoses and filters. Textiles in other road vehicles. Railway application. Application in aircraft and marine.

Textile as structural elements in transport vehicles

Reference.

1. “ Handbook of Technical Textiles”, Ed. A R Horricks and S C Anand, Woodhead Publication Ltd, Cambridge, 2000
2. “ Handbook of Industrial Textiles”, Ed. Sabit Adanur, Technomic Publishing Co. INC

TT – 403N
FUNDAMENTALS OF MANAGEMENT

L T P
4 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

UNIT-I Financial Management

Introduction of Financial Management, Objectives of Financial Decisions, Status and duties of Financial Executives. Financial Planning – Tools of financial planning. Management of working capital, Factors affecting requirements of working capital. Capital structure decisions. Features of appropriate capital structure. Sources of finance.

UNIT-II Personnel Management

Personnel Management – Meaning, Nature and Importance; Functions of Personnel Management – (a) Managerial Functions and (b) Operative functions. Job Analysis: Meaning and Importance; Process of Job Analysis; Job Description and Job specification. Human Resource Development- Meaning and concept.

UNIT-III Production Management

Production Management : Definition and Objectives
Plant location: Ideal plant location. Factors affecting plant location.
Plant Layout : Ideal plant layout, factors affecting plant layout.
Work Measurement : Meaning, Objectives and Essentials of work measurement.
Production Control : Meaning and importance of production control and steps involved in production control.

UNIT-IV Marketing Management

Modern Nature, scope and importance of marketing management. Marketing concepts. Role of marketing in economic development. Marketing Mix. Marketing Information System. Meaning, nature and scope of International Marketing.

NOTE : The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidates shall have to attempt five questions in all, selecting at least one question from each unit.

Books Recommended

Text Books

1. Principles and Practice of Management - R.S. Gupta, B.D.Sharma, N.S. Bhalla. (Kalyani Publishers)
2. Organisation and Management - R.D. Aggarwal (Tata Mc Graw Hill)

Reference Books

1. Principles & Practices of Management – L.M. Prasad (Sultan Chand & Sons)
2. Management – Harold, Koontz and Cyrilo Donell (Mc.Graw Hill).
4. Financial Management - I.M. Pandey (Vikas Publishing House, New Delhi)
5. Management - James A.F. Stoner & R.Edward Freeman, PHI.
6. Marketing Management- Philip Kotler, PHI

TT-405N
ADVANCED CHEMICAL PROCESSING

L T P
4 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

Unit I:

Continuous open width processing, use of eco-friendly enzymes in wet processing. Continuous dyeing, Super critical CO₂ dyeing. New direct, reactive and disperse dyes. Grading and methods to determine fastness relating to washing, light, perspiration, sublimation and hot pressing treatment.

Unit II:

Novel printing techniques like Ink Jet printing or digital printing. Zero formaldehyde easy-care finishes, polysiloxanes based softener. Breathable water-proof fabrics. Antimicrobial finishing of textiles. Low wet pick up techniques.

Unit III:

Source of natural light, sources of artificial light, CIE illuminants, absorption and scattering of light. Beer-Lambert law, Additive and subtractive mixing. Standard observer color matching function, Tristimulus values, Chromaticity coordinates, Kubelka-Munk equation. Metamerism.

Unit IV:

Spectrophotometric curves and their relationship to perceived colors. Principle of spectrophotometer. Colorimeter, Munsell system of color specification. Relationship of hue, value and chroma. Whiteness and yellowness indices. Computer aided color matching and recipe prediction

Reference:

1. "Colourage" Journal
2. "Asian Dyers" Journal
3. "Asian Textile Journal" Journal
4. "Man-made Textiles in India" Journal
5. Shah and Gandhi, "Instrumental Color", Mahajan Book Distributors.
6. Shore J. "Computer Aided Colour Matching", SDC U.K 1998 ISBN.
7. AATCC Technical Manual

TT- 407N

ADVANCED CHEMICAL PROCESSING LAB

L T P
- - 3

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

List of Experiment:

1. Identification of dye on a dyed cotton sample
2. Determination of wash fastness of a dyed sample
3. Determination of Crock fastness of a dyed sample
4. Calibration of a UV-visible transmittance based spectrophotometer
5. Assessment color strength (K/S) of dyed sample
6. Relation between color strength (K/S) and dye uptake
7. Assessment of color difference between samples
8. Determination Lab values and construction of hue and shades based on that.

TT – 415N
PROCESS CONTROL IN SPINNING

L T P
3 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

Unit I:

Importance of process control. Control of mixing quality and cost using Linear Programming. Bale management. Bale management: The concept, Instrumental evaluation of cotton, The final goal-bale management, the control, Step by step implementation of bale management. Control of cotton contamination. Control of cleaning efficiency and waste in blow room and card. Control of waste in comber.

Unit II:

Yarn Irregularity: Concept, Measurement, and Interpretation, Types of Irregularity, Causes of yarn irregularity, Index of Irregularity, Application.

Variance length curves: Fundamental considerations of the variance-length curve, Interpretation of V(l) and B(l) curves, Important characteristics of variance-length curve, Short term and Long term unevenness, Stacked variance length curve.

The spectrogram: Comparison of the diagram and spectrogram, Spectrogram Harmonics, causes of periodic defects, effect of doubling on periodic variation, Control of periodic mass variations.

Drafting wave: Definition, Causes of formation, Quasi-periodic irregularity, causes of drafting waves, Amplitude of drafting wave, Yarn irregularity due to drafting waves.

Yarn hairiness: Importance of Hairiness, Generation of yarn hairiness, Factors effecting hairiness, Effect of Preparatory and Spinning process on hairiness, Measure to reduce Hairiness, Periodic variation in hairiness, Hairiness Testing.

Unit III:

Imperfections: Concept, Measurement, and Interpretation; Importance of thin places, thick places and neps in the textile industry.

Yarn Faults: Importance of Yarn Faults, Determination of Yarn Faults, Various reasons for different types of Yarn Faults. Contribution of Raw material, Blow room and carding, Combing, Draw frame, Speed frame and Ring frame to yarn faults.

Control of yarn count and count CV%, between bobbin lea count variations, Minimizing lea count variation, Effect of count CV on strength CV.

Control of strength, and strength CV%, Mechanism of Strength Generation, Yarn failure mechanism, Influencing Factors, Variables which can affect yarn tensile properties, Influence of humidity of the room on the breaking force, instrument set up affect tensile properties.

Control of end breaks: Mechanism of end breakage in ring spinning, Causes of end breaks in spinning.

Unit IV:

Yarn realisation and Process waste control: Control of measure, Method of consolidating waste, Waste losses at various stages like Blow room, Cards, Combers, Yarn waste, Sweepings, Invisible loss. Judging yarn realization of a mill

Measures for improving performance of blow room and card

Evaluation of auto leveler in draw frame

Measuring for improving performance of comber, draw frame and speed frame

Towards better performance of ring frame in terms of quality and productivity

Measurement of productivity of a spinning mill and means to improve it,

Machinery Audit: Differences with routine Maintenance, Implementation of the system of machinery audit, Tools for machine audit, Machinery Audit in Spinning : Check List, Test Instruments for Machinery Audit

Analysis and interpretation of statistical data. Total quality control.

Reference.

1. Grade, A. R., and Subramaniam T. A., "Process control in cotton spinning" ATIRA, Ahmedabad, 2nd Ed. (1978).
2. Salhotra, K. R., and Ishtiaque, S. M., "Process control in spinning", IIT Delhi, CD cell (2001).
3. Ratlam, T. V., "Quality control in spinning" SITRA, Coimbatore(1994).
4. Chattopadhyay, R., "Advances in Technology of Yarn Production, 1st Ed., NCUTE, IIT Delhi (2002).
5. GAR Foster, "Manual of Cotton Spinning Vol IV"

TT-417N
PROCESS CONTROL IN CHEMICAL PROCESSING

L T P
3 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

Unit I:

Importance of process and quality control in chemical processing. Quality of grey fabrics, selvage quality, stains in grey fabric, overall assessment of quality of grey fabrics. Stitching of grey pieces, common stitching defects and method for assessing stitching quality. Process control in shearing and cropping.

Unit II:

Singeing - Process control in singeing, parameters to control the singeing process
Desizing - Enzyme desizing, parameters to control the enzyme desizing process
Scouring - Parameters to control the pressure boil scouring
Mercerizing – Parameters to control the mercerization process,
Bleaching - Sodium hypochlorite & Hydrogen peroxide, treatment on J-box, pad roll bleaching, washing and drying.
Process control in Heat Setting process.

Unit III:

Process control in Dyeing - Fiber and yarn package dyeing,
Fabric dyeing - Satisfying basic needs, selection of dyes, process control in jigger dyeing, high temperature beam or jet dyeing, continuous dyeing.
Process control in Printing: Selection of thickening agent and preparation of printing paste, printing recipe, printing, fixation, after treatments.
Process control in Finishing: Stenter or felt calendar for temporary finishes, durable finishes: resin finishing, calendaring, decatizing, weight reduction, carbonisation

Unit IV:

Evaluation of dyes - Dyestuff performance test, critical temperature test, migration test and build-up tests.
Textile Chemicals & auxiliaries - Wetting agents, Levelling Agents, Cross linking Agents, Thickeners & Binders for printing, OBA, Softners etc.
Evaluation of processed fabric at different stages: desizing, scouring, bleaching mercerization, heat setting, dyed printed and finished fabric.

References

1. ATIRA / BTRA Books of journals.
2. "Process control in processing" by ATIRA.

TT – 419N
PROCESS CONTROL IN GARMENT

L T P
3 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

UNIT-I

Automation in Garment Industry-Information Technology in Garment Industry, Microprocessor based machinery in design, pattern making, market making, cutting, sewing, embroidery, programmable machines.

Production planning in garment manufacturing; Cost structure in garment manufacturing; Production technology – manual and mechanical systems. Quantitative Production analysis, co-ordination of activities, Check list sheet, Time and motion study: need, Improving production efficiency,

UNIT-II

Stitch application for woven and knitted garment: Stitch identification, Application, Advantages and disadvantages, Proper stitch formation.

Common seam quality defect: Seam rupture on stretch knits, Skipped stitches, Stitch Cracking, Seam slippage and Needle cutting, Causes and remedies

Seam puckering: types, major causes and solution to puckering.

UNIT-III

Sewing Thread selection: Right thread to optimize seam quality, fibre type, thread construction, thread size. Advantages of core-spun sewing thread, Quality aspect of industrial sewing thread. Needle size, needle numbering system

Sewability: Quality parameters for assessing sewability, seam strength, seam pucker, seam slippage, needle cutting.

UNIT-IV

Quality control aspects of garment exports

Quality systems for garment (manufacture), the nature of quality costs, the functions of quality assurance and quality control; evaluating care and appearance, evaluating material contribution, Inspection standard for apparel,

Inspection systems – raw material inspection, in process inspection, final inspection, how much to inspect? Comparability checks; Audit inspection

References:

1. An Introduction to Quality Control for Apparel Industry by PV Mehta
2. Managing Quality for Apparel Industry by PV Mehta & SK Bhardwaj
3. Garment Technology, NCUTE Publication
4. Testing and Quality Management (Vol-1) by V.K. Kothari

TT – 421N
PROCESS CONTROL IN WEAVING

L T P
3 1 0

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

UNIT: I

Importance and consideration for evolving a system for process control in winding, warping, sizing and weaving. Key parameters at winding, Quality and productivity in winding, Control of package faults, measuring principle. Process control in pirn winding: minimizing end breaks, improving the build of the pirn, control of productivity, causes of low productivity.

UNIT: II

Process control in warping: minimizing end break in warping, performance assessment of warping, quality of warp beam, control of productivity, causes of low productivity. Common defects & remedies at warping.

Process control in sizing: control of yarn stretch, performance assessment in sizing, quality of sized yarn, control of productivity, control of size losses. Common defects at sizing & remedies. Common defects in drawing-in & remedies, Costing calculations in drawing-in. Standard norms for setting speeds and production rates at different stages.

UNIT: III

Control of productivity in loom shed, Analysis of warp breaks, Control of loom efficiency, Control of loom stops, Quality of yarn, Loom performance, Control of loss of efficiency by snap reading, Optimum loom allocation

Types and classification of fabric defects, Measures for fabric defect control. Control and norms of hard waste in various processes, care, selection and consumption norms of accessories. Control of fabric quality at loom state.

UNIT: IV

Operative, Running, Machine Efficiency and Service factor. Importance and types of maintenance, Maintenance schedule in winding, warping, sizing and loomshed. Calculations pertaining production and efficiency. Machine allocation in winding, warping, pirn winding, sizing and loom shed. Machine audit.

References:

1. Control in Weaving” ATIRA Ahmedabad, 2nd Ed(1978).
2. Weaving Machines Mechanisms Management, by Talukdar MK, Sriramulu PK, Ajgaonkar DB.

TT-402N
TECHNICAL TEXTILE - II

L T P
4 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

Unit I:

Medical Textiles:

Introduction and classification of Medical Textiles. Fibres used for medical applications. Medical Drapes and Linen. Implantables – sutures, soft tissue implants, hard tissue implants, vascular implants. Nonimplantables – surgical dressing, bandages. Extracorporeal devices, Tissue Engineering. Healthcare and Hygiene products. Super absorbent polymers, hydrogels.

Unit II:

Protective Textiles:

Different types of protective clothing. Functional requirements of defense clothing including ballistic protection, parachute, temperature and flame retardant clothing. Chemical and Biological protective clothing. Water proof breathable fabric.

Unit III:

Technical Textiles in Apparel Sector:

Introduction to Smart Technology for textile and clothing. Areas of application of smart textile. Pathogen barrier fabric, fibres used for pathogen barrier application. Clothing for extreme climatic conditions - wearable technology for snow clothing, high altitude clothing. Electromagnetic radiation protective clothing.

Unit IV:

Other Applications:

Sportech – Sport uniforms, sporting equipments, textiles in sport surfaces
Agrotech – General applications and fibres used in agriculture, horticulture, fishing and animal husbandry
Buildtech – Architectural membranes, hoardings and signages, awnings and canopies.
Packtech. Ropes and cordages. Canvas covers and tarpaulins.

References:

1. “Handbook of Industrial Textiles”, Ed. Sabit Adanur, Technomic Publishing Co. INC
2. “Handbook of Technical Textiles”, Ed. A R Horricks and S C Anand, Woodhead Publication Ltd, Cambridge, 2000
3. “ Textiles for protection, Ed. Richard A. Scott, Woodhead Publication Ltd, Cambridge,
4. “ Wearable Electronics and Photonics, Ed. Xiaoming Tao, Woodhead Publication Ltd, Cambridge

TT-404N
TEXTILE COSTING

L T P
4 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

Unit I: Fundamentals of Costing

Cost concept. Classification of cost, elements of cost. Methods of costing. Unit and operating costing, preparation of cost sheet. Estimation of cost of production and component of total cost. Profit planning, job order, batch process, conversion cost. Inventory costing.

Unit II:

Cost-Profit-Volume analysis, break even point, contribution margin, margin of safety, angle of incidence. Capital budgeting.

Unit III: Cost Structure in Textile Industry

Cost structure, cost of raw material/labour/utilities. Cost control, standard costs, determination of cost per kg of yarn, per metre of fabric, cost of dyeing/printing per metre of fabric, yarn realization, measures of cost reduction, selling price decision for yarn/fabric. Concept of depreciation.

Unit IV: Labour Allocation and Rationalization of Labour

Labour allocation in different department of textile mill. Work-load standards for card tenters, speed frame and ring frame tenters, doffers and winders, weavers, etc. Costing of large package spinning and optimum package size. Costing of Open end spun and Air-jet spun yarns.

Waste and its control at spinning and weaving, Costing of shuttle-less looms like Sulzer, air-jet. Economics of shuttle loom,

References:

1. Textile Costing by SITRA.
2. Khan and Jain, "Management Accounting", Tata McGraw-Hill Publication.
3. Oowler, L. W. J., Brown, J. L., "Wheldon's Cost Accounting and Cost Methods", ELVS Publication.

TT-406N
MANAGEMENT OF TEXTILE PRODUCTION

L T P
4 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

UNIT-I: Indian Textile Industry

Structure of Indian Textile Industry, Organized and Decentralized Sector, Handloom sector, Production and export, Sickness in Textile Industry.

Location and Layout : Plant location and site selection , Factors affecting location , plant lay- out, Different type of layouts, Layout plan for spinning, weaving and process house.

UNIT-II: Production, Planning and Control

Product mix decision, linear programming concept, Supply chain management, Concept of zero defects, Management information system.

Inventory Management: Inventory concepts, techniques to reduce inventory, ABC analysis, EOQ, P and Q systems.

Enterprise Resource Planning: ERP concept, Applications of ERP, Ways to use ERP.

UNIT-III:

Air Conditioning and humidification: Humidification systems used in textile mills, Development in humidification systems.

Power Consumption: Energy consumption in textile machines, Measure to reduce power consumption.

Maintenance Management: Maintenance systems, Maintenance schedules.

Work Management: Basics of work load and work assignment, effect of end breaks on work assignment.

UNIT-IV:

Working Environment: Measures of good working environment, Measures to minimize noise, terms related to lighting, illumination level required for different departments, Material handling equipments, Accidents and safety engineering, Fire prevention and protection.

Suggested Text Books and References:

1. Dudeja V D , “*Management of textile Industry*” Textile Trade Press Ahmedabad (1981)
2. Ormerod A, “*Textile Project Management*” The Textile Institute , Manchester UK(1992)
3. Talukdar M K ,Srirammulu P K and Ajgaokar D B , “*Weaving – Machine , Mechanism and Management ,*” Mahajan Publisher Private Ltd., Ahmedabad , India (1998)

4. Grade A R and Subramanian T A , “Process Control in Spinning,” 3rd Edition., ATIRA Ahmedabad, (1987)
5. Higgins, “*Handbook of Maintenance Management*,” Prentice Hall New York (1999).

TT-416N

HIGH PERFORMANCE FIBRES

L T P
3 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

Unit I:

Fully aromatic polyamide or aramid fibers: Nomex and Kevlar - Polymerization, spinning properties and applications

Ordered Polymeric Fibers: High molecular weight polyester, rigid rod and ladder polymers such as PBL, PBZT, PBO, PBI.

Unit II:

Carbon Fibers: Manufacturing of carbon fibres from PAN precursors, viscose and pitch fibres. Pre-oxidation, carbonization and graphitization. Chemical and structural changes in structure during these fibers. Structure and Properties of these fibers.

Liquid crystal fibres, Gel spinning

Unit III:

Flexible Chain based high performance fibers: High and ultramolecular weight polyethylene. Structure and properties of these fibers.

Optical Fibers: Definition, working principle of optical fibers, different materials used for manufacturing of optical fibers, different types of optical fibers. Manufacturing process of optical fibers and their applications. Hollow and profile fibres, design of spinnerette for such fibres.

Unit IV:

Glass fibres. PEEK fibers, Soyabean fibers etc. Membrane technology. Blended and bicomponent fibres. Medical textiles (fibers used in Medical textiles). Superabsorbent fibres.

Plasma modification. Radiation processing. Industrial tapes. Biaxially oriented films and film fibres. Barrier films and coatings.

Suggested Text Books and References:

1. P. Bajaj & A.K. Sengupta, "High performance fibers"
2. M. Lewin & J. Preston, "High Technology Fibers (Part A, B, C,D)"
3. Lewin & Pearce, "Handbook of Fiber Chemistry". CRC Press LLC; 2 edition (Feb 26 998)

TT – 418N

Industrial Engineering

L T P
3 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

UNIT I

Introduction to work study, Method study, Basic procedure, Recording techniques (charts and diagrams), Elemental breakdown, Micro-motion studies, Therbligs, SIMO-chart, Principles of motion –economy.

Introduction, Objectives, technique, (time) information recording, methods of timings, Time study allowances, Work sampling technique, Performance rating and its determination PMTS, M. T. M., Work factor.

UNIT II

Principles of organization, Importance and characteristics of organization, Organization theories, Classical Organization theory, Neo-Classical organization theory, Modern organization theory, Types of organization, Military or line organization, Functional organization, Line and staff organization, Committees.

Objectives of PPC, Functions of PPC, Preplanning and planning, Routing, Estimating, scheduling-master schedule, and Daily schedule, Gantt chart, Dispatching –centralized vs. decentralized, Control, Follow up and progress reporting.

Introduction, Product development, Product characteristics, Role of product development, 3Ss – Standardization, Simplification and Specialization.

UNIT III

Introduction, Objectives and importance of sales forecasting, Types of forecasting, Methods of sales forecasting-Collective opinion method, Delphi technique, economic indicator method, Regression analysis, Moving average method, Time series analysis.

Introduction, Functions of inventory, Types of inventory, Control importance and functions, Inventory costs, Factors affecting inventory control, Various inventory control models. A. B. C. analysis, Lead-time calculations.

UNIT IV

Introduction, Objectives, Concept and life cycle of a product and V.E., Steps in VE. Methodology and techniques, Fast diagram, Matrix method.

Various concepts in industrial engineering

- a) WAGES AND INCENTIVES, -Concept, Types, Plans, Desirable characteristics.
- b) ERGONOMICS, - its importance, Man-machine work place system, Human factors considerations in system design.
- c) SUPPLY CHAIN MANAGEMENT, - its definition, Concept, Objectives, Applications, benefits, Some successful cases in Indian Industries.
- d) JIT, - Its definition, Concept, Importance, Misconception, Relevance, Applications, Elements of JIT (brief description).
- e) MRP,-Introduction, Objectives, factors, Guide lines, Techniques Elements of MRP system, Mechanics of MRP, MRP-II

- f) TIME MANAGEMENT,-Introduction, Steps of time management, Ways for saving time, Key for time saves.

Reference and Textbooks:

- ❖ Production planning and control by S.Elion
- ❖ Modern production Management by S.S Buffa
- ❖ Industrial engg. and management manufacturing system by Surender kumar, Satya prakashan
- ❖ Essence of Supply Chain Management by R.P mohanty and S.G Deshmukh
- ❖ Industrial engg. and management by S Sharma and Savita sharama

TT- 420N
NONWOVEN TECHNOLOGY

L T P
3 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

UNIT-1: Web Formation Technique

Definition of nonwoven, manufacturing steps of nonwoven fabrics, major fibres which are used for manufacturing of nonwovens, classification of nonwoven.

Parallel laying and Cross laying techniques, Aerodynamic laying, wet laying technique, spun-bond technique and melt-blown technique.

UNIT-2: Mechanical Bonding

Needle punching machine, needle board parameters, needle design, needle parameter, needle modification. Factors affecting fabric structure and fabric mechanical properties. Stitch bonding technique- Maliwat & Malivlies Stitch Bonding Technique, Calculation of machine production.

UNIT-3: Chemical and Thermal Bonding

Bonding agents, forms and classes of adhesives or binders, characteristics required, factors affecting adhesion, various bonding technique: spraying bonding, print bonding, saturation bonding.

Advantages of thermal bonding over chemical bonding, different types of binders. Bonding methods: hot calendaring, belt calendaring. Factors that affect the properties of calendar bonded products. Fusion bonding, bonding types: through perforated drums and perforated belts.

UNIT-4

Dry finishing of nonwoven- Shrinkage, Wrenching, Creeping, and Glazing. Wet finishing of nonwoven: Washing, Dyeing, Printing. Chemical finishing: Antistatic, Antimicrobial, Water repellent, Flame retardant, Water absorbency.

Defects of nonwoven fabrics. Test methods for nonwovens. Application of nonwoven materials.

Suggested Text Books and References:

1. Madhavamoorthy, P., Shetty, G.S., NONWOVEN, Mahajan Publishers Pvt. Ltd., 2005
2. Lunenschloss J and Albrecht W, "Non-woven Bonded Fabric", Ellis and Horwood Ltd., UK(1985)
3. Crema Radco, "Manual of nonwovens", Textile trade Press, UK(1971)
4. Albrecht W, Fuchs H and Kittelmann, "Nonwoven Fabrics", Wiley-VCH Weinheim(2003)

TT-422N
PROCESSING OF MAN MADE FIBRES AND BLENDED
TEXTILES

L T P
3 1 -

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

Note- Nine questions will be set in the question paper i.e. two from each unit. The students will be required to attempt one question from each unit. Question no. 1 is compulsory. It is objective type 10 questions of multiple choices covering the entire four units.

UNIT -I

Pretreatment of man made and blends : Pretreatment of polyester , nylon , acrylic, and their blends , viz. singeing ,desizing , scouring , bleaching ,mercerizing and heat setting. Pretreatments machineries.

UNIT -II

Dyeing of man made : Role of fibre structure in dyeing of man made .Dyeing of polyester & its blend. HTHP, Thermofixation and carrier dyeing. Dyeing of nylon and its blend. Dyeing of acrylic with disperse, acid and cationic dyes. Dyeing of differentially dyeable man made.

UNIT - III

Printing of man made and blends: Direct, resist and discharge styles of printing of polyester, nylon, acrylic and their blends. pigment printing and carbonised prints of polyester. Transfer printing of polyester , nylon, acrylic and their blends.

UNIT -IV

Finishing of Manmade and Blends: Mechanical finishing: calendaring, raising, emerising, decatizing. Optical whitening , anti-pilling and durable press finishes . Soil release, water repellent and flame retardant finishes on manmade and blends. Anti static finish.

Suggested Text Books and References:

1. Nunn D M, "*The dyeing of syntetic polymer and acetate fibres,*" Dyers company publication trust London (1979)
2. Shore J, "*Colorants and auxiliaries ,*" Vol-I and II , Society of dyers and colorists , Bradford , England (1990)
3. Gulrajani M L , "*Polyester Textiles ,*" Book of paper : 37th National Textile Conference ,The Textile Association (India) Mumbai (1980).
4. Gulrajani M L , "*Blended Textiles ,*" Book of paper : 38th National Textile Conference ,The Textile Association (India) Mumbai (1981).
5. Datye K V and Vaidye – A A, "*Chemical Processing of Synthetic Fibres and blends,*" John Wiley and Sons,New York (1984).