Department of English

Course Outcomes

Sr. No.	Course	Course Outcomes
1	F.Y.B.A. Compulsory English	1. Develop Linguistic Competence 2. Learns different literary genres such as Prose, Poetry, Grammar and Communication Skills 3.Students will learn the communication skills
2.	F.Y.B.A. Optional English	1. Learn variety of literary forms such as essays, short stories, and one act plays 2. Learn different cultures of the world 3. Develop aesthetic sensibility
3	SYBA:- Compulsory English	● The students developed competence for self-learning. ● The students acquainted with excellent pieces of prose and poetry in English. ● The students developed interest in reading literary pieces. ● The students developed overall linguistic competence and communicative skills of the students.
4	S. Y. B. A. General English (G-2) Title of the Paper: Study of English Language and Literature	● The students exposed to the basics of short story, one of the literary forms. ● The students familiarized with different types of short stories in English. ● The students understood the literary merit, beauty and creative use of language. ● The students developed integrated view about language and literature.
5.	S.Y.B.A. Special English I-Drama	1. Learn drama as a literary genre 2. Learn drama as an effective mode of expression of social reality 3. Understand the different cultures of the World
6	TYBA:- Compulsory English	● The students introduced to the best uses of language in literature.

		● The students familiarized with the communicative power of English. ● The students exposed to varied cultural experiences through literature.
7.	T.Y.B.A. General English I- Advance Study of English Language and Literature	1. Develop integrated view about language and literature among students. 2. Learn ethos and culture of India and the Worlds 3. Understand the creative use of language.
8	T.Y.B.A. Special Paper III (S-3) Title of the Paper: Appreciating Novel	● The students introduced to the basics of novel as a literary form. ● The students exposed to the historical development and nature of novel. ● The students aware of different types and aspects of novel. ● The students developed literary and cultural sense.
9	Appreciating Poetry (S.Y.B.A.)	This paper introduces English poetry to undergraduates. Students understood the technical aspects of the poetry as a form. Students also learnt how to appreciate poetry. Students enjoyed poetry from different countries.
10	Introduction to Literary Criticism(T.Y.B.A.)	This paper enabled students to understand what is criticism?, the principles of literary criticism. Students also studied different critical terms. This paper enabled students to enrich their critical and analytical skills.

BA MARATHI

FYBA MARATHI GENERAL PAPER-1 (G1)

Sahityik Marathi/ Vyavaharik ani Upyojit Marathi

1. Introduce students to Marathi literature, language and culture.
2. Create interest in Marathi literature.
3. Develop the literary taste of students.
4. Cultivate ability to appreciate literature.
5. Connect literature to real life experience.
6. Understand various branches and movements of Marathi literature.
7. Develop linguistic skills to meet the requirements in the age of globalization.
8. Importance of language in personality developments.

SYBA MARATHI GENERAL PAPER-2 (G2)

Sahitik Marathi/Vhyahvarik and Upyojit Marathi

1. Introduce standard writing practices.
2. Develop the skill of translation.
3. Understand aspects of Biography and Autobiography.
4. Develop ability to appreciate and evaluate selected Biographies and Autobiographies in modern Marathi literature**.**

SYBA MARATHI SPECIAL PAPER-1 (S1)

Marathi Sahityatil Vividh Sahityaprakar (Types in Marathi Literature)

1. Provide basic knowledge of Marathi literature.
2. Introduce literary classics of different historical periods.
3. Create and cultivate taste in Marathi literature.
4. Create perspectives to analyze, evaluate and appreciate literary texts.
5. Develop ability for in-depth study of literature.

SYBA MARATHI SPECIAL PAPER-2 (S2)

Arvachin Marathi Wangmayacha Abhayas (Ancient Marathi Literature)

1. Study of the history of Marathi literature.
2. Clarify the concept of literary history.
3. Introduce the nature, source and types of Marathi literature from 1818 to 1960.
4. Introduce the major Marathi writers and their works from 1818 to 1960.

TYBA MARATHI GENERAL PAPER-3 (G3)

(Modern Marathi Literature and Functional Marathi)

1. Introduce various movements in Modern Marathi literature.
2. Generate interest in modern Marathi literature among students.
3. Provide close understanding of selected literary texts.
4. Introduce students to media.
5. Develop skill in preparing materials for media including Newspaper, Radio and TV.

TYBA MARATHI SPECIAL PAPER-3 (S3)

Sahityavicha (Literary Criticism)

1. Explain the nature and function of literature.
2. Explain the nature of the process of literary creation and the concept of literary genus.
3. Analyze the process of literary appreciation.
4. Provide knowledge of some fundamental concepts in literary appreciation.

TYBA MARATHI SPECIAL PAPER-4 (S4)

1. Understand the original development of Marathi language in the light of linguistic theories.
2. Understand the evolution of Marathi language.
3. Study the basic features of Marathi language.
4. Introduce students to historical and descriptive linguistics.

Department of Hindi

Course Outcomes

Course	Outcomes
F.Y.B.A Gen Hindi 1097	Cos 1. Inbeing the literary research attitude.
	Cos 2. Get familiarized various types of literature.
	Cos 3. Understanding and interpretation of poem, prose, essay, short stories etc.
S.Y.B.A Gen Hindi 2097	Cos 1. Developing reading, speaking, listening and writing skills.
	Cos 2.Students know about Hindi modern and Prachin stories and kavita also it gives human Values social commitment.
	Cos 3.Relation between Hindi literature and real life.
	Cos 4.Famillarize learners with the socio- political contexts life of various Hindi writers.
S.Y.B.A Spe-I Hindi 2098	Cos 1.Introduce basic theories of linguistics to students
	Cos 2.Inrtoduce students to Hindi as the national language.
	Cos 3.Introduce various aspects of Hindi language and enable them to handle the language with accuracy and precision.
S.Y.B.A Spe-II Hindi 2099	Cos 1.By reading and observing Drama's and novel one act plays.
	Cos 2.Introduce the medieval Bhakti movement and the poets and writers associated with it.
	Cos 3.Familiarize the students with of the medieval period.
T.Y.B.A Gen Hindi 3097	Cos 1.Get acquainted with literary critical terminology used in Hindi literature.

	Cos 2.As they are practicing Translation from Hindi to English and English to Hindi and some other languages.
	Cos 3. Enhance the ability to draft official and scientific documents in Hindi.
T.Y.B.A Hindi Spe-III 3098	Cos 1. Familiarize with the development and progress of Hindi language and literature.
	Cos 2.Familiarize with the rich history and tradition of Hindi literature.
	Cos 3.Identify and understand the various Phases in the history of Hindi Literature and the salient Features of each of Those Phases.
T.Y.B.A Hindi Spe-IV 3099	Cos 1. Impart knowledge of theories and types of literature and Literary Criticism.
	Cos 2.Familiarize students with various aspects of literature, its purpose and modes of appreciation.
	Cos 3. Familiarize students with figures of speech and their usage in poetry.

FYBA History General-1
Chhatrapati Shivaji and His Times (1630 – 1707)

Students will able to

CO1: Innovate study techniques in the study of History of Maratha to make it value based, conceptual and thought provocative.

CO2: Learn comparative analysis of the Maratha history.

CO3: Understand the Socio-economic, cultural and political background of 17th century Maharashtra.

CO4: Have interest in the discipline of History

SYBA History General- II
Modern- India (1857-1950)

Students will able to

CO1: Know the History of freedom movement of India.

CO2: Know the aims, objectives problems and progress of Independent India

CO3: Understand the processes of rise of modern India.

CO4: Understand the basic concepts/ concerns/ frame work of Indian History

SYBA History Special Paper - I
Ancient India (3000 B.C. to 1206 AD)

Students will able to

CO1: Survey the sources of History of Ancient India.

CO2: Understand the social, economic, religious and institutional bases of Ancient India.

CO3: Know development of the concept of Nation- State background of political history.

CO4: Study ancient Indian Art & Architecture.

SYBA History Special Paper - II
History of Modern Maharashtra (1818 to 1960)

Students will able to
CO1: Know the history of modern Maharashtra.
CO2: Understand the ideas, institutions, forces and movements that contributes to the modern Maharashtra
CO3: Understand various interpretative perspectives.
CO4: Know the regional history within a broad national framework.

TYBA History General - III
History of the World in 20th Century (1914-1992)

Students will able to
CO1: Understand the contemporary world in the light of its background History.
CO2: Understand the economic transition in World during the 20th Century.
CO3: Understand growth of various political movements that shaped the modern world.
CO4: Know the rise and growth of nationalism as a movement in different parts of the world.

TYBA History Special Paper - III
Introduction to History

Students will able to
CO1: Learn how history is studied, written and understood.
CO2: Learn methods and tools of data collection.
CO3: Understand the approaches to Historiography.
CO4: Learn how to use sources in their presentation.

TYBA History Special Paper - IV
History of USA (1914 – 1992)

Students will able to
CO1: Learn the rise and development of the USA as a world power.
CO2: Understand the socio economic reforms in 1914 – 1992.
CO3: Learn the principles of foreign policy.
CO4: Understand political history of Europe.

Dadapatil Rajale Arts, Science and Commerce College, Adinathnagar,
Tal – Pathardi, Dist – Ahmednagar.
Department of Political Science: **Course Outcomes**

F.Y.B.A. Political Science G – 1 General Paper
Indian politics and government:
COS1: Understand the important features of India.
COS2: Understand the basic framework of Indian Government.
COS3: To know the political process and political system of India.
COS4: To know constitutional values and Principles of Indian Constitution

S.Y.B.A. Political Science G – 2 General Paper
Political theory and concepts:
COS1: Understand the evolution, development & meaning of political concepts and political theory.
COS2: Understand the different ideological standpoints with regard to various concepts and theories.
COS3: To seeks to explain and usage of these concepts & theories with reference to Individual thinkers.
COS4: Know the relevance of these concepts and theories today and explain how concepts & theories of yesteryears gain prominence in contemporary politics.

S.Y.B.A. Political Science Spl– 1 Special Paper
Western political thought:
COS1: To know the classical tradition in political theory from Plato to Karl Marx.
COS2: Understand the Political thoughts of Western political thinkers.
COS3: To understand how the great masters explained & analyzed political events & problems of their time and prescribed solutions.
COS4: To know the contribution of western thinkers in political science

S.Y.B.A. Political Science Spl– 2 Special Paper
Political sociology:
COS1: To Introduce the student's political sociology.
COS2: Understand the politics process by perspective of sociologically.
COS3: Understand the political system and political system of society.
COS4: To know the contribution of political sociology in political science subject.

T.Y.B.A. Political Science, G – 3 General Paper
Local self-government in Maharashtra:
COS1: To introduce the students to the structure of local self govt. of Maharashtra
COS2: To make students aware of the various local self govt. institutions, their functions, compositions and importance.
COS3: know the identify the role of local self govt. & local leadership.
COS4: know the challenges before local self-government.

T.Y.B.A. Political science Spl– 3 Special Paper
Public administration:
COS1: The course provides an introduction to discipline of public administration
COS2: Know the encompasses public administration in its historical context.
COS3: Know the classical and contemporary Public Administrative theories.
COS4: Understand the recent trend such as e-governance, decentralization, feminism and ecological conservations.

T.Y.B.A. Political science Spl– 4 Special Paper
International politics:
COS1: To know the theoretical approaches & perspective of International Politics.
COS2: To know the basic intellectual tools for understanding International Politics.
COS3: know dominant theories of powers and the question of equity & Justice.
COS4: know the balance of power & collective security etc.

Dadapatil Rajale Arts, Science and Commerce College, Adinathnagar
Tal: Pathardi, Dist.: Ahmednagar.

Course Outcomes (COs) - 2018-2019

Department of Economics (UG)

- **F.Y.B.A. – Economics General Paper (G 1)**
  G1- Indian Economy- Problem and Prospects
  1. Understand to natures of economics
  2. Understand to population and Economic Development
  3. Infrastructure and economic development
  4. Role of agriculture in Indian economy
- **SYBA Economics General Paper (G2)**

  Modern Banking

  1. Function of commercial Banks
  2. Principals of commercial Banks
  3. New Technology in Banking
  4. Co-Operative Banking in India
  5. Operation and types of Account
- **SYBA Economics Special Paper -1(S1)**

  Micro Economics

  1. To understand the behaviour of an economic agent
  2. Analysis of production function and equilibrium of producer
  3. Understand to consumer, producer, factor owner and price fluctuation in a market
  4. Understand to market structure
  5. Understand to income, Price, Supply, Elasticity in market
- **SYBA Economics Special Paper -2(S2)**

  Macro Economics

  1. Familiarize the students to basic concepts macroeconomics and application.
  2. To understand the type of national income concepts and measurements.
  3. The theory of employment
  4. Consumption and investment
  5. To understand the inflation and business cycle.
  6. To understand the monetary policy and fiscal policy.

- **TYBA Economics General Paper (G3)**

  Economic Development and Planning

  1. The Role of foreign capital and economic planning in Developing countries.
  2. To approaches of economic development
  3. Social and infrastructural aspects of development
  4. Constrains of development process and micro economic policies
  5. To understand concepts of poverty and development
  6. To understand of population and human development
- **TYBA Economics Special Paper -3(S3)**

  International Economics

  1. The understand to gains from international trade and trend policy
  2. To able to understand concepts BOP and BOT
  3. To understand Concepts of exchange rates
  4. Understand to international trade theories
- **TYBA Economics Special Paper -4(S4)**

  Public Economics

  1. Role and function of the government in economy
  2. Meaning and principals of public expenditure sources of public revenue
  3. Understand to centre – state - financial relationship
  4. Understand to meaning, nature and objectives of budget
  5. Understand to public debt
  6. To able to deficit financing and fiscal policy

Dadapatil Rajale Arts and Science College, Adinathnagar, Tal- Pathardi, Dist- Ahmednagar

Department of Geography

Course Outcomes

FYBA Gg-110 Elements of Geomorphology (G-1)

1. Understand the functioning of Earth systems in real time and analyze how the natural and anthropogenic operating factors affects the development of landforms
2. Distinguish between the mechanisms that control these processes
3. Assess the roles of structure, stage and time in shaping the landforms, interpret geomorphological maps and apply the knowledge in geographical research.

SYBA Gg-210 Geography of Disaster Management (G-2)

1. Gain a perspective of disasters and various dimensions of disaster management
2. Have comprehensive knowledge of various natural and manmade disasters in India
3. Examine the response and mitigation measures of disasters

TYBA Gg-310 Human Geography (G-3)

1. Understand the relationship of man and environment
2. Studies of races of man kinds.
3. Understand the modes of life of Eskimo, PIGMY, GONAD, BHIL and NAGAS.

FYBA Physical Education
Students will able to

CO 1: Students will be able to state the goals of physical education.

CO 2: Students can tell the difference between Health-related physical fitness and skill-Related physical fitness.

CO 3: Students could organize competitions.

CO 4: Students will be able to first aid

CO 5: Student can play Kabaddi, volleyball, table-tennis and so on

M.A.ENGLISH COURSE OUTCOMES		
Sr. No.	Course	Course Outcomes
1	English Literature from 1552 to 1798	This course enabled student to understand the English Literature from Chaucer to Alexander Pope. Students learnt the characteristics of different forms of literature including socio political background of the various literary movements.
2	English Literature from 1798 to 2000	This paper focused literature of the Romantic period, Victorian Period and Modern and Post modern Period. Students understood all literary movements of the periods and also tasted selective literary pieces of renowned literary figures.
3	Contemporary Studies in English Language	The paper mainly deals with linguistic aspects of the English Language. Students studied important concepts from Phonology, Morphology, Socio linguistics and pragmatics. Paper helped students to know more about language and its use.
4	Literary Theory and Criticism	Literary Theory is the way to look at literature with various perspective. Students came across theories like Structuralism, Post Structuralism, Psychoanalytical theory , Modernism and post modernism. It helped students to enrich their artistic sensibility.
5	Indian Writing in English	India has rich tradition of the writers who preferred ' English' instead of regional language to express themselves. This paper introduced the Indian writers who wrote prolifically in English.
6	English Language and Literature Teaching	This paper enabled students to know how to teach language and Literature in the classroom. Different methods of teaching various forms showed way to students regarding teaching of literature.
7	Poetry In English	This paper brought students in realm of English poetry from Chaucer to Modern poets like T.S.Eliot and W.B. Yeats. Students learnt the evolution of poetry as a form of literature.
8	Drama in English	Drama has remain an attraction for lovers of literature. In this paper students learnt the rich history of English Drama. Students also studied various movements and use of techniques in drama.

Dadapatil Rajale Arts, Science and commerce college, Adinathnagar , Pathatdi, Dist- Ahmednagar

Department of Marathi

Course Outcomes

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M.A. Marathi Part I

Paper 1: Applied Marathi

1. To familiarize students with the movements in contemporary literature

2. To interrelate life experiences with literature.

3. To choose a specific area of study in Marathi literature.

Paper 2: History of Medieval Literature

1. To understand the progress and development of Marathi language.

2. To understand various trends and movements in Marathi literature.

3. To familiarize students with specific historical events in medieval Maharashtra.

Paper 3: Linguistics

1. Explain basic theories in Sociolinguistics.

2. Give linguistics description of various aspects of Marathi Language.

3. Understand various branches of linguistics.

Paper 4: Dalit Literature

1. Theoretical description of Dalit and folk literature.

2. Explain salient features of Dalit literature.

3. History of Dalit literature in Post-independence India.

4. Various branches of Dalit literature and their social relevance.

M.A. Part II

Paper 5: Media and Literature

1. Develop the skill for writing for Media.

2. Explain the significance of Media and Social life.

Paper 6 Literary Theory and Criticism and Literary Research

1. Explain the basic research methodology in Marathi.

2. Problems faced by researchers in Marathi.

3. Familiarize student with European literary theories.

Paper 7 Special Author

1. To identify a major writer for extensive study

2. Relate the literary work to the socio-political background of the writer.

3. To observe theoretically the writers contribution to Marathi literature.

Paper 8 Folk Literature in Marathi

1. Explain the nature and function of folk literature.

2. Explore the connection between folk literature and its social background.

3. Explore the ethical and religious contents of folk literature.

Dadapatil Rajale Arts, Science and Commerce College, Adinathnagar
Tal: Pathardi, Dist.: Ahmednagar.

Outcomes - 2018-2019

Department of Economics (PG)

- **Course Outcomes (COs):**

  Student who has completed degree and postgraduate courses can gate good job in the finance department of the central government by taking the Indian economic service exam. The economics graduates also use their degrees to work professionally in the public (federal, state and local governments) and private (banking consulting, retail and corporate) sectors. Such opportunities are available at international coin fund, the national institute of public finance and policy, national council for applied economic research.

Department of Chemistry- Course Outcomes (COS)

Class-F.Y.B.Sc

TERM - I

CO-Physical and Inorganic Chemistry

1. The students got well acquainted with the structure of atom, subatomic particles and their characteristics.

2. Formation of different molecules and their shapes.

3. Laws of thermodynamics and what are spontaneous and non-spontaneous reactions.

Class-F.Y.B.Sc

CO-Organic and Inorganic Chemistry

Student understand about

1. Basic principle of overlapping of atomic orbital with specific shapes and sizes

2. Fundamental concepts of theories of overlapping of atomic orbitals

3. Concept of hybridization and differentiation with overlap

4. Concept of different types valence shell electron pairs and their contribution in bonding

5. Application of non-bonded lone pairs in shape of molecule

5. Basic understanding of geometry and effect of lone pairs with examples

6. The fundamental concepts which govern the structure, bonding, properties and reactivities of organic molecules such as covalent character, hybridization, bond angles, bond energies, bond polarities and shapes of molecules.

7. Drawing of organic molecules and arrow pushing concept.

8. The common and IUPAC names of alkanes, alkenes, alkynes and homocyclic, polycyclic aromatic hydrocarbons.

9. Methods of preparation and chemical reactions of alkanes, alkenes, alkynes and homocyclic, polycyclic aromatic hydrocarbons.

10. Application of Huckel's rule to different organic compounds to find out aromatic /non aromatic characters.

Class-F.Y.B.Sc

TERM - II

CO-Physical and Inorganic Chemistry

1. Understand of behaviour of gases, ideal gas as a model system and its extension to real gases. The dependence of physical state on pressure, volume and temperature is being realized.

2. The existence of liquid state, comparison of its properties with other states is perceived. Liquid crystal are essentials in all common and research devices and instruments.

3. Students able to solve problems regarding van der Waal's and Critical constant and regarding P-V-T relations.

Class-F.Y.B.Sc

CO-Organic and Inorganic Chemistry

The students know about

1. Structure, nomenclature, preparation and reactions of organic compounds.

2. The characteristic reactions of each functional group which can be used to identify and distinguish that compound from other compounds.

3. Predict the conversion of one functional group into other functional group involving one or more number of steps.

4. Conversion of the given compound into other compound containing more or less number of carbon atoms.

5. Prediction of possible products when reactants are given. In case there are more than one possible products, identify the major and minor products.

6. Suggest the possible reagents to bring about the given conversion.

7. Conformational isomerism in alkanes with energy profile diagram.

8. Concept of geometrical isomerism with E/Z nomenclature.

9. Understand of optical activity, isomer number, tetrahedral carbon atom, concept of chirality, enantiomerism, R/S nomenclature for single chiral centre.

10. Write electronic configuration of any element.

11. Give reasons for anomolous behavior of first element of IIIA to VII A groups with other elements in the same group. iii) Know the exact position p-block elements in the long form of the periodic table. iv) Know the allotropes of carbon.

12. Basic compounds of boron, aluminium, silicon

13. Concept of oxyanions, different than mineral acids, oxyacids of phosphorous & sulphur vii) Overlapping of atomic orbitals of halogens, interhalogen compounds.

F.Y.B. Sc.

CO-Chemistry Paper – III -Practical Course.

1. Plot the graph of following functions using excel a) exponential function b) logarithmic function c) linear functions.

2. Determine the gas constant R in different units by eudiometer method.

3. Determine relative viscosity of given organic liquids by viscometer.

4. Investigate the adsorption of acetic acid by activated charcoal and test the validity of Freundlich /Langmuir adsorption isotherm.

5. Determine ΔH and ΔS for the following chemical reactions.

6. Students can perform Organic qualitative analysis.

7. Students can perform Inorganic qualitative analysis.

Class-S.Y.B.Sc

Semester – I&II

Paper 1: CO-Physical and Analytical Chemistry

1. The students acquired the knowledge about order, molecularity, rate of reaction and factors affecting rate of reaction

2. What is Photochemistry, photochemical reactions, laws of Photochemistry?

3. Different types of solutions and economical extractions processes.

Paper 2: CO-Organic Chemistry and Inorganic

Students able to –

1. Identify chiral centre in the given organic compounds.

2. Define Erythro, threo, meso, diasteroisomers with suitable examples. Iii) Able to find R/S configuration in compounds containing two chiral centers. iv) Explain Bayer's strain theory, Heat of combustion and relates stability of cycloalkanes.

3. Explain the stability of cyclohexanes. Draw the structure of boat and chair configuration of cyclohexane. vii) Draw axial and equatorial bonds in cyclohexane.

4. Draw structure of conformations of mono- & disubstituted cyclohexanes ix) Explain the stability of axial and equatorial conformation of monosubstituted cyclohexanes.

5. Study principles and process of metallurgy. A student should be able -

6. Differentiate between ore and minerals.

7. Differentiate between calcination and roasting and smelting.

8. Know the different methods for separation of gangue or matrix from metallic compounds. iv) Know the terms smelting, flux.

9. Methods of prevention of metal from corrosion.

10. Meaning of passivity. vii) Different theories of passivity.

viii) Galvanising, Tinning, Electroplating from corrosion.

Class-S.Y.B.Sc

CO-Practical Course

1. Measurement of compositions of washing soda

2. Solubility of benzoic acid with temperature.

3. To equip students to correlate theoretical and experimental knowledge

4. After completion of practical course student able to i. Verify theoretical principles experimentally ii. Interpret the experimental data iii. Improve analytical skills.

5. Inorganic Qualitative Analysis of Binary Mixtures (including phosphate and borate removal).

6. Sodium carbonate extract is to be used wherever necessary for detecting acidic radicals.

7. Organic qualitative analysis of Binary Mixtures without ether separation solid-solid, Solid-liquid, one: liquid-liquid

8. Perform Organic Preparations.

Class-T.Y.B.Sc (Chemistry)
Semester-III & IV

CO- CH-331: Physical Chemistry

1. The students learned what is rate of reaction and which are the factors affecting rate of reaction.

2. They got knowledge about conduct metric and potentiometric titrations.

3. They understood radioactivity phenomenon, radioactive substances and their uses in different fields.

4. Students learned how to measure crystal structures and molecular structures.

Class-T.Y.B.Sc (Chemistry)

CO- Physical Chemistry practical

1. They learned how to measure the conductance, EMF, pH, Absorbance of different solutions.

2. Calculations of molecular weight of unknown polymer by viscosity measurement of solution.

3. They got idea how to find out order of given reaction.

Class-T.Y.B.Sc (Chemistry)
Semester-III & IV

CO- : Inorganic Chemistry

1. Students will be able to know the structure, bonding, magnetic properties of various molecules.

2. Students will be able to know the co-ordination chemistry and meaning various terms in co-ordination chemistry.

3. Students will be able to know the application of compounds in various fields.

4. Students will be able to know the various theories like valance bond theory, Cristal field theory and molecular orbital theory.

5. Students will be able to know the lanthanides and actinides and their applications.

Class-T.Y.B.Sc (Chemistry)
CO- : Inorganic Chemistry Practical

1. Understand the weights of various compounds by gravimetric analysis.

2. Understand the various titrations such as volumetric and colorimetric.

3. Understand the various techniques such as paper chromatography and column chromatography.

Class-T.Y.B.Sc (Chemistry)

Semester-III

CO- CH-333: Organic Chemistry

At the end of the course the students will know and recall the fundamental principles of organic chemistry that include chemical bonding, nomenclature, structural isomerism, stereochemistry, chemical reactions and mechanism.

Students know about –

1. Definition and types of organic acid and base

2. The pka and pkb concepts

3. Effect of temperature on pka/pkb

4. Comparison between strengths of acids/bases

5. What is acid-base catalysis?

6. Definition and type of nucleophiles and leaving groups

7. Different types of nucleophilic substitution reactions

8. Definition of inversion and racemization

9. The kinetics, mechanism & stereochemistry of these reactions

11. The comparison between SN1 & SN2 reactions

12. SNi mechanism in presence and absence of pyridine

13. To predict product/s or supply the reagent/s for these reactions

14. Different types of carbon-carbon unsaturated compounds

15. Orientation / rules in addition reactions

16. The structure & reactivity of carbonyl group

17. Correct mechanism of addition reactions using different reagents

18. To predict product/s or supply the reagent/s for such reactio

19. Definition and types of elimination reactions

20. Different types of bases and leaving groups

21. Statement of Hoffmann and Saytzeff rule

22. The evidences, mechanism & stereochemical aspects of these reactions

23. Whether a given reaction follows E1, E2 or E1cB mechanism? and between E1 & E2 reactions

24. Definition and types of aromatic substitution reactions & classification of directing groups

25. What is an arenium ion and Ipso substitution?

26. The evidences, reactivity and mechanism of these reactions

27. Whether a given reaction follows addition-Elimination or Elimination-addition mechanism?

Class-T.Y.B.Sc (Chemistry)

Semester-IV

CO- CH-343 Organic Chemistry

1. Students understand free radicals' formation, stability and reactivity and should also be able to use the basic understanding in writing probable reaction mechanisms.

2. Students predict the products, the stereochemistry as well as understand the preferred reaction pathways.

3. Students calculate λ max of organic compounds containing more than one and less than four conjugated systems. Students correlate IR bands with functional groups using numerical data as well as spectral data.

4. Students solve 1H-NMR problems and draw the 1H-NMR spectrum for simple organic compounds mentioning multiplicity pattern and coupling constant with the help of "Tree Diagram" Should able to predict and analyse the multiplicity patterns with more than one coupling constants.

5. Students use 13C-NMR data to interpret the structure NMR problems and should also draw the 1H-NMR spectrum for simple organic compounds mentioning multiplicity pattern and coupling constant with the help of "Tree Diagram" predict and analyze the multiplicity patterns with more than one coupling constants.

6. Students know various key factors responsible for the spectroscopic data acquisition and solve Problems based on UV, IR, MS, 1H-NMR,13C-NMR.

7. The concepts in free radical reactions, mechanism and the stereo chemical outcomes.

8. The basic principle of spectroscopic methods and their applications in structure elucidation of organic compounds using given spectroscopic data or spectra.

9. Meaning of terms Disconnection, Synthons, Synthetic equivalence, Functional Group Interconversion, Target Molecule

10. What is retrosynthesis? And various steps involved in the synthesis of some molecules

Class-T.Y.B.Sc.

CO-Organic Chemistry Practical (CH-349)

1. Students can separate of Binary Mixtures and Qualitative Analysis of Solid-Solid, Solid-Liquid, Liquid-Liquid mixtures.

2. At least one mixture from each of the following should be given-Acid-Base, Acid-Phenol, Acid-Neutral, Phenol-Base, Phenol-Neutral, Base-Neutral and Neutral- Neutral.

3. Students record the- Type, Separation of mixture, Preliminary tests, Physical constants, Elements and Functional groups. Separation and qualitative analysis of the binary Mixtures should be carried out on micro scale using micro scale kits.

2. Organic Estimations-Students can estimate molecular weight of monobasic & dibasic acids. Students can estimate amount of acetamide. Double burette method was used for titration

3. Organic Preparations- The preparation should be carried out on small scale. Students monitor the reaction and purification carried out by recrystallization and purity of the product in Preparation checked by physical constant (M.P/B.P.) determination and thin layer Chromatography (TLC) with proper selection of the solvent system.

Class-T.Y.B.Sc (Chemistry)
Semester-III & IV

CO- Analytical Chemistry

On successful completion of the course students will be able to:

1. Employ a variety of analytical and instrumental methods to prepare, separate & quantify samples from various matrices.
2. Work safely and competently in an analytical laboratory settings.
3. Explain the broad role of chemists in quality control.
4. Understands safe handling of chemicals at their work place.
5. Discover new drugs on serious health issues at international research centers.
6. Can start up their own business like Preparation of organic jiggery, medical shop.
7. Enhance their personal life by applying chemistry knowledge Day to day.
8. Achieve the government post in chemistry fields through the study of UPSC, MPSC.
9. They can start up their carrier in marketing.
10. Utilizes knowledge to do further qualifications, cracking exams of SET, NET.
11. Apply for master's degree in analytical specialization at top ranked colleges or reputed universities.

Class-T.Y.B.Sc (Chemistry)
Semester-III & IV

CO- Industrial Chemistry

1) Understand the basic concepts of unit operation and unit process.
2) Understand the raw materials, chemical reactions, industrial processes of various industries.

Understand the Synthesis of different industrial products and their uses.

Class-T.Y.B.Sc

Semester-III

CO - CH336-B Polymer Chemistry

The students learn the following aspects of Polymer Chemistry

1. History of polymers.
2. Difference between simple compounds and polymer.
3. Names of polymers.
4. Various methods of nomenclature.
5. Difference between natural synthetic, organic and inorganic polymers.
6. Terms-Monomer, Polymer, Polymerization, Degree of polymerization,

Functionality, Number average, Weight average molecular weight.

7. Mechanisms of polymerization.
8. Polymerization techniques.
9. Importance of silicone polymers.
10. Derivatives of cellulose polymers & their applications.
11. Ingredients added to polymers.
12. What are fillers.
13. Polymer reactions and applications.
14. Polymer reactions and their effect on physical and chemical properties.
15. Advantages of polymer reactions to change their properties.

Class-T.Y.B.Sc.

Semester-IV

CO - CH336-B Polymer Chemistry

The students learn the following aspects of Polymer Chemistry

1. What is polymer degradation?
2. Chemical and geometric structures of polymers.
3. Important polymers like PVC, polystyrene, polyvinyl alcohol, Teflon, Resins, nylon, epoxy Polymers, etc.
4. Uses & properties of polymers.
5. Role of polymer industry in the economy.
6. Advantages of polymers.
7. Some industrially important polymers
8. What is polymer processing?
9. Different polymer processing techniques.

10. Polymer testing and analysis.
11. Properties of polymers & testing.
12. Various fibre spinning techniques.
13. Reinforcement & compounding of polymers.

Course outcomes.

A) F.Y. B.SC.

CO-1 Plant Diversity

1) Understand Plant Diversity among Algae. Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms,
2) Know the External and internal characteristics of different plants.

CO-2 Industrial Botany.

1) Understand the importance of Plants for Fundamental needs.
2) Use of Plant resources for establishment of plant based Industry.

CO-3 Practicals.

1) Perform the practicals as per the Laboratory manuals.
2) Use of Plant Resources for various needs.

B.)S.Y.B.Sc

CO-1. Sem-I. (Taxonomy of Angiosperms.)

1) Identify and Describe the Angiospermic plants.
2) Know the Economic importance of Angiospermic Plants.

CO-2 Plant Physiology

1) Know the Physiological Process of Plants.
2) Understands the effect of different conditions on the Physiological processes.

S.Y.B.Sc Sem:- II

CO-1 Plant Anatomy and Embryology.

1) Know the Anatomical and Embryological characters of the plants.
2) Understand the development of Fruits and seeds.

CO-2 Plant Bio- technology.

1) Understand the importance of Plant Bio-technology.
2) Know the applications of Plant Bio-technology in Medicine, Agriculture, Industry and Environmental Science.

CO-3 Practical's

1) Understands the basic Principles of plant Science.
2) Perform the practical as per the laboratory manuals.

C) T.Y. B.Sc.

Semester III

CO 1Cryptogamic Botany

1) Understands the characters of Algae, Fungi, and Bryophytes.

2) Know the Economic importance of Cryptogams.

CO-2 Molecular Biology

1) Understand the various Biomolecules and their structures.
2) Understands the significance of Molecular Biology.

CO-3 Genetics and Evolution

1) Understand the basic concept of Genetics.
2) Understand the process of Evolution in Plants.

CO-4 Spermatophyta & Palaeobotany.

1) Understand the Characters of Angiosperms and Gymnosperms.
2) Know the characters and Fossil records of past plants.

CO-5 Horticulture and Floriculture.

1) Know the significance and Practices of Horticulture.
2) Understand the aesthetic value of Flowers in a day today life.

CO-6 Computational Botany

1) Know the significance of Biostatistics in data analysis.
2) Analyze the given data as per the procedure.

Semester- IV

CO-1 Plant Physiology and Biochemistry

1) Understand the Physiological processes of the plants.
2) Understand the structure of Biomolecule on the plants.

CO-2 Ecology and Biodiversity.

1) Understand the basic concept of Ecology.
2) Know the diversity of Plants.

CO-3 Plant Pathology.

1) Know the different plant Pathogens causing various diseases.
2) Know the remedial measures for control of different diseases.

CO-4 Medical & Economic Botany.

1) Know the various active compounds presents in the plants.
2) Use different plants for the preparations of Medicines.

CO-5 Plant Bio-technology.

1) Understand the basic principles of plant tissue culture.
2) Use of various technique in Agriculture, Medicine. And Plant breeding.

CO-6 Plant Breeding and Seed technology.

1) Understand the principles and process in plant Breeding.

2) Know the process in the production of Seeds of crop plants.

Practicals

CO-1

1) Perform the Practicals of Cryptogamic Botany, Cell and Molecular Biology, Plant Physiology and Bio- Chemistry.as per the laboratory manuals.
2) Apply the practical Knowledge in day today life.

CO-2

1) Perform the Practical's of Genetics & Evolution, Spermatophyta and Palaeobotany, Plant Ecology and Bio diversity, Plant Breeding and Seed technology.as per the laboratory manuals.
2) Apply the practical Knowledge in day today life.

CO-3

1) Perform the Practical's of Horticulture & Floriculture, Computational Botany, Plant Pathology, Medicinal & Economic Botany.as per the laboratory manuals.
2) Apply the practical Knowledge in day today life.

Programme outcomes: COs

(Physics)

T.Y.B.Sc.

Mathematical Physics-I

Students will have understanding of:

1. Various techniques to solve differential equations.
2. How to use vector calculus in various physics problems

Electricity and Magnetism

Students will be able to:

1. Understand the relationship between electrical charge, electrical field, electrical potential, and magnetism.
2. Solve numerical problems involving topics covered.
3. Understand various network theorems.
4. Understanding of ballistic galvanometer
5. Define the magnetic field and magnetic flux, solve technical problems.
6. Calculate the magnitude and direction of the magnetic field for symmetric current distributions using the Law of Biot-Savart and Ampere's Law

Computational Physics

Students will have understanding of

1. Basics of C language.
2. Basics of Arrays and pointers

Modern Physics

On successful completion of this module, students should be able to:

1. Know the vocabulary and concepts of modern physics: basic elementary quantum mechanics, nuclear physics.
2. Understand the relationship between observation and theory and their use in building the basic concepts of modern physics.
3. Understand the application of modern physics to modern technology

Electronics

Completion of this course will enable the students to:

1. Acquire a basic knowledge in solid state electronics including diodes, BJT, and operational amplifier.
2. Develop the ability to analyze and design analog electronic circuits using discrete components.
3. Design, construct, and take measurement of various analog circuits to compare experimental results in the laboratory with theoretical Analysis.
4. Understand the hybrid equivalent of different transistors.

Solid State Physics

Students will have understanding of:

1. Structures in solids and their determination using XRD.
2. Behavior of electrons in solids including the concept of energy bands and effect of the same on material properties.
3. Magnetic and dielectric properties of solids.
4. Practice problem solving by using selected problems in solid state physics.
5. Superconductivity basics

Laser Physics

Completion of this course will enable the students to:

1. Understand and explain the principles and design considerations of various (solid state,
2. gas and semiconductor) lasers, modes of their operation and areas of their application,
3. Understand the principles of ultra short pulse generation and amplification,
4. Understand trends of development of modern lasers,
5. Gain the basic skills of practical work with lasers.

Classical Mechanics

Students will have understanding of:

1. The terminology used in Classical Mechanics.
2. Lagrangian and Hamiltonian formulations.
3. essential features of a problem (like motion under central force, rigid body dynamics, periodic motions), use them to set up and solve the appropriate mathematical equations,
4. Understand Variational principle and Canonical transformations

Quantum Mechanics

Completion of this course will enable the students to:

1. Understanding of: Importance of quantum mechanics compared to classical mechanics at microscopic level.
2. Understand various tools to calculate Eigen values and total angular momentum of particles.
3. Understand Schrodinger's equation for spherical symmetric potential, complete solution of
   hydrogen atom.
4. Understand atoms in external magnetic field.

Statistical Mechanics

Completion of this course will enable the students to:

1. Understand how statistics of the microscopic world can be used to explain the thermal features of the macroscopic world.
2. Use thermal and statistical principles in a wide range of applications.
3. Learn a variety of mathematical techniques.
4. Understand Bose-Einstein and Fermi Dirac statistics.
5. Establish connection between statistics and thermodynamics

Nuclear Physics

Upon completion of the course Students will have understanding of:

1. Basic properties of nucleus and nuclear models to study the nuclear structure properties.
2. Various aspects of nuclear reactions will give idea how nuclear power can be generated.
3. Nuclear fission and fusion.
4. Basic of elementary particles.

S.Y.B.Sc.

Waves and

Students will be able to:

1. Understand the role of the wave equation and appreciate the universal nature of wave motion.
2. Understand superposition of harmonic waves.
3. Understand interference and diffraction (Fraunhofer and Fresnel diffraction)

Optics

1. Understand optical phenomena such as polarization.
2. Through the lab course, understand the principles of measurement and error analysis and develop skills in experimental design.

Mathematical Physics–

Students will be able to:

1. Use, advanced mathematical methods and theories on various mathematical and physical problems.
2. Understand the Fourier theorem and its applications.
3. Understand matrix and partial differential equations.

Electrinics

Completion of this course will enable the students to:

1. Acquire a basic knowledge in solid state electronics including diodes, BJT, and operational
   amplifier.
2. Develop the ability to analyze and design analog electronic circuits using discrete components.
3. Design, construct, and take measurement of various analog circuits to compare experimental
   results in the laboratory with theoretical Analysis.
4. Understand the hybrid equivalent of different transistors.

F.Y.B.Sc.

Mechanics

Students will be able to articulate and describe:

1. Relative motion. Inertial and non-inertial reference frames.
2. Parameters defining the motion of mechanical systems
3. Study of the interaction of forces between solids in mechanical systems.
4. Centre of mass of mechanical systems.
5. Laws of motion and conservation principles.

Thermodynamics

Completion of this course will enable the students to:

1. Know the basics of thermal physics.
2. Make use of different problem solving techniques in the field.
3. Understand the kinetic theory of gases: Maxwell –Boltzmann distribution law, Brownian
   motion etc.
4. Understand the behavior of real gases.

Elements of Modern Physics

On successful completion of this module, students should be able to:

1. Know the vocabulary and concepts of modern physics: basic elementary quantum mechanics, nuclear physics.
2. Understand the relationship between observation and theory and their use in building the basic concepts of modern physics.
3. Understand the application of modern physics to modern technology.

Dadapatil Rajale Arts, Science & Commerce College, Adinathnagar

Department of Mathematics

Course Outcomes 2018-19

Sr. No.	Name Of Teacher	Name of Subject	Course Outcomes
1	Prof. D.N. Kandekar	Mathematics Paper I (MT101) Title of Paper: Algebra & Geometry	i) A student is able to recall basic facts about Algebra & Geometry and is able to display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Algebraic & Geometrical concepts and concerned structures, and is able to follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Algebra & Geometry and hence of its past, present and future role as part of our culture.
2	Prof. P.R. Avhad	Mathematics Paper II (MT102) Title of Paper: Calculus & Differential Equation	i) A student is able to recall basic facts about Calculus & Differential Equation and is able to display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Calculus & Differential Equation concepts and concerned structures, and is able to follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Calculus & Differential Equation and hence of its past, present and future role as part of our culture.
3	Prof. D.N. Kandekar & Prof. P.R. Avhad	Mathematics Paper III (MT103) Title of Paper: Practical Paper based on MT101 & MT102	(i) A student got adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences. (ii) A student is able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.
4	Prof. D.N. Kandekar	Mathematics Paper I (MT211) Title of Paper: Multivariable Calculus-I	i) A student is able to recall basic facts about Multivariable Calculus and is able to display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Multivariable Calculus concepts and concerned structures, and is able to follow the patterns involved, mathematical reasoning.

5	Prof. P.R. Avhad	Mathematics Paper II (MT212(B)) Title of Paper: Laplace Transformation & Fourier Series.	i) A student is able to recall basic facts about Laplace Transformation & Fourier Series and is able to display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Laplace Transformation concepts and concerned structures, and is able to follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Laplace Transformation and hence of its past, present and future role as part of our culture.
6	Prof. D.N. Kandekar & Prof. P.R. Avhad	Mathematics Paper III (MT213) Title of Paper: Practical Paper based on MT211 & MT212(B)	(i) A student got adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences. (ii) A student is able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.
7	Prof. D.N. Kandekar	Mathematics Paper I (MT221) Title of Paper: Linear Algebra	i) A student is able to recall basic facts about Linear Algebra and is able to display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Linear Algebra concepts and concerned structures, and is able to follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Linear Algebra and hence of its past, present and future role as part of our culture.
8	Prof. P.R. Avhad	Mathematics Paper II (MT222(B)) Title of Paper: Numerical Methods & Its Applications	i) A student is able to recall basic facts about Numerical Methods and is able to display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Numerical Methods concepts and concerned structures, and is able to follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Numerical Methods and hence of its past, present and future role as part of our culture.
9	Prof. D.N. Kandekar & Prof. P.R. Avhad	Mathematics Paper III (MT213) Title of Paper: Practical Paper based on MT221 & MT222(B)	(i) A student got adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences. (ii) A student is able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.

10	Prof. P.R. Avhad	Mathematics Paper I (MT331) Title of Paper: Metric Spaces	i) A student is able to recall basic facts about Metric Space and is able to display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student should get a relational understanding of Metric Space concepts and concerned structures, and is able to follow the patterns involved, Metric Space reasoning. (iii) A student is made aware of history of Metric Space and hence of its past, present and future role as part of our culture.
11	Prof. P.R. Avhad	Mathematics Paper II (MT332) Title of Paper: Real Analysis-I	i) A student is able to recall basic facts about Real Analysis and is able to display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student should get a relational understanding of Real Analysis concepts and concerned structures, and is able to follow the patterns involved, Metric Space reasoning. (ii) A student is made aware of history of Real Analysis and hence of its past, present and future role as part of our culture.
12	Prof. P.R. Avhad	Mathematics Paper III (MT333) Title of Paper: Problem Course Based on MT331 & MT332	(i) A student got adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences. (ii) A student is able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.
13	Prof. D.N. Kandekar	Mathematics Paper IV (MT334) Title of Paper: Group Theory	i) A student is able to recall basic facts about Group Theory and is able to display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Group Theory concepts and concerned structures, and is able to follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Group Theory and hence of its past, present and future role as part of our culture.
14	Prof. P.R. Avhad	Mathematics Paper V (MT335) Title of Paper: Ordinary Differential Equation	i) A student is able to recall basic facts about Ordinary Differential Equation and is able display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Ordinary Differential Equation concepts and concerned structures, and is able to follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Ordinary Differential Equation and hence of its past, present and future

			role as part of our culture.
15	Prof. D.N. Kandekar & Prof. P.R. Avhad	Mathematics Paper VI (MT336) Title of Paper: Problem Course Based on MT334 & MT335	(i) A student got adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences. (ii) A student is able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.
16	Prof. D.N. Kandekar	Mathematics Paper VII (MT337(A)) Title of Paper: Operation Research	i) A student is able to recall basic facts about Operation Research and is able display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Operation Research concepts and concerned structures, and is able follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Operation Research and hence of its past, present and future role as part of our culture.
17	Prof. D.N. Kandekar	Mathematics Paper VIII (MT337(F)) Title of Paper: Number Theory	i) A student is able to recall basic facts about Number Theory and is able display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of mathematical concepts and concerned structures, and is able follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of mathematics and hence of its past, present and future role as part of our culture.
18	Prof. D.N. Kandekar	Mathematics Paper IX (MT338) Title of Paper: Problem Course Based on MT337(A) & MT337(F)	(i) A student got adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences. (ii) A student is able apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.
19	Prof. P.R. Avhad	Mathematics Paper I (MT341) Title of Paper: Complex Analysis	i) A student is able to recall basic facts about Complex Analysis and is able display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Complex Analysis concepts and concerned structures, and is able follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Complex Analysis and hence of its past, present and future role as part of our culture.

20	Prof. P.R. Avhad	Mathematics Paper II (MT342) Title of Paper: Real Analysis-II	i) A student is able to recall more basic facts about Real Analysis and is able display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Real Analysis concepts and concerned structures, and is able follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Real Analysis and hence of its past, present and future role as part of our culture.
21	Prof. P.R. Avhad	Mathematics Paper III (MT343) Title of Paper: Problem Course Based on MT341 & MT342	(i) A student got adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences. (ii) A student is able apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.
22	Prof. D.N. Kandekar	Mathematics Paper IV (MT344) Title of Paper: Ring Theory	i) A student is able to recall basic facts about Ring Theory and is able display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Ring Theory concepts and concerned structures, and is able follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Ring Theory and hence of its past, present and future role as part of our culture.
23	Prof. P.R. Avhad	Mathematics Paper V (MT345) Title of Paper: Partial Differential Equation	i) A student is able to recall basic facts about Partial Differential Equation and is able display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Partial Differential Equation concepts and concerned structures, and is able follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Partial Differential Equation and hence of its past, present and future role as part of our culture.
24	Prof. D.N. Kandekar & Prof. P.R. Avhad	Mathematics Paper VI (MT346) Title of Paper: Problem Course Based on MT344 & MT345	(i) A student got adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences. (ii) A student is able apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.

25	Prof. D.N. Kandekar	Mathematics Paper VII (MT347(A)) Title of Paper: Optimization Technique	i) A student is able to recall basic facts about Optimization Technique and is able display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Optimization Technique concepts and concerned structures, and is able follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Optimization Technique and hence of its past, present and future role as part of our culture.
26	Prof. D.N. Kandekar	Mathematics Paper VIII (MT347(F)) Title of Paper: Optimization Technique	i) A student is able to recall basic facts about Computational Geometry and is able display knowledge of conventions such as notations, terminology and to recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student got a relational understanding of Optimization Technique concepts and concerned structures, and is able follow the patterns involved, mathematical reasoning. (iii) A student is made aware of history of Optimization Technique and hence of its past, present and future role as part of our culture.
27	Prof. D.N. Kandekar	Mathematics Paper IX (MT348) Title of Paper: Problem Course Based on MT347(A) & MT347(F)	(i) A student got adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences. (ii) A student is able apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.

Department of Zoology

Course Outcomes (COs) of BSc in Zoology

Course Outcomes (COs)

B. Sc. (Zoology) First Year B.Sc.

B. Sc. (Zoology) First Year B.Sc.
Course ZY 101 -Animal Systematics and Diversity I & II
After successfully completing this course, students will be able to:

- **COs1:** Demonstrate anatomical and physiological attributes of each animal group and why these have led to their success.
- **COs2:** Identify a range of invertebrate and vertebrate animals
- **COs3:** Describe the morphology, habit and habitat. Systematic position and various systems in *Paramecium.*
- **COs4:** Describe the morphology, habit and habitat. Systematic position and various systems in Frog.
- **COs5**: List the various animals in a given phylum.
- **COs6:** State the animal classification.
- **COs7:** Enlist the examples of the phylum's studied.
- **COs8:** Comment on the modifications of common animal forms of the groups studied.

Course: ZY 102-Fundamentals of Cell Biology & Genetics.
After successfully completing this course, students will be able to:

- **COs1:** Differentiate prokaryotic and Eukaryotic cells.
- **COs2:** Explain the principles of staining.
- **COs3:** Describe the structure and functions of cell organelles.
- **COs4:** Label the various cell parts and Cell organelles.
- **COs5:** Explain the cell division process and its significance.
- **COs6:** Explain Mendel's principle, its extension and chromosomal basis and determination of gene action from genotype to phenotype and concepts of inheritance.
- **COs7:** Define the terminologies in genetics.
- **COs8**: Describe the chromosome anomalies and associated diseases

Course: ZY 103 Practicals in Zoology:
After successfully completing this course, students will be able to:

- **COs1:** Identify various animals based on morphological features.
- **COs2:** Prepare the culture of *Paramecium*
- **COs3:** Prepare stained slides of mitosis.
- **COs4:** Identify the cell division phases
- **COs5:** Detect human blood group
- **COs6**: Identify the human genetic traits.
- **COs7:** Identify the cell organelles.
- **COs8:** Explain the morphology and sexual dimorphism of *Drosophila* and Frog.

B. Sc. (Zoology) Second Year B.Sc.

Course ZY 211-Animal Systematics and Diversity III.

After successfully completing this course, students will be able to:

COs1: List the various animals in a given phylum of invertebrates
COs2: Identify various larval stages and development in invertebrate groups
COs3: Explain various modifications in these groups and the need of the modification for survival.
COs4: Explain various adaptations in insects including mimicry and metamorphosis
COs5: Describe the morphology, habit and habitat, systematic position and various systems in Star fish.
COs6: State the outline of animal classification of non-chordates
COs7: Classify the higher invertebrate groups.
COs8: Categorize the diversity found in the invertebrate groups of animals like Arthropoda, Mollusca and Echinodermata.

Course ZY 212: Applied Zoology I

After successfully completing this course, students will be able to:

COs1: Define the concepts of the applied subjects like Fisheries, Aquaculture and Pest Control.
COs2: Identify, freshwater, Marine water fishes.
COs3: Explain the tools and techniques used in aquaculture and agricultural practices.
COs4: Describe the fish species commonly used in fishery business.
COs5: Describe the common agricultural pests from nearby area.
COs6: Illustrate the diseases in aquaculture and agriculture.
COs7: Classify freshwater and Marine water fishes.
COs8: Categorize economically important fish species.

Course ZY 221-Animal Systematics and Diversity IV.

After successfully completing this course, students will be able to:

COs1: List the various vertebrate animals in a given class.
COs2: Identify poisonous and non-poisonous snakes.
COs3: Explain various modifications in the given group of animals.
COs4: Explain various adaptations in avian group as well as migration and flight in birds.
COs5: Describe the morphology, habit and habitat. Systematic position and various systems in *Scoliodon*.
COs6: State the outline of chordate classification.
COs7: Classify the higher vertebrate groups.
COs8: Categorize the diversity found in the vertebrate groups of animals like reptiles, birds and mammals.

Course ZY 222: Applied Zoology II

After successfully completing this course, students will be able to:

COs 1: Define the concepts of the applied subjects like Apiculture and Sericulture.
COs 2: Identify different species and casts of honeybees and species of silkworm.
COs 3: Explain the tools and techniques used in apiculture and sericulture.
COs 4: Explain the important pests of apiculture and sericulture.
COs 5: Describe the economic importance of honeybee and silkworm.
COs 6: Illustrate management of the apiary and sericulture units.

COs 7: Classify of *Apis*, *Bombyx* and *Anthereria.*

COs 8: Select economically important species of *Apis* for unifloral and multifloral honey production.

Course ZY 223: Practicals in Zoology:

After successfully completing this course, students will be able to:

COs1: Identify animals of higher groups in Invertebrates and Vertebrates.

COs2: Distinguish between poisonous and non-poisonous snakes

COs3: Label various parts of the animals and their modifications

COs4: Observe the various tools, crafts and gears used in Apiary, Fishery, Sericulture and Agricultural Pest control.

COs5: Identify the pests in agriculture and enemies in Apiary

COs6: Explain the modifications and adaptations in animals

COs7: Explain the use of tools in Apiary, Sericulture and appliances in Pest control.

COs8: Describe External features and economic importance of freshwater and marine water fishes and other aquaculture organisms.

COs9: Describe the morphology, habit and habitat. Systematic position and various systems in starfish and *Scoliodon.*

B. Sc. (Zoology) Third Year B.Sc.

Course ZY 331: Animal Systematics & Diversity V

After successfully completing this course, students will be able to:

COs1: Outline the systematic position of *Pila globosa* and *Calotes versicolor*
COs2: Label the organs and systems of *Pila globosa* and *Calotes versicolor*
COs3: Describe the major features in the Phylum Protozoa, Porifera, Coelenterata and Hemichordata and the reason of their success in the ecosystem.
COs4: Explain the functional anatomy of *Pila globosa*. and *Calotes versicolor*
COs5: Illustrate the morphological peculiarities of Integument, Heart, Kidney and Brain of vertebrates
COs6: Categorize the Accessory respiratory organs in fish.
COs7: Classify the dentition in mammals.
COs8: Justify the need of electric organs in fish.

Course ZY 332: Mammalian Histology

After successfully completing this course, students will be able to:

COs1: Define the basic terms in histology.
COs2: List the various types of tissues.
COs3: Identify the histological peculiarities in various organs.
COs4: Explain the location, structure and functions of various organs.
COs5: Illustrate the histology of endocrine glands.
COs6: Diagrammatically represent the various organs.

Course ZY 333: Biological Chemistry

After successfully completing this course, students will be able to:

COs1: Define the basic terms in biochemistry.
COs2: Explain the structure, functions and reactions of the various biomolecules.
COs3: Give examples of each group type of biomolecules.
COs4: Correlate the changes in the levels of these biomolecules with the diseases in Human.
COs5: Calculate pH and pOH of buffer solution.
COs6: Classify the biomolecules.
COs7: Draw the structures of major biomolecules.

Course ZY 334: Environmental Biology & Toxicology

After successfully completing this course, students will be able to:

COs1: List the environmental challenges and their remedies.
COs2: Describe the nature of ecosystem, productivity, food webs, energy flow,
COs3: Describe the resilience of ecosystem and ecosystem management.
COs4: Explain Biosphere, biomes and impact of climate on biomes.
COs5: Explain wildlife management in India and conservation of wildlife.
COs6: Explain the three necessary and sufficient conditions i.e. struggle for existence; variation; and inheritance.
COs7: Illustrate the toxic effects of chemicals in the environment on human and his livestock.
COs8: Discuss natural resources, causes of their depletion and their conservation.

Course ZY 335: Parasitology

COs1: Define the basic terms in parasitology.
COs2: List common ectoparasites and endoparasites.
COs3: Explain animal associations and their types.
COs4: Discuss the life cycle and importance of major parasites.
COs5: Illustrate transmission routes of animal and zoonotic parasites
COs6: Classify parasites.
COs7: Justify the control measures of arthropod vectors.
COs8: Convince the importance of hygiene with respect to epidemic diseases.

Course ZY 336: Cell Biology

After successfully completing this course, students will be able to:

COs1: Define the terms in cell biology
COs2: Describe the composition, structure and functions of the plasma membrane.
COs3: Explain the structure and functions of the nucleus and its components.
COs4: Describe the three primary components of the cell's cytoskeleton and how they affect cell shape, function, and movement.
COs5: Diagrammatically represent the phases of division of somatic and gametic cells.
COs6: Differentiate between prokaryotes and eukaryotes.
COs7: Differentiate between rough and smooth endoplasmic reticulum both in structure and function.

Course ZY 341: Biological techniques

After successfully completing this course, students will be able to:

COs1: Define the basic terms solution preparation.
COs2: List the separation techniques.
COs3: Describe the techniques used in hematology.
COs4: Explain the principle of separation techniques.
COs5: Explain the procedure of preparing permanent histological slides.
COs6: Illustrate the working of microscopes.
COs7: Analyze the dimensions of the biological samples.
COs8: Justify the selection of fixatives for histological procedures.

Course ZY 342: Mammalian Physiology & Endocrinology

After successfully completing this course, students will be able to:

COs1: Define the basic terms in physiology.
COs2: List the various types of digestive enzymes.
COs3: Explain the physiological processes in mammals.
COs4: Explain the anatomy of various systems.
COs5: Illustrate the reproductive cycles with hormonal control.
COs6:.Daigramatically represent the working of kidney.
COs7: Justify the endocrine disorders.

Course ZY 343: Genetics & Molecular biology

After successfully completing this course, students will be able to:

COs1: Define the basic terms in genetics.
COs2: Discuss the linkage groups and gene frequency.
COs3: Explain the concept of mutation.
COs4: Explain DNA structure.
COs5: Paraphrase the Central dogma of molecular biology.

COs6: Illustrate the mechanism of replication, transcription and translation.
COs7: Justify the post transcriptional and post translational modifications.

Course ZY 344: Organic Evolution:
After successfully completing this course, students will be able to:
COs1: Define organic evolution.
COs2: Explain the theories of organic evolution.
COs3: Describe the concept of origin of life and theories of origin of life.
COs4: Describe evolution of man.
COs5: Illustrate the presence of organisms at various geological time scale.
COs6: Apply the knowledge in relevant experimentations.
COs7: Categorize different zoogeographical realms.
COs8: Compare animal distribution in different zoogeographical realms.

Course ZY 345: General Embryology
After successfully completing this course, students will be able to:
COs1: Identify the developmental stages
COs2: Describe the key events in early and systematic embryological development.
COs3: Describe the process of gametogenesis.
COs4: Describe the chick development up to 96 hours of incubation and extra embryonic membranes.
COs5: Explain the life cycles of few parasites.
COs6: Explain the theories of preformation, and concepts like growth, differentiation and reproduction.
COs7: Explain the principles and process of fertilization and cleavage.
COs8: Prepare the flow chart of gametogenesis process.

Course ZY 346: Medical Entomology
After successfully completing this course, students will be able to:
COs1: Outline the branches of entomology.
COs2: Define medical entomology.
COs3: Explain the social organization of insects with examples.
COs4: Illustrate the role of household insects in relation to human health.
COs5: Classify major medically important insects.
COs6: Justify the significance of social organization in insects.
COs7: Choose the control measures of medically important insects

Course ZY 347 Practical Paper I
After successfully completing this course, students will be able to:
COs1: Identify the organs by studying the histological slides.
COs2: Identify hormonal disorders using pictures.
COs3: Use techniques like chromatography, spectrophotometry in biological experiments.
COs4: Explain the anatomical features of brain, heart, kidney and skin of vertebrates.
COs5: Demonstrate the importance of modifications in animal for their survival.
COs6: Demonstrate the structure of tissues by making temporary slides.
COs7: Demonstrate haemin crystals and effect of osmolarities on RBCs.
COs8: Sketch and label the various systems and organs of *Pila, Balanoglossus* and *Calotes*.
COs9: Prepare blood smear and identify the various cells.

COs10: Draw exact figures of structures/organism using camera lucida.
COs11: Measure the cell/organism dimensions.
COs12: Prepare blood smear and identify the various cells.
COs13: Process animal tissues and prepare permanent histological slides.
COs14: Count total leucocytes from blood samples.
COs15: Estimate the Hb level in blood samples.
COs16: Estimate blood glucose level, BT and CT.

Course ZY 348 Practical Paper II

After successfully completing this course, students will be able to:

COs1: Identify the fossil types/ adaptations in animals.
COs2: Explain the stages of human evolution.
COs3: Demonstrate the effect of physical and chemical factors on enzyme activity.
COs4: Explain the evidences of evolution
COs5: Demonstrate physical and chemical properties of water and soil samples.
COs6: Illustrate the application of Hardy –Weinberg law
COs7: Detect given carbohydrates using biochemical tests.
COs8: Measure the pH of given samples.
COs9: Isolate protein from milk.
COs10: Prepare acid and base solutions and titrate them.
COs11: Collect and identify freshwater planktons.
COs12: Determine LD_{50} and LC_{50}.
COs13: Estimate nucleic acids in given samples.
COs14: Elucidate the difference between ape and man.
COs15: Prepare temporary mounting of Giant chromosome.
COs16: Prepare paper model of DNA.
COs17: Record zoogeographical distribution of animals.

Course ZY 349 Practical Paper III

After successfully completing this course, students will be able to:

COs1: Identify the life cycle stages of few parasites.
COs2: Identify and explain the types of eggs, blastulae and grastrulae
COs3: Identify the age of chick embryo.
COs4: Identify the phases of cell division.
COs5: List the household Pest and social insects.
COs6: Explain the pathogenicity and morphology of few ectoparasites.
COs7: Explain the diseases spread by vectors.
COs8: Explain the interrelationship of insects and human with examples.
COs9: Explain the effects of household insects on human health.
COs10: Demonstrate rectal parasites in cockroach.
COs11: Demonstrate Mitochondria/ mitotic and meiotic stages by stained preparations.
COs12: Illustrate the social organization in insects.
COs13: Prepare temporary slide of chick embryo to identify the stage and age.
COs14: Prepare mounting of mouth parts of few common insects.
COs15: Justify the effect of colchicine on cell division.

Course Outcome for B.Sc. (Computer Science)

Programming in 'C' (F. Y. B. Sc. Computer Science)

CO1	Explain about the basic concepts of program development statements and its syntax.
CO2.	Explain the various types of arrays and its structure.
CO3	Discuss about the various types of Functions and String handling mechanisms.
CO4.	Explain the Concepts of structures and Unions.
CO5.	Illustrates the various operations performed on different types of files.

Database Management System (F. Y. B. Sc. Computer Science)

CO1	Describe the fundamentals of File processing and database processing system.
CO2.	Explain the various data model and its application.
CO3	Explain the various normal forms and its role in DBMS.
CO4.	Explain the fundamental concepts of SQL programs.
CO5.	Describe the concepts of function, procedure, package, trigger and exception handling.

Object Oriented Programming with C++ (S. Y. B. Sc. Computer Science)

CO1	Explain the top-down and bottom-up programming approach and apply bottom up approach to solve real world problems.
CO2.	Explain the difference between static and dynamic binding. Apply both techniques to solve problems.
CO3	Describe the concept of inheritance and apply real world problems.
CO4.	Discuss the generic data type for the data type independent programming which relate it to reusability.
CO5.	Explain to design of handling large data set using File I/O.

SOFTWARE ENGINEERING (S. Y. B. Sc. Computer Science)

CO1	Explain the fundamental knowledge in science, mathematics, fundamentals of computer science, software engineering and multidisciplinary engineering to begin in practice as a software engineer.
CO2.	Explain to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, manufacturability, sustainability, ethical, health and safety.
CO3	Describe the techniques, skills, and modern engineering tools necessary for engineering practice.
CO4.	Explain the early careers will be capable of team and organizational leadership in computing project settings, and have a broad understanding of ethical application of computing-based solutions to societal and organizational problems.

CO5.	Discuss about analyze, design and manage the development of a computingbased system, component or process to meet desired needs within realistic constraints in one or more application domains.

JAVA PROGRAMMING (T. Y. B. Sc. Computer Science)

CO1	Explain about basic Java language syntax and semantics to write Java programs.
CO2.	Describe the concepts of variables, conditional and iterative execution methods etc.
CO3	Discuss the the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods
CO4.	Explain the various methodologies to handle the exception mechanisms and the principles of inheritance, packages and interfaces
CO5.	Demonstrate the programming concepts for applet and graphics.

WEB DESIGN TECHNOLOGY & PHP (T. Y. B. Sc. Computer Science)

CO1	Describe the concepts of markup languages, un order list, table, formatting, liking and frames.
CO2.	Discuss about the creation of cascading style sheets, backgrounds, media types and building a dropdown menu.
CO3	Explain the JavaScript, control structure, if structure, switch, do-while and logical operators.
CO4.	Describe the javascript functions, javascript arrays and javascript objects.
CO5.	Discuss the DOM, javascript events and XML.

OPERATING SYSTEM (T. Y. B. Sc. Computer Science)

CO1	Describe the basic components of an operating system and their role in implementations for general purpose, real-time and embedded applications.
CO2.	Define the concepts of processes, threads, asynchronous signals and competitive system resource allocation.
CO3	Explain what multi-tasking is and outline standard scheduling algorithms for Multi-tasking.
CO4.	Discuss mutual exclusion principles and their use in concurrent programming including semaphore construction and resource allocation.
CO5.	Expose the details of major operating system concepts, overview of system memory management and the implementation of file systems.

COMPUTER NETWORK (T. Y. B. Sc. Computer Science)

CO1	Explain the local, metropolitan and wide area networks using the Standard OSI reference model.
CO2.	Discussion of various networking technologies.
CO3	Explain the concepts of protocols, network interfaces and design of performance issues in local area networks and wide area networks.

CO4.	Describe about wireless networking concepts, contemporary issues in networking technologies, network tools and network programming.
CO5.	Explain the analysis of different types of protocol and the comparison of number of data link, network and transport layer protocols.

Programming in C LAB

CO1	Explanation of design and algorithmic solution for a given problem.
CO2.	Construction of flowchart for the computer programs.
CO3	Explains the program using Control Statements
CO4.	Explains the program using Arrays and Functions.
CO5.	Explain the program using file handling with structure.

Data Structure Lab Using C++

CO1	Explain the features of C++ using object oriented programming.
CO2.	Describe the relative merits of C++ as an object oriented programming language.
CO3	Describe the major object-oriented concepts to implement object oriented programs in C++ Using encapsulation and inheritance.
CO4.	Describe the major object-oriented concepts to implement object oriented programs in C++ Using polymorphism.
CO5.	Explain the advanced features of C++ specifically stream I/O, templates and operator overloading.

JAVA PROGRAMMING LAB

CO1	Explain the programming language design, syntax and semantics.
CO2.	Describe the critical thinking skills through solving programming problems.
CO3	Explain the standard syntax for java programs and other programming Tools.
CO4.	Describe the animation and events based advanced java program concepts (Applet)
CO5.	Explain the java programs using object oriented class with parameters, constructors, utility, calculations, methods including inheritance, test classes and exception handling.

WEB DESIGN TECHNOLOGY & PHP LAB

CO1	Explain the fundamental tags used in HTML.
CO2.	Develop the web page in various applications.
CO3	Develop the web page using various ordered and unordered listing commands
CO4.	Develop the web page using frame concepts with multi-media handling.
CO5.	Develop the web page using java script.

Course Outcomes- M.Sc. I -Chemistry & M.Sc.-II Analytical chemistry

Class – M. Sc. I

Semester-I

CO - CCTP-1 CHP-110 physical chemistry

1. Student learn the concept of thermodynamics, change of state, quantum chemistry.
2. Student are able to find out rate of reaction at any instants, chemical bonding.
3. Understand kinetics of complex reactions.
4. Learn the role of molecular reaction dynamic.
5. Enzyme catalysis reaction & molecular thermodynamics.

Class – M. Sc. I

Semester-I

CO -CCTP -4 CHP-210 physical chemistry-Section-I molecular spectroscopy

1. Student visualize the instrumentations of molecular spectroscopy IR spectroscopy Raman spectroscopy & Mossbauer spectroscopy & it's application.
2. Student understand about fingerprint region in IR spectroscopy.

Section -II Nuclear and radiation chemistry

1. Student learn about which type of radiation occure in radiation chemistry &it's application.
2. Student know concept of nuclear fission, fission about element.
3. Student understand basic concept of radioactivity.

Semester-I

CO -CCTP-2: CHI-130, Inorganic Chemistry-I

1. Student should imagine molecules in 3 dimension.
2. Understand the concept of point group and apply it to molecule.

3) Understand product of symmetry operation.

4. Student should understand importance of Orthogonality theorem.
5. Student should know the concept of SALC.

6 Know about projection operation.

7. Students able to find out the possible modes of vibration.
8. They should able to learn the rules of constructing character table.
9. Student should correlate the application of symmetry to spectroscopy.
10. Students able to find out the possible modes of vibration.

11. From the previous knowledge of symmetry student must able to find out which mode are IR active.

12. Student understand the detail chemistry of S and P block elements w.r.t. their compounds, their reactions and applications.

13. Learn the advance chemistry of boranes, fullerene, zeolites, polymers etc.

14. Organometallic chemistry of some important elements from the main groups and their applications.

Semester-II

CO - CCTP-5: CHI-230, Inorganic Chemistry

1. Students able to find out the no of microstates and meaningful term symbols, construction of microstate table for various configuration

2. Hund's rules for arranging the terms according to energy.

3. Students understand interelectronic repulsion.

4. Students know the concept of weak and strong ligand field.

5. Students able to find out splitting of the free ion terms in weak ligand field and strong ligand field.

6. Could draw correlations diagram for various configurations in Td an Oh ligand field.

7. Students know basic instrumentation and selection rules and relaxation in rules.

8. Students know basic d-d transition, d-p mixing, charge transfer spectra.

9. Interpretation of electronic spectra for spin allowed oh and td complexes using Orgel diagram.

10. Understand the concept of spectro chemical series and Nephelauxetic series.

11. Able to solve numerical based on crystal field parameters.

12. Understand the various terms involved in magnetochemistry.

13. Various phenomenons of magnetism and their temperature dependence.

14. Various experimental methods to find out magnetic moment.

15. Understood he various Quenching of orbital angular momentum.

16. Importance of bioinorganic chemistry.

17. Role of metals in Metalloprotein and metalloenzymes.

18. Similarities in coordination theory for metal complexes and metal ions complexed with biological ligands.

19. Importance and transport of metal ions.

20. Passive transport metal ions by ionophores and gramicidin.

21. Mechanism for active transport of Na+and K+

22. Nerve impulse generation in rod cell of retina.

23. Importance and function of Ca, Fe and Mg in metalloprotein

24. Catalytic role of Mn in photosynthesis.

Semester-I

CO- CHO-150, Organic Chemistry

At the end of the course the students will know and recall the fundamental principles of organic chemistry that include chemical bonding, nomenclature, structural isomerism, stereochemistry, chemical reactions and mechanism.

1. They will understand the **c**riteria for aromaticity in nonbenzenoid molecules and other advanced polycyclic aromatics.

2. Understand the chemistry of monocyclic heterocycles, nomenclature and reactions.

3. Learn the concept stereochemistry and its importance; their rules and the concept of chirality.

4. Understand the role of various reaction intermediates like carbocation, carbanion, carbenes, radicals, and nitrenes in organic reactions; concept of NGP.

5. Able to describe mechanism of different rearrangement reactions. Appreciates the various steps involved in the molecular rearrangements.

6. Understand the chemistry of Ylides.

7. Use synthetic reagent of oxidation and reduction for solving the problems.

Semester-II

CO -CHO – 250- Organic Chemistry-II

1. Students understand free radicals' formation, stability and reactivity and should also be able to use the basic understanding in writing probable reaction mechanisms.

2. Students write MO diagram for various olefinic compounds and should able to predict the products, the stereochemistry as well as should able to understand the preferred reaction pathways.

3. Students calculate max of organic compounds containing more than one and less than four conjugated systems. Students should able to correlate IR bands with functional groups using numerical data as well as spectral data.

4. Students solve 1H-NMR problems and should also able to draw the 1H-NMR spectrum for simple organic compounds mentioning multiplicity pattern and coupling constant with the help of

“Tree Diagram” Should able to predict and analyse the multiplicity patterns with more than one coupling constants.

5. Students use 13C-NMR data to interpret the structure NMR problems and should also able to draw the 1H-NMR spectrum for simple organic compounds mentioning multiplicity pattern and coupling constant with the help of “Tree Diagram” Should be able to predict and analyze the multiplicity patterns with more than one coupling constants.

6. Students know various key factors responsible for the spectroscopic data acquisition and should able to solve Problems based on UV, IR, MS, 1H-NMR,13C-NMR.

Semester-I

CO -CHG – 190, General Chemistry-I,

At the end of course student will understand

1. Bonding in solids – band theory.
2. Electronic conductivity.
3. Semiconductors, photoconductivity.
4. Non-stoichiometry, defects and types of defects in solids.
5. Ionic conductivity and their application.
6. Superconductivity and theory of superconductivity.

Semester-II

CO-CBOP-2: CHG – 290, General Chemistry-II

At the end of course student will understand / able to explain

1. Different characterization technique of solids.
2. Principle of XRD, instrumentation of powder XRD, Brags law, applications of XRD for crystal structure determination, numerical problems.
3. Principle of SEM, instrumentation of SEM and interpretation of surface morphology of solid from SEM.
4. Principle of TEM, instrumentation of TEM and interpretation of TEM images.
5. Basics of X-rays, Principle of XRF, types of XRF, instrumentation, qualitative and quantitative analysis, numerical.

Class-M.Sc. I

Semester-I

CO - CCPP-1: CHP-107: Practical Course

1. This course is designed to make students aware of how to perform organic compounds in laboratory.

2. The course includes synthesis of some derivatives and organic compounds, which will help them while working in research laboratory in future.

3. Making derivatives of organic compounds will help them in industry or while doing research in medicinal chemistry for Drug development.

4. This practical course is also designed to make student aware of green chemistry and role of green chemistry in pollution reduction.

5. The students learn how to avoid solvents and do solvent free reaction.

6. Also the work-up procedure in many experiments is made more eco-friendly to environment.

Class-M.Sc. I

Semester-II

CO- CCPP-2: CHP-227: Practical Course-II

1. Students are trained to different purification techniques in organic chemistry like recrystallization, distillation, steam distillation and extraction.

2. Students are made aware of safety techniques and handling of chemicals.

3. Students are made aware of carrying out different types of reactions and their workup methods.

4. This practical course is designed to make student aware of green chemistry and role of green chemistry in pollution reduction.

Class-M.Sc. II Analytical chemistry

CO-CHA -390 Electrochemical and radio analytical method of analysis

Section-I Electrochemical method of analysis

1. Student know about the instrumentation of colourimetry & its application.

2. Student understand the type of polarography.

3. Student should know the difference between voltammetry and polarographic method.

4. Student should understand the amperometry technique.

Section -II Radio analytical and thermal method of analysis

1. Student about where this Radio analytical technique used.

2. Student understand about instrumentation of Radio analytical technique & its application.

3. Student should know about thermal method that is DSC, DTA, DSC and its working.

CO-CHA-391 pharmaceutical analysis -Section –I

1. Student understand about what is FDA and its application also.

2. Student know about which apparatus used for biological test and assay and microbiological test and assay.

3. Student should also understand about what is sterilization method and where that are use.

Section -II

1. Student learn about how we analyze the vegetable drug.

2. Student also know about which type of impurity sources introduce in pharmaceutical raw material.

3. Student learn about how analyse the raw material w.r.to identification, assay &its dosage form related with tablet and capsule.

Class- M. Sc. II (analytical chemistry)

CO-CHA-481 Analytical toxicology and forensic science-Section-I Analytical toxicology

1. Student know about the what is narcotic,stimulant, depressants and it's role & effect on human body.

2. Student understand about narcotic & psychotropic substance.

Section - II food analysis

1. Student know about basis of carbohydrates &which type of method are used for analysis of carbohydrates.

2. Student also understand which type of method we are used to calculate total nitrogen or protein.

Class- M. Sc. II (analytical chemistry)

CHA-491 Analytical method for analysis of fertilizer, detergent, water, polymer, paint and pigment - Section -I analysis of fertilizer, soap & detergent & waste water.

1. Student know about method of analysis of fertilizer.

2. Student learn about soap and detergent &it's method of analysis.

3. Student understand from which reason water were polluted and method are use to analyze polluted water.

Section -II Polymer analysis

1. Student know about what is polymer and it’s application.

2. Student also understand about polymer properties.

Class- M.Sc II Analytical chemistry

CO-CHA-387 Practical course – I (Inorganic chemistry)

1. Student visualize & realize the how to handle the instrument that is spectrophotometry, column chromatography.

2. Student know about which type of chemical are hazardous for human body or itself.

3. Student know about which element present in ore & alloy.

4. Student also understand the difference between gravimetric & volumetric analysis.

Class- M.Sc II Analytical chemistry

CO-Sec-I- Geochemical and alloy analysis

1. Student should learn following aspects of analysis of Geological materials & analysis of alloys.

2. Analysis of soil by various methods.

Class- M.Sc II Analytical chemistry

CO-Sec. II- Laboratory Automation & Sensors based Techniques.

1. Student know automated laboratory analyzer like flow injection analyzer,continous flow analyzer, discrete sample analyzer, process control analyzer, Automated titractions.

2. Student understand the concept of chemical sensors like electrochemical, potentiometric, volumetric, optical, calorimetric sensors, and mass sensors in analysis.

3. Miniaturized analytical system microfabrication techniques like silicon and glass micro matching.

Class- M.Sc II Analytical chemistry

Subject - CHA-492 Method of analysis and application.

Sec.I-Pollution monitoring and control.

1. Student learn analytical methods of determination of small amounts of metal pollutants, treatment to waste, remove heavy metals, recovery techniques.

2. Removal of particulate matter by various methods like filtering gravity separation, liquid scrubbing cyclone separation, electrostatic precipitation.

Sec. II analysis of body fluid.

4. Student should able to understand analysis of blood and urine by various methods like glucose oxidase method. Flame photometric techniques. Collection of specimen.

4. Student should learn principle and method of determination of vitamins in body fluid.

4. Student should understand various immunoanalytical techniques like radio-immunoassay,radio-bioassay, ELISA techniques.

5. Kidney function &liver function test.

Class- M. Sc. II Analytical chemistry

Semester-II

CO- CHA-488 Analytical Chemistry Practical Course-III

1. Students made aware of how to perform organic compounds in laboratory.

2. Synthesize of some derivatives and organic compounds, which will help them while working in research laboratory in future.

3. Make derivatives of organic compounds will help them in industry or while doing research in medicinal chemistry for Drug development.

4. Make student aware of green chemistry and role of green chemistry in pollution reduction.

5. The students learn about how to avoid solvents and do solvent free reaction.

6. Also the work-up procedure in many experiments is made more eco-friendly to environment.

7. The students learn pharmaceutical preparation by titration

8. The students learn how to determine cholesterol from blood or food sample or milk.

Class – M.Sc. II Analytical chemistry

CO- CHA- 487 analytical chemistry practical course II

1. Student understand various terms involved in experiments like conductometry, potentiometry,

2. Spectrophotometry, photofluorometry, flame photometry, polarimetric techniques.

4. Student learn estimation of micronutrients & waste water samples by atomic absorption spectrometer.

5. Understand the concept of analysis of paracetamol by HPLC. Analysis of alcohol by GC.

6. Also know nephelometric techniques.

Class- M.Sc. II (analytical chemistry) Semester II

CO-CHA-490 analytical spectroscopy

1. Student can understand/able to explain principle of electron spectroscopy for chemical analysis, instrumentation, esca satellite peak, spectral splitting, esca chemical shifts. Applications of esca .auger electron spectroscopy and ultraviolet photoelectron spectroscopy.

2. Principle of x-ray method of analysis, x-ray spectral lines, x-ray tube, x-ray absorption, emission, x-ray fluorescence.

3. Principle of x-ray diffraction techniques. Instrumentation & qualitative and quantitative analysis. Numerical. A different characterization techniques of solids, principle of XRD, instrumentation of powder XRD.

4. Student should know various key factors of analytical electron microscopy,the transmission electron microscope, scanning electron microscope, scanning transmission electron microscope, scanning probe microscope.

5. Instrumentation of SEM, TEM, interpretation of surface morphology of solid SEM & interpretation of TEM images.

6. Student should able to understand principle of Chemiluminescence, gas phase Chemiluminescence analysis, Chemiluminescence titration, electro-chemiluminescence.

7. Principle of fluoresfluorescence and phosphorescence, measurements & instrumentation, photoluminescent theory, factors affects on photo luminescence,photo- luminescence analysis.

8. Analysis of non-photoluminating compounds. Applications and problems.

9. Student should able to learn 1H -NMR, 13CNMR & 2-D NMR techniques. Solve problems & interpret the structure.

Class- M, Sc. II (analytical chemistry)

Semester-II

CO-Subject- CHA-488 Analytical Chemistry Practical Course-III

1. This course make Students aware of how to perform organic compounds in laboratory.

2. Synthesis of some derivatives and organic compounds, which will help them while working in research laboratory in future.

3. Make derivatives of organic compounds will help them in industry or while doing research in medicinal chemistry for Drug development.

4. Student make aware of green chemistry and role of green chemistry in pollution reduction.

5. The students learn how to avoid solvents and do solvent free reaction.

6. Also the work-up procedure in many experiments is made more eco-friendly to environment.

7. The students learn pharmaceutical preparation by titration

8. The students learn how to determine cholesterol from blood or food sample or milk.

Class- M. Sc. II (analytical chemistry)

CO-CHA-490 analytical spectroscopy

Semester II

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Dadapatil Rajale Arts, Science and Commerce College, Adinathnagar

Tal: Pathardi, Dist.: Ahmednagar.

Outcomes

Faculty of Commerce

- **Course Outcomes (COs):**

1) To impart knowledge about final account of various department.

2) To stimulate the students interest by showing the relevance and use of various economic Theories.

3) Mathematics and statistics open doors in engineering, business, finance, computing, data sciences, health sciences, environmental sciences and public policy.

4) Evaluate marketing mix product policy and stages in new product.

5) Student can get through knowledge of finance and commerce. The knowledge course outcome career banking and finance.

6) Creating an interest in literature, especially Marathi literature.

Marathi ;-F.Y.B .com

Yavarik Ani Upyojit Marathi

I lustrating the nature of short story.

2. Explaining the nature of characterization, literate and philosophical writings.

3. Illustrating one-act-play, travelogue and autobiography as the forms of literature.

4. Illustrating the general skills and usages of Marathi in day-to-day life