



Ajitha Education Society's  
**PANDIT JAWAHARLAL NEHRU MAHAVIDYALAYA**  
Shivaji Nagar (E), Garkheda Parisar, Aurangabad-431009



**Faculty: Arts**

**B.A: General**

## **Programme outcomes, Programme Specific Outcomes & Course outcomes**

Academic Year 2021-2022

### **Department of English**

- 1) To expose students to a vivid range of writings from all over the world.
- 2) To strive students to be imaginative, rhetorical and technically proficient to gain a deeper insight.
- 3) To equip students with knowledge of English as a world language.
- 4) To make students communicate accurately and precisely in speaking and written aspects.
- 5) To prepare students achieve command over English and it's linguistic structures.
- 6) To make students comprehend and recognize different varieties of English language.
- 7) Programme Learning Outcome (PLO/PO)
  - 1) To develop familiarity with major literary works, genres, period and critical approaches to various literatures.
  - 2) To develop writing skills effectively and creatively.
  - 3) To demonstrate through class discussion to identify major genres of literature and their influence on society.
  - 4) To make Students aware of specific works of major authors such as Shakespeare, Chaucer and Milton etc.
  - 5) To make students read, write and comprehend English acquisition of soft skills.



  
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### Course Outline

- 1) Students acquire Listening, Speaking, Reading and Writing skills through prescribe prose and poetry.
- 2) Students develop the ability of critical thinking about various literatures.
- 3) Students understand the various nuances of written and spoken English.
- 4) Students gain the prose and poetry appreciations skills.
- 5) Students use the knowledge of research methodology and prepare their research project.
- 6) Students inculcate the habit of creative writing.

### Programme specific outcome

1. Students of commerce will acquire the skills of communication for business purposes.
2. Students of commerce will be able to communicate effectively and clearly to tackle their day to day affairs with the knowledge a language skills.
3. The students acquire the knowledge of correct and accurate grammatical sentences.
4. The students acquire various sounds and proper pronunciation.
5. The students acquire various sounds and communications skills of business for better employment.
6. The student's professional outlook will be improved for better performance due to personality development.

### Programme outcome

1. To make students read, write and comprehend English language and develop soft skills.
2. The students develop application of soft skills and express in their own views.
3. The students will acquire the skill of making correct and accurate grammatical sentences.
4. The students learn about the various sounds and proper pronunciation of English language.
5. The students develop the skills of business communication to gain employment opportunities.
6. The students will be able to gain confidence with skillfull acquisition of language skills and develop their personality.

### Course outcome

1. Students gain the knowledge to apply basic grammatical rules from the prescribe text.
2. Students gain proficiency in English language and their adoptability to the demand of the situation.
3. Students know the fundamentals of effective communication.
4. Students analyze their vocabulary and communication ability for better productivity, job performance, develop self-confidence and personality.



  
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# Department of Hindi



## Programme outcomes:

- P01: Helps to gain and Enhance the knowledge of Humanity.
- P02: Understands the journey from savage to civilization.
- P03: Understand how cultural, historical geographical, Political, Linguistic,  
And Environmental forces shape the world.
- P04: Demonstrate intercultural awareness and competence.
- P05: Analyze and criticize the reflection of complex problems  
Incorporating multiple Perspectives and innovative thinking.
- P06: Demonstrate the capacity to argue in innovative directions.
- P07: Practice creative thinking and expression.
- P08: Demonstrate detailed knowledge in one or more disciplinary  
Boundaries.
- P09: Develop a detailed understanding of the current state of knowledge in  
One or more disciplines
- P010: Promote active citizenship and community engagement.

## Programme Specific outcomes:

- PS01: Understand the nature, scope and basic concepts in Hindi.
- PS02: Analyze the relationship among various genres of literature like  
Poetry autobiographical novel, drama, story one act play etc.
- PS03: Creates an awareness among the students about economical,  
Socio - Political and communal issues.
- PS04: Understand how applied Hindi is important in various sectors of  
Society like banks, govt. and semi govt. offices etc.
- PS05: Analyze various theories like modernism, feminism, realism,  
Romantics etc.
- PS06: Students will be benefitted from saint poetry. Through Saints, their  
Philosophies can be understood from poetry.
- PS07: Understand the process of literature in Hindi.
- PS08: Develop the creativity and mental set up.

  
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**Course outcomes:**

- C01: Students will develop their attitude towards humanity.
- C02: It helps to build the capacity to argue in innovative directions.
- C03: To preserve and promote India's Linguistic interest related to Hindi Language and install human values inherent in its literature.
- C04: To foster friendship and understanding between and across Hindi and Non – Hindi Speaking people through the learning of Hindi.
- C05: To provide civic and cultural education and to generate interest in the Hindi younger generation.
- C06: Students will get the proper linguistic knowledge to communicate With people around the globe.
- C07: It makes students able to express themselves in Hindi.
- C08: Students get acquainted with the Hindi media like cinema, news, Advertisements, radio anchoring etc.
- C09: Helps to build language ability among students.
- C010: Students will motivate themselves through literature in their Problem solving and will interpret the world.

  
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## Department of Marathi

**Programme Outcomes:**

- PO1: Helps to gain and Enhance the Knowledge of Humanity.
- PO2: To understands the Journey from Savage to Civilization.
- PO3: To understand how cultural, historical, geographical, political, linguistic, and environmental forces shape the world.
- PO4: Demonstrate intercultural awareness and competence.
- PO5: Analyze and criticize the reflection of complex problems incorporating multiple perspectives and innovative thinking.
- PO6: Demonstrate the capacity to argue in innovative directions.
- PO7: Practice creative thinking and expression.
- PO8 Demonstrate detailed knowledge in one or more disciplines and integrate knowledge and perspectives across disciplinary bound



PO9: Develop a detailed understanding of the current state of knowledge in one or more disciplines.

PO10: Promote active citizenship and community engagement.



### Programme Specific Outcomes:

PSO1: To understand the nature, scope, values and basic concepts in Marathi.

PSO2: To analyze the relationship among various genres of literature like poetry, Biography, autobiography, novel, drama, short stories, travel writing, one act play etc.

PSO3: To create an awareness among the students about socio-economic, political, cultural situations through the history of Marathi literature.

PSO4: To promote the values through the literature of Mukundraj, Saint Dnyaneshwar, Saint Dnyandev, Saint Tukaram, Saint Eknath, Saint Namdev etc.

PSO5: To understand the spiritual and religious aspects from the writers the Saint Janabai, Chokhamela, Karmmela, Gora Kumbhar, Visoba Khechar, Savta Mali etc.

PSO6: To develop an interest in Reading-writing skills, critical approach ability.

PSO7: To determine and analyze various literary types like, Dalit, Rural, feminist, tribal, folk literature etc.

PSO8: To understand the literary process through literary criticism.

PSO9: To understand the literary thoughts of great writers such as Sigmund Fried, Karl Yung, F. C. Prescott, S. T. Coleridge, and T. S. Eliot etc.

PSO10: To develop Humanitarian, universal, social commitment approaches towards society.

### Course Outcomes:

CO1: To develop overall mental, social, and innovative growth of students.

CO2: To motivate students to develop reading and writing abilities.

CO3: To get knowledge of our great tradition and culture of Marathi literature.

CO4: To appreciate the impact of social situations in the writings.

CO5: To inculcate the social commitment among students.

CO6 Students will motivate themselves through literature in their problem solving and will interpret the world.

CO7: To help to create creative writers and innovative scholars.

CO8 Supports to create formal and informal writings like Essay, letter, report, news, advertisements etc.

CO9: Promotes to create and develop reading culture.

CO10: Helps to develop Elocution, Debate, etc.

  
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# Department of Public Administration

## Subject Outcomes

- Explain the cross-cultural context of public and private institutions operating in a global environment.
- Manage diversity issues within an organizational framework.
- Identify major issues in today's public and private institutions.
- Demonstrate the integrative knowledge, skills, and ethics necessary for responsible administrative, management and leadership positions.
- Demonstrate the management, legal, ethical, and behavioral skills for effective job performance and career mobility.
- To ready for good citizen.
  
- The student will be familiar with the mechanisms operating in the major political institutions and agencies for the creation and implementation of public policies.
- The student will be familiar with the social forces that affect the creation of public policies.
- The student will be familiar with the predominant political, economic, and social actors that actively engage in the policymaking process, including expert communities, interest groups, the media, agency bureaucrats, and elected officials.
- The student will be familiar with the dominant ideas presently used in the social sciences for understanding the impetus for the creation of public policy and the means for its successful implementation.
- The student will be able to apply this understanding of the various components of social policy making to effectively introduce new aspects to the existing consideration of a specific area of recent public policy interest.



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# Department of Political Science



## PROGRAMME OUTCOMES

- The Bachelor of Arts in Political Science prepares graduates to understand fundamental concepts in the discipline of Political Science.
- Students working toward teacher certification will demonstrate the ability to apply political science knowledge and methodologies within the classroom setting.
- Students will demonstrate substantive knowledge of concepts and facts relevant to Political Science.

## PROGRAMME SPECIFIC OUTCOMES

### B.A. F.Y.

#### ❖ Basic Concepts Of Political Science

- To acquaint with the theories, approaches, concepts and principles of political theory.
- To understand the various traditional and modern theories of political science.
- To evaluate the theories of origin of the state.

#### • Government And Politics Of Maharashtra

- To understand the evolution, scope and significance of state
- To understand the state political, social, economical, study of the state
- To understand the Importance of Panchayat Raj System
- To learn Political Party System

### B.A. S.Y.

#### ❖ Indian Government And Politics

- To understand the philosophy of Indian constitutions.
- To identify the causes, impact of British colonial rule.  
To appreciate the fundamental rights and duties and the directive principle of state policy

#### ❖ International Relations

- To understand the evolution, scope and significance of international relations and the rise of sovereign state system
- To understand the international political economy.
- To learn about issues of National and International World Scenario
- Understanding the nature and developments in national and international politics

### B.A. T.Y.

#### ❖ Western Political Thinkers:

- Building overall consciousness regarding national political history, international relations and present Indian and Western political thinkers.
- To have Exposure to modern as well as ancient political history
- Western political theory is back bone of today's world politics

- Political thought shows justice rights, law & other Issues related to governance

**B.A. T.Y.**

❖ **Political Ideologies**

- Examine and analyze the conditions that create the rise of ideologies.
- Interpret and analyze political ideologies as they apply to modern political problems.
- Apply their knowledge of ideologies to current political issues.



**Course outcome**

**B.A. F.Y.**

❖ **Government And Politics Of Maharashtra**

- To understand the study & scope and significance of state
- To understand the study political, social, economical. study of the state
- To understand & learn the Importance of Panchayat Raj System
- To Evaluated Political Party System

**B.A. S.Y.**

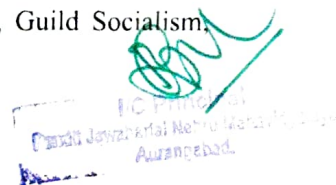
❖ **International Relations**

- To understand the evolution, scope and significance of international relations and the rise of sovereign state system
- To analyze the history of international relational through the causes and phases of colonialism
- To know the impact of First World War and Second World War and its causes and consequences to criticizes the various ideologies which lead to the destruction of world.
- To understand the concept of power, national, regional, global and peace security
- To acquaint with the international organizations and their neighbour nations.
- To identify various issues and challenges towards international relations

**B.A. T.Y.**

❖ **Western Political Thinkers:**

1. Providing an insight into the dominant features of Ancient Western Political Thought: Ancient Greek political thought with focus on Aristotle and Plato; Roman Political Thought: its contributions with special emphasis on the emergence of Roman law.
2. Examining the features of Medieval Political Thought.
3. Evaluating the Renaissance; political thought of Reformation; and Machiavelli.
4. Critically examining Badin's contributions to the theory of Sovereignty; Hobbes as the founder of the science of materialist politics; Locke as the founder of Liberalism with focus on his views on natural rights, property and consent; and Rousseau's views on Freedom and Democracy; Bentham's Utilitarianism; and John Stuart Mill's views on liberty and representative government.
5. Taking an insight into the following: Hegel's views on Civil Society and State; Utopian and Scientific socialism: basic characteristics.
6. Examining the varieties of non-Marxist socialism: Fabianism, Syndicalism, Guild Socialism, and German Revisionism.





## ❖ Political Ideologies

- Examine and analyze the conditions that create the rise of ideologies.
- Interpret and analyze political ideologies as they apply to modern political problems.
- Apply their knowledge of ideologies to current political issues.
- To have current knowledge of today's world political ideologies
- To have knowledge of democracy, nationalism state wise politics



## Project Work

- To explain importance of research
- How collects data
- To describe impact of problems on society

  
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# Department of Sociology

## Programme Specific Outcomes

- 1) Core course ensures that through teaching and learning knowledge of sociological concepts and theory imparted.
- 2) Content at syllabi develop the understanding of social equality, diversity and social issues.
- 3) Whole exercise is done to make students understand and to think critical about society and social problems.
- 4) The course intended to develop scientific temper and research qualities among students for the future career.
- 5) Follow new stream of thoughts and theories of social thinkers

## Course Outcomes

### 1) Introduction to Sociology

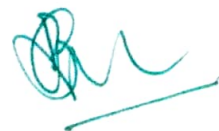
- To explain concept of theoretical perspectives in sociology and how they are used in sociological explanations of social behavior
- Describe origin and the development of sociology in general and development in India in particular
- Give importance and uses of sociology in present society

### 2) Individual and Society

- To explain factor of social change and social control
- To describe concept of social Structure
- To write concept of conformity and deviance

### 3) Introduction to subfield of sociology

- To explain factor of anthropology
- To describe concept of social psychology



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- To write concept of applied sociology
- 4) **Indian social composition**
    - To describe population factors and impact
    - To explain future of Indian society
    - To give importance of democracy in India
  - 5) **Problem of rural India**
    - To describe problems of rural India
    - To explain domestic violence
    - To describe education drop out
  - 6) **Contemporary urban issues**
    - To describe concept of urbanization
    - To give various types of urban planning
    - To explain importance of globalization and urban changes
  - 7) **Population in India**
    - To write on density of population in India
    - To describe concept of Indian Population
    - To Elaborated population growth and environment
  - 8) **Sociology of Development**
    - To explain problems of poverty and unemployment
    - To describe concept of development
    - To give importance and impact of Government Schemes in India
  - 9) **Sociological Tradition**
    - To describe theory of sociological thinkers
    - To explain French revolution
    - To explain scope of industrial revolution
  - 10) **Introduction to Research Methodology**
    - To explain types of Methodology
    - To give scope importance of research
    - To explain problems of objectivity in research
  - 11) **Social Problems in India**
    - **To give** importance of industrial projects
    - **To explain** problems of corruption
    - **To describe** various quality of education in India
  - 12) **Sociological Theories**
    - To explain theory of social action, symbolic interaction theory, theory of violence
    - To describe of theory of power and authority
  - 13) **Social Research Methods**
    - To describe techniques of investigation
    - Use of computer in research
    - To describe utility of social research
  - 14) **Social disorganization in contemporary India**
    - To explain concept and cause
    - To describe women violence
    - To explain terrorism and nakshalism
    - To give changing values and culture in India
  - 15) **Project Work**
    - To explain importance of research



  
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- How collects data
- To describe impact of problems on society



## Department of Economics

### Program Specific Outcomes

At the time of graduation, the students will be able to -

**PSO1:** To know broad characteristics of Indian Economy and World Economy

**PSO2:** To analyze nature and behavior of market, demand and supply in market

**PSO3:** To get acquainted with Policies of Agriculture and Industrial.

**PSO4:** To know about new Economic reforms like globalization

**PSO5:** To acquire knowledge of various aspects of Economics, like human development, human welfare

**PSO6:** To be familiar with aspects of Economic planning, strategy of planning and achievements of planning

### Course Outcomes

**F.Y. B.A.**

**Semester – I**

#### Micro Economics

Upon completion of the course, the students will be able to-

**CO1:** Discuss basic concepts of Economics

**CO2:** Discuss basic aspects of Demand and Supply Theories

**CO3:** Analyze consumer's behavior

**CO4:** Discuss basic aspects of consumer's equilibrium

**CO5:** Analyze and explain market equilibrium

#### Indian Economy

Upon completion of the course, the students will be able to-

**CO1:** Discuss broad features of the Indian Economy

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**CO2:** Identify major issues related to population and population policy

**CO3:** Define natural resources in India

**CO4:** Describe nature and types of unemployment and concept of poverty

**CO5:** Explain new economic reforms and concept of globalization



### **Price Theory**

Upon completion of the course, the students will be able to-

**CO1:** Discuss concept of Production function

**CO2:** Analyze cost and Revenue

**CO3:** Classify market in various types

**CO4:** Evaluate theories of distribution

**CO5:** Understand meaning and related concepts of factor pricing

### **Money, Banking and Finance**

Upon completion of the course, the students will be able to-

**CO1:** Explain basic aspect about money

**CO2:** Evaluate principle of Commercial Banks and Banking Structure in India

**CO3:** Discuss New Concepts in banking sector

**CO4:** Discuss functions of Reserve Bank of India

**CO5:** Define the term money market and capital market

## **S.Y. B.A.**

### **Macro Economic**

Upon completion of the course, the students will be able to-

**CO1:** Discuss basic aspects of macro Economics

**CO2:** Describe concept of National Income

**CO3:** Explain theory of money and identify the index number

**CO4:** Explain theories of employment

**CO5:** Explain Keynesian theory of employment and Nature of trade cycle

### **Development of Economics**

Upon completion of the course, the students will be able to-

**CO1:** Discuss concept of economic development and growth

**CO2:** Analyze theories of Adam Smith and Malthus

**CO3:** Give factors in development process

**CO4:** Get aware about Models of Economic Growth

**CO5:** Explain role of sector approach in Economical Development

  
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## **Public Finance**

Upon completion of the course, the students will be able to-

**CO1:** Discuss nature, scope and importance of public finance

**CO2:** Explain Public Revenue

**CO3:** Comprehend public expenditure

**CO4:** Describe concept, source, causes and effects and importance of public debt

**CO5:** Explain meaning, objective and components of Union Budget

## **Statistical Methods**

Upon completion of the course, the students will be able to-

**CO1:** Analyze collection of data – Primary and Secondary data

**CO2:** Describe types of series – simple, Discrete and continuous series

**CO3:** Discuss Arithmetic mean – its merits and demerits, mode and median

**CO4:** Evaluate Range, mean deviation and standard deviation

**CO5:** Explain variance and Co-efficient of variation

## **International Economics**

Upon completion of the course, the students will be able to-

**CO1:** Explain basic concept of international economics

**CO2:** Describe Gains from trade

**CO3:** Discuss types of tariffs and quotas

**CO4:** Evaluate concept and components of balance of payment

**CO5:** Discuss Demerits and limitations of devaluation

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## **Agriculture Economics**

Upon completion of the course, the students will be able to-

- CO1:** Discuss the role and importance of Agriculture
- CO2:** Describe various technologies used in Agriculture
- CO3:** Explain Government Agriculture Policies
- CO4:** Acquire knowledge of Indian agricultural development from last 50 years

### **History of Economic Thought**

Upon completion of the course, the students will be able to-

- CO1:** Explain concept of Mercantilism
- CO2:** Sketch out Adam Smith division of labour and theory of value
- CO3:** Comprehend Tomas R. Malthus – theory of population
- CO4:** Describe Karl Marks theory of dynamics of social change, theory of surplus value
- CO5:** Explain concept of aggregate economy and the role of fiscal policy

### **Research Methodology**

Upon completion of the course, the students will be able to-

- CO1:** Discuss meaning, nature, scope and objectives of social science research
- CO2:** Describe Facts – features Primary data collection
- CO3:** Discuss motivating factors of social research
- CO4:** Comprehend meaning and need of research design

### **Industrial Economics**

Upon completion of the course, the students will be able to-

- CO1:** Discuss importance and role of Industries in Economic and social development
- CO2:** Know industrial organization, ownership structure
- CO3:** Analyze location and dispersion of industries
- CO4:** Explain composition of industrial sector

#### **Indian Economic Thinker**

Upon completion of the course, the students will be able to-

- CO1** Students know the Economic Thought of Koutilya
- CO2** To know Economic Ideas of Indian Economic Thinker

### **Project work**

- CO1:** Describe Facts – features Primary data collection
- CO2:** Discuss motivating factors of social research
- CO3:** Students know the practical work about Project work

  
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# Department of History

## B.A. History Programme Outcome:

Board of Studies (History) Of Dr Babasaheb Ambedkar Marathwada & History Department faculty has indentified the specific objectives of its undergraduate curriculum. The following are the learning outcomes that we would like to see each history student graduate with. We are continuously and actively assessing our program to ensure that these outcomes are being met.

- Students shall be able to demonstrate thinking skill by analyzing, synthesizing and evaluating historical information from multiple sources.
- Students will develop the ability to distinguish between fact and fiction while understanding that there is no one historical truth.
- Students will demonstrate their understanding of cause and effect along with their knowledge of the general chronology of the human experience.
- Student will develop an ability to convey verbally their historical knowledge.
- Students will be able to demonstrate a breadth of training across historical time and space.
- Students will be able formulate historical arguments and communicate those arguments in clear and persuasive prose.
- Students will be able to apply, assess and debate the major historical schools of thought, methodology and types of sources that historians use to make original arguments.
- Understand the present existing social, political, religious and economic conditions of the people.
- Analyze relationship between the past and the present is lively presented in the history.
- To develop practical skills helpful in the study and understanding of historical events. They draw historical maps, charts, diagrams etc. Prepare historical model, tools etc.
- Develop interest in the study of history and activities relating to history. They :
  - a. Collect ancient arts, old coins and other historical materials,
  - b. Visit place of historical interests, archaeological sites, museums, and archives,
  - c. Read historical document, map, chart etc,
  - d. Play active roles in activities of the historical organizations and associations.
- The study of history helps to impart moral education.
- History installs the feeling of patriotism in the hearts of the Pupils.
- To cultivate historical awareness
- To critically think, read and write about the past.

  
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**Course Outcome: B.A. Sem. I & II**

- P. No. I. Shivaji & His Times,
- P. No. II. History of Modern Maharashtra
- P. No. III. History of the Marathas
- P. No. IV. Twentieth Century Maharashtra



- Understand the concept of swaraj established by Chh. Shivaji
- Understand social and religious background of the 17<sup>th</sup> century Maharashtra
- Understand the process of the transfer of the power from chhatrapati to Peshwa
- Understand social and religious condition in 17<sup>th</sup> century Maharashtra
- Analyse Administrative and Judicial system of Maratha period
- Understand the political ideas of chhatrapati Shivaji Maharaj
- Understand socio-religious & Economic condition of 17<sup>th</sup> century Maharashtra
- Recognize the process Enlightenment in 19<sup>th</sup> Century Maharashtra
- Understand early resistance to Colonial power in Maharashtra
- Recognize & understand the process of the rise & growth of Nationalism in Maharashtra
- To understand various Social movements in 20<sup>th</sup> century Maharashtra
- To know about the development of Education during the colonial period.
- To understand nature of States & States people movement.

**Course Outcome: B.A. Sem. III & IV.**

- P. No. V. History of Early India
- P. No. VII. History of India
- P. No. VI. History of Delhi Sultanat
- P. No. VIII. History of Mughal India

- Understand of Delhi Sultanate.
- Analyse Mughal administration, Arts & Architecture
- Identify cultural synthesis.
- Analyse medieval south India.
- Understand the theory of kingship in Medieval India.
- Analyse the reform of All Uchin Khilji, Shershaha Suri & Akbar.
- Analyse the religious policy Of Akbar.
- Describe Prehistory and protohistory
- Classify urbanization in the gangetic Basin.
- Classification of Buddhism and Jainism
- Acquire knowledge about Early Tamilakam.
- Identify Early Indian Maps.
- Analyses early human settlements - Paleolithic, Neolithic age.

**Course Outcome: B.A. Sem. V & VI**

- P. No. IX. Historiography
- P. No. X. History of Indian National Movement
- P. No. XI. History of India (A.D. 1757- A.D.1885)
- P. No. XV- Glimpes of the History of Marathwada
- P. No. XIII. Field of History
- P. No. XII & XVI Project Work :

- To cultivate historical awareness among student
- To critically think, read and write about the past.
- Produce written work that incorporates consideration of the relevant historiography along with the theory that inform it.
- Construct original historical arguments based on primary source
- Demonstrate a superior quality of writing both in terms of mechanics and in developing an argument effectively
- Write articles on historical topics. Writing history and Techniques of historical writing
- Develop their ability to assess critically historical analysis and argument, past and present

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- Gained an understanding of the development of the academic study of history throughout the world since the later eighteenth century (since the Renaissance )
- Gained an awareness of recent and contemporary debates in the theory practice of history writing.
- Gained insight into how historical arguments have been and are made.
- Identify history as Scientific Discipline.
- Understand nature and scope of archaeology
- Understand the importance of museum in the study of history.
- Encourage widespread participation in archaeology through society, identifying and addressing barriers to inclusivity.
- Understanding of technique and methods of presentation in history by the students,
- Preparation of primary bibliography,
- Identify Collection of Data.
- Presentation of finding, drafting the dissertation
- Understand Historical method of research.
- Increase interest in historical research through project work.
- Evaluate consolidation of English power in India.
- Analyses social, religious consciousness in India.
- Comparison of National movements - pre Gandhian and post- Gandhian Era.
- Identify Modern Indian Maps- sites of mutiny of 1857, Princely states in 1858, major site of National congress session, major sites in Civil Disobedience Movement--Ahmadabad, Dandi, Midnapur, Peshwar.
- Understand the process of Indian constitutional development.
- Analyze Democratic Culture in India
- Describe rise of modern world
- Classify growth of Capitalism.
- Analyze development of Democracy.
- Acquire knowledge about 20<sup>th</sup> century world
- Identify world map- Oceanic Exploration, Europe in 1815, important stages of world war, and Important centers of International trade.
- To Understand ancient history of Marathwada,
- Gain information about Trade & Trades route in Ancient Marathwada,
- To Understand Medieval History of Devagiris Yadava,



  
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**Faculty: Commerce**

**B.Com: General**



**B. Com F.Y./S.Y./T.Y.**

**Programme Specific Outcome**

**Bachelor of Commerce (B. Com.)**

PO 01: The students get theoretical exposure to the branches like accounts, Human resource management, trade and commerce, marketing, management, environment, finance, GST, Law etc.

PO 02: Enable students to become competitive in the areas of computer applications in accounting, group activities, Seminar and presentations, class discussions and e-learning within the classroom.

PO 03: Students get a solid foundation to pursue professional careers and take up various higher learning courses.

PO 04: The students develop entrepreneurial skills to start business ventures and increase self-employment.

PO 05: The students develop decision making at personal and organizational level and personality development skill.

PO 06: The students develop confidence, research aptitude by undertaking debates, group discussions, seminars, projects etc.

  
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## Outcomes of Commerce

B. Com F. Y.

### COs: Commerce



#### B. Com. B. Com First Year, First Semester (CBCS Pattern)

##### Financial Accounting-I (Paper-III)

CO1: The Course aims at acquainting the students with the emerging issues in business, trade and commerce regarding recording, maintaining and presenting the accounting and financial facts.

CO2: It clears the basic concepts of accounting and enables students to Prepare journal, ledger and balance sheet of the sole trader.

##### Business Mathematics and Statistics-I (Paper-IV)

CO1: The objective of this course is to impart knowledge so that students improve their logical reasoning ability and interpretation of various statically results and understand Mathematical calculations.

CO2: It provides basic knowledge of positional averages and enabled to calculate it.

##### Business and Industrial Economics-I (Paper-V)

CO1: The objective of this course is to acquaint the students with the knowledge of Business and industrial economics.

CO2: To provide the knowledge about indifference curve, consumer's equilibrium, elasticity of demand, regarding the elasticity of demand and demand forecasting.

##### Computer Application in Business-I (Paper-VI)

CO1: The Basic objective of this paper is to familiarize the student with basic concepts of the computers and hands on practice of the various operating system commands.

CO2: It provides basic knowledge of computer, computer codes and languages; Computer Codes: Different number systems, Binary, Octal, Hexadecimal, and Decimal.

##### Entrepreneurship Development-I (Paper-VII)

CO1: The object of this paper is to provide the entrepreneurial knowledge to students for entrepreneurship development.

CO2: It clear the concepts of different mechanisms help to start-up.

CO3: This Course provides students how to Set-up a new Venture.

#### B.Com. S. Y. III Semester III (CBCS Pattern)

##### Corporate Account-I (Paper -III)

CO1: The course aims is to acquaint the students' knowledge of company Account. For upgrading recording, maintaining& presenting of financial facts.

CO2: To create awareness about Corporate Accounting in conformity with the provisions of Companies Act and as per Indian Accounting Standards.

##### Cost Account-I (Paper -IV)

CO1: To create ability of students to understand basic cost accounting concepts and the classification of cost.

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CO2:- To develop number of methods.

### **I.T. Application in Business I (Paper -V)**

CO1: This course objective is to familiarize the students of computer application in various practices for their updating knowledge.

CO2:- Familiarize with the mechanism of E-commerce

### **GST Account-I (Paper -VI)**

CO1: Creating ability of students to learn tax concepts, procedure and legislation pertaining to GST in India.

CO2: To make perfection in learning of GST Registration process.

### **Marketing Management-(Op)**

CO1: To provide the marketing knowledge to student for their skill & knowledge development about new era of marketing management.

CO2: Familiarize the students with the basic principles of marketing management.

CO3: Familiarize the students with the recent trends in marketing.

## **B.Com. T.Y. (Semester V and VI) (CBCS Pattern)**

### **1. Advanced Financial Accounting**

CO1: Understanding the preparation of Financial Statement

CO2: The object of this course is to equip the students with the ability to analyze, interpreted and uses financial accounts in Business enterprise.

### **2. Management Accounting**

CO1: This course is to equip the students with the ability to analyze and interpret accounting information in managerial decision making.

CO2: Understand the importance of management accounting techniques in financial decisions

### **3. Auditing**

CO1: The study of various components of this course will enable the student to know about the Auditing procedure.

CO2: To give knowledge about preparation of Audit report.

CO3: Discuss the various concepts of audit like Types of errors and frauds, Various Classes of Audit, Audit programme, Audit Note Book, Working Papers, Internal Control-Internal Check-Internal Audit.

### **4. Business Regularity Framework**

CO1: To improve the knowledge of student about the Indian contract act & consumer protection act. (Act. 2012) & some of the other laws.

CO2: The student will well verse in basic provisions regarding legal frame work governing the business world.

CO3: To develop the awareness among the students regarding these laws affecting trade business, and commerce.

### **5. Computerized Accounting**

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CO1: Provide a practical and theoretical knowledge about the best accounting software Tally ERP 9.

CO2: Equip the students to understand various usages of the Tally software and its application in Business processes for accounting purposes.

CO3: Develop skills to do various accounting through the Tally ERP software.



## 6. Rural Development & Agricultural Business

CO 01: Gain insight into the socio-economic structure of rural India.

CO 02: understand the prospects and problems of rural development in India.

CO 03: Explain the types of agriculture to include, horticulture, dairying and allied rural activities.

CO 04: Define the Agriculture, rural areas and rural families and principles of rural economic development.

  
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Faculty: Science

B. Sc.: General

## Department of Botany

### Programme Specific Outcomes

At the time of graduation, the students will be able to-

**PSO1:** Understand the basic concepts of taxonomy and ecology

**PSO2:** Acquire knowledge about economics and medicinal plants in agriculture and medicine

**PSO3:** Analyse the relationship between plants and microbes

**PSO4:** Understand the biology of diversity of seed plants or phanerogams

**PSO5:** Understand behaviors of fossils and gymnosperm plants


**PSO6:** Understand plant diseases, chemical properties and evolutionary relationship among taxonomic groups

### Course Outcomes

#### B. Sc. First Year

#### Paper I- Diversity of Cryptogams-I

Upon completion of the course, the students will be able to- **CO1:** Identify various types of plants in kingdom Plantae **CO2:** Identify Cryptogams

  
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**CO3:** Identify various types of Algae **CO4:** Describe various types of bacteria **CO5:** Describe various types of fungi **CO6:** Identify various types of viruses

### **Paper II- Morphology of Angiosperms**

Upon completion of the course, the students will be able to-

**CO1:** Describe various types of habitat habit and morphological characters

**CO2:** Identify various types of root, stem and leaves **CO3:** Identify various types of inflorescence and flowers **CO4:** Identify various types of fruits

**CO5:** Describe modifications of roots stems and leaves

### **Paper V- Diversity of Cryptogams-II**

Upon completion of the course, the students will be able to-

**CO1:** Describe Cryptogams

**CO2:** Describe characteristic feature of Bryophytes **CO3:** Describe Characteristic feature of Pteridophytes **CO4:** Identify various types of Bryophytes

**CO5:** Identify various types of Pteridophytes

### **Paper VI- Histology, Anatomy and Embryology**

Upon completion of the course, the students will be able to-

**CO1:** Describe various types of tissues

**CO2:** Describe anatomical characters of monocot and dicot plants

**CO3:** Describe various types of ovules

**CO4:** Describe vascular elements in tissues

## **B. Sc. Second Year**

### **Paper IX- Taxonomy of Angiosperms**

Upon completion of the course, the students will be able to- **CO1:** Describe various Classification Systems of plants **CO2:** Describe characteristics of various angiosperm families **CO3:** Describe various taxonomic terminologies

**CO4:** Describe importance of plant studies

**CO5:** Describe various tools used in taxonomy


### **Paper X- Plant Ecology**

Upon completion of the course, the students will be able to-

**CO1:** Describe importance of plant studies

**CO2:** Describe various terminologies used in ecology

**CO3:** Describe soil structure and soil types **CO4:** Describe various methods of conservation **CO5:** Describe ecological adaptations in plants

  
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### **Paper XIII- Gymnosperms and Utilization of plants**

Upon completion of the course, the students will be able to-

- CO1:** Differentiate angiosperm and gymnosperm
- CO2:** Describe the characteristic feature of gymnosperm plants
- CO3:** Describe economic importance of cereals pulses
- CO4:** Describe importance of timber plants
- CO5:** Describe medicinal values of plants
- CO6:** Describe uses of plants and their parts in various industries

### **Paper XIV- Plant Physiology**

Upon completion of the course, the students will be able to- **CO1:** Describe various physiological processes of plants **CO2:** Describe photosynthesis

- CO3:** Describe transpiration
- CO4:** Describe respiration
- CO5:** Describe stomata and functions of stomata
- CO6:** Describe osmosis

### **B. Sc. Third Year**

#### **Paper XVII- Cell & Molecular Biology**

Upon completion of the course, the students will be able to-

- CO1:** Describe Cell and cell structure **CO2:** Describe molecular basis of cell **CO3:** Describe various types of cells **CO4:** Describe mitosis and meiosis **CO5:** Identify various cell organelles
- CO6:** Describe various stages of cell division

#### **Paper XVIII (A) - Diversity of Angiosperms-I**

Upon completion of the course, the students will be able to- **CO1:** Describe various Classification Systems of plants **CO2:** Describe variations among angiosperm families

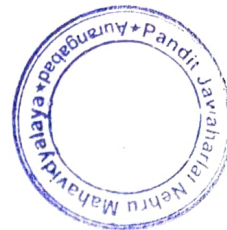
- CO3:** Describe various types of keys used for plant identification **CO4:** Describe various floral characters of angiosperm families **CO5:** Describe importance of plant studies and uses of plants

#### **Paper XXI- Genetics & Biotechnology**

Upon completion of the course, the students will be able to-

- CO1:** Describe genetics

  
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**CO2:** Describe the basic information about gene, hybridisation and genetic material

**CO3:** Describe various genetic abnormalities

**CO4:** Describe mutation and chromosomal aberrations

**CO5:** Describe uses and applications of r-DNA technology

### **Paper XXII (A)- Diversity of Angiosperms – II**

Upon completion of the course, the students will be able to-

**CO1:** Describe characteristic feature of various families of angiosperm plants

**CO2:** Describe the importance of plants of various families

**CO3:** Describe various tools used in taxonomy

**CO4:** Describe botanical gardens, bio-reservoirs and conserved forests

**CO5:** Describe herbariums and gene banks

  
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## **Department of Zoology**

### **Program Specific Outcomes**

At the time of graduation, the students will be able to- **PSO1:** Understand concept of cell biology and genetics **PSO2:** Study various phylum and their classification **PSO3:** Understand mammalian physiology

**PSO4:** Recognize relationship between structure and function at all levels: molecular, cellular, and organismal

**PSO5:** Understand the chemistry and structure of all biological macromolecules including proteins and nucleic acids, determine their biological properties

**PSO6:** Understand nature and basic concepts of physiology, biochemistry, ecology, evolution and biotechnology

**PSO7:** Study animal diversity, including knowledge of specification, classification and evolutionary relationship of major groups of animals

**PSO8:** Understand biological, chemical and physical features of environment, e.g. terrestrial, freshwater, marine, host that animals inhabit

**PSO9:** Gain knowledge in the field of environment conservation, evolution and behaviour of animals

**PSO10:** Understand functions of organisms at the level of the gene, genome, cell, tissue, organ and organ-system

**PSO11:** Understand applications of rDNA technology to think critically and solve problems in the fields of biotechnology by applying research strategies





## Course Outcomes

F.Y. B.Sc.

### Semester I

#### Paper I- Protozoa to Annelida

Upon completion of the course, the students will be able to:-

**CO1:** Identify animals by observation

**CO2:** Describe unique characters of Protozoa, Porifera, Coelenterate, Helminthes and Annelids

**CO3:** Explain life functions of Protozoa, Porifera, Coelenterate, Helminthes and Annelids **CO4:** Describe ecological role of phylum Protozoa, Porifera, Coelenterata, Helminthes and Annelida

**CO5:** Identify diversity from Protozoa, Porifera, Coelenterate, Helminthes and Annelids

#### Paper II- Cell Biology

Upon completion of the course, the students will be able to:-

**CO1:** Describe in detail the structure of cell

**CO2:** Describe function and the composition of the plasma membrane

**CO3:** Explain principles of the cell theory

**CO4:** Differentiate between prokaryotes and eukaryotes

**CO5:** Understand importance of the nucleus and its components

**CO6:** Understand how the endoplasmic reticulum and Golgi apparatus interact with one another and know with which other organelles they are associated

**CO7:** Identify three primary components of the cell's cytoskeleton and how they affect cell shape, function, and movement

### Semester II

**Paper IV- Arthropoda to Echinodermata and Hemichordata** Upon completion of the course, the students will be able to:- **CO1:** Identify animals by observation

**CO2:** Describe unique characters of Arthropods, Mollusks, Echinoderms and Hemichordates **CO3:** Explain life functions of Arthropods, Mollusks, Echinoderms and Hemichordates **CO4:** Explain ecological role of phylum from Arthropoda to Hemichordata

**CO5:** Explain in detail diversity from Arthropods to Hemichordate

#### Paper V- Genetics – I

Upon completion of the course, the students will be able to:-

**CO1:** Describe chemical basis of heredity

**CO2:** Explain role of genetics in evolution

**CO3:** Evaluate conclusions that are based on genetic data

  
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## Course Outcomes

F.Y. B.Sc.

Semester I

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**CO4:** Find the results of genetic experimentation in animal

**S.Y. B.Sc.**

**Semester III**

**Paper VII- Vertebrate Zoology**

Upon completion of the course, the students will be able to:-

**CO1:** Describe unique characters of urochordates, cephalochordates and fishes

**CO2:** Recognize life functions of urochordates to fishes

**CO3:** Explain ecological role of different groups of chordates

**CO4:** Explain the diversity of chordates and describe unique characters of amphibians, reptiles, aves and mammals

**CO5:** Describe life functions of amphibians, reptiles, aves and mammals

**CO6:** Explain ecological role of different classes of vertebrates

**Paper VIII- Genetics - II**

Upon completion of the course, the students will be able to:-

**CO1:** Explain in detail gene expression and its behaviour in transformation

**CO2:** Describe the role of genetics in evolution

**CO3:** Evaluate conclusions that are based on genetic data in population genetics

**CO4:** Describe genetic diseases and disorders

**CO5:** Explain the techniques that are used in genetic engineering

**Semester IV**

**Paper XI- Animal Physiology**

Upon completion of the course, the students will be able to:-

**CO1:** Describe in detail the physiology at cellular and system levels

**CO2:** Explain the role of different bio-molecules

**CO3:** Explain how mammalian body get nutrition from different bio-molecules

**CO4:** Describe the functions of different systems

**CO5:** Describe the physiology of respiratory, renal, endocrine and reproductive systems to define normal and abnormal functions

**Paper XII- Biochemistry and Endocrinology**

Upon completion of the course, the students will be able to:

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**CO1:** Describe in detail the metabolism of carbohydrates, proteins, fats

**CO2:** Explain the fundamental biochemical principles

**CO3:** Describe basic laboratory techniques in biochemistry **CO4:** Describe the structure and function of endocrine glands **CO5:** Explain the role of hormones

**T.Y. B.Sc.**

**Semester V**

**Paper XV- Ecology**

Upon completion of the course, the students will be able to:-

**CO1:** Describe abiotic and biotic factors that affect, the distribution, dispersal, and behaviour of organisms

**CO2:** Identify factors that affect biological diversity and the functioning of ecological systems

**CO3:** Use an ecological vocabulary in arguments and explanations of ecological phenomena

**CO4:** Apply concepts and theories from biology to ecological examples

**CO5:** Analyse and interpret ecological information, research and data

**Paper XVI-F- Biotechnology-I**

Upon completion of the course, the students will be able to:-

**CO1:** Describe the use of genetically engineered products to solve environmental problems

**CO2:** Explain principles for the basis of recombinant DNA technology

**CO3:** Explain steps involved in the production of by-products and methods to improve modern biotechnology and can apply basic biotechnological principles, methods and models to solve biotechnological tasks

**Semester VI**

**Paper XIX- Evolution**

Upon completion of the course, the students will be able to:-

**CO1:** Describe evolutionary history of man

**CO2:** Describe origin of species on earth

**CO3:** Have an enhanced knowledge and appreciation of evolutionary biology and behaviour

**CO4:** Perform, analyse and report on experiments and observations in whole-organism biology

**CO5:** Gain information regarding animal classification and systematic, animal structure and function relationships, evolution between and within major animal groups, human evolution and animal reproduction and development

**Paper XX-F- Biotechnology-II**

  
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Upon completion of the course, the students will be able to:-

- CO1:** Demonstrate ability to apply research strategies like contamination and sterilization of laboratory in cell culture
- CO2:** Explain technical skills necessary for supporting biotechnology research activity in tissue culture and transgenic animal methods
- CO3:** Explain applications of biotechnology
- CO4:** Describe Gene therapy and DNA fingerprinting
- CO5:** Demonstrate knowledge of biotechnology concepts in ex vivo, in vivo gene therapy to diagnosis human diseases

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## Department of Physics

### Programme Specific Outcomes

At the time of graduation, the students will be able to-

- PSO1:** Understand basic concepts of Mechanics, Optics, Thermodynamics and Mathematical methods of Physics
- PSO2:** Use effectively various basic measuring Instruments in laboratory
- PSO3:** Acquire Knowledge of mathematical Physics, Electronics, Statistical Physics and its applications
- PSO4:** Understand basic Laws of practical Physics
- PSO5:** Draw appropriate conclusions on outcomes of experiments
- PSO6:** Acquire ability to understand different types of crystal structures, classical and quantum theory of specific Heat, Electrodynamics with applications and Fibre Optics and its uses
- PSO7:** Understand and apply simple basics of Quantum mechanics
- PSO8:** Understand and solve Maxwell's equations
- PSO9:** Gain comprehensive knowledge of various techniques used in laser and its applications

### Course Outcomes

F.Y. B. Sc. Semester I

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## Paper I –Mechanics, Properties of Matter

Upon completion of the course, the students will be able to:

**CO1:** Describe acceleration due to gravity, Newton's law of gravitation and basics of potential and fields

**CO2:** Discuss basic properties of matter, Young's modulus, Bulk modulus and Modulus of rigidity

**CO3:** Discuss properties of matter especially viscosity and surface tension

**CO4:** Define the general terms in acoustics intensity, loudness, reverberation etc.

## Paper II- Heat & Thermodynamics

Upon completion of the course, the students will be able to:

**CO1:** Define Thermal Conductivity, coefficient of thermal conductivity, Thermal diffusivity, and resistivity; give comparison of conductivities of various metals

**CO2:** Describe reason for modification of gas equation; derive Vander Waals equation of state; define critical constants

**CO3:** Explain Transport phenomenon, mean free path with expression, thermal conductivity and viscosity

**CO4:** Formulate and solve problems in Thermodynamics and Heat; explain adiabatic

Process, isothermal process, reversible process, irreversible process and derive relevant equation, draw indicator diagram

**CO5:** Derive Thermodynamic parameters, Heat engine and Carnot Heat Engine, Maxwell's equation and their applications

## Semester II

### Paper-IV Geometrical and Physical Optics

Upon completion of the course, the students will be able to:

**CO1:** Describe and determine concept of cardinal point and different eye pieces **CO2:** Explain interference phenomenon of light and its relevant experiments **CO3:** Explain concept of diffraction of light and grating

**CO4:** Describe polarization of light and its related Experiments

### Paper V- Electricity & Magnetism

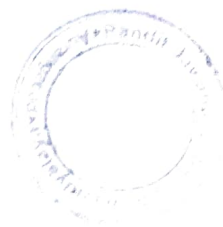
Upon completion of the course, the students will be able to:

**CO1:** Describe the concept of Scalar, vector triple product of vector algebra and Solve divergence, gradient and curl

**CO2:** Explain Coulomb's law, Gauss law and dielectrics with mathematical derivation **CO3:** Explain the concept of Biot-Savart's Law, Ampere's Law and Ballistic Galvanometer **CO4:** Elaborate growth and decay of LCR circuit

  
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## S.Y. B. Sc. Semester III



### **Paper VII- Mathematical Physics and Relativity**

Upon completion of the course, the students will be able to:

**CO1:** Explain partial differentiation, successive differentiation and total differentiation **CO2:** Describe ordinary differential equation and solutions of first and second order differentiation equation

**CO3:** Elaborate theories and methods of statistical Physics and quantum statics

**CO4:** Explain principle of special theory of relativity and derive relevant equations including Einstein equation

### **Paper VIII- Modern Physics**

Upon completion of the course, the students will be able to:

**CO1:** Explain Photoelectric Effect and its applications in various processes

**CO2:** Describe X- Ray radiation and its spectra

**CO3:** Explain theoretical aspect of Atomic mass, nuclear fission and Energy released in nucleus

**CO4:** Describe Particle accelerator, Cyclotron and Deuterons

### **Semester IV**

#### **Paper XI- General Electronics**

Upon completion of the course, the students will be able to:

**CO1:** Describe semiconductors, Zener diode, Transistor and give its application

**CO2:** Explain Amplifier, RC coupling and Transistor biasing and discuss its applications

**CO3:** Describe theoretical and practical aspects of Oscillator and Multi-vibrator

**CO4:** Elaborate modulation, FM Modulation and AM wave

#### **Paper XII- Solid State Physics**

Upon completion of the course, the students will be able to:

**CO1:** Explain types of solids, miller indices, inter planner spacing and different types of Crystal structures

**CO2:** Elaborate concept of inter atomic forces and Kroning Penney Model

**CO3:** Describe classical theory of lattice heat capacity and Debye model; discuss limitations of Debye model

**CO4:** Discuss applications of free electron theory of Metals, Hall effect, Hall voltage and Hall coefficient and importance of Hall Effect

**CO5:** Describe transport properties of electrical conductivity thermal conductivity

### **T.Y. B. Sc. Semester V**

#### **Paper XV- Classical & Quantum Mechanics**

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Upon completion of the course, the students will be able to:

- CO1- Explain basic concept of Classical Mechanics, mechanics of particle, and mechanics of particle by using Newton's laws of motion
- CO2- Derive Lagrange's equation and its various applications
- CO3- Explain basic concepts of constraints, its types and Virtual work done
- CO4- Discuss mathematical basics of quantum mechanics, explain matter wave, Group velocity, particle velocity, operators, wave function and expectation values
- CO5- Derive Schrodinger time dependent and independent equation and describe particle in one-dimensional box

### **Paper XVI- Electrodynamics**

Upon completion of the course, the students will be able to:

- CO1: Describe and understand divergences, curl, and Gauss Law applications in Electrostatics
- CO2: Explain concepts of self-induction, mutual induction and equation of continuity
- CO3: Describe origin of Maxwell's equations in magnetic and dielectric media
- CO4: Derive electromagnetic wave equation in conduction medium
- CO5: Explain transport of energy and Poynting vector, Poynting theorem
- CO6: Describe boundary condition for electromagnetic field vectors B, E, D and H

### **Semester VI**

### **Paper XIX- Atomic, Molecular Physics & LASER**


Upon completion of the course, the students will be able to:

- CO1: Explain Thomson's atom model, Rutherford's nuclear atom model and Bohr's atom model
- CO2: Describe the concepts of Vector atom model, quantum numbers, Coupling Scheme and Pauli's exclusive principle
- CO3: Explain Zeeman Effect and Stark effect
- CO4: Describe Rotation, Vibration Spectra, Raman Effect and its applications in various fields
- CO5: Discuss LASER system and its properties, types of LASER and its medical, biological and industrial applications

### **Paper XX- Non-conventional Energy Sources and Optical Fiber**

Upon completion of the course, the students will be able to:

- CO1: Explain the concept of technologies of non-conventional sources of energy
- CO2: Describe various renewable energy technology
- CO3: Discuss non-conventional energy sources: Biomass, wind energy, tidal energy, ocean energy, geothermal energy and solar energy

  
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**CO4:** Elaborate the concept of solar energy and its applications in various fields

**CO5:** Describe structures of optical fibers

**CO6:** Describe fiber fabrication techniques and testing of optical fiber cables



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## Department of Chemistry

### Programme Specific Outcomes

At the time of graduation, the students will be able to-

**PSO1:** Understand the fundamental principles of Chemistry

**PSO2:** Develop skills in evaluation and interpretation of chemical information and data

**PSO3:** Identify and estimate organic and inorganic compounds using classical and modern laboratory methods

**PSO4:** Analyze various organic mixtures and individual compounds

**PSO5:** Develop skills in the safe-handling of chemical materials, taking into account of their physical and chemical properties including any specific hazards associated with their use

**PSO6:** Gain comprehensive knowledge about fundamental properties of elements

**PSO7:** Acquire knowledge regarding importance of various elements present in the periodic table, coordination chemistry, structure of molecules, properties of compounds and structural determination of complexes using theoretical and instrumental methods

**PSO8:** Perform accurate quantitative measurements with an understanding of the theory and use of contemporary chemical instrumentation, interpret experimental results, perform calculations on these results and draw reasonable accurate conclusion

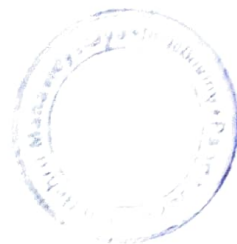
**PSO9:** Synthesize, separate and characterize compounds using published reactions, protocols, standard laboratory equipment and modern instrumentation

**PSO10:** Acquire problem solving skills in three basic areas of Chemistry, i.e., Inorganic, Organic and Physical Chemistry

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Course Outcomes

## F.Y. B.Sc. Semester I



### Paper No. I (Inorganic Chemistry)

Upon completion of the course, the students will be able to-

**CO1:** Predict atomic structure and explain various quantum numbers

**CO2:** Explain standardized names and symbols to represent atoms, molecules, ions and chemical reactions

**CO3:** Explain trends of periodic properties of elements in periodic table

**CO4:** Predict biological role of Alkali and Alkaline earth metals

### Paper No. II (Organic Chemistry)

Upon completion of the course, the students will be able to-

**CO1:** Explain various effects, and properties of organic compounds, nature of bond

**CO2:** Discuss nature of bond breaking and mechanical phenomenon

**CO3:** Explain concept of isomerism and types of stereochemical configuration

**CO4:** Discuss mechanistic pathways of simple organic reaction

## Semester II

### Paper No. IV (Physical Chemistry)

Upon completion of the course, the students will be able to-

**CO1:** Differentiate colloids, liquid crystals and properties of solid, liquid and gas

**CO2:** Derive differential equations related to order of reactions

**CO3:** Explain and correlate various laws with respect to gaseous state

**CO4:** Categorize catalysis on the basis of phases

**CO5:** Identify areas of applications of colloids, enzyme catalysts in day to day life

### Paper No. V (Inorganic Chemistry)

Upon completion of the course, the students will be able to-

**CO1:** Demonstrate preparation, physical and chemical properties, structural properties, applications of various elements

**CO2:** Discuss chemical bonding, hybridization and molecular geometry on the basis of VBT

**CO3:** Differentiate types of indicators and correlate with appropriate titration method

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**CO4:** Explain various aspects of radioactivity

**Practicals (Lab course)**

Upon completion of the course, the students will be able to-

**CO1:** Prepare and standardize various solutions

**CO2:** Determine basicity of given organic acid

**CO3:** Determine viscosity of given liquid

**CO4:** Identify acidic and basic radicals in given mixture

**CO5:** Identify types of organic compounds by chemical analysis method

**S.Y. B.Sc. Semester III**

**Paper No. VII (Organic Chemistry)**

Upon completion of the course, the students will be able to-

**CO1:** Give types of alcohol and its identification in simple organic compounds

**CO2:** Differentiate alcohol and phenols in simple and complex organic molecules

**CO3:** Explain the structure of carbonyl compounds and type of various name reaction involving carbonyl group

**CO4:** Analyse effect of substituent on acidity of carboxylic acid

**CO5:** Analyse effect of basicity in various simple heterocycles

  
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**Paper No. VIII (Physical Chemistry)**

Upon completion of the course, the students will be able to-

**CO1:** Distinguish isothermal, adiabatic, isochoric and other thermodynamic processes

**CO2:** Correlate law of mass action, equilibrium constant with free energy

**CO3:** Solve numerical problems related to efficiency, work done, heat change

**CO4:** State and explain postulates of laws of Thermodynamics

**CO5:** Interpret interrelations between Clapeyron, Clausius and other relevant equations



## Semester IV


### Paper No. X (Inorganic Chemistry)

Upon completion of the course, the students will be able to-

**CO1:** Present in depth knowledge of abundance, position, preparation, properties and chemical behaviour of various d and f block elements from the periodic table

**CO2:** Identify co-ordination compounds and its applications

**CO3:** Differentiate aqueous and non aqueous solve

  
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### **Paper No. XI (Physical Chemistry)**

Upon completion of the course, the students will be able to-

**CO1:** Explain different types of conductometric titrations

**CO2:** Solve mathematical problems on electro-chemistry

**CO3:** Explain phase diagrams of one component systems

**CO4:** Explain phase diagrams of two component systems

**CO5:** Classify electrochemical and electrolytic cells

### **Practicals (Lab course)**

Upon completion of the course, the students will be able to-

**CO1:** Determine concentration values of sample solutions using instrumentation

**CO2:** Evaluate and interpret heat of neutralization reactions

**CO3:** Analyse quantitatively, specific elements by volumetric and gravimetric methods

**CO4:** Determine critical solution temperatures of heterogeneous phases

**CO5:** Determine the molar refractive index of given sample by refractometer

**CO6:** Prepare organic derivatives and determine physical constants

**CO7:** Estimate ester, amide and other organic molecule entities

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### **Paper No. XIII (Physical Chemistry)**

Upon completion of the course, the students will be able to-

- CO1:** Explain synthesis of nanomaterials
- CO2:** Solve mathematical problems on determination of bond length
- CO3:** Derive Schrodinger wave equation of Hydrogen atom
- CO4:** Explain basic features of different spectrometers
- CO5:** Determine structure of molecules applying magnetic property

### **Paper No. XIV (Organic Chemistry)**

Upon completion of the course, the students will be able to-

- CO1:** Find out types of sets of proton in organic compound
- CO2:** Solve simple PMR problems with given data
- CO3:** Classify various organometallic compounds and activity in simple organic transformation
- CO4:** Identify and classify various active Methylene compounds

### **Semester VI Paper No. XVI (Inorganic Chemistry)**

Upon completion of the course, the students will be able to-

- CO1:** Explain nature of metal-ligand bonding and illustrate splitting of d orbitals
- CO2:** Demonstrate mechanism of sodium potassium cycle
- CO3:** Describe essential and trace elements and their role in biological system
- CO4:** Categorize chromatographic techniques with reference to adsorbents and other components

### **Paper No. XXII (Organic Chemistry)**

Upon completion of the course, the students will be able to-

- CO1:** Explain effect of aromaticity on strength of basicity of heterocyclic compound
- CO2:** Classify carbohydrates and its utility in day to day life
- CO3:** Explain synthesis of paracetamol
- CO4:** Explain properties of good Drugs

### **Practicals (Lab course)**

Upon completion of the course, the students will be able to-

- CO1:** Identify organic mixtures by chemical analysis method
- CO2:** Analyse inorganic radicals by chemical analysis method
- CO3:** Identify and separate given mixtures by gravimetric and volumetric method
- CO4:** Analyse percent composition of acid mixture by Conductometric method
- CO5:** Identify empirical formula by potentiometric method

  
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# Department of Microbiology



## Programme Specific Outcomes

At the time of graduation, the students will be able to-

**PSO1:** Understand fundamental principles involved in Microbiology

**PSO2:** Acquire detail knowledge of microorganisms, their types and significance

**PSO3:** Understand metabolic and structural significance of bio-molecules

**PSO4:** Acquaint with concepts of Immunity, Antigen, Antibody and Immune system

**PSO5:** Understand importance and applications of various enzymes in replication transcription and translations

**PSO6:** Acquire detail knowledge of industrial production of enzymes, antibiotics and vitamins

## Course Outcomes

### F.Y. B. Sc. Semester I

#### Paper I – Fundamentals of Microbiology

At the end of the course, the students will be able to-

**CO1:** Identify distribution of microorganism in nature

**CO2:** Determine evolution of microbiology and their role in various biological processes  
**CO3:** Classify Microorganisms into different category according to taxonomic ranks  
**CO4:** Determine Biochemical properties of microorganisms

**CO5:** Calculate magnification, resolving power, depth of focus, numerical aperture of Microscope

#### Paper II- Microbial Techniques and General Microbiology

At the end of the course, the students will be able to-


**CO1:** Conceptualize microorganisms and their types, importance and Practical aspects

**CO2:** Distinguish between beneficial and harmful Microbes

**CO3:** Cultivate, observe and perform microscopic identification of bacteria, fungi and other microbes

**CO4:** Describe concept, methods and pattern of Sterilization and its practical applicability

**CO5:** Discuss role of Microorganisms in spreading diseases, usefulness in agriculture, environment and industrial sector

  
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## Semester II

### Paper-IV Cytology and general Microbiology

At the end of the course, the students will be able to-

- CO1:** Describe different structural parts & its arrangement of Microbial cells
- CO2:** Classify bacteria on nutritional requirements
- CO3:** Determine Bacterial growth curve
- CO4:** Calculate mathematics of bacterial growth curve **CO5:** Describe mode of nutrient uptake by bacteria **CO6:** Describe Bacterial photosynthesis
- CO6:** Discuss advances in Microbiology
- CO7:** Determine shape, size and structure of bacteria by various staining procedures

### Paper V- Basic Biochemistry

At the end of the course, the students will be able to-

- CO1:** Describe structures, functions and classification of carbohydrates, proteins, amino acids, lipids, nucleic acids
- CO2:** Discuss metabolic and structural significance of bio-molecules
- CO3:** Describe functional groups and biochemical interactions present in bio-molecules
- CO4:** Explain concept of pH, buffer, titration curve and pKa value
- CO5:** Explain concept of enzyme, physicochemical factors contributing to enzyme activity
- CO6:** Discuss nutrients uptake of microbes, anaerobic respiration and photosynthesis

## S.Y. B. Sc. Semester III

### Paper VII- Environmental Microbiology


At the end of the course, the students will be able to-

- CO1:** Determine sources of Air, Water and Soil pollution and their effects **CO2:** Describe processes involved in purification of sewage and portable water **CO3:** Determine Air sampling techniques and its effectiveness
- CO4:** Classify enterobacter by various Biochemical tests: IMViC, MPN, Elevated temperature test
- CO5:** Calculate BOD, COD, Chlorine in water
- CO6:** Discuss relationship between soil microorganisms, Role of bio-fertilizers
- CO7:** Describe various biogeochemical cycles

### Paper VIII-Immunology

At the end of the course, the students will be able to-

- CO1:** Explain concept of Immunity, Antigen, Antibody, Immune system

  
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**CO2:** Describe structure, Classes, biological activity and gene Organization of antibodies and their diversity

**CO3:** Rationalize Expression of Ig genes, Monoclonal antibody (Chimeric Antibody and Humanized Antibody) and its formation and applications

**CO4:** Describe Lymphocyte (T and B cell) Activation and Regulation, Effector Mechanism Complement System: Activation and its Regulation

**CO5:** Discuss Diagnostic application of immunology: Practical aspects of Antigen-Antibody Interaction: Precipitation and Agglutination

**CO6:** Perform Blood grouping, isolation of bacterial Antigen and Ag-Ab reactions



#### **Semester IV**

##### **Paper XI-Applied Microbiology**

At the end of the course, the students will be able to-

**CO1:** Describe composition of milk, associated microorganism and Milk Sterilization

**CO2:** Discuss Food and Microorganisms, source of food contamination and food preservation

**CO3:** Describe Food born disease and Intoxication and Pathogen associated with food poisoning

**CO4:** Discuss mechanism of preparation of fermented foods and probiotics with the help of microorganisms

##### **Paper XII-Clinical Microbiology**

At the end of the course, the students will be able to-

**CO1:** Determine mode of entry, infection, symptoms, Laboratory diagnosis and treatment for Bacterial, fungal, Protozoan infections

**CO2:** Describe life cycle, pathogenesis, laboratory diagnosis of HIV, Oncogenic viruses

**CO3:** Determine nutrients for cultivation of pathogenic bacteria

**CO4:** Identify epidemiology of general bacterial, fungal, protozoan infections

**CO5:** Identify normal micro-flora of humans

**CO6:** Determine antibiotic resistance by Bacteria

#### **T.Y. B. Sc. Semester V**

##### **Paper XV-Microbial Genetics**

At the end of the course, the students will be able to-

**CO1:** Differentiate gene expression pattern between microorganisms and eukaryotes

**CO2:** Discuss importance and applications of different genes (structural genes, function genes etc)

**CO3:** Discuss importance and applications of various enzymes in the processes viz. replication transcription and translations etc

**CO4:** Describe various types of RNA and their role during translation, tRNA activations etc



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**CO5:** Discuss mutation, its types and related effects like loss of function and gain of functions etc

**CO6:** Explain re-combinations- transduction, conjugation with types and transformations etc

### **Paper XVI-Microbial Metabolism**

At the end of the course, the students will be able to-

**CO1:** Describe enzyme as biocatalyst, its classification and mechanism of action

**CO2:** Discuss metabolic role of coenzymes

**CO3:** Give industrial applications of free and immobilized enzyme

**CO4:** Explain bacterial anabolic-catabolic pathways and their regulation

**CO5:** Discuss modes of energy yielding metabolism, microbial fermentation and its significance

**CO6:** Determine factor affecting enzyme activity, overall enzyme kinetics viz.  $K_m$ ,  $V_{max}$ ,  $K_{cat}$

**CO7:** Prepare buffers, reagents and stock solutions

### **Semester VI Paper XIX-Recombinant DNA Technology**

At the end of the course, the students will be able to-

**CO1:** Discuss handling and applications of different DNA and RNA modifying enzymes

**CO2:** Elaborate techniques used for DNA transformation in host cells

**CO3:** Describe design of various vectors used for plants, animals and microorganisms and their modification strategies

**CO4:** Design cloning strategies for various applications

**CO5:** Differentiate transformed and non-transformed colonies

### **Paper XX-Industrial Microbiology**

At the end of the course, the students will be able to-

**CO1:** Elaborate various aspects of industrial technology related to Microbiology

**CO2:** Screen industrially important strains

**CO3:** State and explain principles of fermenter design and computer assisted fermentation control

**CO4:** Discuss fermentation process and downstream processing

**CO5:** Formulate media, aspects of raw material used, methods of strain improvement

**CO6:** Describe industrial production of enzyme, antibiotics, amino acids and vitamins

**CO7:** Produce, purify and estimate various products, like enzymes, ethanol, acids, and antibiotics with the help of microbes



  
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# Department of Mathematics

## Programme Specific Outcomes

At the time of graduation, the students will be able to:

**PSO1:** Acquire knowledge in basic Mathematics

**PSO2:** Communicate solutions of mathematical problems effectively

**PSO3:** Equip knowledge in various concepts involve in Calculus, differential equation, real analysis and algebra

**PSO4:** Acquire a breadth and depth of understanding in mathematics

**PSO5:** Understand reasonableness of solutions including sign, size, accuracy and units of measurement

**PSO6:** Apply mathematical proof techniques in a wide variety of mathematical areas, including algebra and analysis

## Differential Calculus

### Course Outcomes

#### F.Y. B.Sc. Semester I

At the end of the course, the students will be able to:

**CO1:** Solve problems on limits continuity and successive differentiation of Functions

**CO2:** Determine partial derivative of function more than one variable

**CO3:** Describe Rolle's Theorem, Lagrange's mean value theorem and Cauchy's mean value theorem

**CO4:** Determine expansion of  $e^x$ ,  $\sin x$ ,  $\cos x$ ,  $\sinh x$ ,  $\cosh x$ ,  $\tanh x$ ,  $\log(ax+b)$  etc.

**CO5:** Determine gradient, divergence and curl and directional derivatives

### Differential Equations

At the end of the course, the students will be able to:

**CO1:** Determine solution of first order linear differential equation

**CO2:** Determine solution of exact differential equation

**CO3:** Determine solution of linear equation with constant coefficient using general and short method

**CO4:** Determine solution of linear homogeneous differential equation

**CO5:** Explain formation of partial differential equation by eliminating the arbitrary-constants/functions

#### Semester II

  
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## Integral Calculus

At the end of the course, the students will be able to:

- CO1: Apply reduction formula
- CO2: Find integration of algebraic rational functions
- CO3: Apply fundamental theorem of integral calculus
- CO4: Find the area bounded by a curve.
- CO5: Calculate the length of arc of a curve
- CO6: Find line integral and surface integrals.
- CO7: Apply the theorems of Gauss, Green's and Stoke's theorem

## Geometry

At the end of the course, the students will be able to:

- CO1: Identify and use different type of equations of plane
- CO2: Determine equations of the system of planes and the length of perpendicular to a plane
- CO3: Determine equation of right line and the angle between the plane and line
- CO4: Determine condition for coplanar lines and short distance between two lines
- CO5: Determine equation of sphere and its intersection with the plane

## S.Y. B.Sc. Semester III

### Number Theory

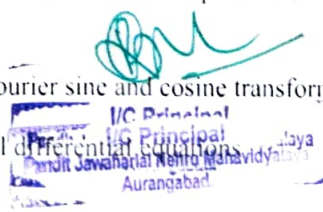
At the end of the course, the students will be able to:

- CO1: Describe division algorithm and solve the problem on it
- CO2: Determine GCD and LCM by using Euclidean algorithm
- CO3: Describe method of solving linear Diophantine equation
- CO4: Determine solution of linear congruence
- CO5: Describe Fermat's and Euler's theorem

### Integral Transform

At the end of the course, the students will be able to:

- CO1: Define beta and gamma functions and derive their properties and apply them in evaluating integrals
- CO2: Determine Laplace transform for various functions, properties of Laplace transforms
- CO3: Determine inverse Laplace transform, properties of inverse Laplace Transform, solve the problems using convolution theorem
- CO4: Determine Fourier transform, properties of Fourier transform, Fourier sine and cosine transforms
- CO5: Apply Laplace transform to find solutions of ordinary and partial differential equations





**CO2:** Explain resultant of several coplanar forces, equation of the line of action of the resultant, equilibrium of a rigid body under 3 coplanar forces

**CO3:** Explain Lammi's theorem and polygon of forces

**CO4:** Explain vector moment of a force and vector moment of couple

**CO5:** Describe basic concepts of centre of gravity and its applications



## Semester IV

### Numerical Methods

At the end of the course, the students will be able to:

**CO1:** Explain Bisection Method, Method of False Position, Newton-Raphson Method

**CO2:** Describe Finite Differences, Newton's Formula for Interpolation, Lagrange's Interpolation Formula, Divided Differences

**CO3:** Describe Least Square Curve Fitting Procedures, Fitting a straight line, Chebyshev polynomial, Power series

**CO4:** Calculate Solution of Linear system of equations, Eigen values and Eigen Vectors **CO5:** Calculate solution of ordinary differential equation by Taylor's series Method, Picard's Method, Euler's Method

### Partial Differential Equation

At the end of the course, the students will be able to:

**CO1:** Solve Lagrange's equation

**CO2:** Find different types of solutions like complete integral, Singular integral and general integral

**CO3:** Determine the solution of partial differential equations using Charpit's Method

**CO4:** Classify partial differential equations to special types

**CO5:** Describe Monge's Method, Method of transformation

### Mechanics II

At the end of the course, the students will be able to:

**CO1:** Find velocity and acceleration in terms of vector derivatives, curvature, Angular speed and angular velocity

**CO2:** Describe Radial and Transverse components of velocity and acceleration, areal speed and velocity

**CO3:** Explain Newton's Law of motion, angular momentum, work, energy, vector point function, Field of force

**CO4:** Describe motion under gravity, projectile, Motion of projectile, Parabola of safety

**CO5:** Describe motion in resisting medium

**CO6:** Describe areal velocity of central orbit, Pedal's equation

  
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## Real Analysis –I

### T.Y. B.Sc. Semester V

At the end of the course, the students will be able to:

**CO1:** Describe sets, functions, real valued functions, countable sets, Least upper Bound axiom and greatest lower bound axiom.

**CO2:** Give different types of sequence such as convergent, Divergent, monotone and its properties

**CO3:** Describe limit superior, limit inferior and Cauchy sequence

**CO4:** Explain basic concepts of series such as convergent, divergent, alternating series

**CO5:** Describe absolute and conditional convergence of the series

### Abstract Algebra- I

At the end of the course, the students will be able to:

**CO1:** Explain elementary concepts of sets, functions and integrals

**CO2:** Describe group, subgroup, counting principle, Normal subgroup, Quotient groups, Homomorphism

**CO3:** Define Ring, some special types of ring

**CO4:** Describe Ideals, Maximal Ideals

**CO5:** Explain quotient ring, polynomial ring

### Mathematical Statistics-I

At the end of the course, the students will be able to: **CO1:** Explain frequency distribution, Histogram

**CO2:** Describe measures of central tendency

**CO3:** Describe Dispersion and Kurtosis

**CO4:** Explain concepts of random variables and its characteristics

**CO5:** Explain concept of the probability with illustration

### Semester VI

#### Real Analysis –II

At the end of the course, the students will be able to:

**CO1:** Find Limits in Metric spaces

**CO2:** Explain continuous functions on Metric spaces

**CO3:** Describe connectedness, completeness and compactness

**CO4:** Describe set of Measure zero, Riemann integral, Fundamental theorem of calculus.

**CO5:** Explain Fourier series

#### Abstract Algebra- II



  
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At the end of the course, the students will be able to:

**CO1:** Describe elementary basic concepts of vector spaces

**CO2:** Explain Linear independence and bases

**CO3:** Describe dual spaces

**CO4:** Describe inner product spaces

**CO5:** Explain modules with illustrations



## **Mathematical Statistics-II**

At the end of the course, the students will be able to:

**CO1:** Find Mathematical Expectation and generating functions

**CO2:** Explain theoretical discrete probability distribution

**CO3:** Describe uniform distribution, binomial distribution, Normal Distribution, Gamma distribution

**CO4:** Describe correlation coefficient

**CO5:** Describe regression with examples

# **Department of Computer Science**

## **Programme Specific Outcomes**

At the time of graduation, the students will be able to-

**PSO1:** Understand basics of software systems

**PSO2:** Design, implement and document solutions to significant computational problems.

**PSO3:** Demonstrate understanding of principles and working of hardware and software systems of computer systems

**PSO4:** Apply fundamental principles and methods of Computer Science to a wide range of applications

**PSO5:** Design, implement, test, and evaluate computer system, component, or algorithm to meet desired needs and to solve computational problems

**PSO6:** Develop proficiency in the practice of computing

**PSO7:** Apply problem-solving skills and knowledge of Computer Science to solve real problems

**PSO8:** Enhance programming skills and adapt new computing technologies for attaining professional excellence and carrying research

## **Course Outcomes**

### **Semester I**

#### **Computer Fundamentals**

Upon completion of the course, the students will be able to-

  
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**CO1:** Explain various steps involved in problem solving techniques

**CO2:** Classify 7-8 high-level programming languages and two operating systems **CO3:** Analyze complex problems and the synthesis of solutions to those problems **CO4:** Explain software engineering principles

**Digital Electronics**

Upon completion of the course, the students will be able to-

**CO1:** Define digital components and devices

**CO2:** Explain logic gates and realization of OR, AND, NOT AND XOR Functions using universal gates

**CO3:** Explain combinational circuits like half adder/full adder, half subtractor/full subtractor, code converters, comparators, MUX/DEMUX

**CO4:** Evaluate sequential circuits like flip-flops, counters and shift registers

**Microprocessor- I**

Upon completion of the course, the students will be able to-

**CO1:** Define taxonomy of microprocessors and knowledge of contemporary microprocessors **CO2:** Explain architecture, bus structure and memory organization of 8086 as well as higher order microprocessors

**CO3:** Explore techniques for interfacing I/O devices to the microprocessor 8086 including several specific standard I/O devices such as 8251 and 8255

**CO4:** Define programming using the various addressing modes and instruction set of 8086 microprocessor

**C-programming II**

Upon completion of the course, the students will be able to-

**CO1:** Explain flowchart and design algorithm for a given problem and to develop IC programs using operators

**CO2:** Define conditional and iterative statements to write C programs

**CO3:** Classify user defined functions to solve real time problems

**CO4:** Describe C programs that use Pointers to access arrays, strings and functions

**CO5:** Explain user defined data types including structures and unions to solve problems

**Communications Skill – I**

Upon completion of the course, the students will be able to-

**CO1:** Describe importance of communication in daily life

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**CO2:** Elaborate importance of grammar as an effective tool for accuracy in communication

**CO3:** Describe listening is the most important aspect of all communication skills **CO4:** Develop body language is an important aspect of effective communication **CO5:** Discuss how pronunciation of words is essential for better comprehension in communication

### **Mathematical Foundation**

Upon completion of the course, the students will be able to-

**CO1:** Define set and constructing proofs

**CO2:** Draw graphs on the basis of available data **CO3:** Explain relations and determine their properties

**CO4:** Classify functions

### **Semester II**

#### **Data Structure**

Upon completion of the course, the students will be able to-

**CO1:** Define concept of Dynamic memory management, data types, algorithms

**CO2:** Give basic data structures such as arrays, linked lists, stacks and queues

**CO3:** Describe the hash function and concepts of collision and its resolution methods

**CO4:** Explain problem involving graphs, trees and heaps

**CO5:** Solve algorithm for sorting, searching, insertion and deletion of data

#### **Operating Systems**

Upon completion of the course, the students will be able to- **CO1:** Define the main components of an OS & their functions **CO2:** Explain the process management and scheduling

**CO3:** Elaborate various issues in Inter Process Communication (IPC) and the role of OS in IPC

**CO4:** Describe the concepts and implementation

#### **Microprocessor- II**

Upon completion of the course, the students will be able to-

**CO1:** Define the taxonomy of microprocessors and knowledge of contemporary microprocessors

**CO2:** Explain architecture, bus structure and memory organization of 8086 as well as higher order microprocessors

**CO3:** Explore techniques for interfacing I/O devices to the microprocessor 8086 including several specific standard I/O devices such as 8251 and 8255

**CO4:** Classify programming using the various addressing modes and instruction set of 8086 microprocessor

#### **C-programming II**

Upon completion of the course, the students will be able to-



  
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**CO1:** Give flowchart and design algorithm for a given problem and to develop IC programs using operators

**CO2:** Develop conditional and iterative statements to write C programs

**CO3:** Exercise user defined functions to solve real time problems

**CO4:** Explain C programs that use Pointers to access arrays, strings and functions

**CO5:** Classify user defined data types including structures and unions to solve problems



### **Communications Skill – II**

Upon completion of the course, the students will be able to-

**CO1:** Give importance of communication in daily life

**CO2:** Describe how grammar is an effective tool for accuracy in communication

**CO3:** Elaborate importance of all communication skills

**CO4:** Explain body language as an important aspect of effective communication **CO5:** Give importance of pronunciation of words for better comprehension in communication

### **Numerical Computational Method**

Upon completion of the course, the students will be able to-

**CO1:** Describe error analysis for a given numerical method

**CO2:** Explain an algebraic or transcendental equation using an appropriate numerical method

**CO3:** Prove results for numerical root finding methods

**CO4:** Explain approximate a function using an appropriate numerical method

### **Semester III**

#### **Advance Data Structure**

Upon completion of the course, the students will be able to-

**CO1:** Explain asymptotic notation, its properties and use in measuring algorithm behaviour

**CO2:** Explain mathematical principles to solve various problems

**CO3:** Evaluate complexities of various algorithms and select the best

**CO4:** Describe different strategies that are known to be useful in finding efficient algorithms to solve problems and to be able to apply them

**CO5:** Use appropriate data structure and algorithms to solve a particular problem

#### **UNIX Operating system**

Upon completion of the course, the students will be able to-

  
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**CO1:** Develop software for Linux/UNIX systems

**CO2:** Define C language and get experience programming in C

**CO3:** Explain important Linux/UNIX library functions and system calls

**CO4:** Verify the inner workings of UNIX-like operating systems

**CO5:** Define a foundation for an advanced course in operating systems

#### **PC maintenance**

Upon completion of the course, the students will be able to-

**CO1:** Describe electronic circuits with the knowledge of courses related circuits, networks, linear digital circuits and analog electronics

**CO2:** Explore the scientific theories, ideas, methodologies in operation and maintenance of communication systems to bridge the gap between academics and industries

**CO3:** describe work profession with new cutting edge Technologies in the fields of electronic design, communication and automatio

**CO4:** Describe operating system and other application software

#### **Programming in CPP**

Upon completion of the course, the students will be able to-

**CO1:** Explain the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects

**CO2:** Describe dynamic memory management techniques using pointers, constructors, destructors

**CO3:** Explain concept of function overloading, operator overloading, virtual functions and polymorphism

**CO4:** Describe inheritance with the understanding of early and late binding, usage of exception handling, generic programming

#### **DBMS**

Upon completion of the course, the students will be able to-

**CO1:** Describe different issues involved in the design and implementation of a database system

**CO2:** Explain physical and logical database designs, database modelling, relational, hierarchical, and network models

**CO3:** Explain data manipulation language to query, update, and manage a database

**CO4:** Describe DBMS concepts such as: database security, integrity, concurrency

#### **Statistical Method**

Upon completion of the course, the students will be able to-

  
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**CO1:** Explain inferential and descriptive statistics. Differentiate between a quantitative and a qualitative variable. Know the four levels of measurement: - nominal, ordinal, interval, and ratio

**CO2:** Define frequency distribution, determine the class midpoints, relative frequencies, and cumulative frequencies of a frequency distribution, Construct a Histogram, a Frequency Polygon, and a Pie Char.

**CO3:** Define mean, mode, and median. Explain the characteristics of the mean, mode, and median.

**CO4:** Calculate mean, mode and median for both grouped and ungrouped data

#### **Semester IV**

#### **Software Engineering**

Upon completion of the course, the students will be able to-

**CO1:** Describe successful professionals in the field with solid fundamental knowledge of software engineering

**CO2:** Utilize and exhibit strong communication and interpersonal skills, as well as professional and ethical principles when functioning as members and leaders of multi- disciplinary teams

**CO3:** Explain foundations in software engineering to adapt to readily changing environments using the appropriate theory, principles and processes

**CO4:** Describe the issues affecting the organization, planning and control of software.

#### **Fedora**

Upon completion of the course, the students will be able to-

**CO1:** Describe various contents of Linux

**CO2:** Give the requirements in Linux system installation

**CO3:** Describe the concept of handling Linux and performing operations using Linux commands and tools

**CO4:** Describe the basics of Linux, logical channels, advantages and limitations

#### **Basics of Networking**

Upon completion of the course, the students will be able to-

**CO1:** Describe concepts of OSI reference model and the TCP/IP reference model

**CO2:** Describe concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks

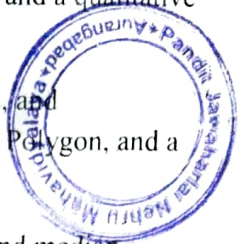
**CO3: Explain** wireless networking concepts

**CO4:** Explain contemporary issues in networking technologies

**CO5:** Explain network tools and network programming

#### **Core Java**

Upon completion of the course, the students will be able to-



  
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- CO1: Define structure and model of the Java programming language
- CO2: Use the Java programming language for various programming technologies
- CO3: Describe software in the Java programming language
- CO4: Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements

### Adv. DBMS

Upon completion of the course, the students will be able to-

- CO1: Explain elementary and advanced features of DBMS and RDBMS
- CO2: Describe conceptual frameworks and definitions of specific terms that are integral to the Relational Database Management Systems
- CO3: Define basic concepts of Concurrency Control and database security
- CO4: Prepare various database tables and joins them using SQL commands

### Web Fundamental

Upon completion of the course, the students will be able to-

- CO1: Describe history of the internet and related internet concepts that are vital in understanding web development
- CO2: Discuss insights of internet programming and implement complete application over the web
- CO3: Describe important HTML tags for designing static pages and separate design from content using Cascading Style sheet.
- CO4: Define the concept of JavaScript's

### Semester V

#### Software Cost Estimation

Upon completion of the course, the students will be able to-

- CO1: Prepare SRS document, design document, test cases and software configuration management and risk management related document
- CO2: Describe function oriented and object oriented software design using tools like rational rose
- CO3: Describe unit testing and integration testing
- CO4: Describe various white box and black box testing techniques

#### Android OS

Upon completion of the course, the students will be able to-

- CO1: Explain android platform Architecture and features
- CO2: Design User Interface and develop activity for Android Applications
- CO3: Define Intent, Broadcast receivers and Internet services in Android Applications

  
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**CO4:** Design database Application and Content providers

### **Core Java-II**

Upon completion of the course, the students will be able to-

**CO1:** Describe fundamentals of programming such as variables, conditional and iterative execution, methods

**CO2:** Explain fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries

**CO3:** Give important topics and principles of software development

**CO4:** Elaborate computer program to solve specified problems

**CO5:** Discuss Java SDK environment to create, debug and run simple Java programs

### **Computer Graphics**

Upon completion of the course, the students will be able to-

**CO1:** Elaborate basics of Computer Graphics, different graphics systems and applications of Computer Graphics

**CO2:** Summarise the working principle of Display devices

**CO3:** Explain various algorithms for scan conversion and filling of basics objects and their comparative analysis

**CO4:** Analyse line, Circle and Ellipse and Character generation algorithm

**CO5:** Describe Geometric transformations including Translation, Scaling, rotation and Shear for 2D objects

**CO6:** Describe Geometric transformations including Translation, Scaling, rotation and Shear for 3D objects

### **Beginners Programming with PHP**

Upon completion of the course, the students will be able to-

**CO1:** Describe client server architecture and able to develop a web application using java technologies to create fully functional website/web applications

**CO2:** Describe role of language PHP and workings of the web and web applications

**CO3:** Prepare web page and identify its elements and attributes

**CO4:** Create dynamic web pages

### **Advanced Networking**

Upon completion of the course, the students will be able to-

**CO1:** Describe state-of-the-art in network protocols, architectures and applications

**CO2:** Describe existing network protocols and networks

**CO3:** Define new protocols in networking

  
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**CO4:** Evaluate research in networking

**CO5:** Investigate novel ideas in the area of networking via term-long research projects

## **Semester VI**

### **Software Quality & Testing**

Upon completion of the course, the students will be able to-

**CO1:** Describe reason for bugs and analyze the principles in software testing to prevent and remove bugs

**CO2:** Classify various test processes for quality improvement

**CO3:** Define test planning

**CO4:** Discuss test process

**CO5:** Explain software testing techniques in commercial environment

### **Android Application Development**

Upon completion of the course, the students will be able to-

**CO1:** Install and configure Android application development tools

**CO2:** Design user Interfaces for the Android platform

**CO3:** Evaluate information across important operating system events

**CO4:** Explain Java programming concepts to Android application development

### **Theory of Computation**

Upon completion of the course, the students will be able to-

**CO1:** Explain finite state machines and the equivalent regular express

**CO2:** State and prove the equivalence of languages described by finite state machines and regular expressions

**CO3:** Classify pushdown automata and the equivalent context free grammars

**CO4:** Verify equivalence of languages described by pushdown automata and context free grammars

### **Advanced Computer Graphics**

Upon completion of the course, the students will be able to-

**CO1:** Give importance of viewing and projections

**CO2:** Explain the fundamentals of animation, virtual reality and its related technologies

**CO3:** Describe typical graphics pipeline

**CO4:** Design an application with the principles of virtual reality

### **Advanced Programming with PHP**

Upon completion of the course, the students will be able to-



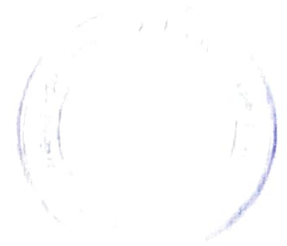
  
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**CO1:** Explain general concept of PHP scripting language for the development of Internet websites

**CO2:** Define basic functions of MySQL database program

**CO3:** Give relationship between the client side and the server side scripts

**CO4:** Evaluate final project using the learned techniques



### **Ethics and Cyber law**

Upon completion of the course, the students will be able to

**CO1:** Explain ethical way of using computer, computer networks and Internet

**CO2:** Define the terms such as ethics, morals, character, ethical principles and ethical relativism

**CO3:** State laws and rules for using computer resources and making them secure

**CO4:** State and explain laws concerning Cyber Space

  
U.S. Prasad  
Principal  
Puthencherry Higher Secondary School  
Aranmula