Program name

MASTER OF ENGINEERING (TEXTILE ENGINEERING)

Program code

617272

Department of Textile Engineering

Faculty of Technology and Engineering

The Maharaja Sayajirao University of Baroda

Vadodara

PSO for M.E. (Textile Engineering)

PSO1: Post Graduates of the programme will have the Critical Thinking, formulate and analyse complex Engineering Problems, Solving them and reaching to substantiate conclusions using principles of engineering and sciences.

PSO2: Post Graduates of the programme will have successful career in Research, academics and textile industry. Capable of continual learning ability and will be adapting to the constantly changing technology. Also will have skills to undertake Collaborative and Multidisciplinary activities.

PSO3: Post graduates of the program will have the ability to design and develop system components or processes to meet quality and cost effective Textile Products by using the concepts of Science, Engineering, Textile engineering and other related disciplines to achieve customer goals

PSO4: Post graduates of the program will have necessary skills to take up Entrepreneurial Venture, Serve to the needs of Textile Industry and the Nation.

Bloom's Taxonomy Levels: 1. Remember 2. Understand 3. Application 4. Analysis 5. Evaluation 6. Creation

Titles of Courses and Detailed Syllabi
w.e.f. 2019-20

(M.E. PART-I)
(M.E. PART-II)

	The Maharaja Sayajirao University of Baroda **Faculty Technology and Engineering** **Department of Textile Engineering**	**Academic Year**	**2019-20**

M.E. (Textile Engineering): Regular Programme				
Year	**I**	**Core / ~~Elective / Foundation~~** **AMT2104** MATHEMATICS AND STATISTICS	**Credits / Hours per week**	**04**
Semester	**I**	Year of Introduction: Year of Syllabus Revision:	**Maximum Marks / Grade**	**100**
Mode of Transaction		Lectures		

Course Outcome (CO)

CO1 Understand solution of nonlinear equations and its solutions

CO2 Understand the procedure of fitting of different curves

CO3 Understand the different techniques of interpolation

CO4 Understand solution of system of equations and its analytical and numerical solutions

CO5 Understand the finite difference methods to solve PDEs

CO6 Understand the different techniques of regression

CO7 Understand the concepts of mathematical modelling and simulation and its application

CO8 Learn about different techniques of optimization

Unit	Topic	Contac	Weightage	BT	CO	PSO	Eleme	Releva	Relatio

No.		t Hours	(%)	Level			nts of Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development (SD)	nce to Local (L)/ National (N)/ Regional(R)/Global (G)	n to Gender (G), Environment and Sustainability (ES), Human Values (HV)and Professional Ethics (PE)
1	**Numerical Methods:** **System of non linear equations:** Newton-Raphson method. Least square approximation. **Interpolation:** i) Linear interpolation, ii) Spline interpolation. **System of linear equations:** Iterative methods **PDE and Modeling of Textile problems through PDE:** Wave equation, Heat equation, Laplace equation and its numericalsolution using Finite Difference Method. Application of DFT and FFT in Textile problems.	14	27	1, 2, 3, 5	CO 1, CO 2, CO 3, CO4, CO5	PSO 1, PSO 3	SD	G	PE
2	**Statistics and its applications**	12	22	2, 3, 5	CO6	PSO 1,			

	Multiple Linear Regression: Introduction, Estimation the coefficients, Linear Regression modelusing matrices, Properties of the least square estimators, inferences in multiplelinear regressions. **Design of techniques:** Some general principles completely randomized designs, randomized-block designs, Latin square and related design.					PSO 3			
3	**Modeling and Simulation:** System and its terminology,Various kinds of Models: Physical model and Mathematical model,Continuous and Discrete systems and their simulation.Needs and techniques of Mathematical Modeling(MM) Classification of MM Modeling in Mechanical vibration	10	24	2, 3, 6	CO7	PSO 1, PSO 3			
4	**Optimization:** **LPP:** Formulation,Solution using Graphical method Simplex method **Classification Optimization techniques:** single variable optimization,Multivariable optimization, Unconstrained optimization,Multivariate optimization with equality constraints (Lagrange'sMultipliers), Multivariate optimization with inequalityconstraints(Kuhn-Tucker condition) Dynamic programming problem: Discontinuous and continuousmodels.	12	27	2, 3, 5	CO8	PSO 1, PSO 3			

Reference Books

1.	Florence Gordon and S.Gordon : Contemporary Statistics, a computer approach, 1994

2.	J.D.Faires and R.Burden : Numerical methods, 2nd edition, Brooks cole publishing Co., 1998.
3.	S.S.Sastry : Introductory Methods of Numerical Analysis, Prentice hall of India, NewDelhi, 1997.
4.	J.N.Kapur : Mathematical Modeling, Wiley eastern Ltd., 1994. 5. Gordon : System, Simulation
5.	Kantiswarup, P.K.Gupta and Manmohan. : Operation Research, Sultanch and sons.
6.	S.S.Rao : Optimization theory and Applications: Wiley Eastern,1984.
7.	Rudra Pratap : Getting started with Matlab, Saunders,1996.

	The Maharaja Sayajirao University of Baroda **Faculty Technology and Engineering** **Department of Textile Engineering**		**Academic Year**	**2019-20**
M.E. (Textile Engineering): Regular Programme				
Year	**I**	**Core / ~~Elective / Foundation~~** **TXE2101 Theory of Textile Structure-I**	**Credits / Hours per week**	**04(theory)**
Semester	**I**	Year of Introduction: 2002 **Revised:2008**	**Maximum Marks / Grade**	**100(theory)**
Mode of Transaction		Lectures & Tutorials		

Course Outcome (CO) TXE 2101

CO1 Understanding of engineering approach of textile structure.
CO2 Understanding of Fibre migration and arrangement in twisted yarns.
CO3 Understanding of Extension and breakage of spun yarns.
CO4 Understanding of Theory of Extension of Continuous filament yarns.
CO5 Understanding of Breakage of Continuous Filament yarn

Unit No.	**Topic/Unit**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements of** Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development	**Relevance to** Local (L)/ National (N)/ Regional(R)/Global (G) developmental	**Relation to** Gender (G), Environment and Sustainability (ES), Human Values

							(SD)	needs	(HV)and Professional Ethics (PE)
1	Introduction, Textile properties, structures and mechanics of fibres, Mechanics of simple yarn structure and filament & blended yarn structure. Textile yarns, twist and basic geometry of twisted yarns, Idealized helical yarn structure, Yarn count and twist factor, Twist contraction and its calculations, Real and idealized yarns, Packing of fibres in yarn, Deviations from idealized form of yarn packing	15	25%	1,2,3,4, 5,	CO1	PSO1 PSO2 PSO3	EMP	N,G,	-
2	Introduction to fibre migration, Theoretical treatment of migration, Characterization of migration behavior, Effect of tension on migration, Interactions of twisting and migration, Factors affecting the migration of fibres	09	15%	4,5,6	CO2	PSO1 PSO2 PSO3			
3	Introduction to spun yarn mechanics – traditional view, Spun yarn mechanics – modified qualitative approach, Various experimental studies of yarn strength, Comparison of various theories of tensile properties	09	15%	4,5,6,	CO3	PSO1 PSO2 PSO3			
4	Extension of Continuous filament yarn – Variation of Fiber Extension, Analysis of Tensile forces, Analysis with Transverse forces and Lateral contraction – Theoretical model, yarn geometry, definition of yarn element, variation of strain through the yarn, stress-strain relation of the filament., Total yarn stress, Analysis of large extension – effects of large extension.	15	25%	3,4,5,	CO4	PSO1 PSO2 PSO3			
5	Extension and breakage of continuous filament yarn – Nature of rupture, modes of propagation of break, effect of twisting methods on Tensile properties	12	20%	4,5,6,	CO5	PSO1 PSO2 PSO3			

Reference Books	
1.	Structural Mechanics of Fibers, Yarn and Fabrics, Volume-I-J.W.S.Hearle, P.Grosberg, S.Backer. Published by: Wiley Interscience Publication,1969
2.	Theory of Elasticity (Third edition)-S.P.Timoshenko, J.N.Goodier. McGrawHill-Indian edition.
3.	Research/Review papers from: Journal of Textile Institute, Textile Research Journal, Indian Journal of Fiber and Textile Research, Textile Progress, Conferences etc.
4.	Master's Dissertations and Ph.D thesis.

	The Maharaja Sayajirao University of Baroda Faculty Technology and Engineering Department of Textile Engineering		**Academic Year**	**2019-20**
M.E. (Textile Engineering): Regular Programme				
Year	**I**	**Core / ~~Elective / Foundation~~ TXE2102 UNCONVENTIONAL WEAVING**	**Credits / Hours per week**	**04(theory)**
Semester	**I**	Year of Introduction: 2002 Revised : 2008	**Maximum Marks / Grade**	**100(theory)**
Mode of Transaction		Lectures & Tutorials		

Course Outcome (CO) TXE 2102

CO1 Thorough understanding, evaluation and analysis of projectile weaving – recent developments and future trends

CO2 Thorough understanding, evaluation and analysis of rapier weaving – its recent developments and future trends

CO3 Students learn intricacy of airjet weaving in details

CO4 Students learn about of multiphase weaving and its future scope

CO5 Students learn about the scope and applicability of water jet looms.

CO6 Accumulators and selvedge in details with new developments. Also Techno economics of shuttleless weaving machines

Unit No.	Topic/Unit	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements of Employability (Emp)/ Entrepreneurship (Ent) / Skill Development (SD)	Relevance to Local (L)/ National (N)/ Regional (R)/Glob al (G) developmental needs	Relation to Gender (G), Environment and Sustainability (ES), Human Values (HV)and Professional Ethics (PE)
1	Overview of Sulzer projectile looms, its weaving cycle, picking mechanism, beat up motion and various important picking elements, their functions, constructions Various developments attempted in various elements such as projectile, projectile gripper, projectile feeder, projectile guide teeth, sley drive, projectile brake, projectile lifter, projectile lubrication system, projectile returner etc with an in-depth focus on improvement	12	20	1,2, 3,4, 5,6	CO1	PSO 1 PSO 2 PSO 3 PSO 4	Emp, Ent.	N, R, G	ES

	Developments in projectile flight control, Developments in mechanisms for multicolor weaving								
2	Overview of rapier weaving, various important elements of rapier picking An in-depth study of developments of various elements in rapier picking such as drive tape, rapier gripper, guide teeth, various rapier drive mechanisms, weft cutters, weft presenters, rapier gripper openers, weft tension control systems etc	18	30	1,2, 3,4, 5,6	CO2	PSO 1 PSO 2 PSO 3 PSO 4	Emp, Ent.	N, R, G	
3	Air jet weaving machine: Main nozzle, various profile reed, relay nozzle, Mounting of nozzle, Faulty weft insertion, Other details	09	15	1,2, 3,4, 5,6	CO3	PSO 1 PSO 2 PSO 3 PSO 4	Emp, Ent.	N, R, G	
4	Multiphase weaving machine: Basic understanding, Weft wave multiphase, Warp wave multiphase, Latest developments and future predictions.	06	10	1,2, 3,4, 5,6	CO4	PSO 1 PSO 2 PSO 3 PSO 4	Emp, Ent.	N, R, G	
5	Water jet weaving machine: Scope, various jetting, nozzle, pump mechanism, water quality requirements, flying angle and timing settings, special care requirements for water jet weaving and latest developments.	06	10	1,2, 3,4, 5,6	CO5	PSO 1 PSO 2 PSO 3 PSO 4	Emp, Ent.	N, R, G	
6	Various Accumulators for shuttleless looms in details, Selvedges for shuttleless weaving machines, Techno economics of shuttleless weaving, Latest developments	09	15	1,2, 3,4, 5,6	CO6	PSO 1 PSO 2 PSO 3 PSO 4	Emp, Ent.	N, R, G	

	The Maharaja Sayajirao University of Baroda **Faculty Technology and Engineering** **Department of Textile Engineering**		**Academic Year**	**2019-20**
M.E. (Textile Engineering): Regular Programme				
Year	**I**	**Core / ~~Elective / Foundation~~** **TXE 2103: Theory And Design of Spinning Machine**	**Credits / Hours per week**	**04(theory)**
Semester	**I**	Year of Introduction: 2002 **Revised:2008**	**Maximum Marks / Grade**	**100(theory)**
Mode of Transaction		Lectures & Tutorials		

Course Outcome (CO) TXE 2103

CO1 To Impart latest knowledge about design aspects of Spinning machines.
CO2 To inculcate research based idea employed in designing of Spinning machines.
CO3 Analyzing important features of latest textile machine designs.
CO4 Studying possibilities of incorporating latest design features on existing machines.

Unit No.	**Topic/Unit**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements of** Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development (SD)	**Relevance to** Local (L)/ National (N)/ Regional(R)/Global (G) developmental needs	**Relation to** Gender (G), Environment and Sustainability (ES), Human Values (HV)and

									Professional Ethics (PE)
1	Introduction: Various paradigm shifts took place in the production pattern of Ring Spinning from early 1940. Correlation with technological development and type of material processed.	01	2%	1, 3,4	CO1 CO3	PSO1	EMP,SD	N,G,L	ES, PE
2	Cotton growth & Cultivation: Hybrid cotton, Change in Ginning Technology, Relationship amongst Cotton factor, Cleaning factor, Trash factor and Machine factor w.r.t. technological changes. Mix Formulation**:** Impact on yarn cost & Quality, Changes in the associated technologies of mix formulation, precision and consistency of mix formulation	07	10%	2, 3, 4	CO1 CO2 CO3	PSO1 PSO2			
3	Blow Room: Role of Blow room in Ring Spinning in 1940 and as on today. Limitations & technological changes took place in the design features/practices followed to overcome these limitations • Beater and cleaning arrangement. • Concept of combined cleaning efficiency of card and blow room, • Blending delay • Feeding system to card	09	15%	3, 4, 5	CO1 CO2 CO3	PSO1 PSO2 & PSO3			
4	Card :- Limitations & technological changes took place in the design features/practices followed to overcome these limitations Basic Operations, Principle of operation, different carding regions of flat revolving card Study and comparison of the above region with reference	11	18%	3, 4,5	CO1 CO3 CO4				

	to development of newly designed card								
5	Draw Frame :- Basic objectives, different parts/ sections of draw frame, major technological advancement on feed sections drafting section and delivery sections	10	17%	4, 5, 6	CO1 CO4				
6	Comber:-Basic role of comber in classical spinning system, Change in the role of modern comber in latest spinning system in terms of enhanced quality and controlled cost of the product • Limitations of classical comber preparatory in meeting higher self-cleaning efficiency at comber and improved hooked fiber straightening. • Concept of scratch combing, regular combing and double combing along with their application areas as per end use. • Limitations of classical comber in meeting higher production rate, • Basic theory involved in changed design features of modern comber and its preparatory processes	07	13%	1, 3, 4	CO1 CO2 CO3				
7	Speed Frame:-Basic functions of speed frame, development in drafting section, twisting region, winding section, etc. Quality with new technologically designed machine and productivity with newly designed machine	09	15%	2, 4, 5	CO1 CO3	PSO1, PSO2			
8	Ring Frame:- Limitations & technological changes took place in the design features/practices followed to overcome these limitations • Economy of the yarn. • High speed draft and High draft ratio • Spinning triangle • Design features of spinning elements of Ring spinning to support high speed ring spinning	06	10%	2, 3, 4, 5	CO1 CO2 CO3	PSO1 PSO2 & PSO3			

	theory; Lappet guide, Ring-Traveler. • Controlling ballooning tension • Winding elements • Spinning geometry, • Yarn tension • Labour compliment								

Reference Books

1.	NCUTE-Spinning-Blow room and Card- Book of Papers
2.	NCUTE-Spinning-Drawing, Combing & Roving-Book of Papers.
3.	Literature of Modern Machinery Technology from LMW, RIETER, TRUETZSCHLER etc. And CD.
4.	Literature review of research papers related to the topics.
5	• Process Control in Spinning, A.R. GARDE & T.A. Subramaniam, ATIRA Silver Jubilee Mono graph, Ahmedabad Textile Industry's Research Association Publication, 1974. ASIN: B0007AK08K
6	• Quality Control in Spinning, T. V. Ratnam, K.P. Chellamani, Edited by Arindam Basu, SITRA Publication.
7	Cost Control and Costing in Spinning Lab, T. V. Ratnam Indra Dorai Swami, S. Seshadri, R. Rajamanikam, SITRA Publication.
8	Tasnim N. Shaikh, Sweety A. Agrawal, Engineering Cotton Yarns with Artificial Neural Networking (ANN), WPI Publishing, Published December 6, 2017 , ISBN 9789385059209.
9.	Latest Research Articles from reputed journals (TRJ, JTI, IJFTR… etc)

	The Maharaja Sayajirao University of Baroda **Faculty Technology and Engineering** **Department of Textile Engineering**		**Academic Year**	**2019-20**
M.E. (Textile Engineering): Regular Programme				
Year	**I**	**Core / ~~Elective / Foundation~~** **TXE2104: Engineering Properties of Textile Material**	**Credits / Hours per week**	**04(theory)**
Semester	**I**	Year of Introduction: 2002 Revised: 2008	**Maximum Marks / Grade**	**100(theory)**
Mode of Transaction		Lectures & Tutorials		

Course Outcome (CO)

CO1 To impart advance knowledge about fiber structure

CO2 To give an in-depth understanding of various engineering properties of fibers – such as tensile, elastic recovery, moisture absorption, dielectric, and fiber friction and study reported research literature

Unit No.	**Topic/Unit**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements of** Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development (SD)	**Relevance to** Local (L)/ National (N)/ Regional(R)/Global (G) developmental needs	**Relation to** Gender (G), Environment and Sustainability (ES), Human Values (HV)and

									Professional Ethics (PE)
1	Nature of matters and different methods to study structure of material. Requirement of fiber structure, traditional view and various models proposed like micellar, fringed micellar, lamellar, fringed lamellar, fibril and fringed fibril Molecular structure of various fibers like cotton and viscose rayon. Molecular structure of wool, silk and synthetic fiber	08	10%	2,3,4,5	CO1	PSO1, PSO2, PSO3 PSO4	EMP,SD	R,N,G	
2	Fiber density – difficulties in fiber density determination, various methods for fiber density determination, density and order	03	5	2,3,4,5, 6	CO2	PSO 1 PSO 2 PSO 3	EMP,SD	EMP,SD	
3	Fiber moisture absorption, its significance in textiles, measurement of regain – various methods and the sources of errors involved, hysteresis in fiber moisture absorption, reports on moisture absorption of various textile fibers, various factors influencing fiber moisture absorption	07	10	2,3,4,5, 6	CO2	PSO1, PSO2, PSO3 PSO4	EMP,SD	EMP,SD	HV, ES,PE
4	Heats of sorption of fibers, differential and integral heats of sorption, their interrelation, measurement of heats of sorption, heats of sorption of various fibers, factors affecting heats of sorption	05	7.5	2,3,4,5, 6	CO2	PSO1, PSO2, PSO3 PSO4	EMP,SD	EMP,SD	
5	Introduction to moisture sorption, effect of hydrophilic groups, directly attached and indirectly attached water molecules, absorption in crystalline and non-crystalline regions, molecular explanation for hysteresis. Limited swelling concept and capillary theory to explain water absorption .Theory proposed by Pierce and multi-layer adsorption Hailwood and horrobin's theory.	06	10%	2, 3, 4, 5	CO1 CO2	PSO1, PSO2, PSO3 PSO4	EMP,SD	R,N,G	
6	Tensile properties and working principles of tensile	08	12%	2,3,4,5	CO1,	PSO1,	EMP,S	R,N,G	

	instruments like CRL, CRE and CRT along with their differences. Experimental work done by Meridith with thorough discussion of results obtained for various fibers like cotton and cellulosic fibers, viscose rayon, acetate rayon, wool and synthetic fibers. Effect of moisture, temperature, light and chemical environment on various fibers. Mechanism of failure in different fibers.				CO2	PSO2, PSO3 PSO4	D		
7	Introduction to elastic recovery with important terms and definitions related to it. Experimental works of Meridith related to recovery characteristics of different fibers like cotton and cellulosic fibers, viscose rayon, wool, synthetic fibers and so on. Discussing influence of test conditions on recovery and mechanical conditioning, swelling recovery and simple recovery models proposed.	05	12%	2,3,4,5	CO2	PSO1, PSO2, PSO3 PSO4	EMP,SD	R,N,G	
8	Time effects in mechanical properties of fibers, fiber creep behavior, primary and secondary creep, research study reports on fiber creep, cumulative- extension test, fiber stress relaxation – its measurement, dynamic tests, characterization of viscoelastic behavior of fibers, methods of dynamic testing, research reports on fiber dynamic behavior, fiber fatigue	10	17.5	2,3,4,5, 6	CO2	PSO1, PSO2, PSO3 PSO4	EMP,SD	N, G	
9	Dielectric properties of fibers, significance, measurement of fiber dielectric properties and difficulties involved in it, various factors influencing fiber dielectric properties	05	10	2,3,4,5, 6	CO2	PSO1, PSO2, PSO3 PSO4	EMP,SD	R, N, G	
10	Friction in textiles, methods to measure it. Pollitt's method to determine coefficient of friction and differential frictional effect in wool.	03	06%	2, 3, 4,5	CO2	PSO1, PSO2, PSO3 PSO4	EMP,SD	R,N,G	

Reference Books	
1.	Research/Review papers from: Journal of Textile Institute, Textile Research Journal, Indian Journal of Fiber and Textile Research, Textile Progress, Conferences etc.
2.	Engineering properties of textile materials by Morton and Hearle, Woodhead publishing

	The Maharaja Sayajirao University of Baroda **Faculty Technology and Engineering** **Department of Textile Engineering**	**Academic Year**	**2019-20**
M.E. (Textile Engineering): Regular Programme			
Year	**II**	**Core / ~~Elective / Foundation~~** **CSC2105: Structured Programming and Numerical Analysis**	**Credits / Hours per week**	**04**
Semester		Year of Introduction: 2007 Year of Syllabus Revision: 2019	**Maximum Marks / Grade**	**100**
Mode of Transaction		Lectures and Practical		

Course Outcome (CO) CSE2101

CO1 Understand the need and types of programming languages in use.

CO2 Understand the fundamentals of a programming language.

CO3 Learn problem solving techniques.

CO4 Understand the concept of structured programming.

CO5 Understand dynamic memory management techniques.

CO6 Implement file handling mechanisms

CO7 Understand various user-defined data types in a programming language

CO8	Learn some advanced concepts of a programming language.

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements of** Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development (SD)	**Relevance to** Local (L)/ National (N)/ Regional(R)/ Global (G)	**Relation to** Gender (G), Environment and Sustainability (ES), Human Values (HV)and Professional Ethics (PE)

1	Introduction to Computer and Programming: Basic block diagram and functions of various components of computer, basic concepts of hardware and software, types of software, compiler and interpreter, evolution of programming languages, concepts of machine level, assembly level and high-level programming, flow charts and algorithms.	05	12	1,2	CO1 CO2	PSO2	EMP SD	G	PE
2	Fundamentals of C Programming: Features of C language, structure of C program, C character set, comments, header files, data types, constants and variables, operators, expressions, evaluation of expressions, type conversion, precedence and associativity, C tokens, operators, storage classes	08	20	1,2,3	CO3 CO4	PSO2			
3	Control Structures in C: Simple statements, decision making statements, simple if, if..else statement, else..if statement, switch case, looping statements, entry controlled loops, exit controlled loops, nesting of control structures, break and continue, goto statement	07	17	1,2,3	CO3 CO4	PSO2			
4	Derived and User-Defined Data Types: Concepts of array, one- and two-dimensional arrays, declaration and initialization of arrays, string, string storage, built-in-string functions, Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and	07	23	1,2,3	CO3 CO4 CO7	PSO2			

	functions, structures and pointers, unions								
5	Function in C Programming: Concepts of user defined functions, prototypes, definition of function, parameters, parameter passing, calling a function, recursive function	05	18	1,2,3	CO3 CO4	PSO2			
6	Advanced Concepts of C Programming: Basics of pointers, pointer to pointer, pointer and array, pointer to array, array of pointers, functions returning a pointer, pointer arithmetic, introduction to dynamic memory allocation, malloac, calloc, realloc, file management, the preprocessor, error handling	08	10	1,2,3	CO3 CO4 CO5 CO6 CO8	PSO2			
Reference Books									
1.	Programming in ANSI C by E. Balaguruswamy, TMH								
2.	The ‘C’ programming language - B.W.Kernighan, D.M.Ritchie, PHI								
3.	Programming in C Ansi standard by Yashwant Kanetkar								
4.	Programming in C - Gottfried B.S., TMH								
5.	A Structured Programming Approach using C – B.A. Forouzan & R.F. Gillberg, THOMSON Indian Edition								
6.	Let us C - Y.Kanetkar, BPB Publications								

	The Maharaja Sayajirao University of Baroda **Faculty Technology and Engineering** **Department of Textile Engineering**	**Academic Year**	**2019-20**

M.E. (Textile Engineering): Regular Programme				
Year	**II**	**Core / ~~Elective / Foundation~~** **CSC2105L: Structured Programming and Numerical Analysis**	**Credits / Hours per week**	**04**
Semester		Year of Introduction: 2007 Year of Syllabus Revision: 2019	**Maximum Marks / Grade**	**100**
Mode of Transaction		Lectures and Practical		

Course Outcome (CO)

CO1 Understand the need and types of programming languages in use.

CO2 Understand the fundamentals of a programming language.

CO3 Learn problem solving techniques.

CO4 Understand the concept of structured programming.

CO5 Understand dynamic memory management techniques.

CO6 Implement file handling mechanisms

CO7 Understand various user-defined data types in a programming language

CO8	Learn some advanced concepts of a programming language.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements of Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development (SD)	Relevance to Local (L)/ National (N)/ Regional(R)/ Global (G)	Relation to Gender (G), Environment and Sustainability (ES), Human Values (HV)and Professional Ethics (PE)

1	1. Write a program that reads two integer numbers statically and perform arithmetic operations on it and prints the result. 2. Write a program that reads two floating point nos. from keyboard and gives their addition, subtraction, multiplication, division and modulo. Compare the results with results of above program.	05	12	1,2	CO1 CO2	PSO2	EMP SD	G	PE
2	1. Write a program to test whether a number entered is positive, negative or equal to zero. 2. Write a program to take a character as an input and display whether it is a number, alphabet upper/lower/vowel) or a special character (Use nested if statement). 3. Write a program to enter the marks of student in four subjects. Then calculate the total, aggregate and display the grades obtained by the student using else-if ladder as well as switch case.	08	20	1,2,3	CO3 CO4	PSO2			
3	1. Write a program to find the sum of n natural numbers using while loop, for loop and goto statement. 2. Write a program to read the numbers until -1 is encountered. Also calculate the sum and average of all positive numbers and mean and sum of all negative numbers separately using goto statement as well as do while loop.	07	17	1,2,3	CO3 CO4	PSO2			

	3. Write a program to evaluate the equation $y=x^n$ (x raise to n).								
4	1. Write a program to read and display n numbers using an array. 2. Write a program to read 10 numbers and display the sum and mean of those numbers.	07	23	1,2,3	CO3 CO4 CO7	PSO2			
5	1. Write a function program to add first N numbers. 2. Write a function find out maximum out of three numbers. 3. Write a function power that computes x raised to the power y for integer x and y and returns double type value.	05	18	1,2,3	CO3 CO4	PSO2			
6	1. Write a function to enter rollno, marks of the three subjects for 3 student and find total obtained by each student. 2. Define a structure data type called time struct containing three members' integer hour, integer minute, and integer second. Develop a program that would assign values to the individual members and display the time in this form: 16:40:51	08	10	1,2,3	CO3 CO4 CO5 CO6 CO8	PSO2			
Reference Books									

1.	Programming in ANSI C by E. Balaguruswamy, TMH
2.	The ‘C’ programming language - B.W.Kernighan, D.M.Ritchie, PHI
3.	Programming in C Ansi standard by Yashwant Kanetkar
4.	Programming in C - Gottfried B.S., TMH
5.	A Structured Programming Approach using C – B.A. Forouzan & R.F. Gillberg, THOMSON Indian Edition
6.	Let us C - Y.Kanetkar, BPB Publications

	The Maharaja Sayajirao University of Baroda **Faculty Technology and Engineering** **Department of Textile Engineering**		**Academic Year**	**2019-20**
M.E. (Textile Engineering): Regular Programme				
Year	**I**	**Core / ~~Elective / Foundation~~** **TXE 2201:** Theory and Design of Weaving Machine	**Credits / Hours per week**	**04(theory)**
Semester	**II**	Year of Introduction: 2002 **Revised:2018,2012**	**Maximum Marks / Grade**	**100(theory)**
Mode of Transaction		Lectures & Tutorials		

Course Outcome (CO) TXE 2201

CO1 To Impart latest knowledge about design aspects of weaving machines.
CO2 To inculcate research based idea employed in designing of weaving machines.
CO3 Analyzing important features of latest textile machine designs.
CO4 Studying possibilities of incorporating latest design features on existing machines.
CO5 Introducing to other winding systems especially for filaments with relevant calculations
CO6 Introduction to modern warping systems
CO7 Introducing all aspects of filament sizing including blends and weaving of filaments on looms

Unit No.	**Topic/Unit**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements of** Employability (Emp)/ Entrepreneurship (Ent)/ Skill	**Relevance to** Local (L)/ National (N)/ Regional(R)/Global (G)	**Relation to** Gender (G), Environment and Sustainability (ES),

							Development (SD)	developmental needs	Human Values (HV)and Professional Ethics (PE)
1	Introduction to other systems in winding with special focus on the filament winding.	08	14%	2,3,4,5	CO5	PSO1, PSO2, PSO3, PSO4	EMP,SD	N,G,L	ES, HV, PE
2	Introduction to direct and indirect warping and features of modern warping machines.	06	10%	2,3,4	CO6	PSO1, PSO3			
3	Introduction to sizing of polyester cotton blended yarn sizing ingredients, process variables, size recipe for different blend, sizing with polyacrylates, after waxing, HPS and Recovery of sizing ingredient	06	10%	2,3,4	CO7	PSO1, PSO2, PSO4			
4	Sizing of filament yarn, Sizing ingredients, warp preparation, Single end sizing machine Quality of sized yarn, assessment of quality Practical difficulties, cost analysis Sizing textured yarn, sizing of nylon yarn	05	8%	2,3,4	CO7	PSO1, PSO2, PSO4			
5	Yarn quality, warp/weft preparation for shuttle less weaving machine, Quality of yarn required, effect of stoppages, Yarn quality, Warp/weft preparation, package and yarn quality along with new developments	05	8%	2,3,4	CO7	PSO1, PSO2, PSO4			
6	Computer assisted analysis of sley kinematics, link synthesis, Measurement of beat up force. Design of shedding tappet, front shed geometry, shed shape diagram, reed orientation angle.	09	15%	3,4,5,6	CO1	PSO1			
7	Importance of transmission and geometrical angles (μ &	09	15%	4,5,6	CO2	PSO2			

	β) in design of new mechanism with its effect on performance of weaving machine. Warp loading and its consequences.					& PSO3			
8	Rapier kinematics, dynamics of water jet looms, Multi phase vis- a vis single phase loom.	06	10%	3, 4,5	CO3	PSO2 & PSO3			
9	Modification of f sley drive f shuttle loom, cloth control and start up mark prevention methods, yarn tension recording and controlling methods.	06	10%	4,5,6	CO4	PSO4			

Reference Books

1.	Weaving Technology-Ormerod
2.	Hand Book of Weaving-Sabit Adanur
3.	Shuttleless Weaving Machines- T.Swaty,SNTL publishers,Prague
4.	Theory of Machines and mechanism- Uicker,Gordon,Shigley .McGraw Hill.
5.	Latest Research Articles from reputed journals (TRJ, JTI, IJFTR… etc)

	The Maharaja Sayajirao University of Baroda **Faculty Technology and Engineering** **Department of Textile Engineering**		**Academic Year**	**2019-20**
M.E. (Textile Engineering): Regular Programme				
Year	**I**	**Core / ~~Elective / Foundation~~** **TXE 2202: Modern Yarn Production**	**Credits / Hours per week**	**04(theory)**
Semester	**II**	Year of Introduction: 2002 **Revised:2008**	**Maximum Marks / Grade**	**100(theory)**
Mode of Transaction		Lectures & Tutorials		

Course Outcome (CO) TXE 2202

CO1 To Impart fundamental as well as advanced engineering knowledge about modern spinning Process.
CO2 To inculcate calculus involved in different modern yarn production processes .
CO3 Analyzing important features of modern spinning machine designs.
CO4 Studying product yarn quality and cost in comparison with classical ring spun yarn .
CO5 To know about other open end spinning system
CO6 To know about modern spinning system

Unit No.	**Topic/Unit**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements of** Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development	**Relevance to** Local (L)/ National (N)/ Regional(R)/Global (G) developmental	**Relation to** Gender (G), Environment and Sustainability (ES), Human Values

							(SD)	needs	(HV)and Professional Ethics (PE)
1	Significance of Ring Spinning system in cotton yarn manufacturing, Limitations of Ring Spinning, Different measures taken to overcome Ring spinning system limitations in Open End spinning system, Basic concept & Different types of OE Spinning,	03	5%	1, 2	CO1	PSO1	EMP,SD	N,G,L	-
2	Rotor Spinning: Basic Concept, Structural features of Rotor Spin box, Twist and Production calculation, Working principle of Rotor Spinning & mechanism of yarn formation including fiber flux and draft calculation at different functional units of rotor spinning machine.	06	10%	2, 3, 4,5	CO1 CO2, CO3	PSO2 & PSO3			
3	Fiber integration into rotor yarn & mechanism of wrapper fiber formation. Concept of PTE, Factors influencing rotor spinning stability, Wrapper fiber/ Belly bands formation and its influence on rotor yarn structure and characteristics.	03	5%	3, 4,5	CO3	PSO2 & PSO3			
4	Influence of various machine parts design; Feed system, Opening roller, Rotor, Draw off Nozzle etc. and process parameters; Opening roller speed, rotor speed, take up speed etc. on the structure of rotor spun yarn.	12	20%	2, 3, 4,5	CO1 CO2, CO3	PSO1, PSO2, PSO3 PSO4			
5	Properties of Rotor spun yarn and fabric; woven as well as knitted. Comparative status with Ring spun yarn and fabric properties	03	5%	3, 4	CO4	PSO2, PSO4			
6	Processing of Man made fibers and blends on Rotor Spinning, Limitations of Rotor in Spinning Manmade	03	5%	2, 3, 5, 6	CO1, CO2	PSO2, PSO3			

	fibers & their Blends, Changes required in Rotor spinning parameters for processing man made fibers								
7	Limitations of first phase design of Rotor in meeting higher production rate. Structure and properties of rotor spun, air-vortex spinning. Core spun and other composite yarns. Twistless, self twist and other unconventional methods of spinning. Yarn characteristics of unconventional spun yarns	10	16.67	3,4,5	CO5, CO6				
8	Air Jet Spinning system: Concept and design features, merits and demerits. Friction Spinning system: Concept and design features, Dref – I, Dref – II, Dref- III, their merits and demerits.	10	16.67	3,4,5	CO5, CO6				
9	Siro - Spinning system: Concept and design features, merits and demerits. Self - Spinning system: Concept and design features, merits and demerits	10	16.67	3,4,5	CO6				

Reference Books

1.	W. Klein, "Technology of Short Staple Spinning", Published by The Textile Institute, Manual of Textile Technology, Edited by H. Stalder, volumes 4 -5, 1993. ISBN: 1870812557
2.	Carl A. Lawrence , " Fundamentals of Spun Yarn Technology", CRC Publications, March 2003, ISBN: 9781566768214.
3.	Peter R. Lord, Hand Book of Yarn Production: Science, Technology and Economics, Taylor and Francis, 11th July 2003. ISBN: 9781855736962
4.	Eric Oxtoby, "Spun Yarn Technology", Butterworths, March 1987. **eBook ISBN:** 9781483161808
5	Advances in technology of Yarn Production by NCUTE publications, Indian Institute of Technology, Delhi.
6.	Latest Research Articles from reputed journals (TRJ, JTI, IJFTR… etc)

	The Maharaja Sayajirao University of Baroda **Faculty Technology and Engineering** **Department of Textile Engineering**		**Academic Year**	**2019-20**
M.E. (Textile Engineering): Regular Programme				
Year	**I**	**Core / ~~Elective / Foundation~~** **TXE 2203: Textured Yarn Technology**	**Hours per week**	**04 (theory)**
Semester	**II**	Year of Introduction: 2002 Revised : 2008	**Maximum Marks**	**100 (theory)**
Mode of Transaction		Lectures & Tutorials		

Course Outcome (CO)

CO1 Understanding the basic concepts of texturizing
CO2 Knowledge about the new developments in different texturizing techniques
CO3 To study the material, machine and process variables for setting the quality of yarn
CO4 Learning the characteristics of the parent and textured yarns
CO5 Knowledge of applications of textured yarns

Unit No.	**Topic/Unit**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements of** Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development (SD)	**Relevance to** Local (L)/ National (N)/ Regional(R)/ Global (G) developmental needs	**Relation to** Gender (G), Environment and Sustainability (ES), Human Values (HV)and Professional

									Ethics (PE)
1	Concept and classification of Texturing, based on yarn characteristics, and methods, Different Structure form in texturing, Difference between thermo-mechanical and mechanical bulking process. Concept of BCF yarn.	5	10%	1,2,3	CO1	PSO 1, PSO 3, PSO 4, PSO 5	EMP, SD	R,N,G	ES
2	Introduction to Air Jet Texturing Process., Air jet texturing Machine Detail: Yarn passage, function and construction of different parts. Development in machine and modification required to process technical yarn, Basic Air flow requirements and Development in Nozzle. Hypothesis develop by different scientist for Loop forming Mechanism, Effect of Material, Machine and Processing parameter on yarn characteristics and application, Comparative analysis of air jet textured yarn quality measurement systems.	15	25%	1,2,4, 5	CO2, CO3, CO4,CO5				
3	Commingling Technology, Machine Detail, function of each part, modification required for high performance yarn, Types of Nozzle and geometry, Effect of Material and Processing Parameter on yarn	10	15%	1,2,4, 5	CO2, CO3, CO4,CO5				

	characteristics. BCF yarn process.								
4	Introduction to texturising, various synthetic fibres and their market shares. Advantages and disadvantages of synthetic fibres. Texturising: Purpose, Various types of textured yarn, their properties and production mechanism. Texturising process and the various parameters which affect textured yarn quality. Various evaluation criterion of textured yarns. High stretch yarns and various methods of high stretch yarns productions.	7	12%	1,2,3, 5	CO1, CO2, CO3	PSO 1, PSO 3, PSO 4, PSO 5			
5	Conventional Method of high stretch yarns production. Continuous process of high stretch yarn productions. Analysis of Twist-Heat Set-Untwisting Mechanism. Different False Twisting Mechanisms, their advantages and disadvantages.	10	16%	2,3,4, 5	CO2, CO3, CO4				

6	Various process of heat setting mechanisms in texturing process. Effect of tension and tension control of texturing process. How to improve heat setting in texturing process. Disadvantages of high stretch yarns, properties of low stretch yarns and their productions.	6	10%	3,4,5, 6	CO2, CO3,				
7	Various production techniques of low stretch yarns. Crimped textured yarns and their properties. Production of crimped yarn by stuffer box. Production of textured yarns by edge crimping mechanism. Production of knit-de-knit crimped yarns	7	12%	2,3,4	CO2, CO5				
Reference Books:									
1.	A Guide to Crimping / Texturising technology by Dr. M.V.S. Rao & A.B. Talele								
2.	Yarn Texturing Technology, J.W.S. Hearle, L. Hollick, D.K. Wilson, Woodhead Publishing Ltd, Cambridge (2001)								
3.	False Twist Textured Yarns: Principles, Processes and Applications by C Atkinson								
4.	Series of article on Air jet Texturing, False twist texturizing								
5.	Manufactured Fibre Technology, V.K.Kothari & V.B.Gupta								
6.	Manmade Fibres, R. W. Moncrieff								

	The Maharaja Sayajirao University of Baroda **Faculty Technology and Engineering** **Department of Textile Engineering**		**Academic Year**	**2019-20**
M.E. (Textile Engineering): Regular Programme				
Year	**I**	**Core / ~~Elective / Foundation~~** **TXE2205: Theory of Textile Structure-II**	**Credits / Hours per week**	**04(theory)**
Semester	**II**	Year of Introduction: 2002 **Revised:2008, 2012**	**Maximum Marks / Grade**	**100(theory)**
Mode of Transaction		Lectures & Tutorials		

Course Outcome (CO) TXE 2205

CO1 In-depth knowledge on permeability and cover of fabric
CO2 Details about fabric geometry and shear properties
CO3 Drape and its attributes
CO4 Some research work on above
CO5 Understand basic models of fabric geometry and modifications in it.
CO6 inculcate research based idea employed to study tensile & buckling behavior of fabric and yarn failure analysis in fabric.
CO7 developing ability for structural design of woven fabrics.
CO8 Imparting knowledge about textile structural composites.

Unit No.	**Topic/Unit**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements of** Employability (Emp)/ Entrepreneursh	**Relevance to** Local (L)/ National (N)/ Region	**Relation to** Gender (G), Environment and

							ip (Ent)/ Skill Development (SD)	al(R)/Global (G) developmental needs	Sustainability (ES), Human Values (HV)and Professional Ethics (PE)
1	Introduction to basic fabric geometry and its importance. Porosity, permeability, elements of total air space in fabric, Fractional cover, Fabric cover of fabric.	06	10%	2,3,4	CO1	PSO1, 2	EMP	N,G,	-
2	Applicable formula (Peirce's geometry), Filling straight, warp jammed crimp values. Fabric shear, Stress distribution during shear, General equation for shear force, Shear properties Model to illustrate shear behaviour and other details.	12	20%	2,3,4	CO2	PSO1, 2			
3	Drape, Drape coefficient, other aspect of draping, Nature of fabric deformation in drape	06	10%	2,3,4	CO3	PSO1, 2			
4	Some experimental result and new developments	06	10%	2,3,4	CO4	PSO2, 4			
5	Peirce's geometrical model, its limitation, modifications in it, various models developed for tensile behavior of fabrics.	09	15%	2,3,4,5	CO5	PSO1			
6	Intrusive and non intrusive methods to find yarn failure in fabric under tensile load. Yarns pull out test. Fabric Assistance. Tensile property of Non- woven and Knitted fabric. Intrusive and non intrusive methods to find yarn failure in fabric under tensile load. Yarns pull out test. Fabric Assistance. Tensile property of Non- woven and	12	20%	4,5,6	CO6	PSO2 & PSO3			

	Knitted fabric.								
7	Structural design of woven fabric, prediction of fabric mechanical property on the basis of constructional parameters. Calculation of Floating Yarn Factor and Cloth Firmness Factor.	05	8%	4,5,6,	CO7	PSO2 & PSO3			
8	Textile Structural composites-classification, manufacturing methods, end use. Estimating engineering constant using matrix method.	04	7%	3,4,5,	CO8	PSO4			

Reference Books

1.	Structural Mechanics of Fibers, Yarn and Fabrics, Volume-I-J.W.S.Hearle, P.Grosberg, S.Backer. Published by: Wiley Interscience Publication,1969
2.	Theory of Elasticity (Third edition)-S.P.Timoshenko, J.N.Goodier. McGrawHill-Indian edition.
3.	Research/Review papers from: Journal of Textile Institute, Textile Research Journal, Indian Journal of Fiber and Textile Research, Textile Progress, Conferences etc.
4.	Master's Dissertations and Ph.D thesis.