

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Skill Development Centre

“Certificate Course in Textile Chemistry”

Syllabus

Duration of course: 6 Months

Need of Course:

1. The textile industry in India contributes to a massive 63% of the global garment and textile market and it continues to grow steadily. The industry is responsible for generating 35 million direct employments across the country.
2. Solapur is the one of the well-known cities known for textile industries. Graduate students were given ideas for their future employability in textiles sectors. Therefore, knowledge of textiles and their processes is key cause for the employability.
3. The role of chemistry in the textile industry is growing, with multiple processes involved at one stage or another. With this in mind, various chemical reactions are used even in smaller units to ensure proper chemical management. Chemistry is important in the textile industry at all stages, from the manufacturing process to the final retail sale.
4. Chemistry plays an essential role in fabric production and apply color pigment. Chemistry also plays a role in applying antifungal chemicals, protective coatings. Therefore, the use of chemistry in apparel is a relatively brand-new field, but it is rapidly expanding as more people buy and sell clothes every day.
5. The course might fulfill the students with technical, analytical and creative skills needed for textile process. These entrepreneurial skills shall empower the students to start their own industries / business in Textile fields.

Employment and Entrepreneurship Opportunities from Course:

1. Textile chemists apply fundamental chemistry knowledge and principles to all aspects of textile production, such as dyeing, fabric, quality control, and so on.
2. Textile chemists play an important role in backhand work. The study of Textile Chemistry creates a pool of potential candidates who fit the profile of personnel required by well-known brands.
3. A textile chemist can create material and turn them into the products. This course will build both theoretical and practical skills. It will understand various fibers and materials and how to modify them into effective product.
4. At a certain number of years of experience in the Textile Chemistry field, people working in this field have the choice of establishing their own businesses and establishing mills and factories that work on a hiring basis for established national and international brands, assisting them in developing and producing high-quality merchandise.

Tentative Fees : Rs. 2000/-

Minimum Admission Eligibility for Student: 12th Science

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Skill Development Centre

Syllabus Structure

Course Title : 'Certificate course in Textile Chemistry'

Course Duration : 6 Months

Name of Skill Course	Duration	Name of Paper	Paper	Hours Per Paper	Th.	Int.	Pract.	Credits
Certificate Course in Textile Chemistry	6 Months	Introduction of Textile Chemistry	I	45	80	20	0	3 Credits
		Practical	II	45			100	3 Credits
		Practical	III	45			100	3 Credits
		Textile process	IV	45	80	20	0	3 Credits
Total				180	160	40	200	12 Credits

Course Duration : 6 Months

Abbreviations :

Th.- Theory Evaluation,

Int.- Internal Evaluation

Pract.- Practical Evaluation

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Course Title : “Certificate Course in Textile Chemistry”

SYLLABUS Details

1)	Paper Title	Introduction of Textile Chemistry	
2)	Paper No	I	
3)	Objectives of Paper	1. Students should aware about India's historical role in global textile trade, current market potential, trends, and economic forecasts.	
		2. Grasp the fundamentals of fibers and colour scientific knowledge to dyeing.	
		3. Describe basic physicochemical aspects of dyeing on fibers.	
		4. Grasp science behind the pre-treatment to fibers, yarn and fabrics.	
		5. Preparatory steps in textile manufacturing.	
4)	Expected out comes from Paper	1. Students can comprehend historical significance of India in world textile trade, potential of the market, market trends, and economic projections.	
		2. Understand fiber forming properties with different textile terms as well as their classification.	
		3. Understand the fundamentals of fibers and the application of colour science to dying.	
		4. Recognize the key aspects of pre-treating fabrics, yarns, and fibers.	
		5. Comprehends the preparatory steps in the production of textiles.	
5)	Content		
	Unite-1	Textiles – History, role of India in global textile trade, current market potential, trends and growth projections, Physical & Chemical properties of fiber, Type of textile fiber – natural (cellulose, cotton, wool, jute and silk), regenerated (viscose, modal) Synthetic (polyester, nylon), etc.	Hour 10
	Unite-2	Introduction of Pigments, Definitions of pigment, Classification of inorganic and organic pigments with examples, additive and subtractive colour mixing, extenders, dyes, pigment dyestuffs, toner and lakes.	Hour 10

	Unite-3	Introduction to yarn, different type of yarn: Slub, amsele, core spun, hollow, loop, chenille, etc Testing of yarn, Factors affecting spinning, Basic defects of yarn.	Hour 10
	Unite-4	Pre-treatment to fibers, yarn and fabrics: Washing, De-sizing, Scouring, Bleaching, Mercerizing, Carbonizing.	Hour 7
	Unite-5	Preparatory steps in textile manufacturing - Farm to Fabric making, fiber/filament formation, yarn spinning, fabric weaving, knit making, etc for apparel clothing.	Hour 8
6)	Reference Book	<p>1 Identification of Textile Fibers, M M Houck, Elsevier Science, 2009</p> <p>2 Traditional Indian Handcrafted Textiles: History, Techniques, Processes, and Designs, Karolia A, 2019</p> <p>3 Basics of Textiles, Seagraot M, Herbert Press, 1975</p> <p>4 Fundamentals of Textile and their care, Dantyagi S, Orient Longman Publication, 2006</p> <p>5 The Chemistry of Synthetic dyes, K. Venkataraman, Academic Press (1 January 1971)</p> <p>6 Chemical Technology in the Pre-treatment Processes of Textiles by S.R. Karmakar, 1999</p>	

1)	Paper Title	Practical and Term Work
2)	Paper No	II
3)	Objectives of Paper	<p>1. To grasp the Laboratory safety and best practices.</p> <p>2 Enable students to develop scientific skills and carry out scientific investigations by applying the principles of Textile chemistry.</p> <p>3. To give practical knowledge of textile materials.</p> <p>4. To study the effect of operations on fiber substrate; dyestuff behavior, its interaction with fibers and dyeing mechanism.</p> <p>5. To explain application of various dyes on natural fibers and effect of process parameters.</p>
4)	Expected out comes from Paper	<p>1. A practical perspective behind textile process can be comprehended by students.</p> <p>2. Theoretical knowledge based on principles and reactions, can be used in laboratory applications.</p> <p>3. Analytical skills can be developed in the students which is an integral part</p>

		of textile chemistry.	
		4. Students have understood application of various dyes on natural fibers and effect of process parameters.	
		5. Students have understood dyeing mechanisms suitable for various dyeing methods.	
5)	Content		
	Unite-1	<p>Practicals (Any Seven)</p> <ol style="list-style-type: none"> 1. Laboratory format, safety, best practices. 2. Identification of fiber, and removal of oil and fats from given cotton fabric by scouring process. 3. Desizing of textile fabric by various methods. 4. Alkaline scouring and solvent assisted scouring of textile goods. 5. Bleaching of textile fabrics using Sodium Hypochlorite. 6. Bleaching of textile fabrics using Hydrogen Peroxide. 7. Pre-treatment of Silk. 8. Pre-treatment of Wool. 9. Chlorite bleaching of textile fabric. 10. Bleaching of textiles using potassium permanganate. 11. Dyeing of wool and silk with Basic Dye. 12. Dyeing of wool and silk with Acid Dye. 	Hour 30
	Unite-2	Industrial Visit and Preparation of Report	Hour 15
6)	Reference Book	<ol style="list-style-type: none"> 1. Gile's Laboratory Course in Dyeing, D G Duff and R S Sinclair, SDC Publ. 2. Textile Bleaching, Steven A.B., Pitman and Sons, London, 1947 3. Technology of Bleaching and Dyeing, Chakraverty, R.R., Trivedi S.S., Vol. 1, Mahajan Publishers, Private Ltd., Ahmedabad, 1979. 4. Chemical Technology in the Pre-treatment Processes of Textiles by S.R.Karmakar, 1999 5. Digital printing of textiles, Ujiie.H., Woodhead publishing, 2006 <p>Textile finishing, D. Heywood, ed., Society of Dyers and Colourists, Bradford, England, 2003</p>	

1)	Paper Title	Practical and Term Work	
2)	Paper No	III	
3)	Objectives of Paper	1. To inculcate the knowledge and analysis of laboratory works in textile processing.	
		2. To understand concept of printing, methods of preparation, and print fixation processes.	
		3. To acquire more practical based knowledge, production, and composition.	
		4. To enable students to understand fabric structures and their analysis.	
		5. To develop an ability to understand different textile materials used to develop products.	
4)	Expected out comes from Paper	1. Students can develop the knowledge regarding fibers and their use for different applications.	
		2. With the acquired knowledge students are able to identify different kinds of fabrics their composition, synthesis etc.	
		3. Students are able to understand different methods of dyeing and printing.	
		4. Students are able to create new designs from basic materials and use them in making designer costumes.	
		5. Students can perform independent research of small scale and apply them to design project.	
5)	Content		
	Unite-1	Practicals (Any Seven) 1. To prepare a Direct dye (Any one suitable dye) 2. To prepare a Disperse dye (Any one suitable dye) 3. To prepare a Vat dye (Any one suitable dye) 4. To prepare a Sulphur dye (Any one suitable dye) 5. To print silk material with acid /basic dyes. 6. To print wool material with metal complex dyes. 7. Determination of colour fastness to various agencies like washing, light and rubbing. 8. Determination of colour fastness to perspiration and bleaching agents. 9. Determination of colour fastness to sublimation and hot pressing. 10. Scouring of cotton by sodium hydroxide and measure water absorbency and shrinkage.	Hour 30

	Unite-2	Library Work and Book Review (Related to course)	Hour 15
6)	Reference Book	<p>1. Textile Bleaching, Steven A.B., Pitman and Sons, London, 1947</p> <p>2. Technology of Bleaching and Dyeing, Chakraverty, R.R., Trivedi S.S., Vol. 1, Mahajan Publishers, Private Ltd., Ahmedabad, 1979.</p> <p>3. Chemical Technology in the Pre-treatment Processes of Textiles by S.R. Karmakar, 1999</p> <p>4. Digital printing of textiles, Ujiie.H., Woodhead publishing, 2006</p> <p>Textile finishing, D. Heywood, ed., Society of Dyers and Colourists, Bradford, England, 2003</p>	

1)	Paper Title	Processes of Textile Chemistry	
2)	Paper No	IV	
3)	Objectives of Paper	1. Acquire the knowledge of sizing.	
		2. Utilize various techniques for scouring and bleaching cotton.	
		3. Brief study of machinery used for dyeing yarn and fabric machines.	
		4. Recognize the various garment processing stages pretreatment, and printing, finishing.	
		5. Different aspect of textile process.	
4)	Expected out comes from Paper	1. Students can comprehend the sizing process.	
		2. Grasp the process of scouring and bleaching.	
		3. Understand specialized equipment for dyeing yarn and fabric.	
		4. Understand the concept of various stages of garment processing, (pretreatment of dyeing, printing, finishing)	
		6. Utilize the knowledge acquired by this course for textile industry.	
5)	Content		
	Unite-1	<p>Sizing</p> <p>Object of Sizing, Sizing ingredients and their functions. Chemistry of Sizing ingredients. Physical and chemical properties of starch, softener, synthetic adhesives. Testing of starches, softeners. Sizing of synthetic warp yarn.</p>	Hour 10

	Unite-2	Bleaching Studying of outline of the process of bleaching of cotton and synthetic materials. Studying of process like sizing, desizing, scouring, bleaching and souring (Batch and Continuous process)	Hour 10
	Unite-3	Dyeing Study of dyeing of cellulosic materials with dyes like direct, vat sulphur, reactive, soluble reactive, soluble vat, mineral khaki and aniline back. Study of dyeing of synthetic fibers like polyester, nylon and acrylic with suitable class of dyes. Brief description of machinery used for dyeing yarn and fabric machines like packagedyeing jigger, winch, padding mangle and continuous dyeing tango.	Hour 10
	Unite-4	Printing Study of printing cellulosic fabrics with dyes like direct, reactive vat, soluble vat, azoics and pigment colours. Study of direct discharge and resist style of printing. Brief study of flatbed screen printing machine, rotary screen-printing machine and roller printing machine.	Hour 8
	Unite-5	Finishing Object and classification of finishing processes. Finish applied on cellulose and synthetic fabrics with reference to resin finishing, water proofing, soil release. Study of water mangling starching, drying, steering, calendaring, mercerization, shrink resisting treatment, optical brightening treatments.	Hour 7
6)	Reference Book	<ol style="list-style-type: none"> 1. Sizing by D.B. Ajgaonkar, M.K. Talukdar and V.R. Wadekar; December 1969 2. Textile Bleaching, Steven A.B., Pitman and Sons, London, 1947 3. Technology of Bleaching and Dyeing, Chakraverty, R.R., Trivedi S.S., Vol. 1, Mahajan Publishers, Private Ltd., Ahmedabad, 1979. 4. Chemical Technology in the Pre-treatment Processes of Textiles by S.R.Karmakar, 1999 5. Digital printing of textiles, Ujiie.H.,Woodhead publishing,2006 6. Textile finishing, D. Heywood, ed., Society of Dyers and Colourists, Bradford, England, 2003 	

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SKILL DEVELOPMENT CENTRE

Nature of Theory Question Paper

“Course Title : ‘Certificate Course in Textile Chemistry’”

Time: 3 Hrs.

Total Marks:80

Instructions:

1. All questions are compulsory.
2. The figure to the right indicates **full marks**.
3. Use of logarithmic table and calculator is allowed.

Q.No.1) Multiple choice questions.

(20)

1. _____

a) b) c) d)

2.

3.

4.

5.

6.

7.

8.

9.

10.

Q.No.2) Write Short Note (any Four)

(16)

1.

2.

3.

4.

5.

6.

Q.No.3.) Write Answer in Details. (Any Two)

(14)

1.

2.

3.

Q.No.4) Write Long Answer (any one).

(15)

1.

2.

Q.No.5) Write Long Answer.

(15)

1.

Internal Examinations of Total Marks: 20

Pattern / Examination nature may be as follows (Any Two of Following):

Written test/ Seminar/ PPT Presentation/ Open book examination / Field Work report / Project Report etc.

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SKILL DEVELOPMENT CENTRE

Nature of Practical Question Paper

“Course Title : Certificate Course in Textile Chemistry”

Time: 3 Hrs.

Total Marks:100

Instructions:

1. Solve any two questions from section-I.
2. Solve any one questions from section-II.
3. 20 marks for viva.

Section-I

Each question has 20 marks.

- 1.
- 2.
- 3.

Section-II

Each question has 40 marks.

- 1.
- 2.

Section-II

Viva 20 Marks