Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Choice Based Credit System (CBCS) in Light of NEP-2020
M. Tech (Common for all Engineering branches)
(2021-2023)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTRM301	AECC	Research Methodology in Engineering	60	20	20	0	0	3	1	0	4

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. The course has been developed with orientation towards research related activities and recognizing the ensuing knowledge as property.
2. To analyze and evaluate research works and to formulate a research problem to pursue research.
3. To develop skills related to professional communication and technical report writing.

Course Outcomes:
At the end of the course, students will demonstrate their ability to:
1. Understanding and formulation of research problem.
2. Apply quantitative and qualitative methods used in engineering research.
3. Analyze interpret and evaluate data that relate to engineering problems.
4. Develop skills related to professional communication, technical report writing and publishing papers.
5. Act professionally, autonomously, ethically and in teams to produce a professional product.

Syllabus

Unit-I
Introduction to Research Methodology: - An overview of Research process, Types of research; Approaches to research, Importance of criticism in Literature review, identifying research gaps; Formulation of research problem; Research design,
Data: Primary and secondary data-sources, advantages/disadvantages; Sampling and primary data collection, sampling size, random and structured sampling

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of
Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Choice Based Credit System (CBCS) in Light of NEP-2020
M. Tech (Common for all Engineering branches)
(2021-2023)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTRM301	AECC	Research Methodology in Engineering	60	20	20	0	0	3	1	0	4

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.

Unit-II

Measurement and Scaling Techniques: - Types of scales, Criteria for good measurement, Attitude measurement - Likert's scale, Semantic differential scale, Thurstone-equal appearing interval scale.

Statistical Tools for Data Analysis: - Measure of central tendency, Measures of dispersion, Correlation and Regression, Formulation of hypothesis, Type I & Type II error, Parametric test, non-parametric test.

Unit-III

Research Methods I - Use of computer software in research and understanding the limitations. Multi-attribute decision making methods, Data envelopment analysis, Grey relational analysis etc., Multidisciplinary research problems, Synthesis of disciplinary research findings; Reliability and sensitivity analysis.

Unit-IV

Research Methods II - Modeling and simulation of engineering problem; Mathematical modeling-formulation, calibration, validation, application; measurement design – validity, reliability, scaling and sources of error. Mathematical programming methods, Numerical analysis, Optimization techniques, Design of laboratory experiments and field tests.

Unit-V

Academic Writing Skills and Presentation - Layout of a Research paper, research report, Thesis structure, Impact factor of Journals, Ethical issues related to publishing, Plagiarism and Self-Plagiarism. Reference Management Software like Mendeley, Software for paper formatting like LaTeX/MS Office, Software for detection of Plagiarism. Guidelines on how to write research papers. Content of Poster presentation, Power point presentation, Oral presentation

Chairperson	**Chairperson**	**Controller of Examination**	**Joint Registrar**
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Choice Based Credit System (CBCS) in Light of NEP-2020
M. Tech (Common for all Engineering branches)
(2021-2023)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTRM301	AECC	Research Methodology in Engineering	60	20	20	0	0	3	1	0	4

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.

Text Books -

1. C.R. Kothari, 2012. Research Methodology Methods and Techniques, 3/e, Vishwa Prakashan,
2. Montgomary, Douglas C., 2007. Design and Analysis of Experiments (Wiley India).
3. Chawla, D. and Sodhi, N., 2011. Research methodology: Concepts and cases. Vikas Publishing House.

Reference:

1. Donald H.McBurney, "Research Methods", 5th Edition, Thomson Learning, ISBN: 81-315-0047.
2. Donald R. Cooper, Pamela S. Schindler, "Business Research Methods", 8/e, Tata McGraw-Hill Co. Ltd.,
3. Timothy J. Ross, "Fuzzy Logic with Engg Applications", , Wiley Publications, 2nd Ed[d]
4. Thiel D.V. "Research Methods for Engineering", Published by Cambridge University Press, UK
5. P.J. van Laarhoven & E.H. Aarts, "Simulated Annealing: Theory and Applications" (Mathematics and Its Applications).

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
M.Tech. in Textile Chemistry (76 Credit_2023-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTTC201	DCC	ADVANCES IN DYEING	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 Objectives (CEOs):
1. Demonstrate theory of dyeing.
2. To teach different dyeing application.
3. To demonstrate the various methods of dyeing
4. Demonstrate various theories and concepts relation to dyeing processes of textile materials.
5. To determine different fastness properties

Course Outcomes (COs):
After completion of this course the students are expected to be able to demonstrate following knowledge, skills, and attitudes. The students will be able to
1. Understand various principles, objectives and properties of dyeing processes in textile wet processing.
2. Understand the preparation of dyed fabric sample and methods of dyeing effectively.
3. Conduct independently fibre and yarn dyeing.
4. Attempt batchwise, semi-continuous and continuous dyeing
5. Analyze fastness properties and various problems associated with dyeing processes of textile material.
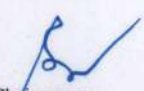
Syllabus

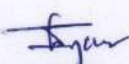**UNIT I: Theory of Dyeing**   **9 hours**
Introduction and objectives of dyeing, Properties of Dyes, Colour and Chemical Constitution: Chromophore, auxochrome and solubilising group, Colour measurement, Solubility of dyes, Substantivity and reactivity, Transport of dye to fiber surface, Dye adsorption on the fiber surface, Diffusion of dye, fixation of dye.

UNIT II: Classification of Dyes   **10 hours**

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
M.Tech. in Textile Chemistry (76 Credit_2023-2025)

COURSE CODE	CATEGORY	COURSE NAME	THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTTC201	DCC	ADVANCES IN DYEING	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.

Type of dyes: Classification of dyes according to chemical constitution and according to application; Properties, mechanism and application of Basic/Cationic dyes, Direct dyes, Reactive dyes, Vat dyes, Sulphur dyes, Acid dyes, Metal Complex dyes, Disperse dyes, Pigments; Commercial names of dyes, Tests for identification of dyes.

UNIT III: Fiber and Yarn Dyeing   8 hours
Fiber dyeing: Loose Stock Dyeing, Top dyeing, Gel dyeing, Tow dyeing, Dope dyeing, Flock dyeing; Yarn dyeing: Package dyeing, Hank dyeing, Space dyeing, Denim Dyeing.

UNIT IV: Fabric Dyeing   9 hours
Batchwise, Semicontinuous and continuous dyeing methods, Soft flow dyeing, Pad-Batch method, Pad-Dry method, Pad-steam method, Thermosol dyeing method, Pad-Dry-Pad-Steam process, pad-dry- thermofix process.

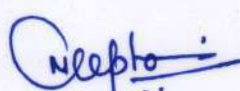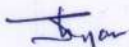## Unit V: Fastness requirements   9 hours
Washing Fastness, Light fastness, Rubbing Fastness, Perspiration fastness, Fastness to laundering, Fastness to bleaching agent, Fastness to dry heat; Xenotest, Launder-o-meter, Crock-meter, Blue wool standard, Grey scale, Staining scale.

References:
1. Technology of Dyeing, V.A. Shenai, Sevak Publications, Wadala Mumbai, 1996.
2. Cellulosic Dyeing, John Shore, Bradford: Society of Dyers and Colourists, 1995.
3. Dyeing and Chemical Technology of Textile Fibre - Trotman, E.R., Charles Griffin and Co. Ltd., London. 1991.
4. Textile Preparation and Dyeing: Asim Kumar Roy Choudhury, Society of Dyers and Colourists, 2011
5. Textile Dyeing: Mahapatra, N.N., Woodhead Publishing India in Textiles, New Delhi, 2018.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
M.Tech. in Textile Chemistry (76 Credit_2023-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P.	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTTC202	DCC	ADVANCES IN PRINTING AND FINISHING	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 Objectives (CEOs):
1. Demonstrate various principles and mechanisms of printing processes on textile goods.
2. Build analyzing capability of various problems associated with finishing processes of textile material
3. Demonstrate various theories and concepts relation to printing and finishing processes of textile materials
4. Illustrate the various principles, mechanism of finishing process on textile materials.

Course Outcomes (COs):
After completion of this course the students are expected to be able to demonstrate following knowledge, skills, and attitudes. The students will be able to
1. The student will be able to understand principles, methods and styles of printing.
2. The student will be able to identify various chemicals and ingredients used for printing.
3. The student will be able to understand the printing process on digital textile printing machine
4. The students will get exposure on mechanical finishing of textile materials.
5. The student will be able to understand different textile chemical finishing.

Syllabus

UNIT I: Printing methods and styles   9 Hours
Introduction and objectives of printing, Different traditional methods of printing: Block printing, Manual Screen Printing, Automatic Flat Bed screen printing, Rotary Screen printing, Transfer printing, Digital printing; Different styles of printing: Direct, discharge and resist style.

UNIT II: Printing ingredients   9 Hours
Dyes: Direct dye, Reactive dye, vat dye, azoic dye, acid dye, metal complex dye, basic dye, disperse dye; pigments: Different types of pigments, Role of Catalyst and Crosslinking agents; Thickeners: Starch, Gum, Sodium alginate, Emulsion thickener; Printing paste rheology, thixotrophic behaviour; Auxiliaries in printing paste; Pretreatment and after treatment processes

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
M.Tech. in Textile Chemistry (76 Credit_2023-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P.	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTTC202	DCC	ADVANCES IN PRINTING AND FINISHING	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.

UNIT III: Digital Textile Printing   10 Hours
Introduction, Advantages, Difference between analog and digital printing, Spot colour and process colour, Essential steps in digital printing, ink jet printing process, Pre and post treatment needed, Principle of ink jet technology- Continuous Ink Jet: Binary Process, Pulsating System, Drop on Demand: Drop formation, Drop Control; CYMK Colour, Quality of image, Types of Digital printing machine, Printing inks: Rheology, Water based inks.

UNIT IV: Mechanical Finishing of textile materials   8 Hours
Introduction and objectives of finishing, Mechanical finishing: Calendering, Embossing, Raising, Seuding, Napping, Pitch finish, Shearing, Sanforisation, drying: Multicylinder drying, Hot air drying, Festoon drying, Palmer drying.
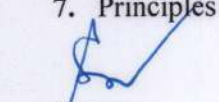
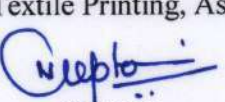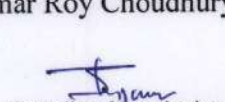## Unit V: Chemical finishing of textile materials   9 Hours
Chemical finishing: Crease resistant finishing, Finishing with softeners, Silicone finish, Water proof and water repellent finish, Flame retardant finish, antimicrobial finish, soil release finish, application of nanotechnology in finishing, application of plasma in finishing.
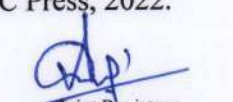
References:

1. Technology of Printing, V A Shenai, N M Saraf, Sevak Publications, Bombay, 1987.
2. Technology of Finishing, V A Shenai, N M Saraf, Sevak Publications, Bombay, 1987.
3. Textile Printing, Leslie W.C. Miles, Society of Dyers and Colourists, UK, 2003.
4. Chemical finishing of Textiles, W.D. Schindler, P.J. Hauser, Woodhead Publishing, 2004.
5. Principles of Textile Finishing, Asim Kumar Roy Choudhury, ELSEVIER, 2017.
6. Advances in Functional Finishing of Textiles, Mohammad Shahid (Editor), Ravindra Adivarekar (Editor), Springer, 2020.
7. Principles of Textile Printing, Asim Kumar Roy Choudhury, CRC Press, 2022.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
M.Tech. in Textile Chemistry (76 Credit_2023-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	T	P	CREDITS
MTTC203	DCC	COATING AND LAMINATION	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 Objectives (CEOs):
1. Demonstrate various principles and mechanisms of coating and lamination on textile goods.
2. Build analyzing capability of various problems associated with coating and lamination of textile material
3. Illustrate the general principles of fabric coating.
4. Demonstrate various theories and concepts relation to coating and lamination.
5. Describe different testing and product evaluation techniques.

Course Outcomes (COs):
After completion of this course the students are expected to be able to acquire following knowledge, skills, and attitudes. The students will be able to
1. Understand commercial and technical scope of coating and lamination of textile materials
2. Evaluate the prerequisites for coating and lamination of textiles.
3. Understand principle of production of coated and laminated textile materials.
4. Evaluate various products of coated and laminated fabrics.
5. Understand quality assurance and test conditions of coated and laminated textile materials.

Syllabus

UNIT I: Introduction to coating and lamination   **9 hours**
Introduction, Definitions, Fabric coating, Fabric finishing, Fabric lamination, Composite materials, Commercial scope of coated and laminated textiles, technical scopes of coated and laminated textiles

UNIT II: Prerequisites for coating and lamination   **9 Hours**
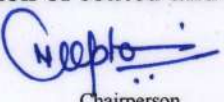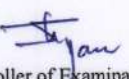Fabrics, Preparation of fabric for coating and lamination, materials required for coating and lamination, Compounding of polymers (Resins), Adhesives, Flame retardancy

UNIT III: Production of coated and laminated fabrics   **9 Hours**

Chairperson	Chairperson	Controller of Examination	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								CREDITS
			THEORY			PRACTICAL		L	T	P	
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTTC203	DCC	COATING AND LAMINATION	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.

General principles of fabric coating, direct coating, foam finishing, transfer coating, coagulated polyurethane coating, Back licking roller techniques, Hot melt extrusion coating, Calender coating, Rotary screen coating, Fabric impregnation, Lamination, Flame lamination, Hot melt lamination, Discussion of the various methods

UNIT IV: Products from coated and laminated fabrics   9 hours
Sports and industrial protective clothing, Industrial and functional products, Automotive applications, Marine applications, Building and architectures, Household products, Medical uses, Military uses, Other materials involving coating and lamination

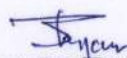## UNIT V: Testing and product evaluation   9 hours
Quality assurance, General test conditions, Testing of coated fabrics, Thermal comfort of apparels, Testing of automotive products, Flammability testing, Specialist testing for chemical and biological hazards, Investigation of faulty material and customer complaints

References:

1. Chemical finishing of Textiles by W.D. Schindler, P.J. Hauser (Editors), Woodhead Publishing Ltd, 2004.
2. Textile Coating and Laminating by William C. Smith, Technomic Publication Company, 1998.
3. Handbook of Technical Textiles by A R Horrocks and S C Anand (Editors), Woodhead publishing Ltd, 2000.
4. Coated and Laminated Textiles by Walter Fung, Woodhead publishing Ltd, 2002.
5. Coating and Laminating of Textile Fabrics by Senthil Kumar, Createspace Independent Publications, 2014.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
M.Tech.
(2021-2023)

| COURSE CODE | CAT-EGO-RY | COURSE NAME | TEACHING & EVALUATION SCHEME | | | | | | | | |
| | | | THEORY | | | PRACTICAL | | | | | |
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	T	P	CREDITS
MTEE101		Matlab	0	0	0	30	20	0	0	4	2

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. 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 (COs):
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 thoughtful manner

Syllabus

UNIT I   5 Hrs.
Introduction: MATLAB basics, The MATLAB environment, Basic computer programming Variables and constants, operators and simple calculations Formulas and functions, MATLAB toolboxes.

UNIT II   5 Hrs.
Matrices and vectors, Matrix and linear algebra review, Vectors and matrices in MATLAB, Matrix operations and functions in MATLAB.

UNIT III   6 Hrs.
Computer programming Algorithms and structures, MATLAB scripts and functions (.m files), Simple sequential algorithms Control structures (if...then, loops).

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
M.Tech.
(2021-2023)

COURSE CODE	CAT-EGO-RY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL					
			ENDSEM University Exam	Two Term Exam	Teachers Assessment*	ENDSEM University Exam	Teachers Assessment*	L	T	P	CREDITS
MTEE 101		Matlab	0	0	0	30	20	0	0	4	2

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.

UNIT IV   5 Hrs.

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

UNIT V   5 Hrs.

Numerical simulations, Numerical methods and simulations, Random number generation, Monte Carlo methods

References:

Rudra Pratap, "Getting Started with MATLAB", Oxford Publication, 2010.

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.
10. Study of Curve fitting and optimization techniques.

Chairperson	Chairperson	Controller of Examination	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

Shri VaishnavVidyapeethVishwavidyalaya, Indore
Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
M. Tech. in Textile Engineering
(2021-2023)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	T	P	CREDITS
MTTX203	DCC	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 DIFFERENT FIBRE SPINNING SYSTEMS   8 HOURS

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 PRODUTION TECHNIQES AND PROPERTIES OF NEW FIBRES   10HOURS

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,

Shri VaishnavVidyapeethVishwavidyalaya, Indore
Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
M. Tech. in Textile Engineering
(2021-2023)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	T	P	CREDITS
MTTX203	DCC	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

UNIT III SPECIALITY FIBRE   10HOURS

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 FIBRE   7 HOURS

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

UNIT V BICOMPONENT FIBRE   10HOURS
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.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
M.Tech. in Textile Chemistry (76 Credit_2023-2025)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING & EVALUATION SCHEME | | | | | | | | CREDITS |
| | | | THEORY | | | PRACTICAL | | | | | |
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	T	P	
MTTC224	DSE	Enzyme Technology for Textile Processing	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 Objectives (CEOs):
1 To demonstrate about nomenclature, classification and characteristics features of enzymes.
2. To illustrate the kinetics of single-substrate enzyme.
3. To impart knowledge on enzymes for pretreatment on Textile substrates.
4. To demonstrate about treatment of effluents with enzymes.

Course Outcomes (COs):
After completion of this course the students are expected to be able to demonstrate following knowledge, skills, and attitudes. The students will be able to
1. Student will be able to understand nomenclature, classification and characteristics of enzymes.
2. Students will be able to interpret kinetics of single-substrate enzyme.
3. Students will be able to understand the application of enzyme on cotton fiber.
4. Students will be able to comprehend the application of enzyme on protein fibers.
5. Students will be able to understand enzyme technology and biological remediation.

Syllabus

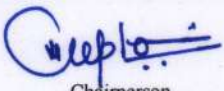### UNIT I: Introduction   9 hours
Textile industry and sustainable textile processing. Importance of enzyme in textile processing. Nomenclature and classification of enzymes; characteristic features of enzymes; modifiers of enzyme activity - activators and inhibitors; specificity of enzyme action; extraction and purifications of enzymes.

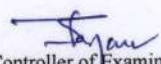### UNIT II: Enzyme Kinetics   9 hours
Various reactions involved in enzyme catalysed processes. Basic principles of interaction between enzyme and substrate. Kinetics of single-substrate enzyme- catalysed reactions; Basics of kinetics of multi-substrate enzyme-catalysed reactions.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
M.Tech. in Textile Chemistry (76 Credit_2023-2025)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING & EVALUATION SCHEME | | | | | | | | |
| | | | THEORY | | | PRACTICAL | | | | | |
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	T	P	CREDITS
MTTC224	DSE	Enzyme Technology for Textile Processing	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.

UNIT III: Enzymes for Cotton Fibre   9 hours
Chemistry and structure of cotton fibre; Pretreatment processes on cotton substrates – Enzymatic desizing, enzymatic scouring and bleaching. Enzyme used in finishing of cotton fabric: bio polishing. Use of amylase, lipase, Oxido-reductase, cellulase etc. Advantages and limitations of enzymatic processes on cotton and other cellulosic fibers.

UNIT IV: Enzymes for Protein and synthetic fibers   9 hours
Chemistry and structure of protein fibers such as wool and silk. Enzymes for processing and functionalizing protein fibres; Enzymatic degumming. enzymatic modification of polyester, polyamide, polyacrylonitrile and cellulose acetate fibres. Advantages and limitations of enzymatic processes on protein and synthetic fibers.

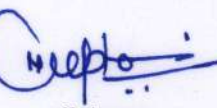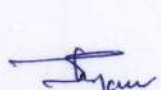### Unit V: Enzymes in Effluent Treatment   9 hours
Water pollution and textile industry. Importance of effluent treatment in textile industry. Process flow of effluent treatment in textile chemical processing plant. Enzyme technology and biological remediation, Enzyme decolourization, decolourization by biosorption and enrichment cultures.

References:

1. Freifelder D., "Molecular Biology ", Jones and Bartlett Publishers Inc. 1987.
2. Nierstrasz V. and Cavaco-Paulo A., "Advances in textile biotechnology", Woodhead Publishing Ltd, Cambridge, UK, 2010.
3. Cavaco-Paulo A. and Gubitz G., "Textile processing with enzymes", Woodhead Publishing Ltd, Cambridge, UK, 2003.
4. Technology of Finishing, V A Shenai, N M Saraf, Sevak Publications, Bombay, 1987.

Chairperson	Chairperson	Controller of Examination	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								CREDITS
			THEORY			PRACTICAL		L	T	P	
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTTX201	DCC	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 basicknowledge 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. Illustrate basic knowledge about the various bonding process of nonwoven fabrics.
3. Illustrate basic knowledge about the various finishing process of nonwoven fabrics.

Syllabus

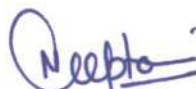**UNIT I INTRODUCTION TO NONWOVENS   10 HOURS**
Introduction to nonwovens, Materials used in nonwovens, fiber description considerations, properties of nonwoven fabric produced using different fibrous matter.

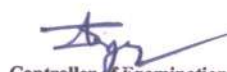**UNIT II BONDING AGENTS USED IN NONWOVENS   8 HOURS**

Bonding agent used in nonwovens; properties desired in bonding agent. Classification and areas of application of nonwoven fabrics,General production steps for nonwoven fabric manufacturing.Dry bonded fabric production steps, spun bonded fabric production steps, wet bonded fabric production steps.

UNIT III PRINCIPLES OF NONWOVEN PROCESSES   9 HOURS

Principles of nonwoven processes: web formation processes. Types of webs and their forming techniques, staple fibre web – dry-laid web and wet laid web, continuous fibre web – spunlaid web and melt blown web.

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								CREDITS
			THEORY			PRACTICAL		L	T	P	
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTTX201	DCC	**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

UNIT IV BONDING OF NONWOVENS   12 HOURS

Mechanical and Thermal bonding processes, needle punch, spun bond and spunless processes, hydro entanglement and chemical bonding processes etc

UNIT V FINISHING OF NONWOVENS   7 HOURS

Finishing of nonwoven fabrics – calendaring and pressing, water repellent finish, antistatic finish, antimicrobial finish, flame retardant finish and soil release finish.

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,1985.
3. Albrecht W, Fuchs H & Kittelmann, "Nonwoven Fabrics", Wiley-VCH Weinheim, 2003.
4. Mrstina V & Fejgal F, "Needle punching textile technology", Elsevier, 1990.
5. Krcma Radco, "Manual of nonwovens", Textile Trade Press, UK,1971
6. Gulrajani M L, "Book of Papers of International Conference on Nonwovens", The TextileInstitute, UK, 1992

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore