SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A' Grade

Revised Syllabus For

Bachelor of Science

Part-II

Chemistry

CBCS PATTERN

Syllabus to be implemented from

June, 2019 onwards.

Scanned with OKEN Scanner

B.Sc.Part II (CBCS) Sem III

Paper No. DSC- C3 - Chemistry paper No. V (Physical Chemistry)

(Theory Credits: 02 : 30 hours, 38 lectures)

Name of the Topics	Expected Learning Outcome
1 Electrolytic Conductivity	Learning and understanding conductivity and transport number of the aqueous solutions with different applications.
2 Physical Properties of Liquids	Knowledge about surface tension, viscosity and refractive index will be gained by the student
3 Surface Chemistry	Learning and understanding surface phenomena at heterogeneous surfaces
4 Nuclear Chemistry	Learning the various Nuclear phenomena and measurement of nuclear radiations
5 Chemical Kinetics	Learning and understanding the knowledge about third order reaction and theories of reaction rates

Unit- I Electrolytic Conductivity (16L)

Introduction, Types of conductors, Conductivity, Equivalent and Molar conductivity and their variation with dilution for weak and strong electrolytes in aqueous solution. Equivalent conductivity at infinite dilution, Measurement of conductance by using Wheatstone bridge. Kolharausch law of independent migration of ions and its applications such as Ionic mobility, determination of degree of ionization of weak electrolyte, solubility and solubility products of sparingly soluble salts, ionic product of water, hydrolysis constant of salt. Conductometric titrations (only acid base titrations). Advantages of conductometric titrations.

Transference number, Hittorf's rule, determination of transport number using Moving boundary method, factors affecting transport numbers. Numerical problems.

Unit- II Physical Properties of Liquids (6L)

Introduction, Classification of physical properties, Surface tension and its determination using Stalagmometeric and differiential capillary rise methods, Viscosity and its determination using Ostwald's viscometer, Refractive index (Snell's law), Specific and Molecular refractivies and its determination using Abbe's refractometer.

Unit – III Surface Chemistry (7L)

Introduction, Adsorption as a surface phenomenon, Defination of adsorption, adsorbent, adsorbate, absorbent. factors affecting adsorption, Types of adsorption, Distinction between physical and chemical adsorption, Adsorption isotherms: Freundlich adsorption isotherm, Langmuir adsorption isotherm. Types of physical adsorption isotherms, applications of adsorption.

Unit – IV Nuclear Chemistry (5L)

Introduction, Types of Nuclear radiation, properties of α, β and γ radiations , Detection and measurement of nuclear radiations by Scintillation and Geiger muller counter methods, radioactive equilibrium and range of α- particles, Geiger Nuttal relations ,determination of radioactive constant (decay constant).

Scanned with OKEN Scanner

Unit --V Chemical Kinetics (4L)

Introduction, Third order reactions: derivation of rate constant, characteristics and examples of third order reaction. Theories of reaction rates as Collision theory and Transition state theory (only quantitative aspect, derivation not expected),

Reference Books:

1) Barrow, G.M. Physical Chemistry Tata McGraw-Hill (2007).
2) Castellan G.W. Physical Chemistry 4 th Ed. Narosa (2004).
3) Kotz, J.C. Treichel, P.M.& Townsend,J.R.General Chemistry, Cengage Learning India Pvt Ltd: New Delhi (2009).
4) Mahan ,B.H. University Chemistry, 3rd Ed. Narosa (1998).
5) Petrucci, R.H. General Chemistry, 5th Ed., Macmillan Publishing Co,: New York (1985).
6) Elements of Physical Chemistry S., Glasstone, D. Lewis.(2010)
7) Principles of physical Chemistry Marron and Prutton. (2007).
8) Elements of Physical Chemistry P.W.Atkins (2017)
9) Essentials of Physical Chemistry Bahl and Tuli. S. Chand, 2010.
10) Physical Chemistry Danials and Alberty (2016)
11) University General Chemistry C.N.R.Rao (2016)
12) Principals of Physical Chemistry Puri, Sharma and Pathania 47Th Edison, Vishal Publishing Co. Daryaganj Delhi. 110002 (2017)
13) Physical Chemistry A.J.Mee.(2015)
14) Advanced Physical Chemistry Gurudeep Raj (2017)
15) Physical Chemistry R.A.Aleberty.(2017-18)
16) Petrucci, R.H. *General Chemistry* 5th Ed. Macmillan Publishing Co.: New York (1985).

Scanned with OKEN Scanner

B.Sc.Part II (CBCS) Sem III

Paper No. DSC-C4- Chemistry paper No. VI (Industrial Chemistry)

(Theory Credits: 02 : 30 hours, 38 lectures)

Expected learning Outcomes :

Name of the topic	Expected Learning Outcome
1.Basic concepts in Industrial Chemistry	a.Learning and Understanding basic concepts and concentration terms b.Distinguish between classical and industrial chemistry c. Distinguish between unit operations and unit processes
2. Unit Operations	Knowledge of some unit operations
3.Corrosion and Electroplating	Understanding the process of corrosion and Knowledge of prevention from corrosion
4.Paper Industry	Knowledge of Indian paper industry
5.Soap and Detergents	Knowledge about the chemical nature and cleansing action of soap

Unit I Basic Concepts in Industrial Chemistry(10)

The difference between classical chemistry and industrial chemistry, Raw material for the Chemical Industry,Material Safety data sheets,Units that make up a chemical process-unit operation and unit processes, Flow Diagrams,Block Diagram, Process flow diagram / flow sheets, Material Balances-The purpose of mass balance calculations,Material Balance Equations,Mass balance calculation procedure and simple example

Definition and Explanation of terms -Normality, Equivalent weight, Molality, Molecular weight,Molarity, Molarity of mixed solution, Acidity of base, Basicity of acid,ppt, ppm, ppb solutions, Mole Fraction, Weight fraction, Percentagecomposition by W/W, W/V, V/V, Problems based on Normality, Molarity, mole fraction, mixed solution, etc.

Unit II Unit Operations(06)

Size reduction- Principle,Jaw crusher,ball mill

Size Enlargement –Principle,Pellet mill,tumbling agglomerators

Separation – Magnetic separation,Froth flotation,Distillation-Distillation of liquid mixtures, Types of distillation, Types of columns and packings, Condensers, Vacuum distillation, Spinning-banddistillation, Steam distillation.

Unit III. Corrosion and Elecroplating (09)

Introduction of corrosion, Electrochemical theory of corrosion,Factors affecting on corrosion -i. Position of metals in the electrochemical series on the basis of standard reduction potential ii. Purity of metal iii. Effect of moisture iv. Effect of oxygen (differential aeration principle) v. Hydrogen overvoltage, Methods of protections of metals from corrosion, Electroplating: Electrolysis, Faraday's laws, Cathode current Efficiency, Basic principles of electroplating, Cleaning of articles, Electroplating of chromium, Anodising

Unit IV Paper Industry (06)

Manufacturing of Pulp,Types of pulp-Sulphate and soda ,Manufacturing of paper, calendaring ,ecological problems of Indian Paper industry, Features of good paper industry

Scanned with OKEN Scanner

UnitVSoaps and Detergents (07)

Introduction, Soaps - Raw materials, Types of soaps, Cleansing action of soap, Manufacture of soap - Boiled or Hot Process, Detergents - Raw Materials, Types of Detergents: Anionic, cationic and amphoteric, Preparation of Teepol and Deriphat, Comparisons between soaps and detergents.

Reference Books:

1) Principles of Physical Chemistry by Puri, Sharma and Pathania, VishalPublishing company Jalindhar
2) Essential of Physical Chemistry by Bahl B.S., Tuli G.D. and BahlArun, S.Chand and Company Ltd.New Delhi
3) Modern Analytical Chemistry By David Harvey, McGRAW-Hill InternationalEdition, 2000
4) Industrial chemistry by B.K.Sharma, Goel Publishing Housing, 16th edition2011
5) Advanced Inorganic Chemistry, Vol.No.1, by Gurudeep Raj, Krishna Prakashan Media Ltd, Goel Publication, Meerut
6) Analytical chemistry by B.K.Sharma, Krishna Prakashan Media Ltd, Meerut,edition 3rd 2011
7)Principles of electroplating and electroforming by Blum and Hogaboom
8)Chemical Process Industries by Shreve and Brink
9)Indusrial Chemistry by LoutfyMadkor and Helen Njenga
10) Elementary Principles of Chemical Processes by Richard Felder and Ronald Rousseau,John Wiley and Sons

Scanned with OKEN Scanner

B.Sc.Part II (CBCS) Sem IV

Paper No. DSC-D3- Chemistry paper No. VII (Industrial Chemistry)

(Theory Credits: 02 : 30 hours, 38 lectures)

Expected learning Outcomes :

Name of the topic	Expected Learning Outcome
1.Co-ordination Chemistry	.Learning and Understanding basic concepts about coordination complexes
2. Chelation	Knowledge about application of chelates in analytical chemistry.
3. P- Block elements	Understanding the properties of P – block elements
4. Chemistry of elements of 3d series elements	Student will be capable of understanding the properties of 3d series elements
5 Inorganic semi-micro qualitative analysis	Student will learn the basic knowledge about the qualitative analysis of inorganic compounds

Unit 1: Co-ordination chemistry **(10)**

1.1 Introduction-Definition and formation of co-ordinate covalent bond in $BF_3 - NH_3$,$[NH_4]^+$ and H_2O
1.2 Distinguish between double salt and complex salt
1.3 Werner's theory-
  1.3.1. Postulates
  1.3.2. The theory as applied to cobalt amines viz. $CoCl_3.6NH_3$, $CoCl_3.5NH_3$, $CoCl_3.4NH_3$, $CoCl_3.3NH_3$
1.4 Description of the terms- ligand, co-ordination number, co-ordination sphere, Effective atomic number
1.5 IUPAC nomenclature of coordination compounds.
1.6 Isomerism in complexes with C.N. 4 and 6
  1.6.1 Geometrical Isomerism
  1.6.2 Optical Isomerism
  1.6.3 Structural Isomerism-Ionisation Isomerism, Hydrate Isomerism, Coordination Isomerism, Linkage Isomerism and Co-ordination position Isomerism
1.7 Valance bond theory of transition metal complex with respect to, C.N. 4, complexes of Cu and Ni C.N. 6 complexes of Fe and Co **(05)**

Unit 2: Chelation

2.1 A brief introduction with respect to ligands, chelating agent, chelation and metal chelates.
2.2 Structural requirements of chelate formation
2.3 Difference between metal chelate and metal complex
2.4 Classification of chelating agents (with specific illustration of bidentate chelating agents)
2.5 Application of chelation with respect to chelating agents - EDTA and DMG

Scanned with OKEN Scanner

Unit-3. P- Block elements (Group 13, 14 and 15) **(09)**

3.1. Position of elements in periodic table
3.2. Characteristics of p-block elements with special reference to Electronic configuration and Periodic properties
3.3. Compounds of group 13,14 and 15
- 3.3.1 Boron-Diborane method of preparation and nature of bonding (structure)
- 3.3.2 Borazine method of preparation and nature of bonding (structure)
- 3.3.3 Allotropes of carbon and phosphorus
- 3.3.4 Oxyacids of nitrogen – HNO_2 , HNO_3.
- 3.3.5 Hydrides of Nitrogen- NH_3 and N_2H_4

Unit 4: Chemistry of elements of 3d series elements **(06)**

4.1 Position of elements in periodic table
4.2 Characteristics of d-block elements with special reference to
- i) Electronic structure
- ii) Oxidation states, stability of oxidation states of Fe with respective to Latimer diagram
- iii) Magnetic character
- iv) Colored ions
- v) Complex formation.

Unit-5. Inorganic semi-micro qualitative analysis **(08)**

5.1 Theoretical principles involved in qualitative analysis.
5.2 Applications of solubility product and common ion effect in separation of cations into groups.
5.3 Application of complex formation in
- a) Separation of II group into IIA and IIB sub-groups.
- b) Separation of Copper from Cadmium.
- c) Separation of Cobalt from Nickel.
- d) Separation of Cl^-, Br^-, I^-.
- e) Detection of NO_2^-, NO_3^- (Brown ring test).

5.4 Application of oxidation and reduction in
- a) Separation of Cl^-, Br^-, I^- in mixture
- b) Separation of NO_2^- and NO_3^- in mixture.

5.5 Spot test analysis.

Reference Books :

1. Inorganic chemistry, Principles of structure and reactivity by J.E. Huheey and etal
2. Inorganic Chemistry by Shriver and Atkins 5 th edition
3. Vogels text book of Qualitative Inorganic analysis by A. I. Vogel .3 rd and 6th edition
4. Advanced Inorganic Chemistry by Agrawal Keemtilal (Pragati Prakashan)
5 Theoretical Inorganic chemistry by C.Day & J.Selbin II nd edition
6. Principles of inorganic chemistry by Puri Sharma & Kalia
7. Modern Inorganic chemistry by R.D.Madan (S.Chand)
8. Inorganic Chemistry by J.D.Lee
9. Basic Inorganic Chemistry by F.A.Cotton,G.Wilkilson & B.L.Gaus wiley
10. Chemistry for Degree students by R.L.Madan (S.Chand Publication)

Scanned with OKEN Scanner

Miss. Jyoti Nitin Patil.
SY B.Sc.

SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A' Grade

Revised Syllabus For

Bachelor of Science

Part-II

ZOOLOGY

CBCS PATTERN

Syllabus to be implemented from

June, 2019 onwards.

Scanned with OKEN Scanner

B. Sc. Part II Semester- III

ZOOLOGY

PAPER-V

DSC- ..... (ANIMAL DIVERSITY-II)

Theory: 30 hrs. (37.5 lectures of 48 minutes)

Marks-50 (Credits: 02)

Unit 1:

Protochordates: (4 hrs.)

General features and Phylogeny of Protochordata.

Agnatha: (4 hrs.)

General features of Agnatha and classification of cyclostomes up to classes.

Pisces: (4 hrs.)

General features and Classification up to orders; Osmoregulation in Fishes.

Amphibia: (4 hrs.)

General features and Classification up to orders; Parental care.

Unit 2:

Reptiles: (4 hrs.)

General features and Classification up to orders; Venomous and non-venomous snakes, Biting mechanism in snakes. (5 hrs.)

Aves:

General features and Classification up to orders; Brain of fowl. (5 hrs.)

Mammals:

General features and Classification up to orders; Origin of mammals.

Scanned with OKEN Scanner

B. Sc. Part II Semester- III

ZOOLOGY

Paper-VI

DSC- ..... (BIOCHEMISTRY)

Theory: 30 hrs. (37.5 lectures of 48 minutes)

Marks-50 (Credits: 02)

Unit 1:

Nucleic acids:

DNA and RNA. (7 hrs.)

Carbohydrate Metabolism: (8 hrs.)

Glycolysis, Krebs Cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogen metabolism, Review of electron transport chain.

Unit 2:

Lipid Metabolism: (5 hrs.)

Biosynthesis and β oxidation of palmitic acid.

Protein metabolism: (5 hrs.)

Transamination, Deamination and Urea Cycle.

Enzymes: (5 hrs.)

Introduction, Mechanism of action, Enzyme Kinetics, Inhibition and Regulation.

Scanned with OKEN Scanner

B. Sc. Part II Semester- IV

ZOOLOGY

Paper-VII

DSC- ..... (REPRODUCTIVE BIOLOGY) Arkad .V.N

Theory: 30 hrs. (37.5 lectures of 48 minutes)

Marks-50 (Credits: 02)

Unit 1: Functional anatomy of female reproduction: **(15 hrs.)**

Outline and histological of female reproductive system in rat and human; Ovary: folliculogenesis, ovulation, corpus luteum formation and regression; Steroidogenesis and secretion of ovarian hormones; Reproductive cycles in human and their regulation, changes in the female tract; Ovum transport in the fallopian tubes; Sperm transport in the female tract, fertilization; Hormonal control of implantation; Hormonal regulation of gestation, pregnancy diagnosis, Mechanism of parturition and its hormonal regulation; Lactation and its regulation.

Unit 2:

Functional anatomy of male reproduction: **(8 hrs.)**

Outline and histological of male reproductive system in human; Testis: Cellular functions, germ cell; Spermatogenesis: kinetics and hormonal regulation; Androgen synthesis and metabolism; Epididymal function and sperm maturation; Accessory glands functions; Sperm transportation in male tract.

Unit 3: Reproductive Health: **(7 hrs.)**

Infertility in male and female: causes, diagnosis and management; Assisted Reproductive Technology: sex selection, sperm banks, frozen embryos, in vitro fertilization, ET, EFT, IUT, ZIFT, GIFT, ICSI, PROST; Modern contraceptive technologies.

Scanned with OKEN Scanner

B. Sc. Part II Semester- IV

ZOOLOGY

Paper-VIII

DSC- ..... (APPLIED ZOOLOGY) Patil J.N

Theory: 30 hrs. (37.5 lectures of 48 minutes)

Marks-50 (Credits: 02)

Unit 1: (4 hrs.)

Introduction to Host-parasite Relationship:

Host, Definitive host, Intermediate host, Parasitism, Symbiosis, Commensalism, Reservoir, Zoonosis.

1, 2, 3 K.R.K

Unit 2: ✓ Reduced (7 hrs.)

Epidemiology of Diseases:

Transmission, Prevention and control of diseases: Tuberculosis, typhoid.

Unit 3: (6 hrs.)

Rickettsiae and Spirochaetes:

Brief account of *Rickettsia prowazekii*, *Borrelia recurrentis* and *Treponema pallidum*.

Unit 4: (8 hrs.)

Insects of Economic Importance:

Biology, Control and damage caused by *Helicoverpa armigera*, *Pyrilla perpusilla* and *Papilio demoleus*, *Callosobruchus chinensis*, *Sitophilus oryzae* and *Tribolium castaneum*

J.S.S 4/5

Unit 5: (5 hrs.)

Poultry Farming:

Reduced Syll.

Principles of poultry breeding, Management of breeding stock and broilers, Processing and preservation of eggs.

Scanned with OKEN Scanner

8196

SHIVAJI UNIVERSITY ◆ NEW SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from June, 2019)

B. Sc. Part II ◆ Semester III

MATHEMATICS

(PAPER VI : DSC - 6 C)

Algebra - I

Dr. B. P. Jadhav
M. Sc., Ph. D., D.H.E.
Ex. Head,
Dept. of Mathematics,
The New College,
Kolhapur.

Dr. Mrs. P. D. Patwardhan
M. Sc., Ph.D.
Ex. Lecturer,
Department of Mathematics,
Rajaram College, Kolhapur.

Dr. M. S. Bapat
M. Sc., NET, M. Phil., B. Ed., Ph. D.
Principal & Head,
Dept. of Mathematics,
Chintamanrao College of
Commerce,Sangli.

Dr. J. D. Yadav
M. Sc., D.H.E., M. Phil., Ph. D.
Associate Professor & Head,
Dept. of Mathematics,
SGM College, Karad.

Dr. H. T. Dinde
M. Sc., Ph. D., D. Litt.
I/C Principal & Head,
Dept. of Mathematics,
K. B. P. College,
Urun-Islampur.

D. B. Patil
M. Sc., M. Phil., SET, M. Ed.
Assistant Professor & Head,
Dept. of Mathematics,
Shri Vijaysinha Yadav Arts &
Science College, Peth Vadgaon.

PHADKE PRAKASHAN

Distributed by : PHADKE B[illegible]

Phadke Bhavan, Near Hari Mandir, Dudhali,

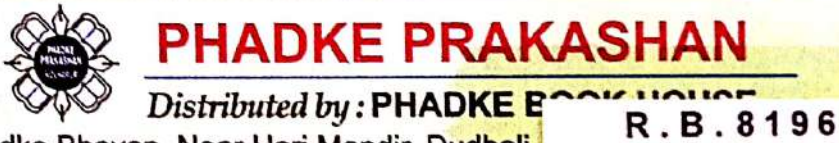
✆ : (0231) 25 40 211 (6 Lin[illegible]

For Inquiry & Order Call : 98605[illegible]

◆ Website : *www.phadkebooks.in*

◆ E-mail : *customersupport@phadkebooks.in*

R.B.8196



Scanned with OKEN Scanner

CONTENTS

□□□

Scanned with OKEN Scanner

SHIVAJI UNIVERSITY • NEW SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from June, 2019)

नोंदणी क्रमांक-8773

B. Sc. Part II ◆ Semester IV

MATHEMATICS

(PAPER VII : DSC - 5 D)

Real Analysis - II

Dr. B. P. Jadhav
M. Sc., Ph. D., D.H.E.
Ex. Head,
Dept. of Mathematics,
The New College,
Kolhapur

Dr. Mrs. P. D. Patwardhan
M. Sc., Ph.D
Ex. Lecturer,
Department of Mathematics,
Rajaram College, Kolhapur

Dr. M. S. Bapat
M. Sc., NET, M. Phil., B. Ed., Ph. D
Principal & Head,
Dept. of Mathematics,
Chintamanrao College of
Commerce,Sangli

Dr. J. D. Yadav
M. Sc., D.H.E., M. Phil., Ph. D
Associate Professor & Head,
Dept. of Mathematics,
SGM College, Karad

Dr. H. T. Dinde
M. Sc., Ph. D., D. Litt
I/C Principal & Head,
Dept. of Mathematics,
K. B. P. College,
Urun-Islampur

D. B. Patil
M. Sc., M. Phil., SET, M. Ed.
Assistant Professor & Head
Dept.
Shri Vijay
Science Co

R. B. 8773

PHADKE PRAKASHAN

Distributed by : PHADKE BOOK HOUSE

Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.

✆ : (0231) 25 40 211 (6 Lines)

For Inquiry & Order Call : 9860551900.

◆ Website : www.phadkebooks.in

◆ E-mail : customersupport@phadkebooks.in

Scanned with OKEN Scanner

CONTENTS

Unit 1. : Sequence of Real Numbers

Unit 2. : Real Analysis - II

□□□

Scanned with OKEN Scanner

Written according to New Syllabus of Shivaji University
based on National Education Policy 2020
as per Choice Based Credit System (CBCS)
(w. e. f. August, 2023)

(ग्रंथालय) 9610
नोंदणी क्रमांक-

B. Sc. Part II ◆ Semester III

MATHEMATICS

PAPER V : DSC - C5

Elements of Differential Equations

Dr. B. P. Jadhav
M. Sc., Ph. D., D.H.E.
Ex. Head,
Dept. of Mathematics,
The New College,
Kolhapur.

Dr. Mrs. P. D. Patawardhan
M. Sc., Ph.D.
Ex. Lecturer,
Department of Mathematics,
Rajaram College, Kolhapur.

Dr. M. S. Bapat
M. Sc., Net, M. Phil., B. Ed., Ph. D.
Principal, D. B. J. College,
Chiplun, Dist. Ratnagiri.

Dr. J. D. Yadav
M. Sc., D.H.E., M. Phil., Ph. D.
Ex. Professor & Head,
Dept. of Mathematics,
Sadguru Gadage Maharaj
College, Karad.

Dr. H. T. Dinde
M. Sc., Ph. D., D. Litt.
Principal,
Shri Shiv-Shahu
Mahavidyalaya, Sarud.

D. B. Patil
M. Sc., M. Phil., SET, M. Ed.
Associate
Dept. c
Shri Vijaysi
Pet

R.B.9610

PHADKE PRAKASHAN
Distributed by : **PHADKE BOOK HOUSE**
Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.
✆ : (0231) 25 40 211 (6 Lines)
For Inquiry & Order Call : 9860551900.
◆ Website : *www.phadkebooks.in*
◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

❑❑❑

Scanned with OKEN Scanner

SHIVAJI UNIVERSITY ◆ NEW SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from June, 2019)

B. Sc. Part II ◆ SEMESTER III

PHYSICS

(Paper V: DSC - C1 Thermal Physics & Statistical Mechanics - I)

by

Dr. P. K. Patil
M. Sc., M. Phil., M. Ed., Ph. D.
Ex. Principal,
The New College,
Kolhapur.

Dr. J. K. Nandagawe
M. Sc., Ph. D.
Ex. Head, Dept. of Physics
The New College,
Kolhapur.

Dr. R. K. Nimat
M. Sc., Ph. D.
Associate Professor
Department of Physics
Balasaheb Desai College,
Patan, Dist. Satara.

कला व वाणिज्य महाविद्यालय
वडूज (ग्रंथालय)
बोंदणी क्रमांक 8143

R.B.8143

PHADKE PRAKASHAN

Distributed by : **PHADKE BOOK HOUSE**

Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.

✆ : (0231) 25 40 211 (6 Lines)

◆ Website : *www.phadkebooks.in*

◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

□□□

Scanned with OKEN Scanner

According to New Syllabus (NEP-2020) of Shivaji University
(introduced from June, 2023)

दादासाहेब जोतीराम गोडसे
आर्ट्स, कॉमर्स, सायन्स कॉलेज,
वडूज (ग्रंथालय)
नोंदणी क्रमांक- 9594

B. Sc. Part II ◆ Semester III

PHYSICS

(Paper VI : DSC - C2
Waves and Optics - I)

by

Dr. P. K. Patil
M. Sc., M. Phil., M. Ed., Ph. D.
Ex. Principal,
The New College,
Kolhapur.

Dr. J. K. Nandagawe
M. Sc., Ph. D.
Ex. Head, Dept. of Physics
The New College,
Kolhapur.

Dr. R. K. Nimat
M. Sc., Ph. D.
Professor
Department of Physics
Balasaheb Desai College,
Patan, Dist. Satara.

R.B.9594

PHADKE PRAKASHAN
Distributed by : PHADKE BOOK HOUSE
Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.
✆ : (0231) 25 40 211 (6 Lines)
◆ Website : *www.phadkebooks.in*
◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

Unit I

Unit II

Scanned with OKEN Scanner

SHIVAJI UNIVERSITY ◆ NEW SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from June, 2019)

B. Sc. Part II ◆ SEMESTER IV

PHYSICS

(Paper VII : DSC - D1 Thermal Physics & Statistical Mechanics - II)

by

Dr. P. K. Patil
M. Sc., M. Phil., M. Ed., Ph. D.
Ex. Principal,
The New College,
Kolhapur.

Dr. J. K. Nandagawe
M. Sc., Ph. D.
Ex. Head, Dept. of Physics
The New College,
Kolhapur.

Dr. R. K. Nimat
M. Sc., Ph. D.
Associate Professor
Department of Physics
Balasaheb Desai College,
Patan, Dist. Satara.

R . B . 8752

दादासाहेब जोतीराम गोडसे
आर्टस्, कॉमर्स, सायन्स कॉलेज
वडूज (ग्रंथालय)
नोंदणी क्रमांक-8752

PHADKE PRAKASHAN

Distributed by : **PHADKE BOOK HOUSE**

Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.

✆ : (0231) 25 40 211 (6 Lines)

◆ Website : *www.phadkebooks.in*

◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

UNIT - I

UNIT - II

❐❐❐

Scanned with OKEN Scanner

SHIVAJI UNIVERSITY • NEW SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from June, 2019)

B. Sc. Part II ◆ SEMESTER IV

PHYSICS

(Paper VIII : DSC - D2
Waves and Optics - II)

by

Dr. P. K. Patil
M. Sc., M. Phil., M. Ed., Ph. D.
Ex. Principal,
The New College,
Kolhapur.

Dr. J. K. Nandagawe
M. Sc., Ph. D.
Ex. Head, Dept. of Physics
The New College,
Kolhapur.

Dr. R. K. Nimat
M. Sc., Ph. D.
Associate Professor
Department of Physics
Balasaheb Desai College,
Patan, Dist. Satara.

R.B.8757

दादासाहेब गोतीराम गोडसे
आर्ट्स, कॉमर्स, सायन्स कॉलेज,
बहुजन (ग्रंथालय)
नोंदणी क्रमांक- 8757.

PHADKE PRAKASHAN

Distributed by : PHADKE BOOK HOUSE

Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.

✆ : (0231) 25 40 211 (6 Lines)

◆ Website : *www.phadkebooks.in*

◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

Unit III

Unit IV

□□□

Scanned with OKEN Scanner

नोंदणी क्रमांक- 8803

SHIVAJI UNIVERSITY ◆ NEW SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from June, 2019)

B. Sc. Part II ◆ Semester IV

STATISTICS

(PAPER VIII : DSC - 8 D)

Statistical Methods - II

Dr. A. V. Dorugade
M. Sc., Ph. D.
Assistant Professor,
Department of Statistics,
Y. C. College, Halkarni,
Tal. Chandgad, Dist. Kolhapur.

Dr. A. A. Kalagonda
M. Sc., M. Phil, Ph. D.
Head,
Department of Statistics,
The New College,
Kolhapur.

Dr. K. G. Potdar
M. Sc., M. Phil., Ph. D.
Head,
Department of Statistics,
Ajara Mahavidyalaya, Ajara.

Dr. M. K. Patil
M. Sc., M. Phil., Ph.D.
Professor & Head,
Department of Statistics,
P. V. P. Mahavidyalaya,
Kavathe-mahankal,
Dist. Sangli

R . B . 8 8 0 3

PHADKE PRAKASHAN

Distributed by : **PHADKE BOOK HOUSE**

Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.

✆ : (0231) 25 40 211 (6 Lines)

For Inquiry & Order Call : 9860551900.

◆ Website : *www.phadkebooks.in*

◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

❐❐❐

Scanned with OKEN Scanner

दादासाहेब जोतीराम पोदसे
कॉलेज,
ग्रंथालय
नोंदणी क्रमांक-
8802

SHIVAJI UNIVERSITY ◆ NEW SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from June, 2019)

B. Sc. Part II ◆ Semester IV

STATISTICS

[PAPER VII : DSC - 7 D]

Probability Distributions - II

Dr. K. G. Potdar
M. Sc., M. Phil., Ph. D.
Head,
Department of Statistics,
Ajara Mahavidyalaya, Ajara.

Dr. M. K. Patil
M. Sc., M. Phil., Ph.D.
Professor & Head,
Department of Statistics,
P. V. P. Mahavidyalaya,
Kavathe-mahankal,
Dist. Sangli

Dr. A. A. Kalagonda
M. Sc., M. Phil, Ph. D.
Head,
Department of Statistics,
The New College,
Kolhapur.

Dr. A. V. Dorugade
M. Sc., Ph. D.
Assistant Professor,
Department of Statistics,
Y. C. College, Halkarni,
Tal. Chandgad, Dist. Kolhapur.

R . B . 8 8 0 2

PHADKE PRAKASHAN

Distributed by : **PHADKE BOOK HOUSE**

Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.

✆ : (0231) 25 40 211 (6 Lines)

For Inquiry & Order Call : 9860551900.

◆ Website : *www.phadkebooks.in*

◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

Scanned with OKEN Scanner

नोंदणी क्रमांक - 8794

SHIVAJI UNIVERSITY ◆ NEW SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from June, 2019)

B. Sc. Part II ◆ Semester III

STATISTICS

[PAPER V : DSC - 7 C]

Probability Distributions - I

Dr. M. K. Patil
M. Sc., M. Phil., Ph.D.
Professor & Head,
Department of Statistics,
P. V. P. Mahavidyalaya,
Kavathe-mahankal,
Dist. Sangli

Dr. A. A. Kalagonda
M. Sc., M. Phil, Ph. D.
Head,
Department of Statistics,
The New College,
Kolhapur.

Dr. K. G. Potdar
M. Sc., M. Phil., Ph. D.
Head,
Department of Statistics,
Ajara Mahavidyalaya, Ajara.

Dr. A. V. Dorugade
M. Sc., Ph. D.
Assistant Professor,
Department of Statistics,
Y. C. College, Halkarni,
Tal. Chandgad, Dist. Kolhapur.

R . B . 8 7 9 4

PHADKE PRAKASHAN

Distributed by : **PHADKE BOOK HOUSE**

Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.

✆ : (0231) 25 40 211 (6 Lines)

For Inquiry & Order Call : 9860551900.

◆ Website : *www.phadkebooks.in*

◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

❑❑❑

Scanned with OKEN Scanner

Written according to New Syllabus of Shivaji University
based on National Education Policy, 2020
as per Choice Based Credit System (CBCS)
(with effect from July, 2023)

नोंदणी क्रमांक- R.B.9618

B. Sc. Part II ◆ Semester III

STATISTICS

(PAPER VI : DSC - C 8)
Statistical Methods - I

Dr. A. A. Kalagonda
M. Sc., M. Phil, Ph. D.
Head,
Department of Statistics,
The New College,
Kolhapur.

Dr. A. V. Dorugade
M. Sc., Ph. D.
Assistant Professor,
Department of Statistics,
Y. C. College, Halkarni,
Tal. Chandgad, Dist. Kolhapur.

Dr. M. K. Patil
M. Sc., M. Phil., Ph.D.
Professor & Head,
Department of Statistics,
P. V. P. Mahavidyalaya,
Kavathe-mahankal,
Dist. Sangli

Dr. K. G. Potdar
M. Sc., M. Phil., Ph. D.
Professor & Head,
Department of Statistics,
Ajara Mahavidyalaya, Ajara.

R . B . 9 6 1 8

PHADKE PRAKASHAN
Distributed by : PHADKE BOOK HOUSE
Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.
✆ : (0231) 25 40 211 (6 Lines)
For Inquiry & Order Call : 9860551900.
◆ Website : *www.phadkebooks.in*
◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

□□□

Scanned with OKEN Scanner

SHIVAJI UNIVERSITY ◆ NEW SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from June, 2019)

B. Sc. Part II ◆ SEMESTER IV

BOTANY

PAPER VII - DSC - D13

Plant Anatomy

by

Dr. C. R. PATIL
M. Sc., Ph. D.
Professor & Former Head,
Department of Botany,
D. K. A. S. C. College,
Ichalkaranji, Dist. Kolhapur.

Dr. T. G. NAGARAJA
M. Sc., M. Ed., Ph. D., FAPS
Former Head,
Department of Botany,
The New College,
Kolhapur.

Dr. S. S. SATHE
M. Sc., Ph. D.
Professor,
Department of Botany,
Shikshan Maharshi
Dr. Bapuji Salunkhe College,
Miraj, Dist. Sangli.

दादासाहेब जोतीराम गोडसे
आर्ट्स, कॉमर्स, सायन्स कॉलेज
वडूज (ग्रंथालय)
नोंदणी क्रमांक - 8764

PHADKE PRAK

Distributed by : **PHADKE BO**

Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur

R.B.8764

✆ : (0231) 25 40 211 (6 Lines)

◆ Website : *www.phadkebooks.in*

◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

❐❐❐

Scanned with OKEN Scanner

SHIVAJI UNIVERSITY ♦ NEW SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from June, 2019)

B. Sc. Part II ♦ SEMESTER IV

BOTANY

PAPER VIII - DSC - D14

Plant Metabolism

by

Dr. C. R. PATIL
M. Sc., Ph. D.
Professor & Former Head,
Department of Botany,
D. K. A. S. C. College,
Ichalkaranji, Dist. Kolhapur.

Dr. T. G. NAGARAJA
M. Sc., M. Ed., Ph. D., FAPS
Former Head,
Department of Botany,
The New College,
Kolhapur.

Dr. S. S. SATHE
M. Sc., Ph. D.
Professor,
Department of Botany,
Shikshan Maharshi
Dr. Bapuji Salunkhe College,
Miraj, Dist. Sangli.

R . B . 8377

कला व वाणिज्य महाविद्यालय
यवतेश्वर (ग्रंथालय)
नोंदणी क्रमांक 8377.

PHADKE PRAKASHAN

Distributed by : PHADKE BOOK HOUSE
Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.
✆ : (0231) 25 40 211 (6 Lines)
♦ Website : *www.phadkebooks.in*
♦ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

□□□

Scanned with OKEN Scanner

Written according to New Syllabus of Shivaji University
based on National Education Policy (NEP - 2020)
(with effect from June 2023)

आर्टस्, कॉमर्स, सा.स. कॉलेज,
वडूज (ग्रंथालय)
नोंदणी क्रमांक- R-9608

B. Sc. Part II ◆ Semester III

BOTANY

PAPER V : DSC - C 13

Plant Systematics and Anatomy

by

Dr. Makarand M. Aitawade
M. Sc., M. Phil., Ph. D.
Assistant Professor & Head,
Department of Botany,
Prof. Dr. N. D. Patil Mahavidyalaya,
Malkapur-Perid, Tal. Shahuwadi,
Dist. Kolhapur.

Dr. Vishal V. Naik
M. Sc., M. Phil., Ph. D.
Assistant Professor,
Department of Botany,
Bharati Vidyapeeth's Matoshri
Bayabai Shripatrao Kadam Kanya
Mahavidyalaya, Kadegaon,
Dist. Sangli.

Dr. Uday H. Patil
M. Sc., Ph. D.
Assistant Professor & Head,
Department of Botany,
Bhogawati Mahavidyalaya, Kurukali,
Tal. Karveer, Dist. Kolhapur.

Dr. Sagar A. Deshmukh
M. Sc., MBA, NET, SET, GATE, Ph. D.
Associate Professor
Department of Botany,
The New College
Kol

R . B . 9608

PHADKE PRAKASHAN
Distributed by : **PHADKE BOOK HOUSE**
Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.
✆ : (0231) 25 40 211 (6 Lines)
◆ Website : *www.phadkebooks.in*
◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

□□□

Scanned with OKEN Scanner

SHIVAJI UNIVERSITY ◆ NEW SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from June, 2019)

B. Sc. Part II ◆ SEMESTER III

BOTANY

PAPER VI - DSC - C14

Plant Physiology

by

Dr. C. R. PATIL
M. Sc., Ph. D.
Professor & Former Head,
Department of Botany,
D. K. A. S. C. College,
Ichalkaranji, Dist. Kolhapur.

Dr. T. G. NAGARAJA
M. Sc., M. Ed., Ph. D., FAPS
Former Head,
Department of Botany,
The New College,
Kolhapur.

Dr. S. S. SATHE
M. Sc., Ph. D.
Professor,
Department of Botany,
Shikshan Maharshi
Dr. Bapuji Salunkhe College,
Miraj, Dist. Sangli.

दादासाहेब जोतीराम गोडसे
आर्टस्, कॉमर्स, सायन्स कॉलेज,
वडूज (ग्रंथालय)
नोंदणी क्रमांक- 8761

PHADKE PRAK

R.B.8761

Distributed by : **PHADKE BO**

Phadke Bhavan, Near Hari Mandir, Dudhali, Kolhapur : 416 012.

✆ : (0231) 25 40 211 (6 Lines)

◆ Website : *www.phadkebooks.in*

◆ E-mail : *customersupport@phadkebooks.in*

Scanned with OKEN Scanner

CONTENTS

□□□

Scanned with OKEN Scanner