GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering
Level: Diploma
Branch: Textile Processing Technology
Subject Code : DI04028051
Subject Name : Quality Control in Textile Processing

w. e. f. Academic Year:	2025 – 26
Semester:	4th
Category of the Course:	Professional Elective - I

Prerequisite:	A foundational understanding of textile processes like pretreatments, dyeing, printing and finishing is required prior knowledge for quality checking & application. Students should be familiar with various applications and chemistry of dyes for various textile fabrics. Additionally, fundamental concepts of various textile productions are helpful for quality management. Familiarity with basic chemical & their functions, terminologies and processes will also be required, enabling students to contextualize their learning within the broader textile wet processing industry.
Rationale:	The polytechnic graduates are required to check and manage quality of finished products in industry. They should have basic knowledge and skills to check/test the quality of bleaching, dyeing, printing and finishing processes with their process parameters. The course on Quality and Process Control in Wet Processing has been designed to provide basic knowledge and skills as well as recent technological developments in the area of Quality and Process control parameters and testing methods of processed goods in textile wet processing.

Course Outcome:
After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Describe the planning and implementation of quality and process control.	R +U + A
02	Perform the quality analysis of pretreated textile materials for implementing process control.	R + U + A
03	Analyze quality of dyed textile materials for controlling the process parameters of dyeing.	R + U + A
04	Check the quality parameters of printed textile materials for controlling the process parameters of printing.	R + U + A
05	Perform the quality analysis of finished textile materials for implementing process control.	R + U + A

**Revised Bloom's Taxonomy (RBT)*

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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	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Fundamentals of Quality & Process Control** 1.1 Terminologies: Quality, Quality Assurance, Quality Control, Process Control, Total quality control TQC and Total Quality Management TQM 1.2 Elements of quality control process and total quality management 1.3 Concept of statistical process control 1.4 ISO 9001 Quality Certification series 1.5 Different standards for quality control 1.6 Basic concept of Six Sigma	08	15
2.	**Quality and Process Control in Pretreatment Operations** 2.1 Process Control in Pretreatments like Shearing/cropping, Singeing, Desizing, Scouring and Bleaching 2.2 Quality Control in Pretreatments (Absorbency Test, TEGAWA test, Cupra ammonium fluidity, Copper Number, Whiteness Index)	10	25
3.	**Quality and Process Control in Dyeing Operations** 3.1 Process control in dyeing of various textile material for various dyeing methods and machines 3.2 Precautions required in dyeing of various textile materials 3.3 Quality Control in dyeing (various colour fastness testing methods like washing, rubbing, light, perspiration, sublimation, hot pressing, dry cleaning, different water and bleach with instruments)	11	30
4.	**Quality andProcess Control in Printing Operations** 4.1 Process control in Printingmethods and machines 4.2 Precautions required in Printing ofvarious textile materials 4.3 Process control of various fixationmachines 4.4 Precautions required in fixation and after treatments	08	15

5.	**Quality and Process Control in finishing Operations** 5.1 Process control in finishing like calendaring, drying, mercerization, heat setting, stentering (Heat setting) etc. 5.2 Quality control in finishing like crease recoverytest, Pilling, luster, Barium activity number test , shrinkage, Iodine adsorption test.	**08**	**15**
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	**30**	**50**	**0**	**0**	**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:

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Process and Quality Control in Chemical Processing	S.V. Gokhale and J.R. Modi	ATIRA, Ahmedabad
2	Orientation Programme in Wet Processing (Quality and Process Control)	---	BTRA
3	Six Sigma – Short term training manual	---	NITTTR, Bhopal

(b) Open source software and website:

1. www.nptel.iitm.ac.in
2. https://ndl.iitkgp.ac.in
3. www.textileschool.com
4. www.textileassociationindia.org
5. www.textilelearner.blogspot.com
6. en.wikipedia.org/wiki/Textile printing

7. http://textilefashionstudy.com
8. http://en.wikipedia.org/wiki/Quality_control

Suggested Course Practical List:

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	Evaluate the efficiency of desizing process	2	2
2	Study the efficiency of scouring process	2	2
3	Study the efficiency of mercerizing process (in terms of dyeing)	5	2
4	Evaluate the efficiency of mercerized fabric by barium activity Number	5	2
5	Evaluate the efficiency of pre shrinking process (%age shrinkage test)	5	2
6	Evaluate the efficiency of crease resistance finish (crease recovery angle test)	5	2
7	Evaluate the efficiency of water repellant finish (Spray test)	5	2
8	Perform flame test on flame retardant finished fabric	5	2
9	Evaluate the efficiency of heat setting (in terms of dyeing)	5	2
10	Perform washing fastness test for various dyes	3	2
11	Perform light fastness test for various dyes	3	2
12	Perform rubbing fastness test for various dyes	3	2
13	Perform sublimation fastness test for various dyes	3	2
14	Compare various thickening agent in terms of flow property.	4	2
15	Perform perspiration test for various dyes.	3	2
16	Study the different types of stains on grey fabric.	2	2
17	Study fixation methods for printed fabric.	4	2
	Total Hours		34

List of Laboratory/Learning Resources Required:

S. No.	Equipment Name with Broad Specifications	PrO. No.
1	Dye Pots: 250 ml, 500 ml	All
2	Glass rod	All
3	Beaker: 100 ml, 250 ml, 500 ml	All
4	Measuring Cylinder of capacity 10 ml, 25 ml, 100 ml	All
5	Laboratory Padding Mangle	5-12
6	Digital weighing balance: 0.02 gm accuracy (100 gm)	2-12

S. No.	Equipment Name with Broad Specifications	PrO. No.
7	Laundr-o-meter	10
8	Fed-o-meter	11
9	Crock meter	12
10	Sublimation fastness tester	13

Suggested Project List:

1) **Process control:** Visit textile industries and collect details regarding process control of various wet processes. Arranged them in proper manner and prepare report.
2) **Quality control:** Visit textile industries and collect details regarding quality control of various wet processes. Arranged them in proper manner and prepare report.
3) **Sample collection:** Collect different dyed and printed samples and prepare their fastness result charts as per fastness results.
4) **Certification:** Visit textile industries and collect details regarding different standards and certification applicable in textile industries.

Suggested Activities for Students:

1) Survey in Industries for TQC and TQM.
2) Collect information about novel process and quality controls.
3) Prepare table for various fastness test results for different dyes and compare.
4) Prepare table for various methods for pretreatment and finishing and compare.
5) Survey market for different certification in textile processing.

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