

**Swami Ramanand Teerth Marathwada University,
Nanded**



B. O. S. In Chemistry

**B. Sc. First Year Semester-I & II
Dyes and Drugs**

In force from June - 2013

B. Sc. First Year (Semester I & II)
DYES AND DRUGS
Syllabus

Semester	Paper	Course No.	Course	Periods/week	Total Periods	Marks
I	I	CHDD-101	Introduction to Dyes	3	45	50
	II	CHDD-102	Introduction to Drugs	3	45	50
II	III	CHDD-103	Introduction to Dye Intermediates	3	45	50
	IV	CHDD-104	Dosage forms, Purity of Drugs and Biostatistics	3	45	50
	V	CHDD-105	Laboratory Course-I	4	120	50

Theory papers 50 marks (External 40 marks and internal 10 marks)

DYES AND DRUGS
Semester – I
Paper: I
Introduction to Dyes (CHDD-101)

Marks: 60

Periods: 45

UNIT I

1. Introduction to Dyes:

08 p

- a) Introduction - Definition of dye. Difference between dye and other colouring matter. Requisites of true dye.
- b) Historical development from natural to synthetic dyes.
 - i) Era of natural dyes.
 - ii) Era of synthetic dye.
 - iii) Pollution problems
- c) Nomenclature of dyes.
 - i) Commercial naming of dyes.
 - ii) Colour index and naming of dyes.

UNIT II

1. Classification of dyes:

14 p

- a) Introduction to classification of dyes
- b) Classification of dyes on the basis of application to fiber.
 - i) Acid dyes ii) Basis of cationic dyes iii) Direct dyes iv) Mordant or adjective dyes v) Azoic dyes vi) Oxidation dyes vii) Ingrain dyes. viii) Vat dyes ix) Sulphur dyes x) Disperse dyes xi) Reactive dyes xii) Solvent dyes xiii) synthetic fibre dyes xiv) Solubilised vat dyes xv) Sulphurised vat Dyes xvi) Disperse reactive dyes.

UNIT III

1. Textile fibers:

06 p

- i) Different types of fibers: a) Cotton b) Wool c) Silk d) Cellulose acetate e) Polyamide f) Polyester g) Polyacrylonitrile h) Polyolefin.

2. Dyeing process:

05 p

- a) Interaction of dye with fibers
 - i) Ionic interaction.
 - ii) Hydrogen bonds.
 - iii) Vander Waal's interaction.
 - iv) Covalent bonds.
- b) Cross Dyeing

UNIT IV

1) Basic Operation in dyeing process and Methods of dyeing:

- a) Basic Operation in dyeing process.
 - i) Preparation of the fibers.
 - ii) Preparation of the dye bath.
 - iii) Application of the dye.
 - iv) Finishing.
- b) Methods of Dyeing –
 - i) Direct dyeing.
 - ii) Vat dyeing.
 - iii) Mordant dyeing.
 - iv) Disperse dyeing.
 - v) Formation of dye on fibers.
 - vi) Dyeing of the wool with acid dyes.
 - vii) Dyeing with reactive dyes.

DYES AND DRUGS
Semester – I
Paper: II
Introduction to Drugs (CHDD-102)

Marks: 50

Periods: 45

UNIT I

1. Introduction to drugs:

5 p

- a) Concept of drug and qualities of an ideal drug,
- b) Some important terms used in study of drugs –
 - i) Pharmacy, pharmacology and pharmacophore, pharmacodynamics and pharmacodynamic agents.
 - ii) Metabolite and anti-metabolite.
 - iii) Pathogen, pathogenicity, chemotherapy and chemotherapeutic agents.

2. Historical evolution from natural to synthetic drugs.

3 p

3. Classification of drugs on the basis of their therapeutic actions–

8 p

- a) Drugs acting on central nervous system.
- b) Drugs stimulating or blocking the peripheral nervous system.
- c) Drugs acting on the cardiovascular, hematopoietic and renal system.
- d) Chemotherapeutic drugs.
- e) Vitamins.
- f) Hormones.

UNIT II

1. Drug design:

4p

- a) Introduction
- b) Analogues and prodrugs
- c) Factors governing drug-design.
- d) Drug design through disjunction and conjunction.

2. Physical and chemical factors and biological activity:

10p

- a) Introduction
- b) Physical factors:
 - i) Structurally specific and non-specific drugs.
 - ii) Relation of functional group and biological activity: Effect of i) alkyl group ii) Hydroxyl group ii) Acidic (-COOH and -SO₃H) Groups iii) Halogen iv) nitro and nitrite group v) amino group g) nitrile group vi) unsaturation vii) Isomerism (structural isomerism and stereoisomerism)
 - iii) Chemical factors: Molecule Negentropy, Cammarata correlation.

UNIT III

1. Medicinal Microbiology.

08 p

- a) Introduction to medicinal microbiology.
- b) Classification of bacteria, pathogenic and non-pathogenic bacteria.
- c) Study of pathogenicity and chemotherapy of bacteria-
 - i) *Salmonella* ii) *Clostridium* iii) *Pseudomonas* iv) *Shigella* v) *Mycobacterium*
- d) Study of pathogenicity and chemotherapy of protozoans-
 - i) Trypanosome ii) *Leishmania* iii) *Plasmodium* and iv) *Entamoeba histolytica*

UNIT IV

1. Immunity.

07P

- a) Introduction and importance.
- b) Immunity –

- i) Innate immunity, consideration at species, race and individual level. Factors deciding innate immunity.
- ii) Acquired immunity.
 - 1. Active immunity (Vaccines, types of vaccines)
 - a) Prophylactic b) Curative c) Diagnostic.
 - 2. Passive immunity (Serum, preparation of immune sera)

DYES AND DRUGS
Semester – II
Paper: III
Introduction to Dye Intermediates (CHDD-103)

Marks: 50

Periods: 45

UNIT I

1. Study of raw material used in dye industries. 03 p

- i) Source of primaries –
- a) Coal tar- Extraction of coal tar primaries by fractional distillation.
 - b) Petroleum - extraction of primaries from petroleum source.

2. Dyestuff intermediates: 12 p

Aliphatic compounds – Use of following in Dye industries.

- a) methyl alcohol
- b) ethyl alcohol
- c) ethylene glycol
- d) glycerol
- e) chloroform
- f) chloroacetic acid
- g) ethyl acetate
- h) acetic anhydride
- i) maleic anhydride
- j) acetyl chloride
- k) acetaldehyde
- l) acetone

UNIT II

1. Dyestuff intermediates (Aromatic): 12 p

Use of aromatic compounds as dyestuff intermediates -

- a) nitrobenzene from benzene.
- b) dinitrobenzene from nitrobenzene
- c) benzene sulphonic acid from benzene
- d) naphthalene-1 -sulphonic acid and naphthalene-2-sulphonic acid from naphthalene
- e) 1-naphthol-4- sulphonic from 1-naphthol
- f) crocein acid and schaffer acid
- g) sulphanillic acid
- h) naphthionic acid
- i) p-nitroaniline
- j) aniline by reduction of nitrobenzene
- k) chlorobenzene from benzene
- l) phenol from chlorobenzene
- m) salicylic acid from phenol
- n) acetophenone from benzene
- o) benzyl alcohol from toluene
- p) benzaldehyde from toluene.

UNIT III

1. Colour and chemical constitution of dyes:

12 p

- i) Study of Bathochromic, Hypsochromic, hypochromic and hyperchromic effect with examples.
- ii) Colour and chemical constitution - Definition of colour, colour and wavelength of radiation, colour absorbed and colour visualized with respect to wavelength region.
- iii) Relation between colour and chemical constitution —
 - a) Armstrong theory (zwitterion theory) and its limitations.
 - b) Witt's theory (Chromophore-Auxochrome theory. – Chromophore, Independent Chromophore, Dependent Chromophore, Chromogenes, Auxochromes and type of Auxochromes

UNIT IV

1. Non textile uses of dyestuff.

06 p

- a) Leather dyes
- b) Paper dyes
- c) Food colours
- d) Solvent
- e) Wood dyes
- f) Medicinal dyes
- g) Dyes for photography
- h) Cosmetic dyes.
- i) Dyes as indicators and reagents,
- j) Fluorescent dyes.
- k) Coloured smokes.
- l) Camouflage colours.

DYES AND DRUGS
Semester – I
Paper: II
Dosage forms, Purity of Drugs and Biostatistics (CHDD-104)

Marks: 50

Periods: 45

UNIT I

- 1. Dosage form and Routes of Administration; 10 p**
- a) Introduction to dosage forms.
 - b) Variety of dosage forms.
 - c) Importance of dosage forms
 - d) Routes of administration of drugs.
 - e) Advantages and disadvantages of oral route of administration,
 - f) Advantages and disadvantages parenteral route of administration.

UNIT II

- 1. Purity of pharmaceutical substances and limit test: 08 p**
- a) Introduction.
 - b) Permissible impurities in pharmaceutical substances.
 - c) Test for purity
 - d) Limit test for - a) Chloride b) Sulphate c) Lead d) Iron e) Arsenic.

UNIT III

- 1. Assay of drugs. 07 p**
- a) Introduction.
 - b) Types of assay.
 - i) Chemical assay
 - ii) Biological assay
 - a) principles of bio-assay b) Methods of bio-assay c) Types of biological systems.
 - iii) Comparison of chemical assay and biological assay.
 - iv) Immunological assay.

UNIT III

- 1. Bio-Statistics. 15 p**
- a) Introduction to bio-statistics and its importance.
 - b) Explanation of the terms with examples:
 - i) Population ii) Biological variables iii) Mean iv) Mode v) Median vi) Accuracy vii) Precision viii) Arithmetic mean ix) Geometric mean x) Standard deviation xi) Mean deviation xii) Range xiii) Normal distribution xiv) Probability xv) Sampling
- 2. Numericals on: 05 p**
- i) Mean ii) Mode iii) Median iv) Standard deviation v) Mean deviation vi) Arithmetic mean vii) Probability

DYES AND DRUGS
Semester – II
Paper: V
LABORATORY COURSE I (CHDD – 105)

Marks: 50

Periods: 120

A. Dyes

1. Preparation of dye intermediates

a) Nitrobenzene b) m-dinitrobenzene c) p-bromoacetanilide d) dibenzal acetone
e) 2,4,6 –tribromo aniline, f) p-nitro actanilide.

2. Preparation of dyes

a) Phenyl azo- β -naphthol b) Picric acid c) Orange II d) Methyl red
e) Aniline yellow f) Butter yellow

B. Drugs

1) Assay of following commercial samples

1. Boric acid 2. Sodium bicarbonate 3. Ferrous sulphate 4. Hydrogen peroxide 5. Iodine solutions (strong and weak) 6. Ascorbic acid

2) Preparation of drugs

i) Aspirin ii) Iodoform iii) Paracetamol iv) Acetanilide

Note: Minimum sixteen Experiments are to be covered.

Reference Books:

1. Synthetic dyes : Grudeep R. Chatwal.

2. Synthetic Dyes : K. Venkatraman Vol. I, Academic Press , New York.

3. Chemistry of Dyes and Principles of Dying : V.A. Shenai, Sevak Publication, Bombay

4. Introduction to dyes : Rastogi

5. Natural and Synthetic organic chemistry : O.P.Agrawal

6. Synthetic Drugs : Grudeep R. Chatwal.

7. An introduction to drugs , Singh and Rangnekar

8. British Pharmacopea

9. Indian Pharmacopea

10. Pharmacology and pharmacotherapeutics : Satoskar and Bhandarkar

11. Practical Organic Chemistry : Singh , Gupta and Bajpai

12. Practical Organic chemistry : I Vogel

13. Practical Pharmaceutical chemistry A.H. Beckett and J.B. Stelnake