Swami Ramanan Teerth Marathwada University, Nanded.

Faculty of Science

B. O. S. In Chemistry
B. Sc. First Year (Dyes and Drugs)

Semester-I & II

CBCS

In force from June – 2016

Distribution of credits for B.Sc. Dyes and Drugs (optional)

Under Faculty of Science

B. Sc. Syllabus structure

Semester Pattern effective from June, 2016

Subject: Dyes and Drugs

B. Sc. First Year (Semester I & II)

Total credits semester I and II: 12

Semester	Paper No.	Name of the Course	Instruction Hrs/ week	Total period	Internal Evaluation	Marks of Semester	Total Marks	Credits
I	CCDD I (Section A)	Introduction to Dyes, P-I	03	45	10	40	50	2
	CCDD I (Section B)	Introduction to Drugs P-II	03	45	10	40	50	2
II	CCDD II (Section A)	Introduction to Dye Intermediates, P-III	03	45	10	40	50	2
	CCDD II (Section B)	Dosage forms, Purity of Drugs and Biostatistics, P-IV	03	45	10	40	50	2
	CCDD P-I (CCDD- I & II), (section A&B)	Practical's based on Section A & Section B of (CCDD- I & II) (P-V)	04	20 Practicals	20	80	100	4
Total credits semester I and II:								**12**

Note:

- **The syllabus is based on six (3x2) theory periods and four practical periods per batch per week.**
- **Candidates should require passing separately in theory and practical examination.**
- **Theory examination 40 marks (30+10 MCQ for each paper).**
- **Internal evaluation 10 marks (test for assignment and attendance).**
- **At least twenty practical should be taken: 10 practical from Section A and 10 from Section B.**

B. Sc. Second Year (Semester III & IV)

Total credits semester III and IV: 12(4*)

Semester	Paper No.	Name of the Course	Instruction Hrs/ week	Total period	Internal Evaluation	Marks of Semester	Total Marks	Credits
III	CCDD III (Section A)	Synthesis and Application of azo, and azoic Dyes. (P-VI)	03	45	10	40	50	2
	CCDD III (Section B)	Synthesis and Application of Drugs acting on CNS. (P-VII)	03	45	10	40	50	2
	CCDDP-II (CCDD- III & IV) (section A)	Practical's based on P-VI & P-VIII (P-X)	04	20 Practicals	10	40	50	2
	CCDDP-II (CCDD-III & IV), (section A)	SEC I (1Skill/Optional)			**15x3=45**			**(02)***
IV	CCDD IV (Section A)	Synthesis and application of methane, anthraquinone, xanthenes and Heterocyclic Dyes. (P-VIII)	03	45	10	40	50	2
	CCDD IV (Section B)	Synthesis and Application of Chemotherapeutic Drugs (P-IX)	03	45	10	40	50	2
	CCDDP-III (CCDD- III & IV), (section B)	Practicals based on P-VII and P-IX (P-XI)	04	20 Practicals	10	40	50	2
	CCDDP-III (CCDD- III & IV), (section B)	SEC II (1Skill/Optional)			**15x3=45**			**(02)***
							Total credits semester I and II:	**12(4)***

Note:

- **The syllabus is based on six (3x2) theory periods and four practical periods per batch per week.**
- **Candidates should require passing separately in theory and practical examination.**
- **Theory examination 40 marks (30+10 MCQ for each paper).**
- **Internal evaluation 10 marks (test for assignment and attendance).**
- **At least twenty practical should be taken: 10 practical from Section A and 10 from Section B.**

B. Sc. Third Year (Semester V & VI)

Total credits semester V and VI: 12

Semester	Paper No.	Name of the Course	Instruction Hrs/ week	Total period	Internal Evaluation	Marks of Semester	Total Marks	Credits
V	DECDD I [(Section A) Elective]	Chemistry of Synthetic Dyes -I(P-XII) **OR** Natural Dyes For Industrial Applications	03	45	10	40	50	2
	DECDD I (Section B)	Chemistry of Synthetic Drugs-(P-XIII)	03	45	10	40	50	2
	DECDDP-I (DECDD- I & II) (section A)	Practical's based on P-XII & P-XIV (P-XVI)	04	20 Practicals	10	40	50	2
	DECDDP-II (DECDD- I & II) (section A)	SEC II (1Skill/Optional)			**15x3=45**			**(02)***
VI	DECDD II (Section A)	Chemistry of Synthetic Dyes -II. (P-IVX)	03	45	10	40	50	2
	DECDD II [(Section B) Elective]	Unit Operation and Pharmaceutical Dosage forms (P-XV) **OR** Principles of Drug Design (P-XV)	03	45	10	40	50	2
	(DECDD- I & II) (section B)	Practical's based on P-XIII & P-XV (P-XVII)	04	20 Practicals	10	40	50	2
	DECDDP-IV (section B)	SEC IV (Project Work)			**50**		**50**	**(02)***
						Total credits semester I and II:		**12(4)***

Note:

- **The syllabus is based on six (3x2) theory periods and four practical periods per batch per week.**
- **Candidates should require passing separately in theory and practical examination.**
- **Theory examination 40 marks (30+10 MCQ for each paper).**
- **Internal evaluation 10 marks (test for assignment and attendance).**
- **At least twenty practical should be taken: 10 practical from Section A and 10 from Section B.**

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure (New scheme)

B. Sc. First year (Semester - I)

Semester Pattern effective from -2016

DYES AND DRUGS

CCDD I (Section-A)

Introduction to Dyes (P-I)

Credits: 02 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.

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Choice Based Credit System (CBCS) Course Structure (New scheme)

B. Sc. First year (Semester - I)

Semester Pattern effective from -2016

DYES AND DRUGS

CCDD I (Section-B)

Introduction to Drugs (P-II)

Marks: 50 **Periods: 45**

UNIT I

1. Introduction to drugs: **05 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 lo synthetic drugs. **03 p**

3. Classification of drugs on the basis of their therapeutic actions **08 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. Chemistry of Pro-drug **04p**

a) Introduction

b) Application of pro-drug

c) Ideal Requirement of pro-drug.

d) Classification of Pro-drug

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 iii) Acidic (-COOH and –SO3H) Groups iv) Halogen v) nitro and nitrite group vi) amino group vii) nitrile group viii) unsaturation ix) structural isomerism and x) stereoisomerism

iii) Chemical factors: Molecule Negntropy, 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 protozones i) Trypanosome ii) Leishmania iii) Plasmodium and iv) *Entamoeba histolytica*

UNIT IV

1. Immunity. 07P

a) Introduction and importance.

b) Immunity –

1) Innate immunity, consideration at species, race and individual level. Factors deciding innate immunity.

2) Acquired immunity.

a. Active immunity (Vaccines, types of vaccines)

i) Prophylactic ii) Curative iii) Diagnostic.

b. Passive immunity (Serum, preparation of immune sera

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure (New scheme)

B. Sc. First year (Semester - II)

Semester Pattern effective from -2016

DYES AND DRUGS

CCDD II (Section-A)

Introduction to Dye Intermediates (P-III)

Marks: 50 **Periods: 45**

UNIT I

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

Source of primaries –

i) Coal tar- Extraction of coal tar primaries by fractional distillation.

ii) Petroleum - extraction of primaries from petroleum source.

2. **Dyestuff intermediates:** **12 p**

Aliphatic compounds – Synthesis and 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 anhydnde i) maleic anhydride j) acetyl chloride k) acetaldehyde l) acetone

UNIT II

1. Dyestuff intermediates (Aromatic): **12 p**

Synthesis and use of aromatic compounds as dyestuff intermediates -

a) nitrobenzene from benzene.

b) dinitrobenzene from nitrobenzene

c) benzene suphonic acid from benzene

d) naphthalene-1 -suphonic 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) napthionic acid

i) p-nitroanline

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

a) Study of Bathochromic, Hypsochromic, hypochromic and hperchromic effect with examples.

b) Colour and chemical constitution - Definition of colour, colour and wavelength of radiation, colour absorbed and colour visualized with respect to wavelength region.

c) R elation between colour and chemical constitution —

i) Armstrong theory (qimionoid theory) and Us limitations.

ii) 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.

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Choice Based Credit System (CBCS) Course Structure (New scheme)

B. Sc. First year (Semester - II)

Semester Pattern effective from -2016

DYES AND DRUGS

CCDD II (Section-B)

Dosage forms, Purity of Drugs and Biostatistics (P-IV)

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 lest for - i) Chloride ii) Sulphate iii) Lead iv) Iron v) Arsenic.

UNIT III

1. Assay of drugs. 07 p

1) Introduction.

2) Types of assay. a) Chemical assay b) Biological assay

i) principles of bio-assay ii) Methods of bio-assay iii)Types of biological systems.

3) Comparison of chemical assay and biological assay.

4) 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) Arithmatic 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) Arithmatic mean vii) Probability

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Choice Based Credit System (CBCS) Course Structure (New scheme)

B. Sc. First year

Semester Pattern effective from June -2016

DYES AND DRUGS

Practical Paper: CCDDP-I (P-V)

(Annual practical Based on [CCDD I & II (Section A & B))

Credits: 04 (Marks: 100)

Marks: 100 **Periods: 1200**

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-napthol b) Picric acid c) Orange II d) Methyl red e) Aniline yellow f) Butter yellow

B . Drugs

1) Assay of following commercial samples

a) Boric acid b) Sodium bicarbonate c) Ferrous sulphate d) Hydrogen peroxide e) Iodine solutions (strong and weak) f) Ascorbic acid

2) Preparation of drugs

a) Aspirin b) Iodoform c) Paracetamol d) Acetanilide

Note: Minimum sixteen Experiments are to be covered.

Reference Books:

1. The Chemistry of Synthetic Dyes Vol I and II By K. Venkataraman
2. Synthetic Dyes By Rajbir Singh
3. Synthetic Dyes by Dr. Gurdeep R. Chatwal
4. Synthetic Dyes by M.S. Yadav
5. Dyes and their Intermediates by Chatwal.
6. Introduction to the Chemistry of Dyestuffs by V.A. Shenai,
7. Dyes and Dyeing by Charles E. Pellow;
8. Fundamental Processes of Dye Chemistry by Fierz-David.
9. Synthetic Drugs By Rajbir Singh
10. Synthetic Drugs by Dr. Gurdeep R. Chatwal
11. Synthetic Drugs by S.K. Agarwal Publisher
12. Principles of Organic Medicinal Chemistry by Rama Rao Nadendla
13. Practical Pharmaceutical Chemistry – I By Dr. A. V. Kasture, Dr. S. G. Wadodkar, Mr. S. B. Gokhale
14. Vogel's Textbook of Practical Organic Chemistry
15. British Pharmacopea
16. Indian Pharmacopea
17. Pharmacology and pharmacotherapeutics : Satoskar and Bhandarkar
18. Practical Pharmaceutical chemistry A.H. Beckett and J.B. Stelnake