GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Textile Manufacturing Technology

Subject Code : DI04029101

Subject Name : Quality and Process Control in Textiles

w. e. f. Academic Year:	2025-26
Semester:	4th
Category of the Course:	MOPEC

Prerequisite:	Basic knowledge of spinning machines and their processes and weaving machines and their variables and processes
Rationale:	Quality and process control in textile is a crucial aspect of the textile industry. Quality and process control ensures the production of high-quality products that meet customer expectations and regulatory standards. A well-structured syllabus for this subject should cover various aspects, including the definition of quality, process control techniques and the role of quality management systems. Quality is a significant factor that affects the success of textile businesses. It influences customer satisfaction, brand reputation and market competitiveness. Therefore, a course focusing on quality and process control in textiles is essential to ensure that students are well-equipped to handle the challenges in the industry. A well-designed quality and process control system can significantly reduce production costs and improve efficiency by minimizing waste, rework and errors. This course ensures students will learn how to optimize their production processes and improve overall productivity.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Recognize the process variables in spinning and weaving that affect quality and cost in textile.	R,U,A
02	Analyze the factors affecting process and apply the remedial measures to control the spinning processes.	R,U,A
03	Analyze the factors affecting process and apply the remedial measures to control the weaving processes.	R,U,A
04	Describe the causes and remedies of faults occurring during spinning and weaving processes.	R,U,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(M)	PA(I)	ESE(V)	
3	0	0	3	70	30	0	0	100

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1. Introduction of Quality and Process Control	1.1 Role and scope for process control 1.2 Key variables of process control for spinning processes 1.3 Key variables of process control for weaving processes 1.4 Tool and techniques of process control 1.5 Statistical Process Control and improving processes	5	9%
2. Quality and Process Control in Spinning	2.1 Instrumental evaluation of cotton, control of mixing quality through fiber characteristics, simultaneous control of mixing cost and quality 2.2 Records for estimation yarn realization and waste, Norms for yarn realization 2.3 Determination of trash content and cleaning efficiency, Cleaning and waste in blow room and cards, Norms for waste and cleaning in blow room, Norms for cleaning efficiency of individual machines in blow room, Optimizing cleaning and waste at cards 2.4 Technological considerations, Optimum level of comber waste, The need for routine check of comber waste, Procedures for control of comber waste 2.5 Reducing within-bobbin count variation, Reducing between-bobbin count variation, Routine control of count, Control of variability in blow room and draw frames, control of variability of lea strength 2.6 Online control in spinning operations	16	38%
3. Quality and Process Control in Weaving	3.1 Scope and approach of process control in winding, Control of quality of knot, Control of efficiency of fault removal, process parameters: Slub catcher setting – condition of slub catchers – calibration of slub catchers with oscillating blades, approach to control productivity 3.2 Scope and approach of process control in warping, Minimizing end breaks in warping, performance in	16	38%

	warping, Quality of warping beams, Productivity at warping 3.3 Scope and approach of process control in sizing, Choice of size recipe and size pick-up, general considerations for size recipe and level of size pick-up, preparation of size pick-up, control of size pick-up, control of yarn stretch, control of moisture in sized yarn, Quality of sized beams 3.4 Scope and approach of control of loom shed, Control of loom efficiency 3.5 Online control in weaving operations		
4. Causes and remedies of faults	4.1 Measurement and assessment of imperfections, Fibre neps: assessment and control, Causes of thick and thin places, Control of yarn unevenness and imperfections, Yarn faults and package defects 4.2 Specific fabric defects: Warp streaks, Reediness, Irregular neppiness, Small weft loops, Curled and folded selvedges, weft snarls, weft bar, broken picks, lashing-in; Some other common fabric defects: Missing ends(Chira), float(Jala), starting marks, shuttle smash, weft slough, Gout, Temple marks, hard size, stains	8	15%
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

R Level	U Level	A Level
15	**20**	**35**

Where R: Remember; U: Understanding; A: Application

References/Suggested Learning Resources:

(a) Books:

1. Process Control in Cotton Spinning, A.R.Garde and T.N.Subramanian, ATIRA, Ahmedabad, 1978.
2. Process control and yarn quality in spinning, G. Thilagavathi & T. Karthik, Woodhead Publishing India Pvt. Ltd., New Delhi, 2016 International Standard Book Number-13: 978-93-80308-18-0
3. Process control in textile manufacturing, Abhijit Majumdar, Apurba Das, R. Alagiruswamy, V. K. Kothari, Woodhead Publishing, 1518 Walnut Street, Suite 1100, Philadelphia, PA 19102-3406, USA, ISBN 978-0-85709-027-0 (print) ISBN 978-0-85709-563-3 (online)
4. Process control in spinning, M. C. Paliwal and P. D. Kimothi, ATIRA, Ahmedabad, 1983
5. Quality control in spinning, T.V. Ratnam & K.N.Seshan, SITRA, Coimbtore, 1987

(b) Open source software and website:

1. https://archive.nptel.ac.in/courses/116/102/116102019/
2. https://textilelearner.net/principles-of-textile-quality-control/
3. https://www.textileblog.com/basic-concepts-of-quality-and-quality-control-in-textile/
4. https://study.com/academy/lesson/what-is-quality-control-in-textile.html
5. https://textilevaluechain.in/in-depth-analysis/articles/textile-articles/textile-testing-and-quality-control/
6. https://www.worldfashionexchange.com/blog/the-importance-of-quality-control-in-garment-manufacturing/

Suggested Project List:

A suggestive list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher:

a) Raw material selection: Students can investigate the importance of raw material selection in determining the overall quality of textiles. They can analyze the properties of textile fibres, such as cotton, wool, silk and synthetic fibres, and their impact on the quality of final product.
b) Students can explore the manufacturing process of yarn, from fibre selection to twisting and plying. They can study the importance of yarn specifications, including count, twist and uniformity, in determining the quality of final fabric.
c) A preliminary study on various types of looms and knitting machines as well as the factors that affect the fabric quality, like tension, thread count and fabric weight.
d) A preliminary study on various methods used in inspecting and controlling the quality of textiles like visual inspection, chemical analysis and instrumental testing. Also they can study the role of statistical process control in identifying and correcting quality issues in timely manner.

Suggested Activities for Students:

Students should conduct following activities in group and prepare reports of about 5 pages for each activity. They also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

a) Prepare report on quality and process control practices in the industry.
b) Give seminar on quality and process control practices in the industry.
c) Prepare report on recent process control practices in spinning and weaving department.
d) Give seminar on recent process control practices in spinning and weaving department.

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