# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
## Shri Vaishnav Institute of Textile Technology
## Diploma in Textile Engineering
## (2020-2023)

| 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* | | | | |
| DTTX601 | DCC | Knitting Technology | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | 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. To provide the knowledge about the knitting process.
2. To impart conceptual knowledge for the knitted structure.
3. To understand fabric structure, quality particular, production calculation.

**Course Outcomes (COs):**

Student will be able:

1. To apply their knowledge on the knitting process.
2. To make different knitted Fabric designing.
3. To identify the fabric & quality particular.
4. To use their knowledge for production of knitted fabric.

**Course Content:**

**Unit-I Introduction** **9 HOURS**

Introduction to knitting and its comparison with weaving, Knitting classification- Circular, Flat etc. Types of needles, elements of knitting machine, positive yarn feeder. Introduction of hand knitting.

**Unit-II Loop making process of weft knitting with different structure** **10 HOURS**

Knitting cycle of different single jersey and double jersey machines, needle gaiting, basic single jersey and double jersey structures and their derivatives.

**Unit-III Weft knitting and it's Development** **10 HOURS**

Introduction of Jacquard knitting and pattern making, modern developments in weft knitting machines, production calculation. .

**Unit-IV Warp Knitting** **8 HOURS**

Warp knitting- Introduction to warp knitting, application of warp knitting, working principle of Tricot and Raschel Machines, different types of warp knitted structure.

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| DTTX601 | DCC | Knitting Technology | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | 4 |

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**Unit-V Knitting Parameters** **8 HOURS**

Feed control in warp knitting machines, modern developments in warp knitting requirement of yarn quality parameters for knitting. Fabric defects in knitting.

**List of Practical's:**

1. To study the application of knitted fabric.
2. To study different types of loops.
3. To study the needle, cylinder and sinker with their settings.
4. To study the single jersey knitting machine.
5. To study the double jersey knitting machine.
6. To study the different stitch cam sections.
7. To study the yarn feeder with its setting.
8. To determine the stitch length & stitch density of knitted fabric.
9. To determine the GSM & tightness factor of knitted fabric.
10. To study the working principle of warp knitting machine.
11. To prepare the fabric on single jersey knitting machine.
12. To prepare the fabric on double jersey knitting machine

**Text Books:**


1. Knitting Technology – Prof. D. B. Ajgaonkar
2. Knitting Technology - Spencer
3. Knitting Technology - Pitman
4. Knitted Clothing Technology – Terry Brackenbury
5. Machine Knitted Fabrics Felting Techniques – Janet Natney


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| DTTX602 | DCC | Advanced Yarn Forming Technology | 60 | 20 | 20 | - | - | 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. Course will provide the knowledge about the limitation of ring spinning system.
2. Course will provide detail knowledge about the manufacturing of rotor yarn.
3. Course will provide introductory knowledge about the other advance yarn process.
4. To deal with the theoretical and quality aspects of doubling.

**Course Outcomes (COs):**

Student will be able:

1. Demonstrate their knowledge on the limitation of ring spinning system.
2. Identify, analyse and design of rotor yarn production system.
3. Recall the knowledge of air jet and wrap spinning system.
4. Justify the importance of doubling for different types of yarn.

**Course Content:**

**Unit-I: Limitation of Conventional Spinning** **8 HOURS**

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

**Unit-II: Rotor Spinning** **12 HOURS**

Objects, developments, Principle and speed, Raw material requirements and preparation, Method of operation, Opening unit, Yarn formation, Yarn withdrawal and winding system, Automation, Calculation related to twist, production etc. Structure and Properties of rotor yarn and its difference with ring spun yarn, brief idea about the end products.

**Unit-III: Air Jet Spinning** **8 HOURS**

Principle, raw material requirements, yarn characteristic and yarn structure, yarn properties and comparison with ring spun yarn, end use of yarn.

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**Unit-IV: Friction Spinning and Other Spinning System** **8 HOURS**

Principle, raw material requirements, yarn structure and its comparison with ring spun yarn, End uses of yarn. Brief Idea about other spinning technology such as Wrap spinning, Air vortex spinning, Dref, Plyfil, Parafil, etc.

**Unit-V: Yarn Doubling** **9 HOURS**

Objectives, Types of doubling, Dry and wet doubling, Feed material preparation, Constructional details and theory of ring doubling and TFO, developments in TFO, Calculation of production, and twist, General idea of material and package faults and their remedies, environmental condition, and supervisory checkpoints.

**Text Books:**


1. Manual of Textile Technology, Vol. V, VI, W Klein, the Textile Institute, 1993.
2. Handbook of Yarn Production, P R Lord, Woodhead Publishing, 2003.
3. Rotor Spinning: Its Advantages, Limitations and Prospects in India, K RSalhotra and S M Isthiaque, ATIRA, 1995.
4. Two-For-One – Technology & Technique for spun yarn, HS Kulkarni and HVS Murthy.
5. Cotton Spinning Calculations,William S Taggart, Macmillan & Co, Limited, 1930.
6. Advances in Yarn Spinning Technology, C A Lawrence, Woodhead Publishing, 2010.


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**Course Educational Objectives (CEOs):**

1. Course will provide the knowledge about the working mechanisms of shuttleless looms.
2. Course will provide the knowledge about Filament weaving.

**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.

**Course Content:**

**Unit-I Introduction to Shuttle less Loom** **10 HOURS**

Comparison of shuttle less weaving with shuttle weaving, limitations of shuttle loom, Introduction to different weft insertion systems on shuttle less weaving machines, common features of shuttle less weaving machines, Advantage and Disadvantage of shuttle less loom, weft accumulators and weft measuring devices used in shuttle less weaving.

**Unit-II Projectile Weaving** **9 HOURS**

Various features of projectile loom, weft insertion cycle of projectile loom, torsion bar picking mechanism, matched cam beat up mechanism, calculations regarding no. of projectile required for different widths of projectile loom.

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**Unit-III Rapier Loom** **9 HOURS**

Classification of rapier looms, yarn transfer systems in different rapier looms, Two phase rapier – their types and working, weft insertion cycle of rapier looms – Dewas system, rapier drives for rigid rapiers and flexible rapier.

**Unit-IV Air Jet loom** **8 HOURS**

Principles of air jet weft insertion loom, weft buckling, weft insertion cycle of Air jet loom, different traversing aid used in air jet loom, need of traversing aid in air jet loom, air quality with respect to air jet loom.

**Unit-V Water Jet loom** **9 HOURS**

Principles of water jet weft insertion and their comparison with air jet loom, weft insertion cycle of water jet loom, flying stability of weft inserted by water jet loom. Essential requirements of filament weaving – modifications required in loom and loom shed.

**Text Books:**


1. Shuttleless Weaving - Dr. M. K. Talukdar.
2. Principle of Weaving - Marks & Robinson.
3. Textile Science & Technology Shuttleless Weaving Machines Oldrich, Talavasek & Vladimir Svaty.
4. Modern Weaving Theory & Practice- R. B. Singh.
5. Modern Preparation and Weaving Machinery - A. Ormerod.
6. Handbook of Weaving, Sabit Adanur, Ph. D.
7. Weaving Technology & Operation - A. Ormerod & Walter S. Sondhelm.


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| DTTX604 | DCC | Printing and Finishing | 60 | 20 | 20 | 30 | 20 | 3 | 1 | 2 | 5 |

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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.

### Course Educational Objectives (CEOs):

1. Impart knowledge about the different style and methods of printing.
2. Impart knowledge about need, objective and application of various finishing agents.

### Course Outcomes (COs):

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

1. Understand different methods and styles of textile printing
2. Print different textile materials with dyes and pigments
3. Understand mechanism of various textile finishes

### Course Content:

**Unit-I Introduction to Printing** **10 HOURS**

Introduction to printing; Printing ingredients; Different methods of printing: block printing, manual screen printing, roller printing, flat bed screen printing, rotary screen printing and transfer printing; Different styles of printing: Direct, discharge and resist style of printing.

**Unit-II Printing of Textile Materials** **9 HOURS**

Printing with pigment: role of binder and emulsion thickener, recipe, procedure; Printing of cellulosic textile materials with direct dye, reactive dye, vat dye and azoic dye; printing of wool, silk and nylon with acid dye, metal complex dye and reactive dye, printing of polyester with disperse dye.

**Unit-III Introduction to Textile Finishing** **8 HOURS**

Finishing: Introduction, need and importance; Classification of finishing: Temporary, semi-permanent and permanent finishing; mechanical and chemical finishing; padding mangle; drying; stenter; brief calculations relating to textile finishing.

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**Unit-IV Mechanical finishing** **8 HOURS**

Raising and shearing: Need, Objective, Seuding, napping, shearing; Calendering: Need, Objective, Swizzing effect, Friction finish, Chasing calender, shreinering calender, embossing calender; Sanforizing: Need, Objective, mechanism of shrinkage, palmer drying.

**Unit-V Chemical finishing** **10 HOURS**

Crease resistant finishing: Need, Objective, mechanism of creasing, Finishing with softeners: Cationic, anionic, nonionic and silicone softeners; water proof and water repellent finishing; flame retardant finishing: flame proof and flame retardancy, Limiting oxygen index; soil release finishing; antimicrobial finishing.

**List of Experiments:**

1. Printing polyester/cotton blended fabric sample with pigment by block printing method
2. Printing of cotton fabric sample with reactive dye by block printing method
3. Printing polyester/cotton blended fabric sample with pigment by screen printing method
4. Printing of silk fabric sample with acid dye by block printing method
5. Printing of silk fabric sample with reactive dye by screen printing method
6. Printing of polyester fabric sample with pigment by screen printing method
7. Study of construction and working of flat bed screen printing machine
8. Study of construction and working of rotary screen printing machine
9. Study of construction and working of padding mangle
10. Study of construction and working of stenter

**Text Books:**

1. Technology of Printing; V. A. Shenai, Sevak Publications, Mumbai, 1998

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2. Technology of finishing; V. A. Shenai, Sevak Publications, Mumbai, 1996
3. Chemical finishing of textiles; W D Schindler, P J Hauser, Woodhead publishing, 2004
4. Principles of textile finishing; Asim Kumar Roy Choudhury; Woodhead publishers, 2017
5. Textile finishing; W. S. Murphy; Abhishek Publications, 2007
6. Technology of textile printing; R. S. Prayag; Shree J. Printers, 1999


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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* | | | | |
| DTTX605 | AECC | Project Work | - | - | - | 60 | 40 | 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. Course will exposed the students to the method of the starting the practical training and project 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

**Course Contents:**

1. Each student will work in the institute lab / outside practical training and project / industry institute to study and conduct their research work.
2. The student performs their project work to a particular project topic under the guidance of the faulty guide allotted to them.
3. Each student has to give two power point presentations during the semester in front of the faculty members.
4. 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 semester exam.

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| DTTX616 | DSE | Textured Yarn Production | 60 | 20 | 20 | - | - | 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.

**Course Educational Objectives (CEOs):**

1. To provide knowledge about the manufacturing process of textured yarns.
2. To understand the principle of air textured yarn and to find the applications of textured yarn.

**Course Outcomes (COs):**

Student will be able to

1. Explain the core concept of texturing process.
2. Solve the problems occurred during manufacturing of textured yarns.
3. Analyze the physical and mechanical behavior of Textured yarns.

**Course Contents:**

**Unit-I Introduction to Texturising** **10 HOURS**

Texturising: Drawbacks of flat filament yarns, requirement of raw material for texturising, drawing process, Definition and concept of texturising, Classification and characteristics of textured process and texturised yarn.

**Unit-II Drawing Process** **10 HOURS**

Draw Texturising concept: sequential and simultaneous draw texturising, Study of simultaneous draw texturising process, Machine profiles, Twisting devices, Heaters, Cooling devices, Coning oil application, Process variables, Defects and remedies in draw textured yarns.

**Unit-III False Twist Texturising Process** **10 HOURS**

False Twist Texturising: Scientific principles in False twist Texturising, Methods of production of stretched (single heater) and modified stretched (double heater) yarns by conventional methods, properties of textured yarn.

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**Unit-IV Air Jet Texturising Process** **8 HOURS**

Air Jet Texturising: Principle of loops formation, Air-jet texturising machine, air- jets, wetting systems, stabilizing devices, process variables in air texturising, Quality of air textured yarns, Properties of air jet textured yarn.

**Unit-V Other Texturising Methods** **7 HOURS**

Other methods of Texturising: BCF draw texturising processes and Yarns, Process variables, Edge crimping, Stuffer box crimping, Knit-de- knit, Gear Crimping, Chemical texturising of natural fibres. Shrinkage of acrylic differential shrinkage method.

**.Text Book's:**


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


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# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
## Shri Vaishnav Institute of Textile Technology
## Diploma in Textile Engineering
## (2020-2023)

| 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* | | | | |
| DTTX626 | DSE | Theory of Colour and Computer Colour Matching | 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. Describe various elements of colour physics.
2. Impart knowledge about various theories of colour.
3. Impart knowledge about computer colour matching in textile industry.

**Course Outcomes (COs):**

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

1. Understand various principles of colour.
2. Reproduce dye to match the colour of given sample.
3. Match the colours of different samples and calculate colour strength and colour difference.

**Course Contents:**

**Unit-I Fundamentals of Color Science** **10 HOURS**

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

**Unit-II Color Order System** **10 HOURS**

Color order system: Munsell system, color atlas system, CIE system, CIE tri-stimulus values, and chromaticity co-ordinates, transformation of the CIE system, whiteness assessment, yellowness index.

**Unit-III Optical Theory** **8 HOURS**

Optical theory for color matching: Reflectance curves of dyed specimens, Kubelka – Munk theory, application of K-M theory to textiles.

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**Unit-IV Color Measuring Instruments** **8 HOURS**

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

**Unit-V Color Difference** **9 HOURS**

Color difference: Pass/fail system and shade sorting, Color difference and chromaticity diagram, color difference equation, CIE color difference equations, Acceptability and perceptibility, setting up tolerance limit. Different light sources

**Textbooks:**


1. Instrumental Color Measurements & CA Color Matching for Textiles; H.S. Shah & .S. Gandhi; Mahajan book distributors, Ahmedabad, 1990
2. Color Physics for Industry – Roderick Mcdonald, Society of dyers and colourists, Bradford, England, 1987
3. Principle of colour appearance and measurement, Asim K. Roy Choudhury, Woodhead publishing series in textiles, 2014
4. Colour for Textiles: A User's Handbook, W. Ingamells, Wilfred Ingamells, Hyperion Books publishers, 1993
5. The theory of Coloration of Textiles; A. Johnson; Dyers Company Publications Trust, Bradford England, 2nd Edition, 1989.


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| DTTX636 | DSE | Apparel Merchandizing | 60 | 20 | 20 | - | - | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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**Course Educational Objectives (CEOs):**

1. To provide the knowledge about the Apparel Merchandising
2. To impart conceptual knowledge for the Merchandising
3. To understand marketing management for business expansion.

**Course Outcomes (COs)**

Student will be able:

1. To apply their knowledge on the various functions of the merchandiser
2. To make merchant plan
3. To identify the suitable market situation
4. To use their knowledge for managing the apparel merchant activity

**Course Content:**

**Unit-I Introduction to Apparel manufacturing process** **10 HOURS**

Apparel construction techniques - Drafting & Patten making. Machinery & Equipment - Cutting, Sewing and finishing. Garment label & folding .Garment packing

**Unit-II Market Survey** **9 HOURS**

Definition of Marketing Management, its function and objectives, types of market, classification of product, marketing mix, retain buyer, elements of cost.

**Unit-III Functions of Merchandising** **9 HOURS**

Merchandising, Main merchandising functions, factors affecting merchandising, visual merchandising, roles and responsibilities of a merchandiser, seasonality of marketing

**Unit-IV Apparel Quality** **8 HOURS**

Quality issues in apparel, marketing of apparel, value addition in garment marketing, functions of export house.

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**Unit-V International Marketing** **9 HOURS**

International Marketing: Nature and Scope of International Marketing, timing, international sourcing , Licensing,/franchising, Export procedure with documentation. Competitive position of Indian Garment Exports, Export Promotion schemes. Latest government scheme & policies for textile & apparel.

**Text Books:**


1. Principles of marketing - Philip Kotler
2. Garment Exports - DO Koshy
3. Fashion Merchandising, Alaine Stone, Jean and samples
4. N Kumar, R Mittal, 'Export management', Anmol Publication P vt Ltd, New Delhi
5. Darliekoshy, 'Effective Export marketing of apparel', Global Business Press
6. Khurana, P.K " Export Management" Galgotia publishing house,2001
7. Kumar and Mittal " Export management" Anmol Publications, 2002


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