GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma in Engineering

Level: Diploma

Branch: Textile Manufacturing Technology

Course / Subject Code : DI01029021

Course / Subject Name : Spinning Technology -I

w. e. f. Academic Year:	2024-25
Semester:	1st
Category of the Course:	ESC-01

Prerequisite:	**Basic knowledge of science subjects.**
Rationale:	Cotton is very important fibre since ancient era. Cotton fibre accounts for almost 50% of the worldwide consumption of textile fibre. Nowadays the worldwide consumption of cotton fibre is reached to 30 million tons per year and India is the second largest country in production of cotton fibre. Spinning technology is a sequence of processes that convert raw cotton fibres into yarn suitable for use in various textile end products- like- woven fabric, knitted fabric, lace making, felting and braiding or plaiting. For manufacturing clean, strong and uniform yarns, series of number of various spinning machines are required. The textile industries are competing with technological upgradation and automation in such way to improve quality and production of yarn with reduction in manufacturing cost. This course is designed to develop knowledge base related to spinning processes of blow room and carding.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Select relevant machine/process for opening and cleaning of cotton	R, U, A
02	Select relevant mixing/blending method.	R, U, A
03	Use carding machine to produce uniform fault free sliver.	A

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
2	0	2	3	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	GINNING and BLOW ROOM Basic operation of Ginning. Saw Ginning machine. What is yarn? Sequence of yarn formation. Basic operations in the blow room: Opening, Cleaning, Dust removal, Blending, Even feed of material to the card. Need for opening and cleaning: Type and degree of opening, General considerations regarding opening and cleaning. Machines for "Opening": UNIfloc, Blendomt. Machines for "Coarse cleaning" Monocylinder cleaner, Unclean. Machines for "Intermediate cleaning": RN cleaner. Machines for "Fine cleaning": UNIflex fine cleaner, CLEANOMAT TFV fine cleaner. Dust removal: Dust extractor, DUSTEX dedusting machine. Metal detection: Magnetic metal extractors, Electronic metal extractors, Combo Shield. Cleaning efficiency of blow room	11	40%
2.	MIXING AND BLENDING The purpose of blending Machines for "Mixing and Blending": Multi Mixer, Unmixed Evaluation of blending Types of blending operations: Bale mixing, Flock blending, Lap blending, Web blending, Sliver blending, Fibre blending, Roving blending	8	20%
3.	CARDING MACHINE Functions of card: Operating principle Operating zones of card: Basic concept of tuft feed, The two-piece chute feed system, Unidirectional feed, The operation of the licker-in, Carding plates or carding bars, Purpose and effects of carding elements, The cylinder, Function and construction of flats, The doffing operation, The detaching apparatus Classification of card clothing: Flexible clothing, Semi-rigid clothing, Metallic clothing Maintenance of card clothing: Stripping, Burnishing, Grinding, IGS-top integrated grinding system Various defects of carding	11	40%

	Calculation of production and cleaning efficiency		
	Total	**30**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
30	**30**	**25**	**10**	**5**	**0**

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. The Rieter Manual of Spinning, Volume-I Technology of Short staple spinning - Klein Werner - Rieter Machine Works Ltd., Winterthur, Switzerland, 2014, ISBN 10 3-9523173-1-4/ ISBN 13 978-39523173-1-0
2. The Rieter Manual of Spinning, Volume-II-Blow room and Carding - Klein Werner - Reinter Machine Works Ltd., Winterthur, Switzerland, 2014, ISBN 10 3-9523173-2-2/ ISBN 13 978-39523173-2-7
3. Spun Yarn Technology - Oxtoby Eric - Butterworth's (Publishers) Limited, UK,1983, ISBN: 0-408-01464--4
4. Handbook of Yarn production - Lord Peter R. - Woodhead publishing limited in association with The Textile institute, North America,2003, ISBN 1 85573 696 9
5. Handbook on Cotton Spinning Industry - B. Purushothama - Woodhead Publishing India Pvt. Ltd., New Delhi, 2016, ISBN 13: 978-93-85059-55-1

(b) Open source software and website:

1 http://www.textileassociationindia.org/
2 http://www.nitma.org/
3 http://www.sitra.org
4 http://www.cottonjouney.com/Storyofcotton/page5.asp
5 http://textiletechinfo.com/spinning/BLOWROOM.htm
6 http://textilelearner.blogspot.in https://nptel.ac.in/course.html
7 https://www.youtube.com/watch?v=pYruLp-X2Jw

Suggested Course Practical List:

1	Demonstrate the modern spinning line
2	Use saw ginning machine for ginning of cotton
2	Demonstrate passage of material on modern blow room line.
3	Use bale opening machines for tuft opening from cotton bale.
4	Demonstrate cleaning of cotton fibres in coarse cleaning machines.
5	Demonstrate cleaning of cotton fibres in fine cleaning machines.
6	Demonstrate removal of dust from cotton fibres through dust removal machine.
7	Determine cleaning efficiency of blow room.
8	Use mixing machines to mix varieties of cotton fibres.
9	Demonstrate the passage of material on carding machine.
10	Demonstrate difference in wire points of licker in, cylinder and flat.
11	Apply different card settings to identify its effects on material.
12	Demonstrate doffing mechanism of can on card.
14	Calculate production and cleaning efficiency of carding machine.

List of Laboratory/Learning Resources Required:

No.	Equipment Name with Broad Specifications
1	Bale opening machine:
2	Cleaning machine
3	Carding machine:

Suggested Project List:

a) **Fibre sample collection:** Collect the sample of different types of cotton fibre, prepare property chart and compare properties.

b) **Card sliver analysis**: Calculate number of fibres in cross section, calculate hank of sliver, and analyze weight/unit length.

c) **Sliver defects analysis:** Prepare report on identification of various defective card slivers, reasons for those defects and possible remedies to avoid it.

d) **Blow room and card settings:** Prepare report on various changes in blow room and card machines and its settings while changing in raw material from natural fibre to man-made fibre.

e) **Market survey of wire points and rollers:** Collect different types of wire points and rollers available in market and make a sample book of wire points with their specifications and uses.

f) **Machine specifications:** Prepare a report on machine specifications of blow room and card of different manufacturers with part numbers mentioned.

Suggested Student Activities

a) Prepare report on different manufacturers' blow room machines based on their industrial visit.
b) Prepare report on different manufacturers' carding machine based on their industrial visit.
c) Give seminar on recent technological advancement of blow room.
d) Give seminar on recent technological advancement of card.
e) Prepare comparative report from e-brochures of different machineries

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