Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of Program M.TECH (Textile Engineering)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
MTTX201	DCS	NONWOVEN SCIENCE AND ENGINEERING	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objective (CEOs):

The students will be able to get the basic knowledge about principle of manufacturing and applications of nonwoven materials to the extent of their technical use .

Course Outcomes (Cos):

Students will be able to:
1. Understand the manufacturing process of nonwovens.
2. Apply knowledge in development of new nonwoven products.
3. Understand the fundamentals of testing and evaluation of nonwovens.
4. Illustrate basic knowledge about the various defects of nonwovens and their solutions.

Syllabus
UNIT I

Introduction to nonwovens, Materials used in nonwovens, classification and areas of application of nonwoven fabrics, Principles of nonwoven processes: web formation processes, mechanical and Thermal bonding processes, needle punch, spun bond and spunless processes, hydro entanglement and chemical processes etc

UNIT II

Testing and evaluation of nonwovens: international standards, structure of nonwovens, and properties of nonwovens, Scientific analysis of structure and properties of nonwovens: fibres and their arrangement, pores and their organization,

UNIT III

Mechanics of nonwovens, fluid flow and fluid absorption, filtration, barrier and breathability, thermal insulation, and acoustic absorption,

UNIT IV

Engineering of advanced nonwoven products: medical nonwovens, nonwoven wipes, nonwoven filters, automotive nonwovens, and home furnishing nonwovens,

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UNIT V

Design and development of new nonwoven products: theories, market study, product costing, case studies, and intellectual property rights.

List of References:

1. Spencer D J, "Knitting Technology", 2nd Ed., Pergamon Press, 1989.
2. Lunenschloss J and Albrecht W, "Non-Woven Bonded Fabric", Ellis and Horwood Ltd., UK,
3. 1985.
4. Albrecht W, Fuchs H & Kittelmann, "Nonwoven Fabrics", Wiley-VCH Weinheim, 2003.
5. Mrstina V & Fejgal F, "Needle punching textile technology", Elsevier, 1990.
6. Krcma Radco, "Manual of nonwovens", Textile Trade Press, UK,1971
7. Gulrajani M L, "Book of Papers of International Conference on Nonwovens", The Textile
8. Institute, UK, 1992
9. Journals: Textile Research Journal, Princeton, USA and Journal of Textile Institute, Manchester, UK.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTTX202	DCS	ENGINEERING OF TEXTILE STRUCTURE	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objective (CEOs):

Student will get knowledge on the theoretical aspect of the geometrical configuration of yarn and fabric and designing of new yarn and fabric structures to the extent of R&D purpose.

Course Outcomes (Cos):

Students will be able to:
1. Indentify and analyze the complex behaviour of yarn structure.
2. Apply knowledge to explain the tensile behaviour of the yarn .
3. Understand the fundamentals of fibre migration.
4. Illustrate basic knowledge about the physical properties of yarn and fabric.

Syllabus

UNIT I

Yarn diameter and count, density, specific volume, Yarn count and twist Factor, Twist Angle and helix angle, twist contraction and retraction packing of fibers and packing fraction, close packing and open packing of fibres, optimum level of twist. Problem solving of various

UNIT II

Effect of twist on yarn strength, Stress-stain curve, Young's modulus, tenacity, RKM etc. Ideal yarn geometry assumptions various relationship and related calculation, mechanics of yarn structure, tensile behavior of staple yarn, and tensile behavior of continuous filament yarn, low strain and large stain model.

UNIT III

Migration of fibre**,** Migration factors controlling and effect of migration in yarn structure, Morton's view of fiber migration in yarn. Various models examples and solutions.

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UNIT IV

Woven cloth setting theories, elements of woven fabric geometry- ends and picks count cover factor, crimps and weight. Cover factors and its relations with fabric weight.

UNIT V

Pierce's simple geometry of plain weave, derivation of basic equations, practical application of cloth geometry, crimps interchange, fabric assistance. Drape of fabric and drape coefficient.

References:

1. Pierce paper on fabric geometry
2. Textile yarn- Grosberg
3. Textile yarn- Technology, Structure and Application – B.C. Goswami, Martindale, Scardino
4. Structural Mechanics of Fibers , Yarns & Fabrics - Hearl , Grosberg & Backer
5. Textile Manufacturing – M.G. Kulkarni

Name of Program M.TECH (Textile Engineering)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
MTTX203	DCS	ADVANCES IN MANUFACTURED FIBRES	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objective (CEOs):
Student will achieve the knowledge of all man made fibres with the working principle, construction, applications of high performance fibres to the extent of their practical applications.

Course Outcomes (Cos):
Students will be able to:
1. Understand the various spinning process of fibres.
2. Apply knowledge to solve problems occurred at the time of manufacturing of fibres.
3. Understand the fundamentals of hollow and bicomponent fibres .
4. Apply their knowledge in development of new fibre product.

Syllabus
UNIT I
General definition of manmade or manufactured fibres, melt spinning, dry spinning, wet spinning, solution spinning and gel spinning. Extruder design, spin head, spinneret, quench chamber. Spin finish application, wind up mechanism.

UNIT II
Production techniques and properties of aromatic polyamides & polyesters, Rigid rod and ladder polymers such as Kevlar, Nomex, BBL, PBZT, PBO, PBI, Manufacturing of carbon fibres from PAN precursors, viscose and pitch fibres, Liquid crystal fibres, High performance polyethylene fibres, Ceramic fibres,

UNIT III
Introduction to new developments. Other fibres including PU, PVA, PE, PVC and polyvinylidene chloride. Primary and secondary variables and their effect on melt spinning. High speed spinning, spinning of microfibre,

UNIT IV

Profile fibres, hollow & porous fibres, spandex fibres; Biodegradable fibres, polylactic acid fibres, chitosan fibres, their preparation properties and applications;

UNIT V

Bicomponent fibres, blended fibres; Fibres in medicine and biotechnology; Aesthetic fibres, bio-mimicking fibres; Membranes; Smart fibres; Comfort fibres; Fibres for Ballistic protection; Photochromatic fibres.

References:
1. Vaidya A A, "Production of Synthetic Fibres", 1st Ed., Prentice Hall of India, New Delhi,1988.
2. Gupta V B and Kothari V K, "Manufactured Fibre Technology", 1st Ed., Chapman and Hall, London, 1997
3. Mark H F, Atlas S M and Cernia E, "Man Made Fibre Science and Technology", Vol. 1, 2, 3, 1st Ed., Willey Inter Science Publishers, New York, 1967.
4. Macintyre J E, "Synthetic Fibres", Woodhead Fibre Science Series, UK, 2003.
5. Fourne F, "Synthetic Fibres: Machines and Equipment, Manufacture, Properties", Hanser Publisher, Munich, 1999.

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Name of Program M.TECH (Textile Engineering)
MTTX204 (Elective-III)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
MTTX224	DCS	TECHNICAL TEXTILE	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objective (CEOs):
> Student will be able to gain knowledge on basic requirement for technical textile product, manufacturing process and application of technical textiles to extent of their practical use.

Course Outcomes (Cos):
> Students will be able to:
> 1. Understand the requirements for development of technical products.
> 2. Apply knowledge and analyze to solve the complex problems occur at the time of manufacturing process.
> 3. Understand the fundamentals of automotive textiles.
> 4. Illustrate basic knowledge about the filter fabrics.
> **5.** Develop new technical products.

Syllabus
UNIT I
> Definition, classification, products, market overview and growth projections of technical textiles. Fibres, yarns and fabric structures in technical textiles and their relevant properties.

UNIT II
> Filtration: Textile and other filter media for dry and wet filtration. Mechanisms of separation. Requirements for good filter media and filtration. Fibre and fabric selection for filtration.

UNIT III
> Geotextiles: Types and application of geosynthetics. Functions and application areas of geotextiles. Fibres and fabric selection criteria for geotextile applications. Mechanics of reinforcement, filtration and drainage by geotextiles. Soil characteristics. Methods of long term prediction of geotextile life and survivability in soil.

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UNIT IV

Automotive Textiles: Application of textiles in automobiles. Requirement and design for pneumatic tyres, airbags and belts. Methods of production and properties of textiles used in these applications.

UNIT V

Sewing threads, cords and ropes: Types, method of production and applications. Functional requirements, structure and properties. Miscellaneous: Functional requirements and types of textiles used for paper making, agricultural, architectural, packaging and footwear.

List of References:

1. Technical Textiles - NCUTE Programme Report 2002 - Prof. P.A.Khatwani, S.S.Yardi
2. Guide to Geotextiles Testing - J.N. Mandal, D.G.Divshikar
3. Coated and Laminated Textiles - Walter Fung
4. Advances in Fibre Science - S. K. MukhopadhyayComposite Technologies - Stuart M. Lee
5. Handbook of Fibre Rope Technology - H.A. Mckenna et.al. Textile Inst. Pub.
6. Smart Fibres fabrics and clothing - Xiaoming Tao
7. Fibre and Whisker Reinforce Ceramics for Structural Applications - David Belitskus
8. Mechanics of Textile & Laminated Composites - A.E.Bogdanovich & C.M.Pastore
9. Hand book of nonwovens, S. J. Russell, Woodhead 2007
10. Geosynthetics in civil engineering, R. W. Sarsby, Woodhead 2007
11. Handbook of Technical Textiles, Anand

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
MTTX234	DCS	TEXTURED YARN TECHNOLOGY	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objective (CEOs):
Student will get the knowledge about the manufacturing process of Textured yarns, bulking process with importance and applications of textured yarn correctly.

Course Outcomes (Cos):

Students will be able to:
1. Explain the core concept of texturing process.
2. Solve the problems occurred during manufacturing of glass textured yarns.
3. Develop the different structure of textured yarns.
4. Analyze the physical and mechanical behavior of Textured yarns.
5. Explain the principle & manufacturing process of air jet textured yarn.

Syllabus
UNIT I
Raw material Requirement for texturing of thermoplastics fibres. Theory of deformations and change of energy level. Change in crystallinity and amourphous structure and molecular rearrangement.

UNIT II
Principles of texturing of thermoplastics fibres and modern classification; False twist texturing process- mechanisms and machinery, optimization of texturing parameters, structure-property correlation of textured yarns; knit de knit, edge crimping, stuffer box etc

UNIT III
Draw-texturing- the need and fundamental approaches; Friction texturing- the need and development, mechanics of friction texturing, latest development in twisting devices, optimization of quality parameters. Noise control in texturing.

UNIT IV

Air jet texturing - Principle, mechanisms, development of jets and machinery, process optimization and characterization, air jet texturing of spun yarns. Air interlacement - Principle and mechanism, jet development and characterization.

UNIT V

Bulked continuous filament yarns - Need, principle, technology development. Hi-bulk yarns - Acrylic Hi-bulk yarn production, mechanism and machines involved, other such products. Solvent and chemical texturing - Need, texturing of synthetic and natural fibres.

References:

1. Yarn Texturing Technology by J.W.S. Hearle, L. Hollick, D.K. Wilson Woodhead Publishing Ltd, England.
2. Textile Yarn, Technology, Structure and Application" – Goswami B.C., Martindale, J.G., Scardino F.L., Wiley Interscience publication, 1977, U.S.A.
3. Wilson D.K. and Kollu T., "Production of Textured Yarns by the False Twist Technique", Textile Progress, Vol. 21, No.3, Textile Institute, Manchester, U.K.,1991.
4. Wilson D.K. and Kollu T., "Production of Textured Yarns by Methods Other than False Twist Technique", Text. Prog., Vol. 16, No.3.Textile Institute, 1981.
5. Gupta V.B. (Edr.), "Winter School on Man-made Fibers – Production, Processing, Structure, Properties and Applications", Vol. 1, 1988.
6. Hes L. Ursiny P., "Yarn Texturing Technology", Eurotex, U.K., 1994.
7. M. Acar and G.R. Wray., "An analysis of the air jet yarn texturing process Part-I: A Brief history of developments in the process", Journal of Text. Institute, Vol.77,No.1, p19-27, (1986).
8. K R Salhotra , "Spinning of man made fibres and blends on cotton systems", The textile Association, India 2004.
9. Hamburger, W. J., "The Industrial Application of the Stress-Strain Relationship", J. Textile Inst. 40, 700 (July 1949).

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Name of Program M.TECH (Textile Engineering)
MTTX205 (ELCTIVE-IV)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
MTTX225	DCS	ADVANCE SPINNING PROCESS	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objective (CEOs):

Students will get introduced with the theory of yarn formation by rotor spinning, friction spinning, air-jet spinning and other spinning systems with the extent of process parameters and quality of yarn.

Course Outcomes (Cos):

Students will be able to:
1. Apply knowledge for the manufacturing Process of various advanced yarns.
2. Solve the complex technical problem in manufacturing of advanced yarn.
3. Identify and analyze the structural difference of advanced yarn.
4. Design the automation required in the machineries.

Syllabus
UNIT I

Principle of open end spinning; description of the working of the rotor spinning; requirements of the raw materials; preparation of the sliver for rotor spinning; yarn formation and its structure; yarn withdrawal and winding; design of rotor, opening roller, transport tube, navel and their implications on production and yarn quality; developments in rotor spinning machine; production limits; process control; techno economic comparison with ring spinning.

UNIT II

Principle of yarn formation - DREF-2, DREF-3 spinning systems; developments in friction spinning systems; raw material requirement; effect of process variables on yarn quality; application of these machines for different end products; the economics; technological limitations.

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UNIT III

Description of the yarn production in air jet spinning machine; feasibility of higher draft applied in this machine; structure and quality of the air-jet spun yarn; raw materials requirement; process variables; production of by Airvortex system.

UNIT IV

Production of yarn in PLYfil , parafil, disc spinning, rubbing technique recpo, electrostatic, working details of the production of double-rove yarns, wrap yarns and core spun yarns; compact yarn, use of raw materials; economics of these methods of yarn production; yarn characteristics and their applications.

UNIT V

Adhesive spinning system, mechanism of twist-less spinning, take-ja process, pavena process Bobtex spinning systems; properties of such yarn, their usefulness and applications.

List of References:

1. Oxtoby E., "Spun Yarn Technology", Butterworths, London, 1987.
2. Klein W., "New Spinning Methods ", The Textile Institute, Manchester, 1993.
3. Dyson E., "Rotor Spinning, Technical and Economics Aspects ", Textile Trade Press, New Mills, Stock Port, 1975.
4. Salhotra K.R. and Ishtiaque S.M., " Rotor Spinning; its advantages ", Limitations and Prospects in India, ATIRA, Ahmedabad, 1995.
5. Lord P.R, " Yarn Production; Science, Technology and Economics ", The Textile Institute,Manchester, 1999.
6. Trommer G., "Rotor Spinning", Meliand Textilebenchte GmbH, Rohrbacher, 1995.
7. Lawerence C.A and Chen K.Z., "Rotor Spinning ", Textile Progress, The Textile Institute, Manchester, 1984.
8. Lawrence C. A., "Advances in yarn spinning technology" Wood head publishing, 2010, ISBN-13: 978 1 84569 444 9.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
MTTX207	DCS	TECHNICAL SEMINAR	0	0	0	0	50	0	0	2	1

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks

Course Educational Objectives (CEOs):
1. To improve the verbal communications and presentations skill of students.
2. To provide the extra knowledge on the topics beyond the syllabus.

Course Outcomes (COs)
   Student will be able to
1. Communication verbally with proper presentation skills
2. Develop the interaction skills.
3. Design the power point presentation of various topics.

Course Contents:

Each student is required to deliver at least four presentations throughout the semester. The duration of presentation is maximum 10 minutes and 5 minutes for question answer. Assessment will be done based on their presentation skill, communications skill and knowledge on the topics.

References:
1. Various websites, journals and magazines, reference books etc.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
			THEORY			PRACTICAL				
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
MTTX214	ODS	OPERATION RESEARCH	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objective (CEOs):
> To introduce the students with the Fundamentals of the Operations Research.

Course Outcomes (Cos):
> After the successful impletion of this course students will be able to
> 1. apply the methods of the OR and the LPP.
> 2. understand and design the graphical test of the LPP with conclusions.
> 3. know the fundamental principles of the simplex method and the duality.
> 4. solve the transportation problems.
> 5. find the solution of the assignment problems.

Syllabus

Unit I
> **Introduction to Operations Research & Linear Programming:** Introduction, Historical Background, Scope of Operations Research , Features of Operations Research, Phases of Operations Research, Types of Operations Research Models, Operations Research Methodology, Operations Research Techniques and Tools , Structure of the Mathematical Model, Limitations of Operations, Introduction, Linear Programming Problem, Requirements of LPP, Mathematical Formulation of LPP, Case Studies of LPP, Graphical Methods to Solve Linear Programming Problems, Applications, Advantages, Limitations

Unit II
> **Graphical Analysis of Linear Programming Problems:** Introduction, Graphical Analysis, Some Basic Definitions, Graphical Methods to Solve LPP, Some Exceptional Cases, Important Geometric Properties of LPP

Unit III
> **Simplex Method & Duality in Linear Programming Problem:** Introduction, Standard Form of LPP, Fundamental theorem of LPP, Solution of LPP – Simplex Method, The Simplex Algorithm, Penalty Cost Method or Big M-method, Introduction, Importance of Duality Concepts, Formulation of Dual Problem, Economic Interpretation of Duality, Sensitivity Analysis

Unit IV

Transportation Problem: Introduction, Formulation of Transportation Problem (TP), Transportation Algorithm (MODI Method), the Initial Basic Feasible Solution, Moving Towards

Unit V

Assignment Problem: Introduction, Mathematical Formulation of the Problem, Hungarian Method Algorithm, Routing Problem, Travelling Salesman Problem

References:

1. Hillier FS and Liberman GJ; Introduction to Operations Research concept and cases; TMH
2. Srinivasan G; Quantitative Models In Operations and SCM; PHI Learning
3. Taha H; Operations research; PHI
4. Sen RP; Operations Research-Algorithms and Applications; PHI Learning
5. Sharma JK; Operations Research; Macmillan
6. Ravindran , Philips and Solberg; Operations research; Wiley India
7. Bronson R ;Theory and problems of OR; Schaum Series; TMH

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			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
MTTX215	DCS	STASTSTICAL METHOD AND DESIGN OF EXPERIMENT	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objective (CEOs):
To introduce the students with the Fundamentals of the Statistics used in the Textile Technology.

Course Outcomes (Cos):
After the successful completion of this course students will be able to
1. apply modern probability theory in the Textile Technology.
2. understand and design the experiment, conduct statistical tests and analyse the results to arrive at the conclusions.
3. know the fundamental principles of the sample distribution.
4. study the capability of process and control the process based on data available.
5. make decisions with minimum error from available data.

Syllabus
UNIT I

PROBABILITY DISTRIBUTION AND ESTIMATIONS: Applications of Binomial, Poisson, normal, t, exponential, chi-square, F and Weibull distributions in textile engineering; point and interval estimations of the parameters of the distribution functions

UNIT II

TESTING OF HYPOTHESIS: Sampling distribution; significance tests applicable to textile parameters – normal test, t-test, chi-square test and F-test; p-Values; selection of sample size and significance levels with relevance to textile applications; acceptance sampling.

UNIT III

ANALYSIS OF VARIANCE AND NON-PARAMETRIC TESTS: Analysis of variance for different models; non-parametric tests - sign test, rank test, concordance test

UNIT IV

PROCESS CONTROL AND CAPABILITY ANALYSIS: Control charts for variables and attributes - basis, development, interpretation, sensitizing rules, average run length; process capability analysis

UNIT V

DESIGN AND ANALYSIS OF EXPERIMENTS: 2 k full-factorial designs; composite designs; robust designs; development of regression models, regression coefficients; adequacy test; process optimizations.

REFERENCES:

1. Montgomery D.C., "Introduction to Statistical Quality Control", John Wiley and Sons, Inc., Singapore, 2002, ISBN: 997151351X.
2. Leaf G.A.V., "Practical Statistics for the Textile Industry, Part I and II", The Textile Institute, Manchester, 1984, ISBN:0900739517.
3. Douglas C. Montgomery, "Design and analysis of experiments", John Wiley & Sons, Inc, Singapore, 2000, ISBN 9971 51 329 3
4. Ronald D. Moen, Thomas W. Nolan, Lloyd P. Provost, "Quality improvement through planned experimentation', McGraw-Hill, 1998, ISBN 0-07-913781-4 14

SUBJECT CODE	Category	SUBJECT NAME	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
			THEORY			PRACTICAL					
MTTX235	ODS	INSTRUMENTATION AND AUTOMATIC CONTROL	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objective (CEOs):
  To Develop and apply the skill of logic design using latest tools and technology

Course Outcomes (Cos):

1. Student will be able to study the basics of Instrumentation.
2. Student will be able to apply and develop the research work, about the control.
3. Student will be able to have problem solving techniques for controlling the faults .
4. Student will be able to take awareness of latest technologies and developments.
5. Student will be able to automate the system.

Syllabus
UNIT I
  Basic concepts of measurement: Introduction to transducers, Measurement and its aim, functional elements of an instrument, performance characteristics. Flow measurement: methods of flow measurement.Pressure and vacuum measurement: Manometers, Bourdon tubes, bellows, diaphragms, Pirani gauges, thermal conductivity gauges.
  Temperature Measurement: Temperature scales, Mercury in glass thermometers, thermocouple, RTD's and bimetallic type, Radiation pyrometers.
  Measurement of displacement, velocity and acceleration. Miscellaneous Measurements: Measurement of humidity, moisture and level Composition Analysis: Spectroscopic analysis, analysis of moisture in gases, pH in concentration measurement.

UNIT II
  Introduction to Virtual Instrumentation: Historical perspective, Classification of different instruments / instrumentation system. Definition and architecture of virtual instrumentation system, salient features and application area of virtual instrumentation.

UNIT III

Common Instrument Interfaces: Current loop, RS 232, RS485, GBIP. Use of library functions to communicate with different instruments.

UNIT IV

Introduction to Computer Control systems in Process Control: DCS Configuration, control console equipment, communication between components, local control units, DCS flow sheet symbols, DCS I/O hardware and setpoint stations. Supervisory control and data acquisition system (SCADA). Programmable Logic Control: Introduction, relative merits over DCS and relays, programming languages, Hardware and system sizing, PLC installation, Maintenance and trouble shooting.

UNIT V

Introduction to Automation: Fully automatic systems, semi automatic systems and manual control systems, tele-operated systems, measurement system, control system, microprocessor based controller, introduction to PLC & DCS.

References:
1. Doebelin E O, "Measurement Systems – Application and Design", McGraw Hill, New Delhi (1975)
2. Patranabis D, "Problems of Industrial Instrumentation" , Tata McGraw Hill, New Delhi, 14th Reprint (1993)
3. Cooper W D, "Electronic Instrumentation and Measurement Techniques", PHI Pvt Ltd., New Delhi (1982)
4. Nakra B C and Chaudhary A K, "Instrumentation, Measurement and Analysis", TMH, New Delhi (1985).
5. Mani and Rangan, "Instrumentation devices and systems", Tata McGraw Hill, New Delhi (1997).
6. *Johnson Curtis D, "Process Control Instrumentation Technology", Prentice Hall of India, New Delhi (1997).*

Name of Program M.TECH (Textile Engineering)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTCS209	ODS	MATLAB	0	0	0	30	20	0	1	2	2

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST Mid Sem Test.

Course Objectives :

1. Understand basic foundations of computer programming
2. Have a basic understanding of how engineers use computers to numerically solve programs.
3. Have a basic understanding of how to test and debug computer programs
4. Have the ability and an appreciation for good documentation of computer programs
5. Have a reasonably good knowledge of the MATLAB programming environment

Course Outcomes:

1. Be reasonably proficient at writing computer programs using MATLAB
2. Be able to formulate computer algorithms and implement those algorithms in MATLAB
3. To solve engineering problems.
4. Be able to decipher MATLAB code written by others.
5. Be able to graphically present the output of computer programs in a well thoughtout manner

UNIT I

Introduction :MATLAB basics , The MATLAB environment, Basic computer programming Variables and constants, operators and simple calculations Formulas and functions, MATLAB toolboxes .

UNIT II

Matrices and vectors, Matrix and linear algebra review, Vectors and matrices in MATLAB , Matrix operations and functions in MATLAB.

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UNIT III

Computer programming Algorithms and structures, MATLAB scripts and functions (m-files) , Simple sequential algorithms Control structures (if...then, loops).

UNIT IV

MATLAB programming, Reading and writing data, file handling , Personalized functions, Toolbox structure MATLAB graphic functions.

UNIT V

Numerical simulations, Numerical methods and simulations, Random number generation, Montecarlo methods

LIST OF EXPERIMENTS

1. Practicing matlab environment with simple exercises to familiarize command window, history, workspace, current directory, figure window, edit window, shortcuts, help files.
2. Data types, constants and variables, character constants, operators, assignment statements.
3. Control structures: for loops, while, if control structures, switch, break, continue statements.
4. Control Structures: For loops, While, If control structures, Switch, Break, Continue statements.
5. Input-Output functions, Reading and Storing Data.
6. Vectors and Matrices, commands to operate on vectors and matrices, matrix Manipulations.
7. Arithmetic operations on Matrices, Relational operations on Matrices, Logical operations on Matrices.
8. Polynomial Evaluation, Roots of Polynomial, Arithmetic operations on Polynomials.
9. Graphics: 2D plots, Printing labels, Grid & Axes box, Text in plot, Bar and Pie chart.