Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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*				
BTTX 701	DCC	Advance Yarn Manufacturing	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. Course will provide the knowledge about the limitation of ring spinning system and its versatility.
2. Course will provide detail knowledge about the manufacturing of rotor yarn and its structure.
3. Course will provide introductory knowledge about the other advance yarn manufacturing system.

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. Demonstrate their knowledge on the limitation of ring spinning system and development of advance yarn system.
2. Identify, analyse and design of rotor yarn production system.
3. Recall the knowledge of air jet and wrap spinning system

Pre-requisite: BTTX 501 YARN MANUFACTURING III

	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	■	■													■	

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX 701	DCC	Advance Yarn Manufacturing	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
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Syllabus

Unit I Limitations of Ring Spinning and Innovation in Spinning 9h

Limitations of conventional methods of spinning, Developments in ring spinning to overcome such limitations. Summary of different new spinning process and their possibilities and limitations.

Unit II Rotor Spinning 9h

Overview, objects, developments, principle and speed; Raw material requirements and preparation; Method of operation - opening unit, yarn formation, structure and aspects of rotor and its influence on yarn, yarn withdrawal and winding system, automation. Calculation related to twist, production etc.

Unit III Rotor Yarn Characteristics 9h

Structure and its difference with ring spun yarn, brief idea about the end products; Production of fancy yarn/core spun yarn in rotor spinning.

Unit IV Air Jet and Air Vortex Spinning 9h

Principle, raw material requirements, yarn characteristic and yarn structure of air jet spun yarn, comparison with ring spun yarn, inter-relationships in spinning technology, end use of yarn.

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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BTTX 701	DCC	Advance Yarn Manufacturing	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.

Principle of air vortex spinning. Difference between air jet spun and air vortex spun yarn structure.

Unit V Friction and other Spinning Techniques **9h**

Principle, raw material requirements, yarn structure and its comparison with ring spun yarn, end uses of yarn. Assessment of DREF- II & DREF III yarn structure and properties. Brief idea about Wrap spinning, plyfil, parafil, disc spinning, rubbing technique, repco, electrostatic spinning, adhesive process like bobtex and twist less spinning etc.

Text Books:

1. Advances in yarn spinning technology, C. A. Lawrence (ed.), Woodhead Publishing Limited, 2010.
2. New spinning system by R.V. Mahendra Gowda, NCUTE publication, 2003.

References:

1. Handbook of yarn production P.R. Lord, Woodhead publication, 2003.
2. New Spinning Systems: Short Staple Spinning Series: Vol 5 (Manual of Textile Technology), W. Klein, The Textile Institute, 1993.
3. Spinning in the 70's, P.R. Lord (ed.), Merrow Publishing Company Limited, 1970.

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering (168 Credit_2023-2027)

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*				
BTTX702	DCC	Advance Fabric Manufacturing	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. Course will provide the knowledge about the working mechanisms of shuttleless looms.
2. Course will provide the introductory knowledge about triaxial weaving, Narrow Fabric weaving and filament weaving.
3. Course will provide the knowledge about modern development in shuttleless loom.

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. Describe the working mechanisms of shuttleless looms and can produce fabrics as per desired quality and specifications.
2. Adjust and modify the weaving machines for Filament weaving correctly.
3. Demonstrate and utilizes the knowledge of triaxial weaving, narrowing fabric weaving and modern development of shuttleless loom.

Syllabus

Unit I Introduction to shuttleless loom **9 h**

Comparison of shuttleless weaving with shuttle weaving, Yarn quality requirements for shuttleless looms, Introduction to different weft insertion systems on shuttleless weaving machines, weft accumulators and weft measuring devices used in shuttleless weaving.

Unit II Projectile loom **9 h**

Sulzer Projectile Loom – features; projectile guides, projectile feeding mechanism, weft insertion cycle of projectile loom, torsion bar picking mechanism, matched cam beat up mechanism, No.

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering (168 Credit_2023-2027)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX702	DCC	Advance Fabric Manufacturing	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.

of projectile required for different widths of projectile loom.

Unit III Rapier loom **9 h**

Rapier loom - different types and features, yarn transfer systems in different rapier looms. Two phase rapier, weft insertion cycle of rapier looms, rapier drives for rigid and flexible rapier.

Unit IV Air Jet and Water jet loom **10 h**

Jet loom - principles of air and water jet weft insertion and their comparison, weft buckling, weft insertion cycle of Air jet loom, different traversing aid used in air jet loom, weft insertion cycle of water jet loom. Air quality requirement for air jet loom.

Unit V Triaxial and Narrow fabric weaving **8 h**

Introduction to Triaxial and narrow fabric weaving; Multiphase weaving, Filament weaving. Industrial fabrics, Introduction to 3D weaving.

Textbooks:

1. Weaving Machines, Mechanisms and Management by Talukdar M. K., Ajgaonkar D. B. and Sriramulu P. K. Mahajan Publishers Pvt Ltd, 2004.
2. Shuttleless Weaving Machines by Oldrich Talavasek and Vladimir Svaty, Elsevier Science Ltd, 1981.
3. Shuttleless looms by J. J. Vincent, Textile Institute; 1st UK Edition, 1980.

References:

1. Weaving Tech. & Operations by Ormerod A. and Sondheln W.S, TheTextile Institute, 1995

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering (168 Credit_2023-2027)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
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BTTX702	DCC	Advance Fabric Manufacturing	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.

2. Preparation & Weaving Machinery, Ormerod A., Butterworth-Heinemann, 1983.
3. Modern Weaving Theory & Practice by R. B. Singh, Mahajan book depot, ahemdabad, 1989.
4. Fabric Forming by Hasmukharai B.S.S. MInstitute of Textile Technology, Komarapalayam, Ero de, 1996.
5. Principle of Weaving by Marks & Robinson, Textile Institute, 1976.

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering (168 Credit_2023-2027)

SUBJECT CODE	CATEGORY	SUBJECT 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*				
BTTX 703	DCC	TECHNICALTEXTILES	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 provide the knowledge about the technical textiles along with technical fibers, technical yarns, and technical fabrics.
2. To provide the knowledge about the application of technical textiles in the filtration, geo textiles, medical textiles, protective textiles, etc.

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

1. To tell the requirement of technical textiles products.
2. To classify the technical textile products based on raw materials, processes, and applications.
3. To understand the role of new technical fibers, technical yarns, and technical fabrics in the applications of technical textile products.
4. To describe different methods of technical yarns and technical fabric formation especially nonwoven fabric.
5. To state the use of composite in technical textiles and different methods of textile composite manufacturing.
6. To Explain the use technical textile products in different application areas.

Syllabus

Unit-I Technical Textiles Overview **10 h**

Definition, Classification based on raw material, process and application area, Market overview, Application areas of technical textiles, Future scope to technical textile

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering (168 Credit_2023-2027)

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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*				
BTTX 703	DCC	TECHNICALTEXTILES	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.

industry. High Performance Fiber, properties, requirement, classification; applications and properties of carbon, Aramid, Basalt, HDPE, Glass, PTFE, Ceramics, etc.

Unit-II Technical Yarns **7 h**

Requirements and applications of technical yarns, Types of technical yarns, their properties and applications, Modification of textile yarn structures for functional applications, Different Yarn formation methods, Hybrid yarns, technical sewing threads.

Unit-III Fabric for Technical Textiles **7 h**

Warp Knitting, Woven Heavy weight Fabrics, Nonwoven Manufacturing: Overview of nonwovens, Definitions of nonwovens, Basic nonwoven processes and their sequences., Web formation techniques, types of web bonding, application of non-woven fabric in different applications.

Unit-IV Application of Technical Textiles **12 h**

Filtration: dry filtration, wet filtration; Geotextiles: drainage, separation, soil reinforcement, and erosion control applications; Medical Textiles: surgical, dialysis, and Hospital Textiles; Agro Textiles: mulch, shade nets; Fire protection, thermal and electrical insulation, Waterproof breathable materials; Conveyor belts, power transmission belts, hose, etc.

Unit-V Textile Composites, Coating and Laminates **9 h**

Composite materials, Textile reinforcement, Manufacturing techniques, Application of textile reinforced composites. Coated and Laminated Textiles: materials for coating and lamination, production methods, products from coated and laminated fabrics.

Textbooks:

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering (168 Credit_2023-2027)

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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*				
BTTX 703	DCC	TECHNICALTEXTILES	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.

1. Handbook of Technical Textiles, Edited by A. R. Horrocks and S. C. Anand, CRC Press, 2000.
2. Coated and Laminated Textiles, Walter Fung, CRC Press, 2002.
3. Handbook of Nnonwovens, Edited by S. J. Russell, Woodhead Publishing Limited, 2007.
4. Technical Textile Yarns, Edited by R. Alagirusamy and A. Das, Woodhead Publishing Limited, 2010.

References:

1. High Performance Fibers, Edited by JWS Hearle, Woodhead Publishing Limited, 2001.
2. Technical Textiles, P. A. Khatwani and S. S. Yardi, NCUTE Programme Report, 2002.
3. Progress in Textiles: Science & Technology (Vol: 3), Edited by V. K. Kothari, IAFL Publications, 2009.
4. Handbook of Medical Textiles, Edited by V. T. Bartels, Woodhead Publishing Limited, 2011.
5. Fibers for Technical Textiles (Vol-I), Edited by Sheraz Ahmad, Abher Rasheed & Yasir Nawab, 2020.
6. Functional and Technical Textiles, Edited by Subhankar Maity, Kunal Singha, Pintu Pandit, Elsevier 2022.

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX705	PW/I	SUMMER TRAINNING: PRESENTATION	0	0	0	60	40	0	0	6	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 provide practical exposure to the actual working of the industry and to understand the various features of the modern machine.

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. Demonstrate their knowledge in a better way in the actual working condition of the Industry.
2. Apply their knowledge to solve the problem.
3. Show their ability to work as a team.

Pre-requisite: NIL

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											■		■		■	■
~~CO4~~																
~~CO5~~																

Syllabus

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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BTTX705	PW/I	SUMMER TRAINNING: PRESENTATION	0	0	0	60	40	0	0	6	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

The student will be taken to the various Industry in and around regularly along with faculty and lab staff. They will explain the actual working of the machine, materials, process and its problems, solutions. They will be acquainted with the modern development of the machines.

References:

1. Institutional training module for industrial visit

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
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BTTX706	PW/I	MINOR PROJECT WORK	-	-	-	30	20	0	0	8	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. Course will exposed the students to the method of the starting the research work through literature review and analysis of a particular problem.
2. Course will provide the students knowledge about the latest instrument and machinery in the institute lab, various research lab and industry.

Course Outcomes (COs)

Student will be able to

1. Apply the knowledge to study a particular problem
2. Analyze and solve the problem coming during their research work.
3. To create a aptitude for a research work

Pre-requisite: NIL

	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

Course Contents:

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX706	PW/I	MINOR PROJECT WORK	-	-	-	30	20	0	0	8	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.

Each student will work in the institute lab / outside research / industry / institute to study and conduct their research work.

The students perform their project work to a particular project topic under the guidance of the faulty guide allotted to them.

Each student must give two power point presentations during the semester in front of the faculty members.

At the end of the semester each student will be required to submit a report of their work done during the semester which will be assessed by their guide for the internal valuation. The students are also required to appear in the end sem exam.

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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*				
BTTX 717	DSE	Textile Mill Planning and Management	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. Student will be able to identify and evaluate the preliminary requirements for starting of a textile plant and project management
2. Student will be able to demonstrate their conceptual knowledge to the pollution control of textile mills
3. Student will be able to investigate the correct reasons of various problems and their solution of a textile plant

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. Apply their knowledge on the various factors for setting up a Textile plant.
2. Calculate production and use it in balancing of machineries.
3. Solve the reason of various problems and their solution of a textile plant.
4. Use their conceptual knowledge to the pollution control of a textile mills.

Pre-requisite: Yarn Manufacturing III (BTTX402), Fabric Manufacturing II (BTTX403)

	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		■					■									

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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BTTX 717	DSE	Textile Mill Planning and Management	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit.
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Syllabus

UNIT I Site selection and erection of textile industry — 10 h

Selection of site for textile mills. Textile mill building structures. Principles and requirements of good foundation for machineries. Protection against noise and vibration. Erection of textile machinery. Importance of leveling methods and instruments used for leveling. Idea and comparison of preventive and breakdown maintenance.

UNIT II Spin plan and weave plan — 10 h

Spin plans for various counts and yarns. Production rates, waste, efficiency level of spinning machines. Estimation of number of machines for production of yarn. Production rates, efficiency etc. of preparatory and weaving shed. Estimation of number of machines in preparatory and weaving.

UNIT III Plant and machine layout — 8 h

Plant lay-out and machine lay-out. Labor allocation in different departments of a textile mill. Work study, method study and work measurement. Application of time study in a textile mill. Importance and use of snap study. Concept and application of logistics in a textile mill. House keeping and Material handling equipments

UNIT IV Air conditioning and humidification — 9 h

Air conditioning, humidification and ventilation for a textile mill - different systems of humidification and their efficiency. Temperature, relative humidity and ventilation requirement for different sections of a textile mill

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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BTTX 717	DSE	Textile Mill Planning and Management	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 V Dust extraction and lighting in textile mills **8 h**

Dust extraction in textile mills - methods and equipments used in dust extraction. Lighting - requirements and fittings, spacing of light fittings etc. Energy audit and power distribution.

Textbooks:

1. Industrial Engineering and Organization Management by S.K. Sharma and Savita Sharma, S K Kataria and Sons, 2013
2. A Manual of Textile Management by V. D. Dudeja, Majestic Books, Hounslow, United Kingdom, 2007.
3. Humidification and ventilation management in textile industry, B. Purushottama, Woodhead Publisher, 2010.

References:

1. Air-conditioning in textile mills (ATIRA silver jubilee monographs) by S.P. Patel, 1979
2. Industrial Engineering & Production Management by S. C. Sharma, Khanna Publishers, 2007
3. Modern Preparation & Weaving Machinery, Ormerod A., Butterworth-Heinemann, 1983.
4. Weaving Machines, Mechanisms and Management by Talukdar M. K., Ajgaonkar D. B. and Sriramulu P. K. Mahajan Publishers Pvt Ltd, 2004.
5. Handbook of Textile Effluent Remediation By Mohd Yusuf, Jenny Stanford Publishing, 2018.

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX 727	DSE	Geotextiles	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 provide knowledge on the fundamentals of manufacturing process of geotextile fabrics.
2. To provide knowledge on the technical requirements and the physical and mechanical properties of geotextile fabrics

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. Explain the importance of the geotextiles.
2. Solve the problems occurred during manufacturing of geotextiles.
3. Develop the different structure of geotextiles.
4. Analyze the physical and mechanical behavior of geotextiles.
5. Explain the principle & manufacturing process of geotextiles.

Pre-requisite: NIL

	CO-POs & PSOs Mapping															
COs	Programme Outcomes (POs) & Programme Specific Outcomes															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	■	■													■	
CO2	■	■		■											■	
CO3	■	■													■	
CO4	■	■	■	■											■	
CO5	■				■										■	

Syllabus

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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BTTX 727	DSE	Geotextiles	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 I Introduction of geotextile Engineering **9 h**

Introduction of geotextiles. Usefulness of geotextiles, understanding soil characteristics, properties affecting engineering behavior of soil, identification, classifications, permeability, effective stress and pore water pressure, seepage of soils and design of filter criteria.

Unit II Fiber - Fabric relationships **9 h**

Geo-synthetics types, functions and application areas of geotextiles, fibres and fabric selection criteria for geotextile applications.

Unit III Mechanics and Evaluation of geotextiles **9 h**

Mechanics of reinforcement, filtration and drainage by geotextiles and functions, material construction and manufacturing processes in case of geotextiles, Evaluation of geotextiles with and without soil, evaluation of filtration and drainage functions, reinforcement, creep, moisture barrier characteristics, durability and ageing.

Unit IV Geotextiles and reinforced soil structures **10 h**

Geotextiles and reinforced soil structures like Retaining walls, embankment, Foundation. Geotextiles in roads and railways: separation, draining and filtering.

Unit V Geotextiles in environmental control **8 h**

Geotextiles in environmental control like covers and liners, landslides, and erosion control.

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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BTTX 727	DSE	Geotextiles	60	20	20	0	0	3	0	0	3

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***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. Geosynthetics in Civil Engineering - R W Sarsby (Editor), Woodhead Textiles Series No. 57, 2006, UK.
2. Fundamentals of Geosynthetic Engineering – S K Shukla, Yin Jian-hua, Taylor and Francis, 2006, UK.
3. Soil Mechanics and Foundation Engineering - Raj P Purushothama, Pearson, Class, give 2007, India.

References:

1. Geotextiles - Blakie, Chapman and Hall, 1987, New York, USA,
2. Engineering with Geosynthetics G V Rao and G V S Raju (Editor),, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1990.

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
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BTTX737	DSE	Chemistry of Intermediates and Dyestuff	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 the various processes of chemical reactions of dye.
2. Recognize difference between natural and synthetic dyes.
3. Classify the dye stuffs and identify the new dyes.

Course Outcomes (COs):

1. List out the various chemical reactions of aromatic and aliphatic compounds.
2. Test about the chemical reaction for identification of various dyes.
3. Plan the recipe for dyeing the given sample.
4. Illustrate the reactions of dyes.

Pre-requisite: BTTX 503 Textile Chemical Processing-I, **BTTX 602** Textile Chemical Processing-II

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	■	■	■	■												
CO3	■	■	■													
CO4	■															
CO5																
CO6																

Syllabus

Unit I Benzene Intermediate and Naphthalene Intermediates **9h**

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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BTTX737	DSE	**Chemistry of Intermediates and Dyestuff**	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
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Benzene Intermediate: The Benzene Aromatic system, Sulfonation, Nitration, Halogenations, Alkylation, Introduction of Formyl and Carboxylic groups, Hydroxylation, Reaction with ammonia, Oxidation and Reduction Naphthalene Intermediates: Sulfonation, Nitration, Halogenation, Hydroxylation Amination, Naphthalenesulfonic acid, Naphthols, Naphthyl amines, Aminonaphthols, Amino naphthalenesulfonic acid.

Unit II Anthraquinone Intermediates **9h**

Reactivity, Routes to Anthraquinone compounds, Halo anthraquinone, Nitro anthraquinone, anthraquinone sulphonic acids, anthraquinone carbo derivatives, amino anthraquinone, hydroxy anthraquinone, anthraquinone ethers, anthraquinone thiols and thio ethers, Leuco intermediates, Benzanthrones.

Unit III Azo Dyes **9h**

Mechanism of the diazotisation and the azo coupling reactions, the diazotization reaction, azo coupling reaction, conclusion, Benzidine dyes, Stilbene dyes, after treated dyes, dyes from amino napthol sulfonic acids, dyes from heterocyclic and acyclic intermediates. Acid Dyes: Neutral dyeing, Milling dyes, chrome dyes, permetallised dyes. Disperse Dyes: Mono azo dyes, Disazo dyes, water soluble dyes,

Unit IV Anthraquinone Dyes **9h**

Legend Sulfonic acid, Di-hydroxy compounds, diamino compounds, amino hydroxy compounds, heterocyclic dyes, Anthrimides and napthocarbazoles, Bromamine acid derivatives. Disperse dyes: Yellow to orange structure, red structure, violet structure, water soluble dyes.

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Shri Vaishnav Institute of Textile Technology
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B. Tech. in Textile Engineering
(2021-2025)

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BTTX737	DSE	Chemistry of Intermediates and Dyestuff	60	20	20	0	0	3	0	0	3

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Vat Dyes: Carbocyclic dyes, Benzoquinones and naphthoquinones, Acylamino anthroquinones, Benzanthraquinones and pyrenediones, anthrathrones, Solubilised vat dyes.

Unit V Phthalocyanine Pigments **9h**

Structure, properties, synthesis, application, unsubstituted Phthalocyanine, substituted phthalocyanine dyes: Phthalocyanine direct dyes, sulfonic acids, sulfonic acid derivatives, carboxylic acid,,Phthalocyanine vat dyes, Phthalocyanine sulphur dyes, Phthalocyanine formation in the fiber.

Textbooks:

1. V. A. Shenai, "Chemistry of Dyes and Principles of Dyeing," 4th Edition, Sevak, Mumbai, Vol. 2, 1983.
2. Dyes and their Intermediates E.N.Abrahart , Hodder Arnold; 2nd edition, 1977.
3. The Chemistry of Synthetic Dyes and Pigments. H. A. Lubs, Ed. Reinhold, New York, 1955.

References:

1. Color Chemistry. Synthesis, Properties and Applications of Organic Dyes and Pigments. 3rd revised edition. By Heinrich Zollinger, 2004.
2. Synthetic Dyes. Dr. Pope Sine. Rajat Publications, 2003.
3. Chemical Testing of Textiles (CRC). Q. Fan (Editor). Elsevier Publication, 2005.

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX718	DSE	MERCHANDISING AND EXPORTS MANAGEMENT	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 following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. Student will be able to identify and evaluate the preliminary functions of marketing & merchandising management for textile & apparels. And also they can have the understanding of import export terms used in apparel industry.
2. Student will be able to understand the roles & responsibilities of merchandiser.
3. Student will be able to investigate the real scenario of Indian textile business with export management.

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

Calculate the fabric, processing and apparel costing of their own.
2. Understand the international activity in the field of textile with export management.
3. Understand the sourcing activities needed for merchandiser.
4. Use their conceptual knowledge for analysis the performance of the Indian textile business.

Pre-requisite: NIL

	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~~																
~~CO5~~																

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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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.

Syllabus

Unit I Merchandising in apparel industry **9h**
Role of fashion merchandiser, production merchandiser, retail merchandiser, importance of communication skills in merchandising, types of buyers, need for apparel exports. Apparel analysis process.

Unit II Overview of Clothing Industry **9h**
Trends in the global textile& apparel industry, recent advancements in garment manufacturing technology, current challenges in textile industry, sustainable supply chain & it's importance.

Unit III Export Procedure Documentation **9h**
Need of export documentation, Types of export documents-commercial & regulatory, terms of payment - letter of credit, documents against acceptance, documents against payment, Inco terms like free on board, cost insurance freight. Shipment modes - types of load, types of containers. Export finance, pre-shipment inspection agencies. Internal documents of merchandiser.

Unit IV Apparel Costing for Merchandiser **9h**
Elements of cost-direct & indirect, Factors influencing costing process, process cost calculation, examples to calculate different process cost like fabric cost, processing cost, garmenting cost etc.

Unit V Sourcing for Merchandiser **9h**
Definition of sourcing, sourcing process in apparel industry, different type of vendors, sourcing strategies for decision making, sourcing destinations in India and world, role of merchandiser in

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Shri Vaishnav Institute of Textile Technology
Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering
(2021-2025)

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BTTX718	DSE	MERCHANDISING AND EXPORTS MANAGEMENT	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 following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

sourcing, factors affecting sourcing process. Vendor management - criteria for vendor selection, vendor evaluation, different supplier types in apparel industry.

Text books:

1.Principles of marketing by Philip Kotler, Pearson publishing, 2018.
2.Apparel Merchandising by R.Rathinamoorthy & R.Surjit, Woodhead Publishing I. Ltd. 2018.
3.The global textile & clothing industry-Technological Advances & Future Challenges by R.Shishoo, Woodhead Publishing I. Ltd. 2012.

References:

1.Textile and apparel in the international economy by K.G. Dickerson, Macmillan USA, 1990.
2.Fashion Marketing by Mike Easey, Wiley; 3rd edition, 2008
3.Fashion Merchandising by Mary D. Troxell, Beatrice Judelle and Elaine Stone Jean Sample, McGraw-Hill Inc.,US; 5th edition, 1990
4.Fashion from concept to consumer by Gini Stephens Frings, Pearson; 9th edition, 2007.

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Choice Based Credit System (CBCS) in Light of NEP-2020
B. Tech. in Textile Engineering (168 Credit_2023-2027)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX633	DSE	**Home Textile**	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 following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To provide knowledge about home textiles such as furnishings, floor coverings, carpets, bed linens, kitchen linens, towels, etc.
2. To provide knowledge about the fibers, yarns, and fabric used for home textiles and their requirements.

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.

1. To differentiate technical textiles with conventional textiles.
2. To explain the need of home textiles and its products.
3. To explain the fiber and fabric used in home textiles.
4. To understand the different home textiles used in and around.
5. To explain the performance requirements for home textiles.

Syllabus

Unit I Technical Textiles Overview **9 h**

Definition, Market overview, Classification, Application; Requirement and application of high-performance fibers in technical textiles; Requirements and applications of technical yarns and fabrics.

Unit II Introduction to Home Textiles **8 h**

History, definition, classification of home textiles; Home textile market scenario, home textiles in India.

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Unit-III Fibers and fabrics Used in Home Textiles **7h**
Areas of application of home textiles; Application of conventional fibers in home textiles; Application of new and sustainable fibers in home textiles.

Unit-IV Applications of Home Textiles **10 h**
A detailed study of Furnishings, Floor Covering, Curtain and draperies, living room Furnishing, Bed linen, bath linens, hotel linens, hospital linens and kitchen linens.

Unit-V Performance Requirements of Home Textiles **11 h**
Importance of performance specification, Performance requirements; labelling issues of home textiles and their requirements for home textiles; Flammability regulations for different home textiles; Evaluation of home textiles; Finishes used in home textiles.

Textbooks:

1. Home Furnishing, V Ramesh Babu & S. Sundaresan, Woodhead Publishing India Pvt Ltd, 2018.
2. Performance of Home Textiles, Subrata Das, Woodhead Publishing India Pvt Ltd, 2010.

References:

1. Handbook of Technical Textiles, Edited by A. R. Horrocks and S. C. Anand, CRC Press, 2000.
2. Technical Textile Yarns, Edited by R. Alagirusamy and A. Das, Woodhead Publishing Limited, 2010.
3. Handbook of Nonwovens, Edited by S. J. Russell, Woodhead Publishing Limited, 2007.

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BTTX738	DSE	Colour Physics and Computer Colour Matching	60	20	20	0	0	3	0	0	3

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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

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: BTTX 503 Textile Chemical Processing-I, **BTTX 602** Textile Chemical Processing-II

	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	■	■	■													
CO3	■	■	■													
CO4	■															
CO5	■															
CO6																

Syllabus

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Unit I Fundamentals of Color Science **9h**

Fundamentals of color science, what is colour, perception of color, color mixing laws, confusion in color perception, metamerism.

Unit II Color Order System **9h**

Munsell system, color atlas system, CIE system, CIE tri-stimulus values, chromaticity co-ordinates, transform of the CIE system, Equation index for color spaces, whiteness assessment, yellowness index.

Unit III Optical Theory For Color Matching **9h**

Reflectance curves of dyed specimens, Kubelka - Munk theory, application of K-M theory to textiles, Developments after K-M theory.

Unit IV Color Measuring Instruments **9h**

Principles of color measuring instruments like: spectrophotometer and colorimeter, optical sensors, signal processor, features of the available color instruments, selection of instrument and its utilization.

Unit V Color Difference Pass/Fail System and Shade Sorting **9h**

Color difference and chromaticity diagram, color difference equation, CIE color difference equations, Acceptability and perceptibility, modified color difference equations based on ABLAB. Pass/fail system, setting up tolerance limit.

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Textbooks:

1. Instrumental Colour Measurements and Computer Aided Colour Matching for Textiles, by H. S. Shah and R. S. Gandhi, Forwand, by Fred W. Billmeyer, Jr., Mahajan Book Distributors, Ahmedabad, India, 1990
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

References:

1. Color for Textiles - A user handbook - Wilfred Ingamells. Society of Dyers and Colourists, 1993
2. Modern Concepts of Color and Appearance - Asim Kr. Roy Choudhary, Elsvier Publication 2015
3. The Theory of Coloration of Textiles - The Theory and Coloration of Textiles , 2nd edition , edited by A. Johnson , Society of Dyers and Colourists
4. Color Technology in the Textile Industry, 2nd Ed. Cairman, AATCC

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