

College Name : R.C.Patel Arts, Commerce & Science College, Shirpur

Title of the Course : Certificate Course in textile Chemistry

Aims/objectives of the Course : To aware the students about Textile chemistry, their applications & career in textile industries.

Duration of Course : 1 Year

Fees structure : 1000/

Course structure : Paper-I- Applied Chemistry for Textile Industries
 Paper-II- Applied Chemistry of dyes & Auxiliaries
 Paper-III- Lab Course

Eligibility for admission : Diploma course in Textile chemistry

Skeleton of Course :

| Sr. No. | Paper | Name of the subject | Theory/ Practical Course | Teaching Hrs | Max. Marks Allotted | | | Passing | | | Credit |
|---------|-----------|--|--------------------------|--------------|---------------------|----------|-------|----------|----------|-------|--------|
| | | | | | External | Internal | Total | External | Internal | Total | |
| 1 | Paper-I | Applied Chemistry for Textile Industries | Theory | 90 | 60 | 40 | 100 | 24 | 16 | 40 | 6 |
| 2 | Paper-II | Applied Chemistry of dyes & Auxiliaries | Theory | 90 | 60 | 40 | 100 | 24 | 16 | 40 | 6 |
| 3 | Paper-III | Lab course | Practical | 120 | 60 | 40 | 100 | 24 | 16 | 40 | 6 |

Minimum Staff : 03

Mode of examination : Internal & External (Theory & Practical)

Details of Syllabus : Enclose the syllabus copy

R.C.Patel Art's, Commerce & science College, Shirpur

CTC- 101- Applied Chemistry for Textile Industries

Paper- I

THEORY

Contact Hrs- 90

1. **Elementary Chemistry:** (10 Hrs)
Concept of atom, atomic number, isotopes & isobars, molecular weight & equivalent weight, compounds & mixtures.
2. **Concepts in volumetric analysis:** (20 Hrs)
Oxidizing & reducing agents, units of concentration, molarity, normality, formality, numerical, standard solutions, types.
3. **Acids & bases:** (20 Hrs)
Arrhenius theory, Lewis theory & Lowry-Bronsted theory, properties & uses of acids & bases.
4. **Water:** (10 Hrs)
Sources of water, impurities in water, hardness of water, temporary hardness, permanent hardness & effects.
5. **pH & pOH:** (10 Hrs)
Introduction, concept, definition, calculation of pH value of acid, bases. Determination of pH by colorimetric method.
6. **Industrial visit.** (20 Hrs)

REFERENCE BOOKS:

1. Analytical chemistry by G. D. Christian
2. Physical chemistry by Atkins.
3. Vogel's Textbook of Quantitative chemical analysis- Jeffry, Basset.

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CTC- 102- Applied Chemistry of Dyes & Auxiliaries

| Paper- II | THEORY | Contact Hrs- 90 |
|---|---------------|------------------------|
| 1. Dyes- | | (20 Hrs) |
| Definition, color chemistry, constitution of dyes, types, characteristics, of dyes. | | |
| 2. Brief study of chemicals useful in textile industries: | | (20 Hrs) |
| Acetic acid, aluminum acetate, calcium carbonate, copper sulphate, lead acetate, potassium chromate, sodium sulphate, sodium nitrate, sodium silicate, ZnO, ZnCl, NaCl & other related chemicals. | | |
| 3. Basic concepts of Organic chemistry: | | (20 Hrs) |
| Carbon chemistry, difference between organic & inorganic compounds, classification of organic compounds, hydrocarbon, homologous series, isomerism. | | |
| 4. Polymerization: | | (15 Hrs) |
| Introduction, Classification, brief study of textile important polymers like polyester, polyamide & other polymers. | | |
| 5. Morphological & fine structure of Natural fibres: | | (15 Hrs) |

TEXT/REFERENCE BOOKS:

1. Textile Fibres, Shenai V.A., Vol-1, Sevak Publications, Bombay, 3rd edition, 1991.
2. Textbook of chemistry for PUC (Vol- I & II)
3. Dyeing & chemical technology of Textile fibres- E. R. Trotman
4. Physical chemistry by Atkins.
5. Analysis of Chemicals- N. F. Desai.

College Name : R.C.Patel Arts, Commerce & Science College, Shirpur

Title of the Course : Diploma Course in textile Chemistry

Aims/objectives of the Course : To aware the students about Textile chemistry, their applications & career in textile industries.

Duration of Course : 1 Year

Fees structure : 1000/

Course structure : Paper-I- Chemistry of Polymers in Textile Industries
 Paper-II- Chemistry of Fibres in Textile Industries
 Paper-III- Lab Course

Eligibility for admission : Certificate course in Textile chemistry

Skeleton of Course :

| Sr. No. | Paper | Name of the subject | Theory/ Practical Course | Teaching Hrs | Max. Marks Allotted | | | Passing | | | Credit |
|---------|-----------|---|--------------------------|--------------|---------------------|----------|-------|----------|----------|-------|--------|
| | | | | | External | Internal | Total | External | Internal | Total | |
| 1 | Paper-I | Chemistry of Polymers in Textile Industries | Theory | 90 | 60 | 40 | 100 | 24 | 16 | 40 | 6 |
| 2 | Paper-II | Chemistry of Fibres in Textile Industries | Theory | 90 | 60 | 40 | 100 | 24 | 16 | 40 | 6 |
| 3 | Paper-III | Lab course | Practical | 120 | 60 | 40 | 100 | 24 | 16 | 40 | 6 |

Minimum Staff : 03

Mode of examination : Internal & External (Theory & Practical)

Details of Syllabus : Enclose the syllabus copy

R.C.Patel Art's, Commerce & science College, Shirpur

DTC- 101- Chemistry of Polymers in Textile Industries

Paper- I

THEORY

Contact Hrs- 90

1. **Basic Determinants of Fibre Forming Polymers:** (20 Hrs)
Importance of polymer science. Various applications of polymers. Classification of polymers. Definition of monomer, oligomer, high polymer, mesomer, cohesive energy density, solubility parameter, glass transition temperature, functionality and degree of polymerization.
2. **Condensation Polymerization:** (15 Hrs)
Mechanism, types, feasibility, essential requirements and importance of condensation polymerization.
3. **Mechanism of Polymers:** (20 Hrs)
Nomenclature, Dyestuff chemistry, Types of dyes & pigments, Manufacturing of dyes.
1. **Technology of Textile Polymers:** (20 Hrs)
Characterization of polymers by different physical techniques such as DTA, DSC, TGA, IR, X-Ray diffraction
2. **Developments in polymers for textiles:** (15 Hrs)
Synthetic polymers, Polymer waste and techniques of utilisation.

REFERENCE BOOKS:

1. Polymer science- V. R. Gowarikar
2. Natural Polymer man-made Fibres, Carrol and Porczynski C.Z., National Trade Press Ltd., London, 1965.
3. Visco-Elastic Properties of Polymers, Ferry, J.D., John Wiley and Sons, New York, 3rd edition, 1980.
4. Textbook of Polymer Science, Bill Meyer F.W., John Wiley and Sons, New York, 3rd Edition, 1984.
5. Vogel's Textbook of Quantitative chemical analysis- Jeffry, Basset.

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DTC- 102- Chemistry of Fibres in Textile Industries

| Paper- II | THEORY | Contact Hrs- 90 |
|---|---|-----------------|
| 1. Fibres: | Introduction, Classification, Characteristics of Fibres | (15 Hrs) |
| 2. Fundamentals of Fibre Spinning- | General principles of the spinning process, Theory of solidification of polymer in various spinning techniques. Concept of melt spinning, general features and essential requirements of melt spinning. | (20 Hrs) |
| 3. Polyester fibres: | Raw materials, manufacturing process, physical and chemical properties and end uses of polyester. | (20 Hrs) |
| 4. Ployamide fibre: | Raw materials, manufacturing process, physical and chemical properties and end uses of Nylon-6 and Nylon-66. | (20 Hrs) |
| 5. Commercial and rural importance of Natural fibres: | Cotton, wool, silk, ramie, jute, linen, pineapple, Natural Bamboo fibers, their occurrence, properties and uses. | (15 Hrs) |

TEXT/REFERENCE BOOKS:

1. Textile Fibres, Shenai V.A., Vol-1, Sevak Publications, Bombay, 3rd edition, 1991.
2. Textbook of chemistry for PUC (Vol- I & II)
3. Dyeing & chemical technology of Textile fibres- E. R. Trotman
4. Microscopy of Textile Fibres, Greaves, P.H., Saville B.P.Oxford: BIOS Scientific Publishers Ltd., 1995.
5. Handbook of Fibre Chemistry, Lewin Menachem, Eli M. Pearce, Marcel Dekker Inc., New York, 2nd edition, 1998.
6. Analysis of Chemicals- N. F. Desai.

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DTC- 103- Practical Course

Paper- III

LAB COURSE

1. Determination of Total hardness of given water sample by EDTA solution method.
2. To find alkalinity of water by indicator method.
3. To determine the saponification value of given coconut oil sample.
4. Preparation of color dyes.
5. Measurement of absorbance of color dyes by colorimeter.
6. To determine suspended solids of given water sample.
7. To determine the purity percentage of NaCl.
8. To determine the purity percentage of Na_2SO_4 .
9. To determine the purity percentage of $\text{Na}_2\text{S}_2\text{O}_4$.
10. Detection of type & functional group.
11. Detection of type & functional group.
12. Detection of type & functional group.
13. Detection of type & functional group.
14. Microsoft excel operating skills.
15. Microsoft Power point operating skills.
16. Determination of P^{H} of water.
17. Purification of impure water by treatment.
18. Determination of TDS of water.

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ADC- 101- Polymers in Textile Industries

Paper- I

THEORY

Contact Hrs- 90

1. Fiber: (10Hrs)

Fiber forming polymers and their requirement, chemistry of natural & synthetic fibrous polymer classification, requirements for fiber forming polymers, essential & desirable properties of textile fibers, essential properties, classification of fibers .

2. Measurement of physical characteristics of cotton : (20 Hrs)

viz. length, fineness, maturity, bundle strength, colour and foreign matter including principle, construction, operation, and calibration of the equipment in common use.

3. Mechanical properties of fibres (20 Hrs)

relation between structure and mechanical properties of fibres, Measurement of physical properties of man-made fibres i.e. length, denier, strength, elongation, modulus, work of rupture, crimp, spin finish, fibre quality index etc.

4.Non-fibrous Polymers: (20 Hrs)

Introduction, chemistry of Gum, Starch, Proteins, enzymes.

5.Green chemistry: (10 Hrs)

Introduction, importance & need, environmentally benign approaches in chemistry.

6.Preparation of Textile Industrial visit report. (10 Hrs)

REFERENCE BOOKS:

1. Polymer science- V. R. Gowarikar
2. Physical chemistry by Atkins.
3. Technology & Dyeing by Shenai.
4. Textbook of Polymer Science, Bill Meyer F.W., John Wiley and Sons, New York, 3rd Edition, 1984.

R. C. Patel Art's, Commerce & science College, Shirpur

ADC- 102- Chemistry in Textile Industries

Paper- I I

THEORY

Contact Hrs- 90

- 1. Surface active agents- (20 Hrs)**
Definition, surface activity, wetting, leveling & dispersing, types, characteristics & textile application, theory of degeneracy.
- 2. Oils: (20 Hrs)**
Classification, sulphation, Saponification reaction, mineral oils, waxes, furnace gaseous fuels from petroleum & coal, LPG & CNG.
- 3. Chemistry of Dyes & Colour Chemistry: (15 Hrs)**
Fractional distillation of coal tar and its products, and their use in textile industry (3), Isolation of Xylene, Benzene, Toluene, Naphthalene and Anthracene,
- 4. Unit organic process/operation: (20 Hrs)**
sulphonation, nitration, amination and hydroxy compound
- 5. Preparation of Textile visit report: (15 Hrs)**

TEXT/REFERENCE BOOKS:

1. Textile Fibres, Shenai V.A., Vol-1, Sevak Publications, Bombay, 3rd edition, 1991.
2. Textbook of chemistry for PUC (Vol- I & II)
3. Dyeing & chemical technology of Textile fibres- E. R. Trotman
4. Physical chemistry by Atkins.
5. Analysis of Chemicals- N. F. Desai.

ADC- 103- Practical Course

Paper- III

LAB COURSE

1. Dyeing of cotton hand with hot brand reactive dye.
2. Dyeing of cotton hand with vinyl sulphone reactive dye.
3. Dyeing of cotton hand with vat colors.
4. Dyeing of cotton hand with sulphur black.
5. Dyeing of cotton hand with naphthol color.
6. Determination of strength of formaldehyde solution.
7. Binary organic mixture.
8. Binary organic mixture.
9. Binary organic mixture.
10. Working on Microsoft Word.
11. Working on Chemdraw .
12. Working on Structure Analysis.
13. Introduction of Internet
14. To determine % of Acetic acid.
15. To determine solid content of dye fixing agents.
16. To determine solid & active content of softeners.