Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav School of Management

Choice Based Credit System (CBCS) in Light of NEP-2020
MBA – Hospital and Health Management - III SEMESTER (2021-2023)

MBAI301C ADVANCEDHUMAN VALUES AND PROFESSIONAL ETHICS

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*				
MBAI301C	AECC	Advanced Human Values and Professional Ethics	60	20	20	-	-	3	-	-	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical: **C** - Credit; **AECC-** Ability Enhancement Compulsory Course

***Teacher Assessment** shall be based on following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objective

The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of "right" and "good" in individual, social and professional context

Examination Scheme

The internal assessment of the students' performance will be done out of 40 Marks. The semester Examination will be worth 60 Marks. The question paper and semester exam will consist of two sections A and B. Section A will carry 36 Marks and consist of five questions, out of which student will be required to attempt any three questions. Section B will comprise of one or more cases / problems worth 24 marks.

Course Outcomes

1. Help the students to understand right conduct in life.
2. To equip students with understanding of the ethical philosophies, principles, models that directly and indirectly affect personal and professional life.

COURSE CONTENT

Unit I: Inculcating Values at Workplace

1. Values: Concept, Sources, Essence
2. Classification of Values.
3. Values in Indian Culture and Management: Four False Views, Value Tree
4. Eastern and Western Values; Values for Global Managers

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MBA – Hospital and Health Management - III SEMESTER (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*				
MBAI301C	AECC	Advanced Human Values and Professional Ethics	60	20	20	-	-	3	-	-	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical: **C** - Credit; **AECC-** Ability Enhancement Compulsory Course

***Teacher Assessment** shall be based on following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Unit II: Professional Ethics

1. Ethics: Concept, Five P's of Ethical Power, Organisational Tools to Cultivate Ethics
2. Theories of Ethics: Teleological and Deontological
3. Benefits of Managing Ethics in an Organisation
4. Ethical Leadership

Unit III: Indian Ethos and Management Style

1. Indian Ethos and Workplace
2. Emerging Managerial Practices
3. Ethical Considerations in Decision Making and Indian Management Model
4. Core Strategies in Indian Wisdom and Ethical Constraints

Unit IV: Human Behavior – Indian Thoughts

1. Guna Theory
2. Sanskara Theory
3. Nishkama Karma
4. Yoga: Types, Gains; Stress and Yoga

Unit V: Spirituality and Corporate World

1. Spirituality: Concept, Paths to Spirituality
2. Instruments to achieve spirituality
3. Vedantic Approach to Spiritual and Ethical Development
4. Indian Spiritual Tradition.

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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*				
MBAI301C	AECC	Advanced Human Values and Professional Ethics	60	20	20	-	-	3	-	-	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical: **C** - Credit; **AECC-** Ability Enhancement Compulsory Course

***Teacher Assessment** shall be based on following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Suggested Readings

1. Kausahl, Shyam L. (2006). ***Business Ethics – Concepts, Crisis and Solutions***. New Delhi: Deep and Deep Publications Pvt. Limited
2. Murthy, C.S.V. (2012). ***Business Ethics –Text and Cases.*** Himalaya Publishing House: Mumbai
3. Chakraborty, S. K. (1999). ***Values and Ethics for Organizations***. Oxford university press
4. D.Senthil Kumar and A. SenthilRajan (2008). ***Business Ethics and Values.*** Himalaya Publishing House: Mumbai

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Master of Technology

SEMESTER I

COURSE CODE	Category	COURSE 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*				
MTMAN 101	BS	Advanced Mathematics	60	20	20	-	-	3	0	0	3

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

Course Educational Objectives (CEOs):

To introduce the students to advanced mathematics.

Course Outcomes (COs):

After the successful completion of this course students will be able to:

A. understand the concept of a vector space, subspace, basis, dimensions and their properties.
B. find solution/numerical solution of PDE.
C. explain fundamental principles of probability theory.
D. understand the concept of Markov process and Queuing theory.
E. demonstrate the ability to solve mathematical problem with fuzzy logic.

Syllabus

UNIT – I

Linear Algebra:

Vector Space , Subspace, Basis & dimensions, Change of Basis, Linear Transformation, Matrix Representation of Linear Transformation.

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COURSE CODE	Category	COURSE 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				
MTMAN 101	BS	Advanced Mathematics	60	20	20	-	-	3	0	0	3

UNIT – II

Numerical Solution of Partial Differential Equations:

Classification of second order equations, Finite difference approximation to derivatives, Elliptic equations, Solution of Laplace's equation, Solution of Poisson's equations, Parabolic equations, Solutions of Heat equations, Hyperbolic equations.

UNIT – III

Probability & Statistics:

Probability, Compound probability, Discrete Random Variable, Binomial and Poisson distribution, Continuous random variable, Normal distribution, Sampling distribution, Theory of hypothesis.

UNIT – IV

Stochastic Process & Queuing Theory:

Introduction of random or stochastic processes, Markov processes, Markov chain, Queuing theory: M/M/1: ∞/∞/FCFS, M/M/1: N/∞/FCFS.

UNIT – V

Fuzzy Set and Theorems:

Fuzzy sets, Fuzzy relation, Fuzzy arithmetic, Fuzzy logic.

Texts:

1. Higher Engg. Mathematics: B. S. Grewal, Khanna Publishers, Delhi
2. Higher Engg. Mathematics: E. Kreyzig, John Wiley & Sons (Asia) Pvt. Ltd.
3. Operation Research: S. D. Sharma, Kedar Nath and Ram Nath, Delhi.
4. Probability, Random variables & Random processes: Schaum's outlines.
5. Stochastic processes: J. Medhi, New age international publishers.
6. Calculus of finite differences and Numerica Analysis: Gupta and Malik.
7. Fuzzy logic in Engineering: T. J. Ross.
8. Fuzzy set theory and its applications: H. J. Zimmersoms.

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Shri Vaishnav Institute of Textile Technology
M. Tech. in Textile Chemistry

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*				
MTTC101	DCC	ADVANCES IN PRE-TREATMENTS	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 pre-treatment processes on textile goods.
2. Build analyzing capability of various problems associated with pre-treatment processes of textile material
3. Demonstrate various theories and concepts relation to pre-treatment processes of textile materials

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate the following knowledge, skills, and attitudes. The students will be able to

1. Understand various principles of pre-treatment processes in textile wet processing.
2. Prepare Ready For Dyeing (RFD) fabric sample which can be dyed and printed effectively.
3. Analyze various problems associated with pre-treatment processes of textile material.

Pre-requisite: Basic knowledge of Fiber Science and Textile Chemical Processing

Cos	CO-POs & PSOs Mapping															
	Programme Outcomes (POs) & Programme Specific Outcomes															
	PO1	PO2	PO3	PO4	PO6	PO6	PO7	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	■	■	■													
CO2	■	■	■													
CO3	■	■	■													

Syllabus

UNIT I: Basic of pretreatments 9 hour

Aims of preparatory processes, Water requirement and pretreatment, Impurities in water and their effect, hardness of water, method of water softening, sequestering agents, Surface active

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTTC101	DCC	ADVANCES IN PRE-TREATMENTS	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.

agents, HLB Value, method to calculate HLB value, Griffin's scale, Micelle formation, Emulsion theory, Properties of soaps and detergents, theory of detergency.

UNIT II: Singeing and Desizing 9 hour

Singeing, latest technologies in singeing, Gas singeing, Parameters to be controlled in Gas singeing, Desizing of cotton; different desizing methods, Desizing and its environmental aspects, Enzymatic desizing and its importance, oxidative desizing, Desizing of synthetic and blended fabrics, Determination of desizing efficiency.

UNIT III: Scouring 10 hour

Techniques for scouring of cotton and viscose rayon, Machinery used for scouring of cotton, solvent scouring, **Scouring of wool**: Emulsion scouring, suint scouring, solvent scouring and freezing, Carbonisation of wool, **Degumming of silk:** degumming with soap, detergent and enzyme, bio-scouring, **Scouring efficiency:** Drop test, sinking water test, Methods used to test degradation of cotton during scouring, Copper number, Cuprammonium fluidity test

UNIT IV: Bleaching 9 hour

Emerging bleaching techniques: BEN-INJECTA and BEN-IMPACTA, Combined preparatory processes, Continuous Bleaching Range (CBR), Optical brightening agent Whiteness measurement, Efficiency of bleaching.

Unit V: Mercerization 8 hour

Chemical and physical changes during and after mercerization, Slack mercerization and mercerization with tension, Liquid Ammonia mercerization, caustic recovery plant and its

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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*				
MTTC101	DCC	ADVANCES IN PRE-TREATMENTS	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.

efficiency, Efficiency of mercerization: Barium activity number, energy conservation by process and machine modification.

Textbooks:

1. Textile Preparation and Dyeing by Asim Kumar Roy Choudhury, Science publishers, 2006
2. Technology of Bleaching and Mercerizing, Shenai V.A., Sevak Publication, Bombay, Vol. - 3, 3rd edition, 2003.
3. Textile Scouring & Bleaching – Trotman E.R., B.I. Pub., 1993, New Delhi

References:

1. An Introduction to Textile Bleaching, J.T. Marsh, B.I. Publication, New Delhi, 1979
2. Technology of Bleaching and Dyeing. R.R Chakravorty, S.S. Trivedi, Vol. 1, Mahajan Publishers Private Ltd., Ahmedabad, 1 979.
3. Chemical technology in the pre-treatment processes of textile. S. R. Karmakar, Elsevier Publication, 1999
4. Textile Preparation and Dyeing. Asim Kumar Roy Choudhury, Science publishers, 2006
5. Handbook of textile and industrial dyeing; M. Clerk (Editor), Woodhead publishers, 2011

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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*				
MTTC102	DCC	THEORY OF COLOURATION IN 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 Objectives (CEOs):

1. Demonstrate various theories relation to kinetics and thermodynamics of dyeing.
2. Illustrate various mechanisms relating to dye-fiber interaction
3. Demonstrate about fixation of dye and bond formation

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 theories relation to kinetics and thermodynamics of dyeing.
2. Analyse various mechanisms relating to dye-fiber interaction and problems associated with them.
3. Understand the theories relating to bond formation between dye and fiber and its effect on fastness properties.

Pre-requisite: Basic knowledge of Fiber Science and Textile Chemical Processing

COs	CO-POs & PSOs Mapping Programme Outcomes (POs) & Programme Specific Outcomes															
	PO1	PO2	PO3	PO4	PO6	PO6	PO7	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	■	■	■													
CO2	■	■	■													
CO3	■	■	■													

Syllabus

Unit I: Colour and Chemical Constitution 9 hour

Dye and pigment, Chromophore: azo, anthraquinone, triphenyl methane, auxochrome: electron donor, electron acceptor, solubilizing groups, substantivity and reactivity, Different theories of

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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*				
MTTC102	DCC	THEORY OF COLOURATION IN 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.

interaction between chromophore and auxochrome: Resonance Theory, Molecular Orbital Theory.

Unit II: Kinetics of Dyeing 10 hour

Definition of terms and mathematical equation relevant to physio chemical aspect of dyeing such as diffusion coefficient, standard affinity, heat of dyeing, entropy of dyeing, saturation value, adsorption on sites etc. Different models representing diffusion of dyes inside fibers: pore model, free volume model, Methods for measurement of diffusion coefficient and different equation used for calculation of diffusion coefficient, Significance of diffusion coefficient in relation of physical structure of fibre.

Unit III: Thermodynamics of dyeing 9 hour

Adsorption isotherms and experimental design for their determination: Langmuir, Freundlich and Nernst Isotherm, applicability of adsorption isotherm to different dye fibre systems, Standard affinity equation representing different adsorption isotherm, Dye fibre interactions and analytical methods for their investigations.

Unit IV: Fixation and bond formation 9 hour

Fixation of dye in fibers, Van der Waals' forces, hydrophobic bonding, hydrogen bond, ionic bond, Ion dipole forces, Covalent bond. Identification of bond between dye and fiber, Fourier Transformation Infrared spectroscopy, Bond strength and fastness properties, calculation of bond strength

Unit V: Technique of coloration 9 hour

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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*				
MTTC102	DCC	THEORY OF COLOURATION IN 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.

Quantitative treatment for kinetics as well as equilibrium dyeing state of dye in solution, in fibre and dye fibre interactions. Role of fibre structure and other characteristics in dyeing, Dye-polymer interaction and methods of investigation, Reaction mechanism for different textile dyes with fibres. Use of improved chromophores

Textbooks:

1. The Physics and Chemistry of Colour, K. Nassau, Wiley-Interscience, New York, USA, 2nd edition, 2001
2. Modern Concepts of Colour and Appearance, A.K. Roy Choudhury, Science Publishers, New Delhi, 1999
3. The Colour Science of Dyes and Pigments, K. McLaren, Adam-Hilger, Bristol, UK, 1983
4. The Mathematics of Diffusion, Crank, Clarendon Press, Oxford, UK, 2nd Edition, 1975

References:

1. The Theory of Colouration of Textiles by by C.L. Bird (Editor), W.S. Boston (Editor), Alan Johnson (Editor), Dyers Company Publication Trust, Bradford, UK, 1989.
2. Cellulosic Dyeing, John Shore, Bradford: Society of Dyers and Colourists, 1995
3. Handbook of textile and industrial dyeing; M. Clerk (Editor); Woodhead publishers, 2011
4. Collected Works, Gibbs, Longman, Green & Co., London, UK, 1928
5. The Physical Chemistry of Dyeing, T. Vickerstaff, Oliver & Boyd, London, UK, 2nd Edition, 1954

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MTTX 103 (Elective 1)

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*				
MTTX113	DSE	STRUCTURE AND PROPERTIES OF 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):

The students will be able to gain knowledge on structural properties of fibres and also to explain the mechanical , electrical and thermal behaviour of fibre and its measurement correctly.

Course Outcomes (Cos):

Students will be able to:

1. Understand and Analyze basic structure of fibres.
2. Apply knowledge and analyze to solve the complex behaviour of fibre.
3. Understand the Dielectric and frictional fundamentals of fibres.
4. Illustrate basic knowledge about the structural behaviour of fibre.
5. Remember the working Principles of various measuring instruments.

Syllabus

UNIT I STRUCTURE OF TEXTILE FIBRES **9 HOURS**

Study of fibre structure by X-rays, IR Spectroscopy, optical and electron microscopy (SEM). Determination of degree of crystallinity, orientation, crystal size and morphology. Structure of fibres, morphology and order in fibre structure. Theories of fine structures of fibres.

UNIT II MECHANIAL PROPERTIES OF TEXTILE FIBRES **10 HOURS**

The Mechanical properties of fibres. Theories of elasticity. Visco elastic properties of fibres, various models like Maxwell, Irings etc, Thermodynamics analysis of deformation. Stress relaxation, creep, stress-strain relations, Temperature of visco-elasticity as applied to natural fibres. The Boltzman supervision principle and Nutting's Power Law, their application to fibres.

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MTTX 103 (Elective 1)

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*				
MTTX113	DSE	STRUCTURE AND PROPERTIES OF 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 HYDROPHILIC PROPERTIES OF FIBRES **8 HOURS**

Sorption isotherms, heat of sorption, swelling and theories of moisture sorption. Hydrophilic and hydrophobic properties. Thermal Properties: Thermal expansion, Thermal conductivity;

UNIT IV ELECTICAL PROPERTIES OF FIBRES **10 HOURS**

Di-electric properties. Effects of frequency and temperature on dielectric constant and static electricity. Electrical resistance and its measurement, Static electricity and measurement of static charge in fibres.

UNIT V FRICTIONAL PROPERTIES OF FIBRES **8 HOURS**

Frictional properties – Theory of friction and lubrication and its application to fibres. Measurement of friction. Optical properties: Polarizability and refractive index. Birefringence and its measurement;

References:

1. Vaidya; Production of Synthetic Fibres.
2. Shennai VA; Technology of Textile Processing – Vol.I, Textile Fibres.
3. Gupta, Kothari; Progress in TST Vol.II Textile Fibres Developments & Innovations
4. Murthy HVS; Introduction to Textile Fibre
5. Moncrieff Man Made Fibres.
6. Akira Nakamura; Fibre Science & Technology (Translated from Japanese).
7. Mishra SP; A Text Book of Fiber Science & Technology.
8. Tatsuya Hongu, Glyn O. Philips; New Fibers 2nd Edition.

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Shri Vaishnav Institute of Textile Technology
M. Tech. in Textile Chemistry

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*				
MTTC123	DSE	SUSTAINABLE 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. Demonstrate about sustainable approach in textile chemical processing.
2. Illustrate about green chemistry and its application in textile chemical processing
3. Demonstrate about eco friendly fibers, dyes and chemicals and their importance

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 about sustainable approach in textile chemical processing
2. Analyse about unsustainable textile chemicals and their eco-friendly alternatives.
3. Understand the production and application of eco-friendly fibers, dyes and chemicals and their importance.

Pre-requisite: Basic knowledge of Fiber Science and Textile Chemical Processing

	CO-POs & PSOs Mapping															
COs	Programme Outcomes (POs) & Programme Specific Outcomes															
	PO1	PO2	PO3	PO4	PO6	PO6	PO7	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	■	■	■	■	■		■			■						
CO2	■	■	■	■	■		■			■						
CO3	■	■	■	■	■		■			■						

Syllabus

Unit I: Eco friendly Textiles 9 hour

Introduction, Concept of AOX, Toxicity, German Ban, Carcinogenic and suspected carcinogenic amines, testing methods for toxicity, Eco friendly processing, Eco auditing and Eco labeling, Some Textile Chemicals and their eco-friendly alternatives.

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Unit II: Green Chemistry 9 hour

Introduction, Principles of green chemistry, challenges and misconceptions in green chemistry, assessments, Key developments in green chemistry-supercritical carbon dioxide as green solvent, Textile Industry and pollution, Carbon footprint in textile industry, Importance of Compliances for brands and retailers

Unit III: Application of Green chemistry 10 hour

Green approach in dye manufacturing industry: alternative synthesis for eco-friendly products, search for sustainable sources, use of natural based chemicals, Green approach in auxiliary chemical manufacturing industries: Reduction in use and emission of harmful auxiliaries, Green approach in dyeing, printing and finishing industries: Reduction in energy, water usage, time,

Unit IV: Eco friendly fibers, dyes, and chemical auxiliaries 10 hour

Eco friendly fibers: Organic cotton, Lyocell fiber, Bamboo fiber, Recycled cotton, Recycled polyester. Natural dye: Classification, extraction, purification, advantages and disadvantages of natural dyeing, application of mordant, Toxicity of mordants, fastness properties. Biodegradable and green surfactants, eco friendly stain remover, vegetable lubricants

Unit V: Bio-processing 7 hour

Enzyme, Use of enzyme in textile industry, Enzymatic desizing, Enzymatic scouring, Enzymatic bleaching, Bio polishing, Enzyme based softeners.

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MTTC123	DSE	SUSTAINABLE 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.

Textbooks:

1. Environmental Chemistry of dyes and pigments, Abraham Reife(Editor), Harold S. Freeman(Editor), Wiley Publishers, 1996
2. Sustainable Textiles: Life Cycle and Environmental Impact, R.S. Blackburn (Editor), Woodhead Publishing in Textiles, 2009
3. Handbook of Sustainable Textile Production, Marion I. Tobler-Rohr, Woodhead Publishing in Textiles, 2011
4. Sustainable Apparels: Production, Processing and Recycling, R.S. Blackburn (Editor), Woodhead Publishing in Textiles, 2015

References:

1. Green Chemistry, Theory and Practice, P. Anastas, J. C. warner, Oxford University Press, New York, USA, 1998
2. Environmental Issues - Technology Options for Textile, R.B. Chavan, Department of Textile Technology, IIT Delhi, 1998
3. Environmental Problems in Chemical Processing of Textiles, Y.S. Asolekar, NCUTE, IIT Delhi, 2000
4. Dyeing and Printing with Natural dyes, M.L. Gulrajani, D. Gupta, NCUTE, IIT Delhi, 2001
5. Textile Preparation and Dyeing, Asim Kumar Roy Choudhury, Society of Dyers and Colourists India, Mumbai, 2011

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTTC133	DSE	ADVANCED COLOUR PHYSICS	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. Describe various elements of colour physics.
2. Recognize the various colours used in textile industry.
3. Compare the various colours present in dye.

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. Prepare dye recipe for given project.
2. Reproduce different dye shades to match the colour of given sample.
3. Able to identify the acceptance of the given dyed sample.
4. Simulate the colours in different dyes.

Pre-requisite: Basic knowledge of Textile Chemical Processing

	CO-POs & PSOs Mapping														
	Programme Outcomes (POs) & Programme Specific Outcomes														
COs	PO1	PO2	PO3	PO4	PO6	PO6	PO7	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	■	■	■													
CO3	■	■	■													
CO3	■															
CO4	■															

Syllabus

Unit I: Theory of Color and Spectrophotometer
9 hour

Colour perception, theories of colour vision, colour measurement. Reflectance Spectrophotometer-- Basic components of Reflectance Spectrophotometer, Spectrophotometer performance and selection parameter, New commercial spectrophotometer--Tristimulus

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MTTC133	DSE	ADVANCED COLOUR PHYSICS	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.

colorimeters-Gloss meters- multi-angle spectrophotometer, new developments in multi -angle spectrophotometers, non-contact spectrophotometers reflectance curves.

Unit II Advanced Theory of CIELAB 9 hour

The CIE color specifications – Computation of tristimulus values, XYZ from reflectance values, The CIE standard illuminants, Chromaticity coordinates & chromaticity diagram – Features and Limitations, The CIELAB color specification, color space, Kubelka – Munk relation & concentration of colorant – Features and Modification to K-M theory, Four-Flux theory & Multi-Flux theory – Color difference equations and calculations, grey scale rating – Metamerism & metameric index, color consistency & color inconsistency index, opacity calculations.

Unit III: Color Assessment in Textile 9 hour

Sample preparation, presentation & measurement, Selection of spectrophotometer, laboratory Equipments of computer color matching system, Change in Hue with increase in concentration, Chromaticity coordinates & chromaticity diagram, Dye gamut mapping, setting tolerances, compatibility of dyes, Color difference assessment, colour difference using different color difference equations.

Unit IV: Advance color strength measuring methods 9 hour

The CII & the concentration of a dye, The CII of mixtures of dyes, Fastness rating, Pass/Fail – Specifying tolerances, Shade sort using 555 method, Advanced shade sort methods, Color strength analysis, Relative strength methods, linear region of dyes, color strength & residual color difference, color strength of navy blue & black, color strength of dyes with the same color index number.

Unit V: Color difference index and assessment in Textile 9 hour

Color strength of fluorescent dyes & residual color difference – whiteness index & yellowness index - whiteness index of various natural & man-made fibres using different WI equations – whiteness of OBA treated samples, Whiteness of OBA with tinting agent, Whiteness

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MTTC133	DSE	ADVANCED COLOUR PHYSICS	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.

measurement with & without UV filter, UV-filters with different cut-off wavelength, effect of washing on whiteness of white substrates for medical ware & hospital ware, Soil removal evaluation of detergents, yellowness index of white & near – white textile substrates, Studies in dye behavior, Dye build-up properties, Linear and nonlinear behavior of dye, fastness properties.

Textbooks:

1. The Theory of Colouration of Textile by Johnson, A, SDC 2nd Edition,1998
2. Color Physics for Industry. Roderick Mcdonald. Society of Dyers and Colourists, 1997
3. Computer Color Analysis. A.D. Sule. New Age International Limited. 2003
4. Instrumental Colour Measurements and Computer Aided Colour Matching for Textiles, by H. S. Shah and R. S. Gandhi, Forward, by Fred W. Billmeyer, Jr., Mahajan Book Distributors, Ahmedabad, India, 1990

References:

1. Modern Concepts of Color and Appearance - Asim Kr. Roy Choudhary, Elsevier Publication 2015.
2. The Theory of Coloration of Textiles, by A. Johnson , Society of Dyers and Colourists 2nd edition, 1989.
3. Physico – Chemical Principles of Colour Chemistry by Peters. A. T and Freeman, H.S Blackie, 1995.
4. Color for Textiles - A user handbook - Wilfred Ingamells. Society of Dyers and Colourists, 1993
5. Analytical Chemistry of Synthetic Colorants by Peters. A. T and Freeman, H.S Blackie, 1991.

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MTTC104	SEC	COLOURATION IN TEXTILE LAB	0	0	0	30	20	0	1	2	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. Demonstrate various pre-treatment processes through laboratory experiment
2. Demonstrate various dyeing processes through laboratory experiment
3. Demonstrate assessment of colour strength and fastness properties through laboratory work

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. Prepare Ready For Dyeing(RFD) fabric sample which can be dyed and printed effectively.
2. Prepare dyed fabric sample which can be processed further.
3. Evaluate fastness properties of dyed fabric samples.
4. Evaluate colour strength and colour differences using spectrophotometer

Pre-requisite: Basic knowledge of Textile Chemical Processing

	CO-POs & PSOs Mapping															
COs	Programme Outcomes (POs) & Programme Specific Outcomes															
	PO1	PO2	PO3	PO4	PO6	PO6	PO7	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	■	■														
CO2	■	■	■													
CO3	■	■	■													
CO4	■	■	■													

Syllabus

List of Experiments (Expand it if needed):
1. Desizing of grey cotton fabric sample and assessment of desizing efficiency.
2. Scouring of desized cotton fabric sample and assessment of water absorbency.
3. Bleaching of scoured cotton fabric sample and evaluation of whiteness index.
4. Dyeing of cotton fabric sample with reactive dye and assessment of washing fastness.

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MTTC104	SEC	COLOURATION IN TEXTILE LAB	0	0	0	30	20	0	1	2	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.

5. Dyeing of silk fabric sample with acid dye and assessment of light fastness.
6. Dyeing of woollen fabric sample with acid dye and assessment of rubbing fastness.
7. Study and observation of construction and working of spectrophotometer.
8. Dyeing of cotton fabric with two different types of reactive dyes and comparison of colour strength.
9. Dyeing of silk fabric sample with two different types of acid dyes and assessment of colour difference value.
10. Dyeing of silk cotton fabric with any natural dye using different mordants and comparison of washing fastness.

Textbooks:

1. Textile Preparation and Dyeing, Asim Kumar Roy Choudhury, Science publishers, 2006
2. Chemical technology in the pre-treatment processes of textile. S. R. Karmakar, Elsevier Publication, 1999
3. Handbook of textile and industrial dyeing; M. Clerk (Editor); Woodhead publishers, 2011
4. A Laboratory Course in dyeing, C. H. Giles, The Society of Dyers and Colourists, 3rd edition, Bradford, UK, 1974

References:

1. ISI Handbook on Textiles, SP: 15-1981, B.I. Publications, New Delhi, India, 1981
2. ASTM. 1987, Standards on Color and Appearance, 2nd edition, Designation E 313-79, West Conshohocken, PA, USA, 1987
3. Standard Methods for Determination of the Colourfastness of Textile and Leather, The Society of Dyers and Colourists, Bradford, UK, 4th Edition, 1978
4. Technology of Bleaching, V.A. Shenai, Sevak Publications, Mumbai, 1984.
5. Cellulosic Dyeing, John Shore, Bradford: Society of Dyers and Colourists, 1995.

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