Course Name : Diploma Technical Chemistry

Course Code : DTC

Semester **:** Fourth

Subject Title **:** Basics of Weaving

Subject Code : 135TM41

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks
L	T	P		Theory		Test	Total		P		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	3	80	32	20	100	40	-	-	-	-	50	20	150

RATIONALE:

Most of the textile processing such as dyeing, printing, finishing, etc. is carried out on the material in fabric form. This requires the basic knowledge of different methods of fabric manufacture and their properties. This subject intends to impart the basic knowledge of different fabric manufacturing techniques, different weave types and testing of fabric properties

Objectives:

The students will be able to:

1. Get the knowledge of various fabric manufacturing techniques.
2. Study the important properties of fabrics.
3. Get the skills to identify/differentiate between fabrics produced by different manufacturing techniques e.g. weaving, knitting and nonwoven.

	Section I		
S.N.	**Contents**	**Hours**	**Marks**
1.	Classification of fabric manufacturing techniques: Weaving, Knitting and Nonwoven and their fabric properties	2	4
2	Process flow chart for Warp and weft preparation: Winding, Warping, Sizing, Drawing-in and Weft winding	8	14
3	Process flow chart for weaving process, brief overview of primary, secondary and auxillary motions on loom(Function/Object, Working and Parts).	8	14
4	Introduction to different shedding methods – tappet shedding, dobby shedding and jacquard shedding. Introduction to automatic looms and unconventional weaving machines- Projectile, Rapier, Waterjet and Airjet (Principle and Passage).	6	8
	Section II		
5	Cloth production calculations and Weaving fabric faults, causes and remedies, Fabric specifications (EPI, PPI, Cloth width, % Warp and Weft crimp, Warp and Weft count, fabric GSM, etc.).	4	10
6	CLOTH ANALYSIS: Study of weaves – plain, twill, and satin weaves and their derivatives (Design, draft and peg plan for basic weaves)	10	16
7	Study of fabric properties such as thickness, cover factor, air permeability, water permeability, crease recovery, abrasion resistance, pilling, drape, tensile, tearing and bursting strength.	10	14
	TOTAL	48	80

PRACTICALS:

Experiments:

1. Brief study of fabric making machines –Weaving loom, knitting machine and non-woven machine.
2. Study of yarn passage on Winding and Warping machine.
3. Study of yarn passage on Pirn Winding and Sizing machine.
4. Demonstration of automatic & unconventional looms.
5. Yarn crimp determination by Shirley crimp meter.
6. Yarn count, tex number, denier and lea strength measurement.
7. Twist tester to find twist factor.
8. Work of rupture determination by Ballistic strength tester (lea and fabric)
9. Determination of tearing strength of fabric by tearing tester.
10. Crease recovery tester to find crease recovery angle.

Text Book: -

1) Textiles -by A. Wynne - The Motivate Series, Macmillan

Reference Books:-

1)Textiles - By Norma Hollen, Jane saddler and Anna Langford, Macmillan Publishing Company.

Course Name : Diploma Technical Chemistry

Course Code : DTC

Semester **:** Fourth

Subject Title **:** Polymer science and advanced textile fibers

Subject Code : 135CH45

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks
L	T	P		Theory		Test	Total		P		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	-	3	80	32	20	100	40	-	-	-	-	-	-	100

RATIONALE

- The students should have knowledge of the classification of polymers. They should be conversant with technical terms involved such as monomers, mesomer, repeat unit, functionality, average molecular weight, average degree of polymer, degree of substation.
- Polymer isomers and their structure to strength relationship.
- Requirements of fiber producing polymer
- Chemistry of polymerization, methods of polymerization.
- Technology of polymerization.
- Knowledge of various advanced fibers will give the students insight into
- This subject intends to give chemical and technological knowledge of the manufacturing of manmade fibers.

OBJECTIVES:

The students will be able to:

Get the knowledge of various processes in fiber manufacturing.

Know the various man- made polymers their technology of manufacturing.

Study parameters that decide the strength of polymer.

SECTION - I

1	• Significance Of Polymer science and the applications of polymers • Definitions: monomer, oligomer, high polymer, functionality, degree of polymerization, glass transition temperature. • Requirements of fiber forming polymers. • Isomerism atactic, isotactic syndiotactic • Structure- property relationships with emphasis on fiber forming polymers.	10 L	15
2	• ***Condensation polymerization***: Types, essential requirements and importance of condensation polymerization. • Mechanism with examples. ***Addition polymerization***: • Mechanism, essential requirements of addition polymerization. initiators, retarders and inhibitors. Industrial applications of addition polymerization • ***Co-polymerization:*** Concept of graft and block co-polymerization and their importance.	08L	15
3	• Concept of Mn, Mw, poly-dispensability & their significance. • Effects molecular weight distribution of polymer on spinnability & drawability	6L	10
SECTION- II			
4	• Aramids, • Carbon fibers	9L	15
5	• Polyurethane fibers (spandex Or Lycra), • Lyocell (Tensel). • Polylactic acid fibers	9L	15
6	• .Poyimide fibers, • Polyvinylchloride fibers	6L	10
		48	100

Learning resourses:

Text Book

- Polymer Science: V.R.Gowarikar, New Age International Limited , publishers Ltd (2007)
- A Text book of Fiber Science and Technology by S.P.Mishra, New Age International (P) Ltd.

Reference books:

- Text book of polymer science by Fred W. Billmeyer, Jr, Wiley India (2007)
- Polymer science. Text Book:Ahluwalia V.K.,Anuradhamishra, Anne Books India (2009)
- Manufactured Fiber Technologyby V.B.Gupta and V.K.Kothari. Chapman and Hall.

Course Name : Diploma in Technical Chemistry

Course Code : DTC

Semester : Fourth

Subject Title : Technology of Bleaching and Mercerizing

Subject Code : 135CH42

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		P		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	-	3	80	32	20	100	40	--	-	-	-	--	--	100

RATIONALE:

Technology of Bleaching deals with all the preparatory processes like shearing, singeing, desizing, scouring, souring, bleaching and mercerizing carried out in a bleach house to make the fabrics receptive to further processes of dyeing, printing and finishing. It also covers the machines and chemicals or auxiliaries used in these processes on all the substrates from natural cotton, wool, silk to the man-made and the synthetic fibre fabrics. Various faults and damage caused to material in the process are considered to check the quality of the bleached fabric.

OBJECTIVES:-

1. Introduce students to principles of wet processing of cotton involving de-sizing, scouring, bleaching and mercerizing of cotton.
2. Introduce students to principles of wet processing of other natural textile fibers.

Chapter	Contents	Hours Reqd.	Marks Alloted
	SECTION-I		
01	Shearing and Cropping Importance of grey inspection, shearing and cropping. Study of shearing and cropping machines.	**02**	**04**
02	Singeing Object of singeing, Methods of singeing, Various types of gas singeing m/cs., Singeing of yarn, woven, knit, synthetic & blended fabrics., Evaluation of the efficiency of singeing.	**06**	**06**
03	Desizing Object, methods of desizing, continuous desizing, desizing of blends, concept of grey chemicking.	**06**	**08**
04	Scouring Object, reactions involved in scouring, study of kier, J-box, JT-10, Jigger. Scouring of cotton, wool, silk, acrylic, nylon, polyester and their blends. Scouring of knit goods, scouring of coloured woven goods, solvent scouring, concept of bio-scouring	**08**	**10**
05	Bleaching Object, classification of bleaching agents, Bleaching of cotton, wool, silk, acrylic, nylon, polyester and their blends. Study of bleaching of knitted fabric and top dyed goods. Study of machinery used for semi-continuous and continuous bleaching. Developments in bleaching.	**10**	**12**
SECTION-II			
06	Mercerization Object, various changes brought about by mercerization, concept of cellulose conversion during mercerization, factors affecting the mercerization process. Yarn mercerization, machines used for woven and knitted fabric. Concept of hot mercerization and liquid ammoniamercerization. Test methods like Barium Activity Number, axial Ratio, Lustre ratio, deconvolution count etc. to evaluate the efficiency of mercerization	**16**	**20**
07	Preparation of Protein Preparatory process, sequence for woolen goods. Scouring of wool in top & fabric form, Carbonization, Crabbing., Milling, Potting. Preparatory process sequence for silk goods., Degumming of silk.	**16**	**20**
		64	**80**

Learning Resources :

Text Book:-

1. Technology Of Bleaching & Merserising Vol III By V A Shenai

   Sevak Publications Third Edition 1996

Reference Books:

1. Bleaching, Dyeing and Chemical technology of Textile fibres- E.R.Trotman
   B I PublicationsPvt Ltd New Delhi 1993
2. Introduction to Textile mercerising - J.T.Marsh
   B I PublicationsPvt Ltd New Delhi 1979

Course Name : Diploma in Technical Chemistry

Course Code : DTC

Semester : Fourth

Subject Title : Chemistry of Dyeing

Subject Code : 135CH43

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		P		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	-	3	80	32	20	100	40	--	--	--	--	--	--	100

RATIONALE:

The chemical processing of textiles is a value addition process by way of enhancing the aesthetic properties through dyeing and printing. In the second year of this course, the students are taught about the dyeing and printing of textiles with various types of dyes and pigments along with different methods, and styles. The students are also made acquainted with the operations of the machines involved in these processes. In general this subject is devised to impart the knowledge and skills in the areas of dyeing and printing of the textiles.

OBJECTIVES:

The students will be able to:

- Get the basic concepts in dyeing of cellulosic material.
- Know the technology of dyeing of cellulosic material with various classes of dyes.
- Differentiate the various dyeing techniques and their advantages and disadvantages.

CHAPTER	CONTENTS	HOURS	MARKS
	SECTION – I		
01	**Introduction to Theory of Dyeing** O N Witt`s Theory of Color and chemical constitution Classification of dyes, C I Constitution Number, C I Generic No Definitions of affinity, reactivity, exhaustion, percentage shade, classification of dyes, influence of pre-treatments on dyeing properties.	**06**	**10**
02	**Dyeing with Direct Dyes** General properties, principles and methods of application of direct	**04**	**05**

	dye on Cellulosic materials. Classification of direct dyes, various shop floor practices of dyeing of cellulosic materials with direct dye, various after treatments to improve fastness of direct dyed goods, faults and remedies in direct dyeing.		
03	**Dyeing with Reactive dyes** Concept of hot brand, cold brand, HE, ME & vinyl sulphone reactive dyes. Important steps involved in reactive dyeing, different shop floor practices of reactive dyeing on cellulosic materials, general properties of reactive dyes, stripping of reactive dyes, faults and remedies in reactive dyeing..	**06**	**10**
04	**Dyeing with Vat dyes** General properties of vat dyes, classification of vat dyes. Important steps involved in vat dyeing, various methods of application of vat dyes on cellulosic material, faults and remedies in vat dyeing.	**03**	**05**
05	**Solubalised Vat Dyeing** General properties of solublised vat dyes, important steps involved in dyeing with solublised vat dyes, shop floor practices of dyeing of cellulosic materials with solublised vat dyes, faults and remedies in solublised vat dyeing.	**02**	**05**
06	**Sulphur Dyeing** General properties of sulphur dye, important steps involved in sulphur dyeing, different oxidation methods in sulphur dyeing, shop floor properties of dyeing of cellulosic materials with sulphur dyes, stripping of sulphur dyes, faults and remedies in sulphur dyeing.	**03**	**05**
SECTION – II			
07	**Azoic Dyeing** General properties of azoic colours, concept of napthols and bases, important steps involved in Azoic dyeing, various shop floor properties of azoic dyeing method to improve rubbing fastness of azoic dyed goods, fault and remedies in azoic dyeing	**06**	**10**
08	**Dyeing With Acid Dyes** General Properties of acid dyes classification of acid dyes, different methods for level dyeing for wool & silk, dyeing of wool & silk with acid dyes & metal complex dyes.	**08**	**15**
09	**Dyeing with Basic Dyes** General properties of basic dyes, different retarding agents uses in basic dyeing. Dyeing of wool & silk, important steps involved in dyeing of cotton with basic dyes using mordant, faults and remedies in basic dyeing.	**06**	**10**
10	**Quality control in dyeing** Methods of testing fastness properties of dyed goods to washing, rubbing, light, & perspiration.	**04**	**05**
	Total	**48**	**80**

Learning Resources:-

Text Books:-

Sr. No.	Author	Title	Edition	Year of Publication	Publisher
1	V.A.Shenai	Technology of Dyeing	2nd	2000	Sevak Publications Mumbai - 400031
2	T.L.Vigo	Textile processing & properties	2nd	1994	Elsevier Science B.V. Amsterdam
3	Clifford Pireston	The dyeing of cellulose fibres	1st		Dyers co. publication trust. England.
4	F.Sadav	Chemical technology of fibre materials	1st	1973	Mir publication miscrow
5	M.L.Gulrajani	Silk dyeing printing & finishing	3rd	1988	I.I.T. Delhi Dept.

Course Name : Diploma in Technical Chemistry
Course Code : DTC
Semester : Fourth
Subject Title : Introduction to Printing
Subject Code : 135CH44

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		P		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	-	3	80	32	20	100	40	--	--	--	--	--	--	100

RATIONALE:

The chemical processing of textiles is a value addition process by way of enhancing the aesthetic properties through dyeing and printing. In the second year of this course, the students are taught about the dyeing and printing of textiles with various types of dyes and pigments along with different methods, and styles. The students are also made acquainted with the operations of the machines involved in these processes. In general this subject is devised to impart the knowledge and skills in the areas of dyeing and printing of the textiles.

OBJECTIVES:

The students will be able to:

- Get the basic concepts in dyeing of cellulosic material.
- Know the technology of dyeing of cellulosic material with various classes of dyes.
- Differentiate the various dyeing techniques and their advantages and disadvantages.

CHAPTER	CONTENTS	HOURS	MARKS
	SECTION – I		
01	**Introduction To Textile Printing as against Dyeing:** Preparation of cloth for printing with emphasis on cotton fabric. Printing paste ingredients with their chemistry and functions, different trade products available, property requirements of printing paste Classification of thickeners, the chemistry and properties of natural and natural modified thickeners, rheology of thickeners, preparation of thickener paste such as starch, gum, dextrin, etc.	**09**	**15**
02	Understanding the concepts and meaning of percentage depth of colour, stock and reduction paste, first print, over print and wet-on-wet, nip padding single phase and two phase printing with appropriate applications, examples	**03**	**05**

03	**Styles Of Printing** Introduction to various of styles of printing with principles involved. Direct style of printing on cotton materials using Direct, Reactive, Vat, Solubilized Vat and Azoic colours including stabilized azoics, Dishcharge and resist styles in white and coloured effect using above dyes (Print paste formulations and process sequence for a) Direct style, b) Discharge style, c) Resist style	**12**	**20**
	SECTION – II		
04	**Methods of printing:** General principles of various methods of printing, study of printing machines involving roller, flatbed screen printing and rotary screen printing. Advantages and limitations of roller, rotary and flatbed printing. Techno commercial comparative study of above machines.	**12**	**20**
05	**Printing with Pigments** Processes involved in the printing of pigments, khadi, metallic powders, flock, etc. Role and selection of synthetic binders and thickeners.	**06**	**10**
06	**Special print effects** Block, batik, tie and dye, crimp style	**06**	**10**
	Total	**48**	**80**

Learning Resources:

Text Books:-

1. Technology of Printing - Vol. IV- V.A.Shenai Sevak Publications Fifth Edition 2002

Reference Books:

1. Introduction to Textile Printing-.Published by Butter Works In Association with I C I dyestuff Division.
2. Textile Preparation and Dyeing Asim kumar Roy Chaudhary Oxford & IBH Publishing Co Pvt Ltd.2006 New Delhi
3. L.W. C. Miles Textile Printing 2nd 1981 The Dyer Company Publication Trust

Course Name : Diploma in Technical Chemistry
Course Code : DTC
Semester : Fourth
Subject Title : Dye House Practical
Subject Code : 135CH46

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
				Theory		Test	Total		P		OR		TW		
L	T	P		Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
-	-	8	-	-	-	-	-	-	150	60	--	--	50	20	200

RATIONALE:

The laboratory experiments under Dye-House Practicals covers all the related laboratory exercises of the textile wet processing subjects covered during Semester-IV viz. Chemistry and Technology Textile Fibres, Technology of Bleaching & Mercerising and Technology of Dyeing of Natural Fibres. This will give an opportunity to work and understand textile processing in an integrated manner.

COURSE CONTENTS:

- Analysis of chemicals used in textile processing such as alkalies, acids, salts, oxidizing agents, reducing agents, using volumetric and gravametric methods.
- Analysis of water used in textile processing by Soap, EDTA method or using advanced techniques.
- Testing analysis of various bleaching agents used such as sodium hypochlorite, H_2O_2, sodium chlorite, etc.
- Identification of fibres by various methods, solubility, burning etc. Use of projection microscope for identification.
- Analysis of blends.
- Desizing, scouring & bleaching laboratory based experiments on various textiles.
- Testing of scoured, bleached fabrics based on various standards.
- Analysis of various auxiliaries used in dyeing of natural fibres.
- Application of direct, azoic, basic, acid, acid mordant, reactive, vat, solublised vat and natural dyes on textile yarns.
- After treatment of dyed textiles to improve fastness properties.
- Evaluation of dyes by comparative dye trials.
- Effect of different parameters and auxiliaries on dyeing processes.

Learning resourses:-

Text Book:

1. Principles and practices in Dyeing- V.A.Shenai Sevak Publication First Edition 1991

Reference Book:

1. GILES`S Laboratory Course in Dyeing Society of Dyers & Colourists Fourth Edition 2000.

Course Name : Diploma in Technical Chemistry
Course Code : DTC
Semester : Fourth
Subject Title : Professional Practices (Personality Development)
Subject Code : 135CH47

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		P		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
-	2	-	-	--	--	--	--	--	--	--	--	--	50	20	50

RATIONALE:

Subject in Personality Development is designed to enable students to develop their personality to gain confidence. This will help them to look forward for better future.

OBJECTIVE:

The student should be able to:

- Give a technical presentation using powerpoint or OHP
- Develop an outlook for future career planning
- Develop communication skills required for interviews, group discussions and aptitude tests

COURSE CONTENT:

1. Development of Presentation Skills.
2. Entrepreneurship as a career.
3. Career Planning for Success
4. How to face Aptitude Test, Technical Test, GD and Interview.

Course Name : Diploma in Technical Chemistry

Course Code : DTC

Semester : Fourth

Subject Title : Student Centered Activity/Test

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		PR		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-

Rationale:–

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Expert lectures, E-learning sources, E-library, Internet, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives:

The Student will be able to:

1. Acquire information from different sources
2. Prepare notes for given topic
3. Present given topic in a seminar
4. Interact with peers to share thoughts
5. Take the advantages of E-learning sources