

GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE TECHNOLOGY (29) DEPARTMENT ELECTIVE – III: TECHNOLOGY OF DENIM MANUFACTURING SUBJECT CODE: 2182908 B.E. 8th SEMESTER

Type of course: Elective

Prerequisite: Students should have basic knowledge of fibres, spinning, weaving and chemical processing.

Rationale: The city of Ahmedabad, state of Gujarat and the country as a whole is global hub for sourcing denim fabric and the jeans. The state has the highest production of denim fabric in the country. The city of Ahmedabad is centre of denim manufacturing with few of the top ten companies of the world.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
			PA		ALA	ESE	OEP			
3	0	2	5	70	20	10	20	10	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment; AL-Active learning assignments; OEP-Open Ended problem

Content:

Sr. No.	Content	Total Hrs	% Weightage
1.	History of Denim and jeans. An overview of denim industry of world. Development of Indian Denim industry. Types of denim fabrics.	04	10
2.	Fibres for denim like cotton, viscose, lycra, polyester etc. Properties, blending etc. Spinning of yarn for denim. Core spun yarns, Fancy yarn etc. Future trends.	07	18
3.	History of Indigo -- Natural & Synthetic, Brief Introduction to Chemistry of Indigo & Sulphur dyes. Technology of Indigo Dye Application -- Slasher, Rope and Looptex	07	18
4.	Weaving preparatory for denim. Sheet warping, ball warping, sheet indigo dye sizing, rope dyeing technology, looptex etc. Dyeing machinery. Dyeing of indigo yarns with non indigo dyes. Modifications in shuttleless looms for making denim fabric.	08	20
5.	Finishing of Denims. Knitted Denims including Production Technology of Indigo-dyed Packages, Shirting / Lightweight Denims	06	13
6.	Introduction to Jeans- making & Washing. Seams, stitches, needles, sewing threads, sewing for denim fabric. Dyeing and digital printing of jeans.	06	15
7.	Quality Control / Assurance in Denim Manufacturing. Some basic Calculations	04	06

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	10	10	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Denim: Manufacture, Finishing & Applications, Ed. by Roshan Paul, The Textile Institute, Manchester, 2016
2. Denim Book: From Cotton to Fashion by Clariant
3. Denim Book by Archroma
4. Denim Fabric Manufacturing, Cotton Inc, NC, USA
5. Denim : A Fabric for all Dyeing, Weaving & Finishing by M.S. Parmar, S.S. Satsangi, Dr. Jai Prakash, NITRA, 1996
6. Denim by Dr. J. J. Shroff, ATIRA, 2015

Course Outcome:

After learning the course the students should be able to:

1. Describe the fibre used for making denim fabric.
2. Describe the process of manufacturing and application of indigo and non indigo dye.
3. Describe the conversion of fibres to yarn and denim fabric.
4. Describe the garment manufacturing process for making various end products out of denim fabric.
5. Describe the quality control measures required for denim fabric and jeans.

List of Experiments:

1. To study properties of various fibres used for making denim fabric.
2. To understand the spinning of ring and compact ring spun yarn for use in making denim fabric.
3. To understand the spinning of rotor, air jet spun, fancy, lycra blended yarns for use in making denim fabric.
4. To understand the manufacturing, properties and application of indigo and non indigo dyes.
5. To explore the preparatory process of weaving department like sheet warping, ball warping, sheet dyeing cum sizing, rope dyeing, looptex etc.
6. To study modifications of the shuttleless loom for producing heavy fabric.
7. To study finishing operations of denim fabric.
8. To study joining techniques for making garments of denim fabric like seams, stitches, threads, needles, sewing machines, sewing etc.
9. To study different washes given to jeans.
10. To study different quality parameters of denim fabric and jeans.

Design based Problems (DP)/Open Ended Problem: Apart from above experiments a group of students has to undertake one open ended problem/design problem. Few examples of the same are given below.

1. Making a report on global and Indian market of denim and jeans.
2. Making collection of different types of denim fabric.

3. Detailed listing of various quality parameters of denim and jeans.
4. Collecting samples of seams used for making garments using denim fabric.

Major Equipment:

Basic spinning including rotor, shuttleless looms, preparatory and garmenting machines.

List of Open Source Software/learning website: <http://nptel.iitm.ac.in>, World Wide Web, Google Search Engine etc.

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.