Dnyandeep Shikshan Prasarak Mandal Chandrapur

ARTS, COMMERCE AND SCIENCE COLLEGE

TUKUM, CHANDRAPUR

Program Outcomes,
Program Specific Outcomes
&
Course Outcomes

PREFACE

A program outcome represents the knowledge, skills and attitudes of the students at the end of a degree program. **Program Specific Outcomes** means what the graduate students of a specific degree program should be able to do and **Course Outcomes** are the resultant knowledge skills that the students acquire at the end of the course. It defines the cognitive processes a course provides.

The IQAC of the institute guides the departments regarding the preparation of program outcomes, program specific outcomes and course outcomes. These are charted by the departments in alignment with the university prescribed syllabus, the core values and objectives of the institution. Each department, following extensive discussions, according to the nature and scope of the Programmes and Courses offered by them, prepare Course outcomes.

The institution outlines POs and PSOs for all programmes and COs for each course. After aligning these with the University envisaged learning outcomes, the course plans are made by the departments. The college follows a Graduate-attribute-linked course plan for the courses offered across all programmes. It is designed to incorporate the teaching, learning and assessment strategies in such a way as to give enough weightage to each of the specified learning activities and attainment of outcomes. These are prepared in the departments by the teachers handling each course.

The students form the pivot around which all activities of the college revolve. The various curricular and co- curricular activities of the college enhance their academic capabilities and future potentials. The curricular and academic activities of the college are aimed at augmenting the quantitative and qualitative nature of the programmes offered, providing vertical and horizontal mobility and in ensuring career orientation, skill development and the promotion of entrepreneurial skills. Along with the prescribed curriculum and traditional teaching methods like lectures, assessments, quiz, notes sharing, assignments etc. smart boards, ICT tools, projectors and new interactive software to conduct online exams etc are employed, partially automated library with 10162 books, 14 periodicals and journals and 05 e-Journals is one among them.

The teaching and learning methods streamline for effective transfer of knowledge is carried out by making use of diverse innovative and novel teaching techniques that are student centric in approach. Mentoring and tutorial system are introduced to maintain discipline and to reduce dropout rates and for one-to-one assistance.

An effective and transparent continuous internal evaluation system is in place. An effective attendance system, regular assessments and remedial coaching have markedly improved the performance and the placement status of the students. During the last academic year --- students go to higher studies and – students were recruited in different sectors.

PROGRAMME - BACHELOR OF ARTS (B.A.)

PROGRAM OUTCOME OF B.A.

Students taking admission to B.A. programme are expected to impregnate with following quality, which help them in their future life to achieve the expected goals.

PO1. Realization of human values, culture and sense of social service.
PO2. Skill of effective communication and language learning i.e. reading, writing, listening and speaking another language with fluency and understand its cultural value
PO3. Independence in learning appropriate theories and methodologies with intellectual honesty and an understanding of ethical and human values
PO4. Develop critical and analytical skills to the identification and resolution of problems within complex changing social, linguistic and literary contexts
PO5. Expertise in respective fields, work with self esteem, self reliance, self-reflection and creativity to face adversities in the work and personal life.
PO6. Become a responsible citizen who cultivates human values for the formation of an egalitarian society"

COMPULSORY ENGLISH

PROGRAM SPECIFIC OUTCOME–

PSO1. Imbibing moral and human values through study of English language.
PSO2. Proficiency in English language to improve employability.
PSO3. Develop Languageskills and strengthen strategies to develop vocabulary for effective communication in English
PSO4. Availing the job opportunities in translation
PSO5. Develops the literary research attitude in order to fulfil needs of growing societies and Nation.

COURSE OUTCOMES –

B.A. 1st Year: Sem I and II
Paper: Compulsory English

By completion of this course students will able to-
CO1. To develop reading skills.
CO2. To develop writing skills
CO3. To develop speaking skills
CO4. To develop listening skills
CO5. To understand grammatical items.
CO6. To understand the format of letter writing.

B.A. Part II :Sem III and IV
Paper: Compulsory English

CO1. To develop reading skills.
CO2. To develop writing skills
CO3. To develop speaking skills
CO4. To develop listening skills
CO5. To understand rules of Grammar
CO6. To learn the skill of conversation

B.A. Part III: Sem V and VI
Paper: Compulsory English

At the end of the course the students will
CO1. Acquire language skills required for day to day and specific purpose.

CO2. Be able to interpret and illustrate concepts of communication, prose and poetry.
CO3. Be able to analyse and interpret the text prescribed.
CO4. Develop certain life skills and strengthen strategies to develop vocabulary.

MARATHI

PROGRAM SPECIFIC OUTCOME–

PSO1: Enhance empathy, inclusiveness, and tolerance and human values.
PSO2. Learn Marathi culture with its variety and plurality in Indian society.
PSO3. Go through the contemplation by numerous thinkers on human life, values, and human problems expressed in Marathi
PSO4. Create an interest in Marathi reading, writing and communication skill.
PSO5. Availing the job opportunities in translation, transformation and media.
PSO6. Develops the literary research attitude in order to fulfil needs of growing societies and Nation

COURSE OUTCOMES –

The Students taking subject Marathi for B.A. programme are expected to impregnate with following quality, which help them in their future life to achieve the expected goals.

B.A. 1st Year: Sem I and II

Paper –मराठी

CO1. व्यक्तीमत्व विकास साध्यकरता येतें

CO2. वैचारिक साहित्याचे स्वरूप कळते

CO3. साहित्य व भाषाविषयक आकलन क्षमता वाढते

CO4. विविध वाड्मय प्रकाराची ओळख पटते

CO5. समाज सुधारकाच्या मौलिक विचाराची माहिती मिळते

B.A. IInd Year: Sem III and IV

Paper –मराठी

CO1. जीवन जगण्याची कला अवगत होते

CO2. व्यक्ती चित्रण या साहित्य प्रकाराची ओळख पटते

CO3. वैज्ञानिक जीवन जाणीव निर्माण होते

CO4. महापुरुषांच्या समाजकार्याची ओळख पटते

CO5. मानवी नीतीमूल्य विध्यार्थी जाणतात

B.A. IIIrd Year: Sem V and VI

Paper –मराठी

CO1. लेखन विषयक नियमाची ओळख होते

CO2. मराठीच्या व्यवहारक्षेत्राची ओळख पटते

CO3. मुद्रित शोधक म्हणून रोजगार संधी प्राप्त होते

CO4. वृत्तपत्रक्षेत्रात रोजगार उपलब्ध होऊ शकतो

CO5. जाहिरात क्षेत्रात रोजगारसंधी उपलब्ध होते

CO6. जीवनविषयक व्यवहार ज्ञान मिळते

HINDI

PROGRAMSPECIFICOUTCOME–

PSO1. संप्रेक्षणात्मक व प्रयोजन्मुलक हिन्दी भाषा का ववकास करना ।

PSO2. हिन्दी भाषा सिज और सरल रूप में दैननक व्यविार मे उपयोगी ि ो ऐसा प्रयास ।

PSO3. हिन्दी भाषा संवर्धन प्रचार व प्रसार करना ।

PSO4. छात्रो की संवाद शक्ति का क्तवकास करना ।

PSO5. छात्रो का क्तिन्दी शब्द संग्रिक्तवकक्तसत करना ।

COURSE OUTCOMES –

हिन्दी बी. ए. भाग-1 सत्र 1-2

CO1. छात्रो की वाचन लेखन व बोलने की ग्रिण करणे की शक्ति का क्तवकास करना ।

CO2. साक्तिक्तययक क्तवधा व संक्तिययकारो का संक्तिप्त अध्ययन ।

CO3. हिन्दी व्याकरण को समझाकर अशद्धुीयोको दरू करना ।

CO4. पाररभाक्तिक क्तिन्दी व देवनागरी क्तलक्तप का अध्ययन ।

CO5. पत्र लेखन कला का अध्ययन ।

हिन्दी बी. ए. भाग-2 सत्र 3-4

CO1. छात्रो की वाचन लेखन व बोलने की सनूनेकी ग्रिण करणे की शक्ति का क्तवकास करना ।

CO2. छात्रो की क्तचंतन मनन करने की शक्ति का क्तवकास करना ।

CO3. साक्तिक्तययक क्तवधा व संक्तिययकारो का संक्तिप्त अध्ययन ।

CO4. हिन्दी व्याकरण को समझाकर अशद्धुीयोको दरू करना ।

CO5. क्तवद्यापन लेखन कला का अध्ययन ।

CO6. संगणक computer का संक्तिप्त पररचय का अध्ययन ।

संप्रेक्षणात्मक हिन्दीबी. ए. भाग-3 सत्र 5-6

CO1. छात्रो की क्तिन्दी भाि ा व संवाद शक्ति का क्तवकास करना ।

CO2. छात्रो की क्तचंतन मनन करने की शक्ति का क्तवकास करके उन्ि े क्तियाशील बनाने का प्रयास करना ।

CO3. संप्रेि णायमक क्तिन्दी-पत्रकाररता और अनवुाद ि ेत्र का अध्ययन करकेरोजगार प्राप्त करने मे सिम करना ।

CO4. क्तिन्दी -पत्रकाररता और अनवुाद ि ेत्र का मियव व लेखन समझाकर अशद्धुीयोको व कक्तमयो को दरू करन ा

SOCIOLOGY

PROGRAMSPECIFICOUTCOME–

PSO1. Develop scientific temperament for eradication of superstitions and inhuman traditions.
PSO2. Promote and propagate citizenship values for the unity and integrity of the nation
PSO3. Create awareness among students about various social problems, their nature and causes and make them self-inspired to find out remedies
PSO4. Know work of social institution, organizations, their nature, and utility.
PSO5. Students familiar with tribal society and culture, their problems and develop positive attitude towards them

Course Outcomes –

B.A. 1st Year: Sem I and II

Paper: Introduction to Sociology

CO1. Understand the development of sociology and basic concept of sociology.
CO2. Describe the types, theories and elements of basic social institutions – marriage, family and religion.
CO3. Classify the types primary and secondary group.
CO4. Distinguish factors and progression of social change.

B. A. 2nd Year: Sem III &IV

Paper: Indian Society: Issues and Problems

CO1. Connect the theories of origin of caste and changing trends in caste system.
CO2. Knowing the significance of social institution, caste system, religion, nationalism, integrity, equality and justice.
CO3. Define the nature of social problems, causes and consequences.
CO4. Examine the nature of violence against women.

B.A. 3rd Year: Sem V&VI

Paper: Sociology of Tribal Society

CO1. Survey the impact of social changes in India, causes and consequences of westernization and Sanskritization.
CO2. Getting the deep knowledge about various social groups like tribal community, women bulk
CO3. Trace Out the economy in primitive society.
CO4. Sketch the role of religion in tribal society.
CO5. Identify the peasant and tribal movements, causes of Santhal movements.

HISTORY

PROGRAM SPECIFIC OUTCOME–

PSO1: Students know the national and international history.
PSO2: Preserve Indian culture by creating awareness about age old Indian culture.
PSO3: Demonstrate thinking skills by analyzing, synthesizing and evaluating historical information from various sources.
PSO4. Critically recognize the Social, Political, Economic, religious and cultural aspects of History and understands the background of our religion, custom and diversity of country.
PSO4: Prepare students for various competitive examinations
PSO5: To help in nation building by developing patriotism among students
PSO6. Make carrier as historian, acquired professional skill in getting jobs, such as tourist guide.
PSO7. Develops the research attitude.

Course Outcomes –

B.A.

CO1. The course will result to gain entry in Administrative Services.
CO2. It will lend a hand to the students to get involve in research related with historical facts.
CO3. Students can pursue their post-graduation in Archaeology.
CO4. The course will help the students to take admission in Graduation and Post-Graduation Teacher Training Program.
CO5. Students can also opt for Law.
CO6. Students can also pursue their further studies in Travel and Tourism.
CO7. Students can also opt for Journalism.

POLITICAL SCIENCE

PROGRAM SPECIFIC OUTCOME. –

PSO1. Understand the basic concept and ideological orientations of political science.
PSO2. Understand the basic concept and issues concerning human rights and challenges.

PSO3. Analyze the core intellectual traditions in political thoughts and apply their central tenets to contemporary political problems and issues.
PSO4. Use analytical skills to understand civic, social and environmental challenges.
PSO5. Compare and contrast the various political, social and Economic systems that exist across the international community and analyze the political consequences of those variations.
PSO6. Demonstrate social responsibility and ethical reasoning within a variety of contexts
PSO7. Acquire knowledge of political law and Constitution of India.
PSO8. Understand the cultural, social, political, economic and constitutional environment as a historical perspective of Indian Administration.

Course Outcomes -

B.A. Part I : Sem. – I

CO1. Students study Indian Democracy.
CO2. They learn philosophy of Indian Constitution and aware about their fundamental rights.
CO3. Students participate as a voter in the election.

B.A. I : Sem. – II

CO1. Students study local self-Government.
CO2. They learn rural and urban local self-Government and realize how the citizen participates in it to develop their villages.

B.A. – II Sem. – III

CO1. Students study political theory.
CO2. They learn how to solve the problems of groups community with the help of Political theory.

B.A. – II Sem. IV

CO1. Students study political concept and political analysis.
CO2. They learn legitimacy and know the way of legitimacy.

B.A. III, Sem. V

CO1. Students study Indian Political thought.
CO2. Students learn the thought of Mahatma Phule and understand how education is important to human being.
CO3. Students understand the thoughts of V. D. Sawarkar, Mahatma Gandhi, Dr. B. R. Ambedkar, Ram Manohar Lohiya, Pandit Jawaharlal Nehru.

B.A. III, Sem. – VI

CO1. Students study Western political thoughts.
CO2. Students learn Plato's thought and understand how to create ideal state.
CO3. Students understand the thoughts of Thomas Hobbes, Lenin and Carl Marks

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ECONOMICS

PROGRAM SPECIFIC OUTCOME–

PSO1. Acquire knowledge of economics theories and principles and their applications as well as identify the basic concepts and theories of microeconomics and macroeconomics.
PSO2. Understand and study the meaning, functions and role of central and commercial banks in the Indian economy.
PSO3. Understand the efficiency and equity implications of market Interference, including monetary policies of India.
PSO4. Determine economic variables including inflation, unemployment, poverty, GDP, balance of payments etc.
PSO5. Understand the behavior of financial and money markets and perform cost-benefit

analysis for making investment decisions.

PSO6. Acquire knowledge about theories of economic growth, development and issues of economic planning.

Course Outcomes –

B.A. Part I - Sem I

Paper I –Microeconomics I

CO1. To understand how market works, identify the various determinants of firms demand for factor services, monopoly and oligopoly in factor market equilibrium.

CO2. To introduce the Student to the basic micro economics concepts like demand, supply production, cost and revenue and the theories explaining their determination

CO3. To enable the student to apply the theories in analyzing real world micro issues.

CO4.Understanding how different degrees of competition in a market affect pricing and output.

B.A. Part I - Sem II

Paper I –Microeconomics II

CO1. To get a basic understanding about micro economics.

CO2. To provide basic understanding on micro economics concepts, relating to markets, factor pricing, distribution and economics of uncertainty

CO3. Developing the knowledge about theories of economic growth & development and issues of economic planning.

B.A. Part II - Sem III

Paper I –Macroeconomics I

CO1. To give an insights to the students about the basic concepts used in Macro economics.

CO2. To illustrate the meaning of inflation, deflation and stagflation, identify different kind of inflation, causes and effects of inflation on the different sectors of the economy.

CO3. To enable the Students to know the evaluation and pole of money in the Economy.

B.A. Part II - Sem IV

Paper I –Macroeconomics II

CO1. This paper gives and insight to the students about the basics concepts used in macro economics and policy alternatives.

CO2. To enable the students to understand the theoretical framework and the working of an economy as a whole.

CO3. To suggest the policy alternatives used in controlling the economy

CO4. Creating awareness about changing macro-economic policies and theories

B.A. Part III - Sem V

Paper I –Indian Economy I

CO1. To enable the students to have an understanding of the various issues of the Indian Economy.

CO2. To enable the students to comprehend and critically appraise current issues and problems of Indian economy.

CO3. The focus of this course is on the development of Indian Economy since Independence.

CO4. To understand the importance of planning undertaken by the government of India.

CO5. Developing the skill of data collection & use of sampling techniques in research

B.A. Part III - Sem VI

Paper I –Indian Economy II

CO1. To understand the importance of planning undertaken by the government of India.

CO2. Understanding the efficiency and equity implications of market interference,

CO2. To enable the Students to understand the basic concepts of development and Growth

CO3. Developing research knowledge in economics.

GEOGRAPHY

PROGRAM SPECIFIC OUTCOME–GEOGRAPHY

PSO1. Disseminate acquired knowledge in societal and environmental contexts and demonstrate the knowledge of need for sustainable development.

PSO2. Prepared for professional carriers in geography and allied disciplines like GIS and Remote sensing.

PSO3. Learn the application of various modern instruments and correlate the knowledge for development of human society.

PSO4. Gain knowledge about concept and scope of basic environmental geography and components of environment.

PSO5. Serve as a Geographer, a teacher in schools and high schools conservator in forest, Soil, Agricultural Departments, cartographer in map making divisions of Government etc.

COURSE OUTCOMES

F Y B A

Semester I

Introduction to Geography	**Student will be able to understand (COS)** 1. Describing the nature of geographic there branches and disciplines. 2. Identifying and explaining the Universe solar system and time zones and time calculation in unique planet of earth. 3. Applying knowledge of Environment, Ecology and natural environment. 4. Showing awareness of responsibility of your planet; view study of recent trends in Geographical Environment. 5. Evaluating the impacts of human activities on natural environment.
Practical Geography	1. Student with domestic knowledge of globe and maps, Essentials of map like map history, map making, type and use. 2. Student will be familiar with scale and statistical methods.

Semester II

Climatology	**(COS)** 1. Students will learn the process of infraction between the atmosphere and the earth's surface. 2. They will be able to understand the importance of the ozone layer and bed effect of green-house to apply this for the solution of environmental problem. 3. They understand how the planetary and periodic wind and pressure belt related to each other. 4. Student can explain the important role of water to create conditions conservation and participation.

S Y B A

Semester III

Geomorphology	**(COS)** 1. Develop and idea about geomorphology and different types of fundamental concepts. 2. Explain different types of geomorphic processes like weathering and mass wasting and cycle of erosion. 3. Understand the processes of erosion deposition and resulting landforms. 4. Acquire knowledge about slope forms and processes.

Semester IV

Geomorphology and Oceanography	**(COS)** 1. Acquire knowledge about glaciers type work of erosion. 2. Understand the processes of underground water and topography.

	3. Understand the oceanography ridge and trenches imp. 4. Acquire knowledge about types AL Nino – La Nona, Coral Reefs and Oceanographically landforms.

T Y B A

Semester V

Gg-101 Geography of Maharashtra	**Student will be able to understand (COS)** 1. Understand the physiography division administrative analysis of Maharashtra 2. Study about climatic & geological condition of Maharashtra like rainfall forest type economic impact 3. Understand the value of agriculture importance & agriculture crops and resources. 4. Understand the population density & variation structure.
Practical Geography	1. Introduce the student elements and graphical method. 2. Students will be understand mechanism of land view & land surways. 3. To understand cartographic symbol & their uses. 4. Students get knowledge by population analysis by diagram like a pyramid & component methods.

Semester VI

India a Geographical analysis	**(COS)** 1. Students understand a geographical physical structure their values, rivers. Important & conservation. 2. Student with understand the domestic Indian climate condition and the season distribution of climate season 3. Student analysis the study of Indian resource power & their distribution pattern in Indian like annex of iron, wal etc. 4. Study by Indian population & distribution pattern & problem.

HOME ECONOMICS

PROGRAM SPECIFIC OUTCOME -

PSO1. Build life skills and entrepreneurial skill through value-based education and service oriented course structure.

PSO2. Develop awareness about waste management and water conservation for environmental protection.

PSO3. Acquire skill in preparation of bouquets and flower arrangement which enhance the chances of employment.

PSO4. Disseminate the knowledge about basic concepts of nutrition, nutritive value of food and food function for local advantage.

PSO5. Understand the methods of food preparation and food preservation and develop abilities to plan diets for various diseases

COURSE OUTCOMES –

B.A. Part I - Sem I

By completion of this course students will able to

CO1. Understand the field of home economics

CO2. Create an awareness among the students about resources and their management in the family.

CO3. Aware about decision making and to enhance the decision-making capability of the women.

CO4. Gain knowledge and develops skill regarding principles and methods of interior design.

CO5. Acquire skill in preparation of bouquets and flower arrangement for decoration and enhance the chances of employment.

B.A. Part I - Sem II

By completion of this course students will able to

CO1. Acquire basic knowledge of principles involved in planning of residential house.
CO2. Learn an apply various methods and techniques of the work simplification.
CO3. Develop employability skills and the skill of earning while learning
CO4. Develop awareness about waste management and water conservation for environmental protection.
CO5. Aquire basic skill for self employment

B.A. Part II - Sem III

CO1. Understand the basic concept of nutrition
CO2. Gained the knowledge of food, food functions and nutritive value of foods.
CO3. Develop abilities to plan diets for various stages.
CO4. Develop entrepreneurial skills.

B.A. Part II - Sem IV

CO1. Understand the basic concept of related nutrition
CO2. Develop abilities to plan diets for various diseases
CO3. Understand the methods of food preparation and food preservation.
CO4. Aware work of different agencies in the area of health

B.A. Part III – Sem. V

CO1. Understand the concept of human development
CO2. Gain the knowledge about the factors affecting human development

B.A. Part III – Sem. VI

CO1. Understand the role of heredity and environment in development
CO2. State the role of parents and teacher in child development
CO3. Understand the problems of child.
CO4. Able to develop skill based activities.

ENGLISH LITERATURE

PROGRAMME SPECIFIC OUTCOMES

1) To understand English literature through wide variety of literary work
2) To apprehend diversity of culture and cultural sensibility around the world
3) To maintain the scope of employability and entrepreneurship in the field of media and journalism, teaching, public relation, human resources and creative writing
4) To make students socially responsible and helpful to society
5) To cultivate the mind of student toward research and creative imagination

COURSE OUTCOMES –

B. A.Part I - Sem I &Sem II

CO1. Students would become familiar with basic literary terms and figure of speeches
CO2. The writing and communication skills of the students would be improved
CO3. Students would form their literary ideas and be able to compose light literary pieces

B.A.-II, Sem-III (English Literature)

Course Outcomes

CO1. To aware the students about various issues of society
CO2. To provide an opportunity to interact with respected and established writer
CO3. To develop philosophical approach
CO4. To develop scientific approach about literature
CO5. To inculcate broad view about the mirror of society
CO6. To turn their mind toward fiction
CO7. To share the information about industrial age

CO8. To take deep outlook toward society
CO9. To familiar with various terms in literature
CO10. To develop sentiment about the situation among the student

B.A.-II, Sem-IV (English Literature)
Course Outcomes
1) To turn the mind of students about socially backward classes
2) To realize problem of thief
3) To understand the social discrimination in society
4) To understand the importance of parents
5) To learn positive thought from autobiography
6) To increase social awareness by reading biography
7) To develop point of view
8) To understand difference between fable and short story
9) To understand the importance of narrative
10) To present clear view about social surrounding

B. A.Part III - Sem V and Sem VI
CO1. Examine the issues discussed in the text in the socio-historic and cultural context. Compose an article in technical writing genre.
CO2. Conceptualize various types of Drama such as Tragedy, Comedy, Farce, Melodrama etc.
CO3. Evaluate literary texts and write critical views about the text.
CO4. Describe the process and origin of the development of drama in its structure with the text .
CO5. Analyze the structures and organizations of his dramatic works. Identify major literary characters in Shakespeare's works

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MARATHI LITERATURE

COURSE OUTCOMES –
B. A. Part I - Sem I & II
Programme Outcome:
1) वाचन कौशल्य व लेखन कौशल्य ह्याला चालना देणे.
2) भाषेविषयी आवड निर्माण व्हावी ह्याकरिता उद्बोधित करणे.
3) सामाजिक अंगाने पाठ्यक्रम गद्य व पद्य ह्यांचे विवेचन करणे.
4) विचारांची देवाणघेवाण चांगल्याप्रकारे करता यावी ह्याकरिता विद्यार्थ्यांमध्ये संवाद कौशल्य विकसित करणे.

Course Outcomes:
1)साहित्याविषयी अभिरुची निर्माण करणे.
2)विद्यार्थ्यांमध्ये लेखन व संवाद कौशल्य ह्याविषयी जागरूकता निर्माण करणे.
3)साहित्य आणि समाज यांचेतील परस्पर संम्बंध अंतर्भूत करणे.
4)साहित्यातून सामाजिक, सांस्कृतिक व तात्विक मांडणी करता यावी भाषिक कौशल्य आत्मसात करणे.

B. A. Part II - Sem III & IV
CO1) मानवीजीवन संघर्ष कळतो
CO2) मानवीजीवन संघर्षाचे स्वरूपाची ओळख होते
CO3) नाटकयावाड्मय प्रकराची माहिती मिळते
CO4) साहित्याचा आस्वाद वसाहित्याची सामाजिकता याची जाणीव होते
CO5) जगण्यातील उत्कता निर्माण होते

B. A.-Part III - Sem V and VI

Programme Outcome:
1) विद्यार्थ्यांमध्ये सामाजिकमूल्ये रुजविणे.

2) भाषिक उदबोधन करणे.

3) कविता,कथा, कादंबरी नाटक इ.वाड;मय प्रकार जाणून घेणे.

4) विचारांची देवाणघेवाण चांगल्याप्रकारे करता यावी ह्याकरिता विद्यार्थ्यांमध्ये संवाद कौशल्य विकसित करणे.

Course Outcomes:

1) साहित्याविषयी अभिरुची निर्माण करणे.व संशोधनाला चालना देणे.

2) विद्यार्थ्यांमध्ये लेखन व संवाद कौशल्य ह्याविषयी जागरूकता निर्माण करणे.

3) साहित्य आणि समाज यांचेतील परस्पर संम्बंध अंतर्भूत करणे.

4) साहित्यातून सामाजिक, सांस्कृतिक व तात्विक अंगाने मांडणी करता यावी यासाठी भाषिक कौशल्य आत्मसात करणे.

HINDI LITERATURE

COURSE OUTCOMES –

1. संप्रेक्षणात्मक व प्रयोजन्मुलकहिन्दीभाषाकावकासकरना।
2. हिन्दी भाषासिजऔर सरलरूप मेंदैननकव्यविार मे उपयोगी ि ोऐसा प्रयास।
3. हिन्दी भाषा संवर्धन प्रचार व प्रसार करना।
4. छात्रो की संवाद शक्तिका क्तवकास करना।
5. छात्रो का क्तिन्दीशब्दसंग्रिक्तव कक्तसत करना।

BACHELOR OF COMMERCE (B.COM.)

PROGRAMME OUTCOMES

Students who have taken admission in program of B. Com. are expected to acquire the following outcomes.

PO1. Develops commercial sense and built up conceptual foundation and application skills in the areas of accountancy, finance, management, research and higher education

PO2. Develop managerial skills and ability to manage accounts, people and organizations across the world.

PO3. Build life skills and entrepreneurial skill through value based education and service oriented programs

PO4. Skill in hands for budgeting policy and Human Resources Management.

PO5. Develop Numerical ability, analytical and decision making skills, Well versed with business regularity framework.

PO6. Equipped with financial and management accounting techniques covering the technical areas that required accountants.

PROGRAMME SPECIFIC OUTCOMES

PSO1: Mathematical knowledge to analyze and solve problems
PSO2: Statistical reasoning and inferential methods, modeling and its limitations
PSO3: Interpreting and communicating the result of a statistical analysis. **PSO4:** Data analysis using statistical computing tools and software
PSO5: Enhancing confidence through problem-solving method

COURSE OUTCOMES

B.COM. PART I SEMESTER I & II
COMPULSORY ENGLISH

B.Com-I, Sem-I
Course Outcomes

1) To realize them the importance of family and blessing of elders
2) To aware them about self-realization and introspection
3) To aware them about Indian democracy and its importance in human society
4) To awake them about women empowerment
5) To aware them about critical appreciation of poem
6) To give them basic idea about grammar
7) To Increase their vocabulary through glossary
8) To aware them about paragraph writing
9) To aware them about teamwork, leadership and time management
10) To build confidence and positive thought in their mind

B.Com-I. Sem-II
Course Outcomes

1) To aware about life and its importance
2) To enlighten them to think out of box
3) To understand them importance of hard work and patience
4) To enhance their scientific approach
5) To motivate them about social work and human value
6) To provide them basic information about voice
7) To aware about advertisement skills
8) To aware about habits and its benefits in life
9) To change their daily routine

10) To improve their dialogue writing

MARATHI

B. Com.Part I – Sem I &II
Paper – Marathi
Programme Specific Outcome:

1) वाचन कौशल्य व लेखन कौशल्य ह्याला चालना देणे.
2) भाषेविषयी आवड निर्माण व्हावी ह्याकरिता उद्बोधित करणे.
3) सामाजिक अंगाने पाठ्यक्रम गद्य व पद्य ह्यांचे विवेचन करणे.
4) विचारांची देवाणघेवाण चांगल्याप्रकारे करता यावी ह्याकरिता विद्यार्थ्यांमध्ये संवाद कौशल्य विकसित करणे.

Course Outcomes:

1)भाषेविषयी अभिरुची निर्माण करणे.
2)विद्यार्थ्यांमध्ये लेखन व वाचन कौशल्य वृद्धिंगत करणे.
3)साहित्य आणि समाज यांचेतील परस्पर संम्बंध अंतर्भूत करणे.
4)साहित्यातून सामाजिक, सांस्कृतिक व तात्विक अंगाने मांडणी करता यावी यासाठी भाषिक कौशल्य आत्मसात करणे.

HINDI

Programme Specific Outcomes

PSO1. **हिन्दी भाशा संवाद कोषल्य को** ववकसित करना ।
PSO2. **पत्र लेखन, पंरिभाशिक षब्द, देवनागरी लिपि व कम्प्युटर का परिचय व महत्व** का अध्ययन
PSO3. क्तिन्दी शब्द संग्रि क्तवकक्तसत करना ।

B.Com. Sem I & II

Course Outcomes

CO1. **संवाद कौशल्य व ग्रहण** शक्ति का क्तवकास करना ।
CO2. साक्तिक्तययक क्तवधा व संक्तियकारो का संक्तक्षप्त अध्ययन ।
CO3. क्तिन्दी व्याकरण को समझाकर अशद्धीयोको दरू करना ।
CO4. **व्यवहारिक हिन्दी ज्ञान पत्र लेखन, पंरिभाशिक षब्द व देवनागरी लपि का** का अध्ययन ।
CO5. **कम्प्युटर का सामान्य परिचय महत्व व विषेशताओं** का अध्ययन ।

COURSE OUTCOMES

PAPER I- FINANCIAL ACCOUNTING - (FAC)

On of successful completion this course students will be able to:
CO1: Prepare Accounts of Non-Trading Institutions.
CO2: Prepare Accounts of Co-operative Societies.
CO3: Prepare Accounts of Agriculture Farms.
CO4: Prepare Accounts of Hire, purchases and Instalment purchase.
CO5: Understand Laws of Insolvency and prepare Accounts of Insolvency of Individuals.

PAPER II- STATISTICS TECHNIQUES AND BUSINESS MATHEMATICS

On of successful completion this course students will be able to:
PSO1: Mathematical knowledge to analyze and solve problems

PSO2: Statistical reasoning and inferential methods, modeling and its limitations
PSO3: interpreting and communicating the result of a statistical analysis
PSO4: Data analysis using statistical computing tools and software
PSO5: Enhancing confidence through problem-solving method

PAPER III -PRINCIPLES OF MANAGEMENT

On of successful completion this course students will be able to:
CO1: Discuss and communicate the management evolution and how it will affect future Managers.
CO2: Practice the process of management's four functions: planning, organizing, leading, and Controlling.
CO3: Explain how organizations adapt to an uncertain environment and identify techniques Managers use to influence and control the internal environment.
CO4: Gather and analyze both qualitative and quantitative information to isolate issues and Formulate best control methods.

PAPER IV -BUSINESS ECONOMICS

Upon successful completion of the requirements for this course students will
CO1: Be familiar with introductory canonical models of consumer and macro economy.
CO2: Have a basic understanding of the operation of a modern economy.
CO3: Be able to evaluate the effects of Government interventions in individual markets andin the macro economy.
CO4: Analyze operation of markets under varying competitive condition.
CO5: acquired knowledge about population crisis and theories of population and formulate methods to resolve

OPTIONAL PAPER I - BASIC MARKETING MANAGEMENT

On completion of this course, the students will be able to
CO1. Students will demonstrate strong conceptual knowledge in the functional area of marketing management.
CO2. Students will demonstrate effective understanding of relevant functional areas of marketing management and its application.
CO3. Students will demonstrate analytical skills in identification and resolution of problems pertaining to marketing management.

B.COM. PART II SEMESTER III

COMPANY LAW

On of successful completion this course students will be able to:
PSO1: Critically review the Indian legal system and institution relevant to commercialsactors and advisors and argue its relevance in managing contemporary business organizations
PSO2: Critically examine the general areas of contact and corporate law and regulation encountered by commercial in local and global settings
PSO3: Growth in entreprenureship skill of the students Economics
PSO4: Apply an understanding of the nature of the multinational firm as institutional structure for the conduct of the cross-border trade and investment.
PSO5: Analyse the key decisions that multinational firms make in relation to the choice of markets and entry strategies

MARATHI

Programme Outcome:

1. वाचन कौशल्य व लेखन कौशल्य ह्याना चालना देणे.
2. भाषेविषयी आवड निर्माण व्हावी ह्याकरिता उद्बोधित करणे.
3. सामाजिक अंगाने पाठ्यक्रम गद्य व पद्य ह्यांचे विवेचन करणे.
4. विचारांची देवाणघेवाण चांगल्याप्रकारे करता यावी ह्याकरिता विद्यार्थ्यांमध्ये संवाद कौशल्य विकसित करणे.

Course Outcomes:

1) भाषेविषयी अभिरुची निर्माण करणे.
2) विद्यार्थ्यांमध्ये लेखन व वाचन कौशल्य वृद्धिंगत करणे.
3) साहित्य आणि समाज यांचेतील परस्पर संम्बंध अंतर्भूत करणे.
4) साहित्यातून सामाजिक, सांस्कृतिक व तात्विक अंगाने मांडणी करता यावी यासाठी भाषिक कौशल्य आत्मसात करणे.

HINDI

B.Com. Sem III & IV

Course Outcomes

CO1. **भाषा का व्यवहारिक ज्ञान प्राप्त कराना**

CO2. छात्रो की क्त ंतन मनन करनेकी शक्ति का क्तवकास करना ।

CO3. साक्तिक्तययक क्तवधा व संक्तियकारो का संक्तक्षप्त अध्ययन ।

CO4. **व्यवहारिक हिन्दी ज्ञान पत्र लेखन, पंरिभाशिक षब्द व देवनागरी लिपि का** का अध्ययन ।

CO5. संगणक **बवउचनजमत** का संक्तक्षप्तपरर य **महत्व व विषेशताओं** का अध्ययन ।

CORPORATE ACCOUNTING –I

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

CO1: Learn to prepare Final Accounts of Companies, Valuation of Goodwill, Super profit method and Capitalization method and Valuation of shares Intensive Value, Market Value and Fair Value.

CO2: Able to develop awareness and train them in Corporate, Accounting inconformity with the Provisions of Indian Companies Act 1956 and Indian Accounting Standards.

CO3: Explain basic nature of a joint stock company as a form of business organization and the various kinds of companies based on liability of their members, the types of shares issued by a company, accounting treatment of shares issued at premium and at discount including oversubscription, forfeiture of shares and reissue of forfeited shares under varying situations. the meaning of debenture and explain the difference between debentures and shares.

CO4. Describe various types of debentures, record the journal entries for the issue of debentures at par, at a discount and at premium

COST ACCOUNTING

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

CO1: Understand the meaning cost, costing and Cost Accounting, Advantages and Disadvantages of Cost accounting.

CO2. Understand attendance and payroll system, Methods of Labour Turnover, remuneration and bonus methods, also be able to calculate labour cost.

CO3. Understand the integrated and non-integrated accounting system and to know how to prepare a reconciliation statement to find out the reasons for the difference in the net

profit/net loss as per cost and financial records.

CO4. Understand cost accounting methods maintained by real estate developers/builders and other businesses working on contract. They shall be able to calculate the cost and profit of each contract.

CO5. Understand the concepts of normal, abnormal loss/gain and its calculation. They shall able to know the calculation of cost per process

MONETORY ECONOMICS I

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

CO1. Understand the role of monetary policy for output, inflation and exchange rate determination.

CO2. Understand the difference between monetary policy regimes, the causes and features of financial crises in the modern economy, the opportunities and feasibilities of stabilization policy

CO3. Able to analyze financial and monetary data, apply the macroeconomic tools for the analysis of monetary sphere

CO4. Able to acquire the necessary skills to discuss different macroeconomic problems, the monetary authorities' actions and decisions, the consequences of monetary policy changes for the economy

PAPER V- OPTIONAL PAPER MARKETING MANAGEMENT (ADVERTISING MANAGEMENT)

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

CO1. Demonstrate an understanding of the overall role advertising plays in the business world.

CO2. Demonstrate an understanding of advertising strategies and budgets.

CO3. Identify and understand the various advertising media.

CO4. Demonstrate an understanding of how an advertising agency operates.

B.COM. PART II SEMESTER IV

PAPER I - SECRETARIAL PRACTICE

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

PSO1. Understand the application of secretarial practices in both theoretical and practical aspects

PSO2. Determine the procedures and schedules to be followed on preparing financial statements of Companies

PSO6. Analyse the administrative and secretarial practices which constitutes effectiveness to the business

PSO3. Understand the basic concepts and functions of administration

PSO4. Develop proficiency in the management of an organization

PAPER II - MANAGEMENT ACCOUNTING

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

CO1. Understand the basic concepts of management accounting

CO2. Understand the analysis of financial statements by using various methods

CO3. Understand different ratios used for analyzing financial Statements

CO4. Prepare fund flow statement for the business organization

CO5. Prepare the cash flow statement required for the business

PAPER III - MONITORY ECONOMICS II

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

CO1. Identify the principles behind the workings of the financial system, the Indian Banking System, the role of development banks in India. To study the law andpractice of Banking System in India, study the recent trends in Indian Banking System

CO2. Assess the responses of the economy to both monetary and fiscal policy, explain basic purposes of the monetary and financial systems. Identify the markets for stocks, bonds, derivatives, and currencies.

CO3. Demonstrate an understanding of the history, evolution, structure, operations and regulation of commercial banking, central banking and financial systems together with the design and conduct of monetary policy.

PAPER IV - CORPORATE ACCOUNTING II

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

CO1: Student would learn to prepare Accounting for Liquidation of companies – Preparation of Liquidator's Final Statement of Account. Accounting for Amalgamation, Absorption and External Reconstruction of companies – Calculationof purchase consideration

CO2. Understand final accounts of general insurance companies

CO3. Understand the functions and importance of accounts of banking companies.

PAPER V - OPTIONAL PAPER MARKETING MANAGEMENT (SALES AND DISTRIBUTION MANAGEMENT)

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

CO1. Enable the students to prepare sales promotion budget and the knowledge about various sales promotion strategies may benefit those students who dream of a career in salesmanship.

CO2. The students will be able to formulate their own strategies to manage sales force in their client organization.

B.COM. PART III SEMESTER V

PAPER I- AUDITING

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

CO1. Know the process of auditing, pre-commencement consideration of audit.

CO2. Understand Audit Programme, Audit Evidence, procedure, techniques and Audit working papers

CO3. Acquaint with all techniques and audit sampling.

CO4. Understand the purpose of Internal Control and its application to various items.

CO5. Understand connection between Internal Control, Internal Check and Internal Audit.

CO6. Practical knowledge regarding the points to be covered while checking the payment as well as receipts of vouchers and the related supporting document

PAPER II- INDIAN ECONOMICS (URBAN)

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

CO1. Understand the concept and definition of urban and urbanisation.

CO2. The role of urbanisation in economic development and Role of economic development in redistribution of population.

CO3. The students are trained to comprehend issue and opportunities associated with urbanization. CO4. They are better suited to research and administrative job that require

understanding of finer aspects of an increasing globalization and urbanizing world.

PAPER III- BUSINESS COMMUNICATION PAPER I

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

CO1. Familiar with the complete course outline/Course Objectives/Learning Outcomes/ Evaluation Pattern & Assignments

CO2. Participate in an online learning environment successfully by developing the implication-based understanding of Paraphrasing, deciphering instructions, interpreting guidelines, discussion boards & Referencing Styles.

CO3. Demonstrate his/her ability to write error free while making an optimum use of correct Business Vocabulary & Grammar.

PAPER IV- COMMERCIAL LAW

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

CO 1. Understanding basic principles and origins in the area of commercial law,

CO 2. Theoretical and practical preparation enabling students to acquire knowledge and skills related to commercial law

CO 3. Define basic terms, values and laws in the area of commercial law,

CO 4. Describe methods of applying principles and provisions of commercial law,

CO 5. Compose simple contracts and asses the correctness of applying specific laws to aspecific cases and choosing the most appropriate one

PAPER V- ADVANCE ACCOUNTING PAPER I

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

CO1. Demonstrate understanding of concepts underlying the accounting for course topics

CO2. Analyze accounting problems and apply appropriate accounting procedures to coursetopics

CO3. Use Codification to research issues related to course topics

CO4. Use Excel spreadsheets to organize and present information

CO5. Communicate accounting information clearly, concisely and accurately

CO6. Identify significant differences between U.S. and international accounting standards for covered topics

B.COM. PART III SEMESTER VI

PAPER I- INCOME TAX

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

CO1. Collect the basic concepts and definitions of Income Tax Act 1961

CO2. Know the residential status of assesse and incomes exempted from tax

CO3. Familiar with the computation of income from salary

CO4. Familiar with the computation of income from house property

CO5. Familiar with the computation of income from business and profession

PAPER III- BUSINESS COMMUNICATION II

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

CO1. To distinguish among various levels of organizational communication and communication barriers while developing an understanding of Communication as a process in an organization.

CO2. To draft effective business correspondence with brevity and clarity.

CO3. To stimulate their Critical thinking by designing and developing clean and lucid writing skills.
CO4.To demonstrate his verbal and non-verbal communication ability through presentations.

PAPER IV- CORPORATE LAW

In view of increasing emphasis on adherence to norms of good corporate governance, Company Law assumes an added importance in the corporate legislative it deals with structure, management, administration and conduct of affairs of Companies.

A thorough study of various provisions of the Companies Act, 2013 is a must for becoming a competent and efficient Company Secretary.

In the light of this, the course covered various provisions and case studies related to Incorporation of various types of companies, Charters of company . doctrine of constructive notice, doctrine of indoor management, various rules regarding managerial personnel, Management & control of companies, majority powers and minority rights, Corporate accountability, Merger, De-merger, amalgamation, Winding up proceeding, winding up of unregistered company, dissolution of company. NCLT & NCLET, XBRL/E-FILLING

PAPER V- ADVANCE ACCOUNTING PAPER II

CO1. The various advanced accounting concepts and its Practical approach.
CO2. Nature of Banking Company and its Financial Statements.
CO3. The practical approach of account writing using Software.
CO4. Concept of analysis of financial statements

PAPER VI- MARKETING MANAGEMENT (SERVICE MARKETS)

CO1. Appreciate the challenges facing the services marketing in traditional commercial marketing, e-marketing and non-commercial environments;
CO2. Appreciate the difference between marketing physical products and intangible services, including dealing with the extended services marketing mix, and the four unique traits of services marketing;
CO3. Recognise the challenges faced in services delivery as outlined in the services gapmodel;
CO4. Develop professional business writing skills

PROGRAMME - BACHELOR OF SCIENCE (B.Sc.)

PROGRAM OUTCOMES

Students taking admission to the program of B.Sc. are expected to get equipped with following

PO1. Explaining the basic scientific principles and methods.
PO2. Inculcate scientific thinking and awareness among the student.
PO3. Ability to communicate with others in regional language and in English.
PO4. Ability to handle the unexpected situation by critically analyzing the problem.
PO5. Understanding the issues related to nature and environmental contexts and sustainable development.

COMPULSORY ENGLISH

PROGRAM SPECIFIC OUTCOME–

PSO1. Imbibing moral and human values through study of English language.
PSO2. Proficiency in English language to improve employability.
PSO3. Develop Language skills and strengthen strategies to develop vocabulary for effective communication in English
PSO4. Availing the job opportunities in translation
PSO5. Develops the literary research attitude in order to fulfil needs of growing societies and Nation.

Course Outcome-

B.Sc. Part I - Sem-I &II
Paper- Compulsory English

CO1. Students would become familiar with basic grammar items'
CO2. The writing and communication skills of students would be improved'
CO3. Students would come to know various sentence structures and meanings of difficult words.
CO4. Students would become familiar with the basic phonetic structure of English

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SUPPLIMENTARY ENGLISH

PROGRAM SPECIFIC OUTCOME. –

PSO1. Imbibing moral and human values through study of English language.
PSO2. Proficiency in English language to improve employability.
PSO3. Develop Language skills and strengthen strategies to develop vocabulary for effective communication in English
PSO4. Availing the job opportunities in translation
PSO5. Develops the literary research attitude in order to fulfil needs of growing societies and Nation.

Course Outcomes -

B.Sc. Part I - Sem-I &II

CO1. Students are enable and inspire to read and learn various types of texts and enrich vocabulary and understand men and manners.
CO2. Instil poetic sense among students through reading of poetry.
CO3. Upgrade students' grammatical sense and master the basic grammatical aspects of English language.
CO4. Providian opportunity to students to learn language elements and their application in the practice.

MARATHI

PROGRAM SPECIFIC OUTCOME–

PSO1. वाचन कौशल्य व लेखनकौशल्यह्याना चालना देणे.

PSO2. भाषेविषयी आवडनिर्माणव्हावीह्याकरिताउद्बोधितकरणे.

PSO3. सामाजिकअंगानेपाठ्यक्रमगद्यवपद्यह्यांचेविवेचनकरणे.

PSO4. विचारांचीदेवाणघेवाणचांगल्याप्रकारेकरतायावीह्याकरितावि्यार्थ्यांमध्येसंवादकौशल्य विकसित करणे.

Course Outcome

B. Sc. Part I- Sem-I &II

CO1) भाषेविषयी अभिरुची निर्माण करणे.

CO2) विद्यार्थ्यांमध्ये लेखन व वाचन कौशल्य वृद्धिंगत करणे.

CO3) साहित्य आणि समाज यांचेतील परस्पर संम्बंध अंतर्भूत करणे.

CO4) साहित्यातून सामाजिक, सांस्कृतिक व तात्विक मांडणी करता यावी भाषिक कौशल्य आत्मसात करणे.

HINDI

PROGRAM SPECIFIC OUTCOME–

PSO1. संप्रेक्षणात्मक व प्रयोजन्मुलक हिन्दी भाषा का ववकास करना ।

PSO2. हिन्दी भाषा सिज और सरल रूप में दैननक व्यविार मे उपयोगी ि्ो ऐसा प्रयास ।

PSO3. हिन्दी भाषा संवर्धन प्रचार व प्रसार करना ।

PSO4. छात्रो की संवाद शक्ति का क्तवकास करना ।

PSO5. छात्रो का क्तिन्दी शब्द संग्रिक्तवकक्तसत करना ।

COURSE OUTCOMES –

हिन्दी भाग-1 सत्र 1-2

CO1. छात्रो की वाचन लेखन व बोलने की ग्रिण करणे की शक्ति का क्तवकास करना ।

CO2. साक्तिक्तययक क्तवधा व संक्तियययकारो का संक्तिप्त अध्ययन ।

CO3. हिन्दी व्याकरण को समझाकर अशद्धीयोको दरू करना ।

CO4. पाररभाक्तिक क्तिन्दी व देवनागरी क्तलक्तप का अध्ययन ।

CO5. पत्र लेखन कला का अध्ययन ।

CHEMISTRY

PROGRAM SPECIFIC OUTCOME

PSO1 Have sound knowledge about the fundamentals and applications of chemical and scientific theories

PSO2 Every branch of Science and Technology is related to Chemistry

PSO3 Easily assess the properties of all elements discovered.

PSO4 Apply appropriate techniques for the qualitative and quantitative analysis of chemicals in laboratories and in industries.

PSO5 Will become familiar with the different branches of chemistry like analytical, organic, inorganic , physical, environmental, polymer and biochemistry

PSO6 Helps in understanding the causes of environmental pollution and can open up new methods for environmental pollution control.

PSO7 Develops analytical skills and problem solving skills requiring application of chemical principles.

PSO8 Acquires the ability to synthesise, separate and characterize compounds using laboratory and instrumentation techniques.

Course Outcomes

B.Sc. Part I Sem-I

Paper-I – Organic Chemistry

CO1. Dyes are very important class of organic chemicals. They are the source of colour in different colouring chemicals available in market. In this course the synthesis and usefulness of different dyes are discussed.

CO2 – Nowadays synthesis of medicine is a very important issue for pharmaceutical industry. The medicines can be antipyretic drugs like paracetamol or antibiotic like penicillin. This course mainly deals with the structural determination, synthesis and uses of some drugs such as antipyretics, analgesic, sulpha-drugs penicillin etc.

CO3 – Heterocyclic compounds are very interesting due to their distinct structure and the availability of this kind of heterocyclic structures in medicinal drugs. So the technique of synthesis of heterocyclic compounds is important in the synthesis of different drugs. This course gives the quantitative ideas about the synthesis, properties and uses of such heterocyclic compounds like pyrrole,pyridine, quinoline, thiophene, furan etc.

CO4 - Proteins are important kind of chemicals in biological bodies. The preliminary unit of proteins are amino acids. This course discussed the methods of synthesis of proteins. Also the conversion of one amino acid to other by protection and de-protection of different groups are also discussed here.

CO5 – Carbohydrates, starch etc. are different class of macromolecules consisting of preliminary units like glucose, mannose etc. Their structure are also a matter of constant study due to their uniqueness. They are available in different foods like potato and recently they are being used in medicinal sciences also. This course deals with determination of structure of these class of chemicals and also their preliminary units. Inter-conversion of one preliminary unit to other is also discussed here.

CO6 – Alkaloids and terpenes are two very important class of organic chemicals available in different kind of drugs and perfumery chemicals like ephedrine,citral etc. The contents of this course deals with synthesis and structural determination of these class of chemicals. Few reactions of them are also discussed here.

CO7 – Synthesis of organic reaction is itself involves a large part of organic chemistry. This is called synthetic organic chemistry. This is discussed in a simple way for some simple molecule to the students. This includes fragmentation and retro synthesis analysis and also finding synth-on or reactive starting molecule of a target molecule.

CO8 – Pericyclic reactions are used in a vast way in nature and also by organic chemist. This course gives the student the theoretical basis of this kind of reaction and also helps them to find a way to carry out these types of reaction.

CO9 – To determine the structure is very important for organic chemist. Various spectroscopic methods are available like NMR, IR, UV absorption spectroscopies are few of them. The students are given a very preliminary idea on in this course.

CO10 – Hereditary its transfer is a matter of discussion among the scientist for a long time. Deoxyribonucleic acid (DNA) is responsible for this. RNA (ribo nucleic acid) is also another class of nucleic acid. This course gives the students a basic idea about the structure and nature of these types of compounds.

CO 11 – Use of green chemistry in modern chemical transformation is a becoming very important tool recently. The course taught here gives the student the principle of green chemistry and few methods of using green chemistry in chemical transformations.

B.Sc. Part II Sem-III

Paper-II Physical Chemistry

Course Description:

The course covers the basic physical principles that are the foundation of essentially all materials and biological chemistry. Topics include Phase equilibria, Thermodynamics, Chemical Kinetics and Solutions & Colligative properties.

Course Outcome (COs): Upon successful completion of the course, students should be able to:

CO1. State and apply the laws of thermodynamics; perform calculations with ideal and real gases; design practical engines by using thermodynamic cycles; predict chemical equilibrium and spontaneity of reactions by using thermodynamic principles.

CO2. Analyze heterogeneous systems in equilibrium and its applications in industrial sectors.

CO3. Identify feasibility of chemical reactions, order and kinetics of various reactions. Industrial applications of catalysts.

CO4. Students are expected to learn different colligative properties and its applications.

B.Sc. Part III Sem V

Paper II - Physical Chemistry

Course Description: This course contents are concepts in electrochemistry, its applications and fundamentals in Quantum mechanics.
Course Outcome (COs): Students will gain understanding of
CO1. Fundamentals in electrochemistry, Electrolytic substances and its transport properties, various electrolytic and electrochemical cells and its applications.
CO2. Classical mechanics, Quantum mechanics and its applications.

Practical
Physical Chemistry

Course Outcome (COs): On successful completion of the course students will be able to:
CO1. Developed expertise relevant to the professional practice in chemistry
CO2. Developed an understanding of the breadth and concepts of physical chemistry
CO3. An appreciation of the role of physical chemistry in the chemical sciences and engineering
CO4. Developed an understanding of the role of the chemist and chemical engineer in tasks employing physical chemistry
CO5. An understanding of methods employed for problem solving in physical chemistry
CO6. Experience in some scientific methods employed in basic and applied physical chemistry
CO7. Developed skills in procedures and instrumental methods applied in analytical and practical tasks of physical chemistry
CO8. Developed skills in the scientific method of planning, developing, conducting, reviewing and reporting experiments
CO9. Developed some understanding of the professional and safety responsibilities residing in working with chemical systems.

PHYSICS

PROGRAMSPECIFICOUTCOME–

PSO1. Improve scientific attitude and temperament in experimental skills, data analysis, calculations, measurements, the strength of equations, formulae, graphs, mathematical tools to tackle the problems
PSO2. Understand theories, concepts and significance of physics and its relevance in present day Technology.
PSO3. Create interest in the subject and improve technological aspect through mini projects, projects, models, demonstrations, presentations etc.
PSO4. Gain the knowledge of quantum mechanical concepts applicable in understanding behaviour of nano-materials and applications in nanotechnology.
PSO5. Understand various types of crystal structures and symmetries and understand the relationship between the real and reciprocal space and learn the Bragg's X-ray diffraction in crystals.
PSO6. Enhance academic abilities, personal qualities and transferable skills this will give them an opportunity to develop as responsible citizens.

Course Outcomes -
B.Sc. Part I Sem-I
Paper-I (USPHT01)- Mechanics and Relativity
CO1. Grasped the Newton's laws of motion, different types of frames of references and Centre of mass.
CO2. Learned conservation laws of energy and linear momentum and apply them to solve problems
CO3. Learn the basics idea of moment of inertia and its application for different shapes of object. Also know about rotational motion.
CO4. Fundamental ideas of special theory of relativity such as length contraction and time dilation and mass – energy invariance.
CO5. Identifying and describing physical systems with their professional knowledge.

Paper-II (USPHT02): Gravitation, Oscillation and Properties of Matter
CO1. To understand the concepts Gravitation and its application.

CO2. Learned the basic concept of SHM, its displacement, velocity and energy relation. Also learned about oscillation and its type.
CO3. Learned difference between elastics and non- elastics material and elasticity depend upon which factor.
CO4. Basic idea of Viscosity and different types of flow. Also learned about surface tension.

B.Sc. Part II Sem-III

Paper-I (USPHT05): THERMAL PHYSICS

CO1. The course makes the students able to understand the basic physics of heat and temperature and their relation with energy, work, radiation and matter.
CO2. The students also learn how laws of thermodynamics are used in a heat engine to transform heat into work.
CO3. Study the laws of thermodynamics, thermodynamic description of systems.
CO4. Realize the importance of Thermo dynamical functions and applications of Maxwell's relations.

Paper-II (USPHT06): RADIATION AND STATISTICAL PHYSICS

CO1. Familiarity with Black body radiation, Spectral distribution and different types of laws.
CO2. Learned about statistical distribution and have basic ideas.
CO3. Know about the Maxwellbotzman distribution and its application.
CO4. The students also study Bose-Einstein and Fermi Dirac Statistics and their applications.
CO5. Developing their scientific intuition, ability and techniques to tackle problems either theoretical or experimental in nature.

B.Sc. Part III Sem-V

Paper I (USDSEPHT09): ELEMENTS OF MODERN PHYSICS

CO1. Students would know about the basic principles in the development of modern physics.
CO2. Students to study the advance branches: quantum physics, nuclear physics, particle physics and high energy physics.
CO3. Learned about the Planck's hypothesis, photoelectric effect, Compton effect, matter waves, atomic models, Schrodinger wave equations.
CO4. Know about brief idea of nuclear and its stability. Also know about B, ϒ-rays emission and Fission and fusion.

Paper II (USDSEPHT10): SOLID STATE PHYSICS

CO1. Students learned a clear picture of crystal structures and a clear understanding about x-ray diffraction.
CO2. Expected to gain knowledge of superconductivity, its underlying principles and its applications in modern world.
CO3. Learned the magnetic Properties of matter.
CO4. Know about the Energy band picture of conductor, semiconductors and insulators
CO5. Knowing about the light and its importance in life, its characteristics, properties and use in various instruments

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BOTANY

PROGRAM SPECIFIC OUTCOME–

PSO1. Understand the nature and basic concepts of cell biology, genetics, anatomy, morphology, biochemistry, physiology, taxonomy and ecology of plants.
PSO2. Students learn to carry out practical work, in the field and in the laboratory, gain skills and proficiency in Interpreting plant morphology and anatomy, Plant identification etc.
PSO3. Identify the taxonomic position of plants, formulate the research literature and analyze plants with substantiated conclusions using first principles and methods of nomenclature and classification in Botany.
PSO4. Identify problems and independently propose solutions using creative approaches, acquired through interdisciplinary experiences, and a depth and breadth of knowledge/expertise in the field of Plant Identification
PSO5. Demonstrate hands on skill in the experimental techniques and methods of analysis in various fields of Botany

Course Outcomes -

B.Sc Part-I Sem-I

Paper- I (Micro-organisms, Algae, Fungi & Plant Pathology)

On completion of the course, students are able to-

CO1. Understand the diversity among Algae, Fungi & Micro-organisms.
CO2. Know the systematics, Morphology & Structure of Algae, Fungi & Micro-organisms.
CO3. Understand the life cycle pattern of Algae, Fungi & Micro-organisms.
CO4. Understand the useful & harmful activities of Algae, Fungi & Micro-organisms.
CO5. Know the terminologies in plant pathology.
CO6. Understand the scope & importance of plant pathology.
CO7. Know the prevention & control measures of plant diseases & its effect on economy of crops.

Paper- II (Bryophyta, Pteridophyta, Gymnosperms & Paleobotany)

On completion of the course, students are able to-

CO1. Know the classification, occurrence, structure & reproduction of Bryophyta, Pteridophyta, Gymnosperms.
CO2. Understand the economic importance of Bryophyta, Pteridophyta, Gymnosperms.
CO3. Know the scope of paleobotany, types of fossils, its role in global economy & geological time scale.
CO4. Understand the various fossil genera representing different fossil groups.

B.Sc Part-I Sem - II

Paper – I (Morphology& Anatomy of Angiosperms)

On completion of the course, students are able to-

CO1. Understand the habit of the Angiosperm plant body.
CO2. Know the vegetative characteristics of the plant.
CO3. Learn about the reproductive characteristics of the plant.
CO4. Understand the scope & importance of Anatomy.
CO5. Know various tissue systems.
CO6. Understand the normal & anomalous secondary growth in plants.
CO7. Perform the techniques in Anatomy.

Paper- II (Taxonomy& Diversity of Angiosperms)

On completion of the course, students are able to-

CO1. Identifying different groups of plants. Understand the plant Morphology & basic Taxonomy.
CO2. Understand the phylogeny of Angiosperms – a general account of the origin of Angiosperms.
CO3. Understand the general range of variations in the group of Angiosperms.
CO4. Learn the wide activities in Angiosperms & trends in classification.
CO5. Learn about the characters of important families of Angiosperms.
CO6. Know the floral variations in Angiospermic familes, their phylogeny & Evolution.
CO7. Understand various rules, principles & recommendations of plant nomenclature produces in plant identification.
CO8. Understand major evolutionary trends in various parts of Angiospermic plants.

B.Sc Part-II Sem-III

Paper- I (Reproductive Biology of Angiosperms, Plant growth &Development)

On completion of the course, students are able to-

CO1. Know the methods of pollination, fertilization, Endosperm &embryogeny.
CO2. Understand the structure & functions of anther, pistil, anther wall & pollen wall.
CO3. Evaluate the special structures of ovules.
CO4. Understand the growth & developmental process in plants.
CO5. Understand the plant movements.
CO6. Understand physiological &metabolical changes happening along with the environmental impact.
CO7. Understand the role of various plant growth regulators.

Paper- II (Plant Biochemistry & Physiology)

On completion of the course, students are able to-

CO1. Understand the biochemical nature of cell.
CO2. Know the chemical nature of biomolecules.

CO3. Understand the different types of interaction in biomolecules.
CO4. Understand the structure & general features of enzymes.
CO5. Understand the concept of enzyme activity & enzyme inhibition.
CO6. Know importance & scope of plant Physiology.
CO7. Understand the plant & plant cells in relation to water.
CO8. Understand the process of photosynthesis in higher plants with particular emphasis on light & dark reaction, C3 & C4 pathways.
CO9. Understand the respiration in higher plants with particular emphasis on aerobic & anaerobic respiration.
CO10. Learn about the movement of sap & absorption of waterin plant body.

B.Sc Part-II Sem-IV
Paper- I (Cell Biology, Genetics & Biotechnology)
On completion of the course, students are able to-
CO1. Understand cell wall, plasma membrane, cell organelles & cell division.
CO2. Understand Mendelian & Neo-Mendelian genetics.
CO3. Study the phenomenon of dominance, laws of segregation, independent assortment.
CO4. Understand the different types of genetic interaction, incomplete dominance, co-dominance, multiple alleles etc.
CO5. Understand the biochemical nature of nucleic acid, their role in living system, experimental evidences to prove DNA as a genetic material.
CO6. Understand the process of protein synthesis & role of genetic code in polypeptide formation.
CO7. Understand the fundamentals of recombinant DNA technology.
CO8. Understand the principle & basic protocols for plant tissue culture.
CO9. Know about the genetic engineering.
Paper- II (Plant Ecology)
On completion of the course, students are able to-
CO1. Understand the concept of biotic & abiotic component.
CO2. Classify the soil on the basics of physical, chemical & biological components.
CO3. Analyse the Phytogeography of India.
CO4. Evaluate the energy sources of ecological system.
CO5. Assess the adaptation of plants in relation to light, temperature, water, wind & fire.
CO6. Conduct experiment using skills appropriate to sub divisions.
CO7. Analyze the characteristics of different plant communities.
CO8. Examine the structure & functions of ecosystem.
CO9. Acquiring knowledge about importance of environment. Learn about pollution, global warming & climate change.
B.Sc. Sem- V
Paper- I(Economic Botany I)
Paper- II (Economic Botany II)
On completion of the course, students are able to –
CO1. Understand the concept of economic Botany & relate with environment, communities & ecosystem.
CO2. Develop critical understanding on the evolution concept of organization of Apex new crops, varieties, importance of germplasm diversity, issue related to access ownership.
CO3. Increase the awareness & appreciation of plants & plant products encountered in everyday life.
CO4. Appreciate the diversity of plants & their plant product in human use.

SemV: Skill Enhancement Course
Paper : Mushroom Culture
CO1. Recall various types & categories of mushroom.
CO2. Demonstrate various types of mushroom cultivating technologies.
CO3. Examine various types of food technologies mushroom cultivation.
CO4. Value the economic factors associated with mushroom cultivation.
CO5. Device new methods & strategies to contribute to mushroom production.

B.Sc. Sem VI
Paper-I (Plant Diversity & Conservation)
Paper-II (Plant Diversity & Conservation)
CO1. Develop understanding the true concept & scope of plant biodiversity.
CO2. Identify the causes & implication loss of biodiversity.
CO3. Apply skill to manage plant biodiversity.
CO4. Utilize various strategies for the conservation of biodiversity.
CO5. Conceptualize role of the plant in human welfare with special reference to India.

Sem VI: Skill Enhancement Course
Paper: Ethnobotany
CO1. Conceptualize Ethnobotany as a interdisciplinary
CO2. Restate the established methodology of Ethnobotany studies.
CO3. Categories various indigenous ethnic groups & their environmental practices.
CO4. Understand the legalities associated with Ethnobotany

ZOOLOGY

PROGRAMME SPECIFIC OUTCOMES

After successfully completing this course, students will:
PSO1. Understand the nature and basic concepts of Cell Biology, Genetics, Taxonomy, Physiology, Embryology, Ecology and Applied Zoology.
PSO2. Gains knowledge about research methodologies, effective communication and skills of problem solving methods.
PSO3. Improved the knowledge about animals special adaptations and evolutionary relationship.
PSO4. Improved information about external morphology and anatomy of animals including human being.
PSO5. Take appropriate steps towards conservation of endemic and endangered animal species.
PSO6. Develop ability in application of the acquired knowledge to improve applied zoology to make the Nation self-reliant and sufficient.
PSO7. Aware about natural resources and their importance in sustainable development.
PSO8. Have ability to engage in independent and life-long learning in the broadest context of technological change.
PSO9. Able to identify and critically evaluate their own beliefs, values and actions in relation to professional and societal standards of ethics and its impact on ecosystem and biosphere .

COURSE OUTCOMES

B.Sc. Part I - Semester-I

CORE PAPER I (USZOTOI) - ANIMAL DIVERSITY OF NON CHORDATE (PROTOZOA TO ANNELIDA)

After successfully completing this course, students will be able to:
CO1. Classify invertebrates and to be able to understand the possible group of the invertebrate observed in nature.
CO2. Describe morphological structure, various system and life cycle of Protozoa to Annelida
CO3. Understand the locomotor organelles and locomotion in protozoa.
CO4. Describe polymorphism in hydrozoa and alternation of generation in sponges.
CO5. Explain conservation and sustainable use of non-chordate animals

CORE PAPER II (USZOTO2) - CELL BIOLOGY

After successfully completing this course, students:
CO1. Understand and defines the terms in cell biology.
CO2. Understand and compares between the prokaryotic and eukaryotic cells and extrapolates the life to the aspect of development.
CO3. Describe the composition, structure and functions of the plasma membrane.
CO4. Explain cellular mechanisms and its functioning depends on cell organelles and structures.

CO5.Describe theelectron transport mechanism and oxidative phosphorylation in mitochondria along with its structure.
CO6. Explain cell division and differentiate between mitosis and meiosis.

PRACTICALS – B. Sc. - SEMESTER I

CO1. Recognize the live forms of invertebrate animals.
CO2. Analyze and describe zoological concepts, including morphology and anatomy.
CO3. Explain conservation and sustainable use of animals.
CO4. Explain and demonstrate the importance of animals for human beings.
CO5. Demonstrate functions of dissecting and compound microscope.
CO6. Explain and demonstrate stages of mitosis and meiosis in Cell division.

B.Sc. Part I - Semester- II

CORE PAPER III (USCZOT03) - ANIMAL DIVERSITY OF NON-CHORDATE (ARTHROPODA TO HEMICHORDATA)

After successfully completing this course, students will be able to:
CO1. Identify the general characters and its classification up to classes of major invertebrate phyllas.
CO2. Describe External Morphology, Digestive system, Circulatory system, Nervoussystem, Reproductive system and Sense organs of given examples in phylum Arthropoda, to Hemichordata
CO3. Understand and describe Pearl formation, Bipinnaria and Brachiolaria larva.
CO4. Understand and describer generation and autotomy in Echinoderm and affinities in Balanoglossus.
CO5. Understand the importance of classification of animals and classify them effectively using the six levels of classification.

CORE PAPER IV (USCZOT04) - GENETICS AND EVOLUTION

After successfully completing this course, students will be able to:
CO1. Define the basic terms in genetics.
CO2. Discuss Mendel's work on transmission of traits and Laws of Genetics
CO3. Explain the Linkage, Crossing over, Syndrome, chromosomal mutation and genemutation.
CO4. Describe and explain evolutionary theories**,** Urey – Miller experiment, Oparin Theory.
CO5. Preserve and conserve fossils which are the major evidences of evolution.
CO6. Explain Process of Evolutionary change

PRACTICALS - B. Sc. - SEMESTER II

CO1. Develops skill in preparation of DNA model.
CO2. Identify specimens and classify animals from phylum arthropoda to hemichordate up to species.
CO3. Learn anatomy of different animals of different phylum.
CO4. Identify human blood groups and human genetic traits.

B.Sc. Part II - Semester-III

CORE PAPER V (USCZOTO5) - ANIMAL DIVERSITY (CHORDATES) AND COMPARATIVE ANATOMY

After successfully completing this course, students will have:
CO1. Knowledge of classification of protochordates and chordates along with studies on various physiological functions and interactions of chordate organisms with examples
CO2. Conceptual knowledge of vertebrate adaptations in relation to their environment
CO3. Understand general taxonomic rules on animal classification.
CO4. Knowledge of Comparative anatomy related to derivatives of integuments, aortic arches and hearts and Urinogenital system.

CORE PAPER VI (USCZOT06) - PHYSIOLOGY AND BIOCHEMISTRY – I

After successfully completing this course, students will be able to:
CO1. Describe Metabolism of Carbohydrates, Protein and Lipid.
CO2. Explain General properties, Classification, Distribution and chemical nature ofEnzyme.
CO3. Describe the Structure and functions of digestive glands,Gastro-intestinal hormones and Vitamins
CO4. Explain Digestion and absorption of proteins, carbohydrates and lipids
CO5. Describe the Mechanism of Respiration, Transport of O_2 and CO_2
CO6. Describe the Respiratory pigments and effects of smoking

PRACTICALS - B.Sc. - SEMESTER III
CO1. Demonstrate carbohydrates, proteins and lipids in animal tissues
CO2. Classify the vertebrate animals up to genus
CO3. Explain and demonstrate the importance of animals for human beings

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B.Sc. Part II–Semester IV

CORE PAPER VII (USCZOT07) - DEVELOPMENTAL BIOLOGY

CO1: Identify the developmental stages
CO2: Describe the key events in early and systematic embryological development.
CO3: Explain the theories of preformation, and concepts like growth, differentiation and reproduction.
CO4: Explain the principles and process of fertilization and cleavage.
CO5: Elucidation of early embryonic development of invertebrates and vertebrates.

CORE PAPER VIII (USCZOT08) - PHYSIOLOGY AND BIOCHEMISTRY-II

After successfully completing this course, students will be able to:
CO1: Define the basic terms in physiology.
CO2: Explain the physiological processes in mammals.
CO3: Explain the anatomy of various systems.
CO4: Illustrate the reproductive cycles with hormonal control.
CO5:.Daigramatically represent the working of kidney.
CO6: Justify the endocrine disorders.

PRACTICALS - B. Sc. - SEMESTER IV
CO1. Explain and describe morphological stages of frog and chick development.
CO2. Detect urea, albumin sugar and creatine in human urine.
CO3. Able to demonstrate sperm counting in domestic animals to the farmers.
CO4. Demonstrate of haemin and haem chromogen in human blood.

B.Sc. Part II–Semester V

CORE PAPER X (USCZOT10) - APPLIED ZOOLOGY

After successfully completing this course, students:
CO1. Acquire knowledge of fresh, brackish and marine water fisheries. Understand the culture technique of fish.
CO2. Know the benefits of monoculture and poly culture. Learn and apply knowledge of fish preservation. Identify the fish diseases.
CO3. Acquire in depth knowledge of life history and pathogenecity of Ancyclosotoma and Wuchereria.
CO4. Learn and identify damage caused by crop pests.
CO5. Develop knowledge of medical importance and control methods of insect vectors. Learn and identify agricultural pests.
CO6. Acquire knowledge of fowls, broilers and commercial layers.
CO7. Learn principles of poultry breeding. Learn and apply methods of processing and preservation of eggs.
CO8. Learn and identify poultry diseases and learned skill for carrier options in poultry farms.

CO9. Understand dairy animal's management. Learn methods of preservation of semen and artificial insemination.
CO10. Learn the testing of milk quality. Learn and identify cattle diseases.

CORE PAPER XII (USCZOT12) - AQUATIC BIOLOGY

CO1. Understand basic biological processes that occur in and between organisms in nature. This understanding will make you capable of describing and explaining both biological interaction processes and their importance to ecosystems.
CO2. Acquire Knowledge of conservation strategies for protected marine animals and plants and able to monitor water quality.
CO3. Understand Aquatic pollution and eutrophication and sewage treatments.
CO4. Get the knowledge of water quality assessment like BOD and COD.

PRACTICALS - B. Sc. - SEMESTER V

CO1. Demonstrate Estimation of quality of milk
CO2. Identify insect pests and suggest majors for eradication of crop pests.
CO3. Measure quality of water in relation to dissolved oxygen, free CO_2, turbidity etc.
CO4. Carry out Qualitative and quantitative enumeration of zooplankton.

SKILL ENHANCEMENT COURSE– PAPER II - SERICULTURE

CO1. Identify and describe different types of silkworms and demonstrate economic importance of silkworms to the local society.
CO2. Know use of different instruments in sericulture industry
CO3. Learn and explain life cycle of Eri silkworm.
CO4. Learn and explain life cycle of Mulberry, Tassar and Muga silkworm.

PRACTICALS B. Sc. SEMESTER V- SKILL ENHANCEMENT COURSE

CO1. Use applied knowledge of silkworms for benefit of local societies
CO2. Use skill hand knowledge for the job.

B.Sc. Part III–Semester VI

CORE PAPER XV (USCZOT15) MICROTECHNIQUE, BIOINFORMATICS AND BIOSTATISTICS

CO1. Learn the working of microscopes. Mechanism, staining technique EM and Image processing methods in microscopy
CO2. Learn the working of microtome. Mechanism, Methods of various process micro technique. Histo-chemical staining techniques and the procedure of preparing permanent histological slides
CO3. Able to describe education that leads to comprehensive understanding of the principles and practices of bioinformatics.
CO4. Information and Computer Literacy: To educate and make them up to date with the current scientific literature, computer programs and web information and Structure of nucleotide Protein and sequence.
CO5. Learn how to effectively collect data, describe data, and use data to make inferences and conclusions.

CORE PAPER XVI (USCZOT16) - REPRODUCTIVE BIOLOGY

After successfully completing this course, students will be able to:
CO1. Describe **r**eproductive System and abnormalities of Human Sex Development
CO2. Explain Hypothalamus – Hypophyseal – Gonadal axis and Gonadal hormones
CO3. Describe Reproductive Endocrine Disorders in Male and Female
CO4. Describe androgen metabolism and Biochemistry of Semen, cryptorchidism and Castration
CO5. Describe reproductive cycles in rat and human and their regulation.
CO6. Describe mechanism of parturition and its hormonal regulation, Lactation and its regulation.
CO7. Explain Infertility in male and female and assisted Reproductive Technology

CO8. Describe modern contraceptive measures
CO9. Describe Demographic terminology used in family planning.

PRACTICALS -B. Sc. - SEMESTER VI

CO1.First-hand knowledge about use of BLAST and FASTA for the retrieval of nucleotide and protein sequence.
CO2.Students are able to handle microscopes, work with micrometers.
CO3.Expertise in preparation of line graph, bar graph, pie diagram by using excel.
CO4.Gain skill about histological slide preparation, staining and mounting
CO5.First- hand knowledge about surgical techniques.
CO6.Expertise in pathological determination of pregnancy by using preganancy kit.

SKILL ENHANCEMENT COURSE - MEDICAL DIAGNOSTICS

CO1. Determine and explain blood groups in human blood sample.
CO2. Gain knowledge about medical imaging like X-ray, Ultrasonography, MRI and CT scan.
CO3. Identify symptoms of Tuberculosis and explain preventive measures of tuberculosis.
CO4. Identify symptoms of Hepatitis and explain preventive measures of Hepatitis

PRACTICALS SEMESTER VI- SKILL ENHANCEMENT COURSE - MEDICAL DIAGNOSTICS

CO1.Differentiate between ABO blood group and Rh factor in blood.
CO2. Hand in knowledge about different medical instruments.

ENVIRONMENTAL SCIENCE

PROGRAM SPECIFIC OUTCOMES. –

PSO1. Acquired fundamental knowledge of different aspects of environment and local, regional and global environmental problems.
PSO2. Understand the basic concepts of Environment and its components along with their interactions through study of Ecology, Biodiversityand Environmental Chemistry.
PSO3. Understand different technologies like biotechnology, water and Wastewater treatment technology to find the solutions and their applications in abatement of Pollution and other environmental problems.
PSO4. Use of different tools for the management of Environment, Energy resources, solid wastes, Biodiversity conservation like Remote Sensing & Geographical Information Systems and different methodologies.
PSO5. Acquired skill and the knowledge to conduct experiments and data analysis needed for the environmental design and management.

Course Outcomes - ENVIRONMENTAL SCIENCE

B.Sc. Part I: Semester I,

Paper I USENVT01: Fundamentals of Environmental Science

CO1. Learning about Origin of the Universe, formation of the earth and scope of environmental science
CO2. Understanding of segments, structure, climate and meteorological elements
CO3. Basic understanding of hydrosphere
CO4. Demonstrating science of lithosphere, soil formation and minerology

Paper II USENVT02: Ecology

CO1. Basic understanding of ecology and interaction of organisms
CO2. Learning of population, community ecology and dynamics
CO3. Demonstrating ecosystem ecology, processes and biogeochemical cycle

CO4. Illustrating adaptation of animals and plants in different environment

Semester I, USENVP01: Practical

CO1. Demonstrating laboratory safety rules and sampling of surface and ground water
CO2. Illustrating preservation of water samples
CO3. Learning of analysis of various water quality parameters
CO4. Measurement of Ph, electrical conductivity and solids in water sample
CO5. Measurement of humidity of air
CO6. Estimation of bulk density of soil and interpretation of results

B.Sc. Part I - Semester II

Paper I USENVT03: Elements of Environmental Science

CO1. learning of aquatic characteristic and water environment
CO2. Understanding of environmental problems and recent research to solve the problems
CO3. Grasping knowledge of environmental education and understanding basic priorities in India
CO4. Perception of sustainable development, case studies and awareness through public participation

Paper II USENVT04: Applied Ecology

CO1. Understanding natures services w.r.t. food and atmospheric services
CO2. Demonstrating management and conservation of forest, wildlife highlighting the role of Red Data Book
CO3. Learning- design aspects of ecosystem, treatment wetland and solid waste management by natures forces
CO4. Illustrating ecological applications in conservation and restoration of ecosystem

Semester II : USENVP02: Practical

CO1. Demonstrating and displaying laboratory safety rules for handling while performing practical
CO2. Demonstration and Measurement of water quality parameters
CO3. Collection of water samples in B.O.D..bottles for the analysis of dissolved oxygen.
CO4. Demonstration and collection of soil samples.
CO5. Determination of total organic carbon and percent organic matter of the soil sample.
CO6. Identification and learning- characteristic features of rocks.

B.Sc. Part II - Semester III

Paper I USENVT05: Pollution Science

CO1.Basic understanding of various types of air pollutants and problems
CO2. Illustrate water pollution, oil pollution and thermal pollution
CO3. Demonnstrating noise pollution, radiation pollution and occupational hazards
CO4. Understanding basic causes and sources of soil contaminants and pesticide pollution.

Paper II USENVT06: Natural Resources and GIS

CO1. Learning natural resources and method of obtaining energy from it.
CO2. Understanding of earths water and land resources and management
CO3. Demonstrating natural disaster, hydrometeorological disaster and disaster management cycle
CO4. Understanding basic concepts of remote sensing, GIS and environmental management

Sem- III - USENVP03: Practical

CO1. Demonstrating laboratory safety rules for performing practicals.
CO2. Performing practical on settleable particulate matter by Dust fall jar method
CO3. Estimation of relative humidity by psychrometer.
CO4. Analysis of surface water quality for effective chlorine dosages
CO5. Analysis of rainwater for pH, conductivity, hardness and acidity
Co6. Undertaking Sampling for planktons and their preservation

B.Sc. Part II - Semester IV

Paper I PSENVT07: Pollution Control Technologies

CO1. Knowledge of Industries and Zoning Criteria, Control Devices for Particulates, Control Devices for Gases:
CO2. basics of Water Pollution Control, Thermal Pollution Control and Water Pollution Remedial Technologies
CO3. Apply measures to control Noise Pollution, Radiation Pollution and Occupational Health Hazards
CO4. Critically examine soil pollution control, pesticide pollution control and pesticide pollution control technologies

Paper II, USENVT08: Forest & Wildlife

CO1.Basic understanding of forest science, destruction and measurement
CO2. Applying measures of silviculture, tree improvement for the conservation of forest
CO3.Understand wildlife in its totality
CO4. Grasping knowledge of NGOs ,their working and involvement of people

Semester IV- USENVPO4: Practical

CO1. Study of the lake-Estimation of pH and Conductivity of water sample
CO2. Study of irrigation water for its suitability for crops
CO3. Analysis of alkalinity in irrigation water
CO4. Analysis of biogas slurry for pH
CO5. Determination of coagulant dose by Jar test apparatus w.r.t. suspended solids or turbidity removal.
CO6. Undertaking proximate analysis of coal for moisture content, volatile matter and carbon content

B.Sc. Part III - Semester V

Paper IX (Discipline specific elective) USENVDST-09: Environmental Engineering

CO1. Understanding of sampling of air, water, soil and solid waste
CO2. Discussing details of instrumental methods
CO3. Learning of Operation and Maintenance of Pollution Treatment Units
CO4. A professional education of corporate management including environmental management

Practical 05: USENVDSP-05: Environmental Engineering

CO1. Analysis of rain water for PH, Carbondioxide and Dissolve oxygen.
CO2. Analysis of hand pump water for fluoride and iron concentration
CO3. Comparative studies of surface and ground water sample for pH, conductivity
CO4. Determination of physicochemical parameters of waste water for COD , BOD and Suspended solids
CO5. Estimation of phosphate from waste water sample

Semester V Paper X (Discipline specific elective) USENVDST-10: Environment and Innovations

CO1. Basic understanding of innovation and environmental innovation
CO2. Demonstration of physical, chemical and biological innovation
CO3. Demonstrating innovation in agriculture, forestry and biodiversity
CO4. Grasping knowledge of water, education and energy innovation

Practical (Discipline specific elective Practical 06) USENVDSP-06: Environment and Innovations

CO1. Analysis of fly ash for physical and chemical parameters
CO2. Determination of organic farming soil for organic carbon.
CO3. Estimation of vermicompost sample for pH, acidity and chloride
CO4. Analysis of cowdung cake/slurry for physical and chemical parameters
CO5. Determination of water holding capacity of soil

Paper XI (Discipline specific elective) USENVDST-11: Industrial processes and pollution control

CO1. Manufacturing details of cement industry
CO2. Grasping knowledge about coal mining and testng
CO3. Demonstrating manufacturing of pulp and paper and testing
CO4. Broad understanding of industrial pollution

Practical (Discipline specific elective Practical 07) USENVDSP-07: Industrial processes and pollution control

CO1. Analysis of coal sample for moisture, volatile acids, organic carbon and ash.
CO2. Determination of silica from coal ash.
CO3. Estimation of chemical oxygen demand from waste water sample.
CO4. Determination of biochemical oxygen demand from waste water sample

Paper XII (Discipline specific elective) USENVDST-12: Urban Ecosystems

CO1. Illustrate the urban ecosystem and elements associated with it, existing environmental issues, conflicts and their impact in urban development
CO2. Recall the importance of interaction between urban society and relate into environment governance and policy decisions.
CO3. Examine housing scenarios at different scales of cities and identify urban Environmental issues associated with it.
CO4. Determine ecological planning by connecting environmental variables.

Practical (Discipline specific elective Practical 08) USENVDSP-08: Urban Ecosystems

CO1. Estimation of Total Dust Fall (TDF) concentration by Dust fall jar method
CO2. Determination of dust concentration deposited on different leaves
CO3. Grasping knowledge of vermicompost
CO4. Examination of municipal water sample for free/residual chlorine, hardness and chloride.
CO5. Determination of tap water sample for chlorine demand and effective doses

Semester V Paper I (Skill Enhancement Course) USENVSEC-01: Organic manure preparation

CO1. Imparting knowledge about plant nutrients-Visit to local agriculture shop for detail plant nutrients products
CO2. Understanding about biofertilizer manufacturing methods-Visit to local biofertilizer making units
CO3. Grasping knowledge of Vermi-compost -Visit to local nursery for actual making of Vermi-Compost
CO4. Visit to local unit for in plant training

Semester V

Paper II (Skill Enhancement Course) USENVSEC-02: Demineralization plant Operation, maintenance and safety

CO1. Demonstrating working of demineralization-Visit to local D.M.Plant
CO2. Understanding working of cation and anion exchanger -Visit to local D.M.Plant
CO3. Illustrating physico-chemical methods-Practicals based on water analysis
CO4. Demonstrating safety and O&M of D.M.plant- Visit to local D.M.Plant

B.Sc. Part III - Semester VI

Paper XIII (Discipline specific elective) USENVDST-13: Environmental Management

CO1. Understanding Solid Waste and Hazardous Waste Management
CO2. Grasping knowledge of Industrial Wastewater Treatment
CO3. Demonstrating basics of Cleaner Technologies and EMS
CO5. Illustrating: Environmental Impact Assessments and E.A.

Practical ((Discipline specific elective Practical 09) USENVDSP-09: Environmental Management

CO1. Determination of physical parameters of (I) well water and (II) river water.
CO2. Determination of residual chlorine/free chlorine from municipal water sample.
CO3. Estimation of sulphates by colorimetry/ spectrophotometry
CO4. Estimation of phosphates by spectrophotometry
CO5. Determination of nitrate from ground water sample

Paper XIV (Discipline specific elective) USENVDST-14: Environmental Restoration

CO1. Understanding basic things about ecological restoration
CO2. Grasping in depth information Eco-restoration Methods

CO3. Illustrating methods of Eco-restoration of Abiotic Environment
CO4. Enhancing forces of nature for restoration

Practical (Discipline specific elective Practical 10) USENVDSP-10: Environmental Restoration
CO1. Determination of total organic carbon in soil.
CO2. Determination of pH value of different types of soil.
CO3. Determination of water holding capacity of soil.
CO4. Determination of suspended solids and total solids of raw sewage
CO5. Estimation of Chemical Oxygen Demand of the given wastewater sample by open reflux method.

Paper XV (Discipline specific elective) USENVDST-15: Industrial Safety and Environmental Management
CO1. Understanding concepts and Principles of safety management
CO2. Knowing more about safety audit in industrial applications
CO3. Gathering information about Accident investigation and reporting
CO4. Knowing applications of Environmental Management in an industry

Practical (Discipline specific elective Practical 11) USENVDSP-11: Industrial Safety and Environmental Management
CO1. Determination of total suspended solids and total solids of waste water sample.
CO2. Estimation of sulphate of waste water sample
CO3. Estimation of phosphate of waste water sample.
CO4. Examination of waste water sample for biochemical oxygen demand

Paper XVI (Discipline specific elective) USENVDST-16: Solar Photovoltaic Technology
CO1. Understanding Fundamentals of Solar Cell
CO2. Exploring Solar Cell technologies
CO3. Learning Planning & Design aspects of solar cell
CO4. Developing Skill for Operations & Maintenance (O&M)

Practical, (Discipline specific elective Practical 12) USENVDSP-12: Solar Photovoltaic Technology
CO1. Determination of effect of color (wavelength) on cell current
CO2. Determination of effect of shading on cell current.
CO3. Determination of Effect of Tilt Angle on Cell Current.
CO4. Studies on current voltage characteristics of solar cell.

Paper III (Skill Enhancement Course) USENVSEC-03: Soil Sampling and Analysis
CO1. Basic information about Importance of Soil Testing and Analysis
CO2. Practical demonstration of Instrumentation in Soil Testing and Analysis-Visit to district soil testing laboratory
CO3. Grasping Laboratory Setup methods, especially safety operation
CO4. Providing information of Soil Test Report & Fertilizer Recommendation

Paper IV (Skill Enhancement Course) USENVSEC-04: Bamboo Application and Technology
CO1. Understanding bamboo as a resource
CO2. Learning Methods Bamboo durability
CO3. Visit to Bamboo based industries
CO4. Explaining the role of Bamboo for sustainable development

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MICROBIOLOGY

Programme Specific Outcomes- - B. Sc.
PSO1. Understanding about cultivating the pure bacterial cultures from soil, water, air, milk, etc.
PSO2. Ability to use laboratory instruments like spectrophotometer, colorimeter, LAF, PH meter, Electrophoresis, Compound microscope, Centrifuge.
PSO3. Preparing for a career in a pharmacy and medical related business or industries.
PSO4. Ability to plan the small-to-mid-size laboratories and industries of their own.

PSO5. Effectively utilizing the knowledge of microorganisms to develop sustainable solutions tocurrent and future environmental problems.
PSO6. Developing and implementing solution-based systems and/or processes that address issuesand/or improve existing systems within in a microorganism-based industries.

Course Outcomes

B.Sc. PART-1, SEMESTER-1

PAPER- I -FUNDAMENTALS OF MICROBIOLOGY

After successfully completing this course, student will be able to

CO1. To understand history, relevance of microbiology.
CO2. Students will gain knowledge about the different cell organelles of microorganisms and their detailed functions.
CO3. To understand the principle and parts of taxonomy and various methods of classification of bacteria
CO4. To understand general and unique characteristics of viruses, Archaebacteria and fungi.

PAPER –II- MICROBIAL TECHNIQUES

After successfully completing this course, student will be able to

CO1. To understand the working of various microscopes and their application
CO2. To learn different methods of staining bacteria.
CO3. To gain knowledge about microbial nutrients, types of media, microbial technique for isolation of pure culture and various methods of preservation of it.
CO4. To gain knowledge of various agents used to controlled microbial growth.

SEMESTER-2

PAPER-III-GENERAL BIOCHEMISTRY

After successfully completing this course, student will be able to

CO1.Th student is able to describe the concept of PH, buffers, types of solutions and types of bonds with their importance.
CO2. Overview of major biomoleculeles- classification, structure, function of carbohydrates, lipids, proteins, amminoacids, nucleic acids

PAPER-IV- APPLIDE MICROBIOLOGY

After successfully completing this course, student will be able to

CO1. Student will gain knowledge of air microbiology- composition, control of microorganism, air born diseases.
CO2. Student will gain knowledge of water microbiology- methods of determination of sanitary quality of water and sewage treatment methods employed in waste water treatment.
CO3. Know the concepts related to popular milk products, milk examination and spoilage.

B.Sc. PART-2, SEMESTER-III

PAPER-I- MICROBIAL PHYSIOLOGY AND METABOLISM.

After successfully completing this course, student will be able to

CO1. The student will learn the techniques of studying bacterial growth curve and physical condition require for bacterial growth.
CO2.Conceptual knowledge of properties, structure, functions of enzyme, enzyme kinetics and their regulation, factors affecting enzyme activity.
CO3.Discuss the biosynthesis and the degradation pathway involved in the physiology of microbes.

PAPER-II-FOOD, SOIL MICROBIOLOGY AND MICROBIAL ECOLOGY

After successfully completing this course, student will be able to

CO1. Understand the significance and activities of microorganisms in various foods and role of intrinsic and extrinsic factors on microbial growth in foods leading to spoilage, and understand the principles underlying the preservation methods.
CO2.Understand the various biogeochemical cycles - microbes involved and biochemical mechanisms of Carbon, Nitrogen, Phosphorus cycles etc.
CO3.Student will gain knowledge of composting and their various methods.
Student will learn in detail mechanism of Biological nitrogen fixation, biofertilizers and biopesticide
CO4. Student will gain knowledge of environmental biotechnology.

SEMESTER-IV

PAPER-III-INDUSTRIAL MICROBIOLOGY

After successfully completing this course, student will be able to
CO1. To develop understanding of functional and fabrication aspects of various bioreactor designs
CO2.To learn the techniques of discovering new useful microorganism by various isolation, screening and strain improvement methods.
CO3. : Develop an understanding of downstream processes like detection and assay of the product, methods of recovery of the product and purification of the production.
CO4. To gain knowledge about microbial production of various industrial products such as Beverages, enzymes, organic acids, Antibiotics, fermented food.

PAPER-IV- MICROBIAL GENETICS AND MOLECULAR BIOLOGY

After successfully completing this course, student will be able to
CO1. The students will be able to understand the concept of gene expression, gene regulation, mutations and DNA repair in prokaryotes.
CO2. The students will be able to understand how DNA replication and recombination occurs in bacteria.
CO3.The student will be able to understand transcription, post transcription modification and translation.
CO4. Student will gain knowledge about genetic recombination-bacterial transformation, transduction, conjugation.

B.Sc. , SEMESTER-V

After successfully completing this course, student will be able to

PAPER-I-MEDICAL MICROBIOLOGY

CO1. Get a clear vision about various aspects of infectious diseases
CO2. The student will able to explain general and specific mechanisms by which an infectious agents causes disease.
CO3. Student will gain knowledge about microbial diseases of human.

PAPER-II- BIOINSTRUMENTATION

After successfully completing this course, student will be able to
CO1.To understands the principle, construction, working and application of spectrophotometer, centrifugation, electrophoresis, and chromatography.

SEMESTER- VI

PAPER-III-RECOMBINANT DNA TECHONOLOGY

After successfully completing this course, student will be able to
CO1.Student will gain knowledge about isolation and purification of nucleic acids for routine laboratory procedures.

CO2. The student will be able to able to analyze the role of various enzymes, vectors and technology and other tools used in recombination DNA technology
CO3. The student will able to apply the knowledge of recombination DNA technology to create novel products

PAPER-VI-IMMUNOLOGY

After successfully completing this course, student will be able to
CO1. Know the role of immune cells and organs and the functional mechanisms of each.
CO2.The student will be able to describe the role of immune system in both maintaining health and contributing to disease.
CO3. To study the concepts related to antigen and antibody.
CO4. Student will gain knowledge of allergic reaction and autoimmune diseases.

COMPUTER SCIENCE

Programme Specific Outcomes

PSO1: Effectively communicating computing concepts and solutions to bridge the gap between computing industry experts and business leaders to create and initiate innovation
PSO2: Effectively utilizing their knowledge of computing principles and mathematical theory to develop sustainable solutions to current and future computing problems.
PSO3: Exhibiting their computing expertise within the computing community through corporate leadership, entrepreneurship, and/or advanced graduate study
PSO4: Developing and implementing solution based systems and/or processes that address issues and/or improve existing systems within in a computing based industry.
PSO5: Information on Emerging Trends: Give information about software design and development practices to develop software applications in emerging areas such as Cloud and High performance computing, Data analytics and Cyber security.
PSO6: Successful Career and Entrepreneurship: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

Course Outcomes (COs)

B.Sc. I Computer Science Semester I, Paper I : INFORMATION AND COMMUNICATION TECHNOLOGY	
CO1	Learning about basic structure and functions of computer system, number system and computer memory.
CO2	Understanding of structure, functions and working of I/O and storage devices.
CO3	Basic understanding of operating system and its types.
CO4	Undertanding of basics of internet, its types and topologies.
B.Sc. I Computer Science, Semester I Paper II : PROGRAMMING TECHNIQUES & INTRODUCTION TO 'C'	
CO1	Understanding language evolution and difference between high level and assemble language.
CO2	Acquiring in depth knowledge of programming construction tools
CO3	Understanding C Character Set, Keyword, Constants and Variables, Data types, Type Casting, operators and expressions in C.
CO4	Understanding various conditional and looping statements in C.
B.Sc.I Computer Science Semester II Paper I: OPERATING SYSTEM & LINUX	
CO1	Understanding purpose, function and role and types of operating system

CO2	Understanding of operating system components and concept of process and job control.
CO3	Grasping knowledge of Linux operating system.
CO4	Understanding of of shell scripts pipe and filters, permission modes
B.Sc.I Computer Science Semester II Paper II: STRUCTURED PROGRAMMING WITH 'C'	
CO1	Understanding concept of arrays and strings.
CO2	Understanding concept of structures, array of structures and union.
CO3	Understanding concept of functions and storage classes.
CO4	Grasping knowledge of pointers, file structures and dynamic memory management.
B.Sc. II Computer Science Semester III Paper I: DATABASE MANAGEMENT AND SYSTEM ANALYSIS	
CO1	Understanding basic terminology of database.
CO2	Understanding the concept of functional dependency normalization and various normal forms.
CO3	Understand the concept of system analysis and system development life cycle.
CO4	Acquiring in-depth knowledge of system design, system implementation and documentation.
B.Sc. II Computer Science Semester III Paper II: OBJECT ORIENTED PROGRAMMING WITH C++	
CO1	Acquiring in-depth knowledge of basic elements of programming.
CO2	Understanding the basic concept of OOPs.
CO3	Understanding the concept of constructors, destructors, operator overloading and concept of inheritance with its types.
CO4	Understanding the concept of pointers, virtual and friend functions.
B.Sc. II Computer Science Semester IV Paper I: ALGORITHM &DATA STRUCTURES	
CO1	Understand basic concept, fundamentals and operations of data structure.
CO2	Understand the concept of recursion with its properties and its applications.
CO3	Understand the concept of linked list with its representation, types and operations.
CO4	Understand the concept of trees and graphs.
B. Sc. II Computer Science Semester IV Paper II: VISUAL BASIC & INTRODUCTION TO .NET	
CO1	Basic understanding of integrated development toolkit .
CO2	Understand various visual basic controls and ActiveX controls.
CO3	Acquire in-depth knowledge of Interface, Array and ActiveX Data Object
CO4	Understand Basic concepts of .NET and Visual Studio .NET
B.Sc. III Computer Science, Semester V PAPER-I(9.1) (Elective-I): E-Commerce& Web Designing	
CO1	Understanding of basics of e-commerce
CO2	Understanding of basics of HTML

CO3	Acquire in-depth knowledge of working with HTML linking, graphics in web page , tables and frames.
CO4	Acquire in-depth knowledge of advanced HTML form design concept of CSS.

B.Sc.III Computer Science, Semester V **PAPER-II(9.2):(Elective II): DATABASE PROGRAMMING WITH ORACLE**	
CO1	Acquire in-depth knowledge of RDBMS concept, oracle, SQL tools and commands.
CO2	Understanding of various SQL languages
CO3	Understand SQL functions and database objects.
CO4	Understand basic elements of PL/SQL programming
B.Sc.III Computer Science, Semester VI **PAPER-I(11.1)(Elective-I):Core Java**	
CO1	Understanding of basics of Java language and its programming concepts.
CO2	Understanding concept of classes and object concept in java , java language features and packages in java
CO3	Acquiring in-depth knowledge of exception handling and multi-threading in java.
CO4	Acquire in-depth knowledge of AWT and Applets in java
B.Sc.III Computer Science, Semester VI **PAPER II(11.2)(Elective-2): DATA COMMUNICATION WITH CLOUD COMPUTING**	
CO1	Understanding of concept of data transmission, data encoding, signals, data link controls and multiplexing.
CO2	Acquiring in depth knowledge of communition network, LAN, MAN and various network topologies.
CO3	Understand various communication protocols and concept of internetworking
CO4	Acquire in-depth knowledge of cloud computing basics

MATHEMATICS

Programme Specific Outcomes

PSO1: Students will demonstrate an understanding of the common body of knowledge in maths and demonstrate the ability to apply analytical and theoretical skill to model and solve the mathematical problems
PSO2: Understand the nature of mathematical proofs and be able to write clear and concise proofs.
PSO3: Be able to communicate effectively in oral and written form
PSO4: Be able to write simple computer programs to perform the mathematical competition.
PSO5: Learn about application of mathematics in other field and gain experiences in mathematical modelling
PSO6: Develop the ability to read, understand and use basic definition in linear and abstract algebra and real analysis and be able to prove simple consequence of this definition
PSO7: Student learns to communicate idea effectively and to digest new information and concepts independently.
PSO8: Students are encouraged to develop intellectual and become involved with professional organization
PSO9: Communicate mathematical ideas both orally and in writing
PSO 10: Investigate and solve unfamiliar maths problems
PSO11: Demonstrate the proficiency in writing proofs

COURSE OUTCOMES -

B. Sc. Sem -I

Paper-I- Differential and integral calculus

CO1: Calculate the length of an arc.
CO 2: Evaluate the area of surface of revolution.
CO 3: Obtain equation for surface and curve in 3 dimension.

Paper-II – Differential calculus and trigo.

CO 1: After studing this course you should be able to recognize D.E.
CO 2: To check a solution of D.E.
CO 3: Use an initial condition to find particular solution of D.E.

B. Sc. Sem -II

Paper-I –O.D.E & D.E.

CO 1: Explain meaning of solution of D.E.
CO 2: Solve exact D.E.
CO 3: Solve Cauchy- Euler equation.

Paper-II –P.D.E .

CO 1: Formulate physical problem as PDE.
CO 2: Inter prêt solution in a physical context .
CO 3: To physically inter prêt solution.

B. Sc. Sem -III

Paper-I- Real analysis.
C0 1: Describe the fundamental property of the real no.
C0 2: Demonstrate skill in communicating mathe.
CO 3: Demonstrate and understanding of the theory of sequence and series.

Paper-II- Set theory and Laplace transform.
C0 1: List element of a finite set.
C0 2: Illustrate sets using venn diagram.
CO 3: Perform intersection, union.

B. Sc. Sem -IV

Paper-I- Algebra.
C0 1: Multiply out bracket.
C0 2: Simply some formule.
CO 3: Solve simple linear equation.

Paper-II- Element of no theory.
C0 1: Express the basic property of gcd.
C0 2: Solve linear Diophantine equation.
CO 3: Solve linear congurant.

B. Sc. Sem -V

Paper-I- Linear algebra.
CO 1:Recognize the concept of term span and LD,LI,basis.
CO 2:Use matrics algebra to L.T.
CO 3:Compute and use eigenvector and eigen value.

Paper-II-General relativity-I
CO 1: Student will be able to solve basic std. problem of general relativity.
CO 2: Apply tensor to the description of curve.
CO 3: Solve problem by applying the principle of relativity.

B. Sc. Sem -VI

Paper-I- Complex analysis and vector analysis.
CO 1:Prove basic result in complex analysis.
CO 2:Demonstrate under standing and appreciation of deeper aspect of complex analysis.
CO 3:Demonstrate skill in communication math orally and in writing .

Paper-II-General relativity-I
CO 1: Describe world line of particle and photon in a curve space time.
CO 2: Solve problem by applying the principle of relativity.

PREFACE

A program outcome represents the knowledge, skills and attitudes of the students at the end of a degree program. **Program Specific Outcomes** means what the post graduate students of a specific degree program should be able to do and **Course Outcomes** are the resultant knowledge skills that the students acquire at the end of the course. It defines the cognitive processes a course provides.

The IQAC of the institute guides the departments regarding the preparation of program outcomes, program specific outcomes and course outcomes. These are charted by the departments in alignment with the university prescribed syllabus, the core values and objectives of the institution. Each department, following extensive discussions, according to the nature and scope of the Programmes and Courses offered by them, prepare Course outcomes.

The institution outlines POs and PSOs for all programmes and COs for each course. After aligning these with the University envisaged learning outcomes, the course plans are made by the departments. The college follows a Post-Graduate-attribute-linked course plan for the courses offered across all programmes. It is designed to incorporate the teaching, learning and assessment strategies in such a way as to give enough weightage to each of the specified learning activities and attainment of outcomes. These are prepared in the departments by the teachers handling each course.

The students form the pivot around which all activities of the college revolve. The various curricular and co- curricular activities of the college enhance their academic capabilities and future potentials. The curricular and academic activities of the college are aimed at augmenting the quantitative and qualitative nature of the programmes offered, providing vertical and horizontal mobility and in ensuring career orientation, skill development and the promotion of entrepreneurial skills. Along with the prescribed curriculum and traditional teaching methods like lectures, assessments, quiz, notes sharing, assignments etc. smart boards, ICT tools, projectors and new interactive software to conduct online exams etc are employed, partially automated library with 10162 books, 14 periodicals and journals and 05 e-Journals is one among them.

The teaching and learning methods streamline for effective transfer of knowledge is carried out by making use of diverse innovative and novel teaching techniques that are student centric in approach. Mentoring and tutorial system are introduced to maintain discipline and to reduce dropout rates and for one-to-one assistance.

An effective and transparent continuous internal evaluation system is in place. An effective attendance system, regular assessments and remedial coaching have markedly improved the performance and the placement status of the students. During the last academic year --- students go to higher studies and – students were recruited in different sectors.

MASTER OF ARTS (M.A.)

Programme Outcome:

PO1. The students acquire in depth knowledge in the field of social sciences, literature and humanities which make them sensitive and sensible enough to solve the issues related with mankind.

PO2. The postgraduates will be acquainted with the social, economic, historical, geographical, political, ideological and philosophical tradition and thinking of their respective subjects.

PO3. The program also empowers the post-graduates to appear for various competitive examinations or choose the any post graduate or research programme of their choice.

PO4. The M. A. program enables the students to acquire the knowledge with human values framing the base to deal with various problems in life with courage and humanity.

PO5. The students will be ignited enough through the knowledge of the special PG programme to think and act over for the solution of various issues prevailed in the human life to make this world better than ever.

PO6. Through the PG programme the students will come know about research in their respective subject. It may also provide the information to the students for collection of Data, enquiry, primary and secondary methods of collection of data, classification and tabulation of data.

PO7. Students get knowledge of various research methods and can realize the importance of research to find solutions of a specific issue.

M.A. MARATHI

Programme Specific Outcome:

PSO1. To introduce new trends in Marathi literature to know the importance of criticism.
PSO2. To increase vision regarding literary value.
PSO3. To know the concept and process of literature.
PSO4. To know the importance of language in human life.
PSO5. To understand the communication process and method.
PSO6. Understand the tradition of researchers in Marathi literature.
PSO7. To prepare for the examinations like NET/SLET 2.
PSO8. To inculcate moral values in order to strengthen the society.

M.A. Marathi (Semester I & II) Course Outcome:

पेपर- १) अर्वाचीन कविता :

Course Outcome:

1) कवितेत मानवी जीवनाचे प्रतिबिंब व्यक्त होते.

2) सृष्टीसौंदर्य न्याहाळता येते.

3) जीवनातील सुख दुखाची जाणीव यातून व्यतीत होते.

4) समाज जीवनाशी एकरूपता साधता येते.

5) सर्वस्पर्शी वाड;मय असल्याची जाणीव निर्माण करणे.

पेपर- २) साहित्यशास्त्र :

Course Outcome:

1) वाड;मयीनमूल्ये व जीवनमूल्ये जाणून घेणे.
2) साहित्यप्रकाराची संकल्पना समजून घेणे.
3) ललित साहित्य व शास्त्रीय साहित्य ह्याविषयी जाणून घेणे.
4) साहित्याचे मूलद्रव्य रुजविणे.
5) साहित्यातील सौदर्यस्थळे समजून घेणे.

पेपर- ३) मराठी वैचारिक निबंध :

Course Outcome:

1) महापुरुषांच्या जीवनकार्याची प्रेरणा मिळते.
2) वैचारिक वाड;मयातून मूल्यनिर्मिती होते.
3) ऐतिहासिक घटनांचा तपशील न्याहाळता येतो.
4) वैचारिक प्रगल्भता वृद्धिंगत होते.
5) जीवनविषयक मूल्ये रुजवता येते.

पेपर- ४) नाटक :

Course Outcome:

1) समाज प्रबोधन करता येते.
2) सांस्कृतिक अभिरुची निर्माण करता येते.
3) घटनांचा तपशील मांडता येते.
4) समाज मनाचा वेध घेता येतो.
5) सांस्कृतिक दर्शन घडवता येते.

M. A. Marathi (Semester III & IV) Course Outcome:

पेपर- १) प्राचीन मध्ययुगीन मराठी कविता :

Course Outcome:

1) संत साहित्याचे आकलन करता येते.
2) यामधून वर्तमान जीवनाविषयीची जाणीव व्यक्त होते.
3) वाड;मयीनमूल्ये वृद्धिंगत करता येतात.
4) आत्मपरीक्षणाला वाव मिळते.

5) सामाजिक जाणिवा विकसित होतात.

पेपर- २) भाषाविज्ञान :

Course Outcome:

1) भाषिक कौशल्य विकसित करणे.

2) प्रमाणभाषेविषयी जागरूकता निर्माण करणे.

3) भाषावृद्धीची चळवळ राबवता येते.

4) भाषिक तत्व आणि व्यवहार ह्याविषयी जागरूकता निर्माण करणे.

5) बोलीभाषाव प्रमाणभाषा ह्यातील परस्पर संबंध समजणे.

पेपर- ३) विशेष ग्रंथकार तुकाराम :

Course Outcome:

1) तत्कालीन सामाजिक परिस्थिती जाणून घेणे.

2) समाज आणि साहित्य ह्याची जाणीव निर्माण करणे.

3) वैज्ञानिक दृष्टीकोन रुजविणे.

4) साहित्याविषयी जागरूकता निर्माण करणे.

5) व्यवहारज्ञान विकसित करणे.

पेपर- ४) मराठी वाड;मयाचा इतिहास :

Course Outcome:

1) सामाजिक व सांस्कृतिक मूल्ये रुजविणे.

2) वर्तमानात साहित्याचे महत्व अवगत करणे.

3) वाड;मयीन जाणिवा निर्माण करणे.

4) साहित्याच्या विविध पैलूंविषयी जाणून घेणे.

M.A. SOCIOLOGY

PROGRAMME OUTCOMES

PO1: To promote a commitment to the improvement about the societal understanding and social institutions.

PO2: To educate the students about various sociological theories

PO3: To prepare students to initiate and facilitate interactions between government and non-governmental sectors to provide ethical and workable solutions to societal needs.

PO4: To educate students to be compassionate and effective leaders who humanely manage public welfare programmes

PO5: To translate research into effective practices and achievable, human policies.

PO6: To encourage students to acquire knowledge, skills and capabilities arising from the need for a more efficient and effective public administration.

PO7: To motivate students to utilize the job opportunities.

PROGRAMME SPECIFIC OUTCOMES

PSO1: To provide the students a deeper and broader understanding of the subject.

PSO2: To enhance their research ability to add new thinking and concept into its body of knowledge.
PSO3: To equip the students for seeking suitable employment ability.
PSO4: To impart knowledge and develop understanding of research methodology and its application for research relevant to social problems
PSO5: To use ethical skills in transparent, accountable decision making for the common good.

COURSE OUTCOMES

M. A. Part I: Semester – I

Paper- 1: Classical Sociological theory

CO1. Observe the biography and ideas of Auguste Comte.
CO2. Depict the life history and theories of Herbert Spencer.
CO3. Illustrate the biography of Karl Marx and his theories.
CO4. Describe the life study of Max Weber and his thoughts.

Paper- 2: Methodology of Social Research-I

CO1. Tabulate the types, uses and steps in social research.
CO2. Enumerate the types of research design and functions.
CO3. Assemble the Tools of Data Collection-Questionnaire, Interview, Observation, Case study.

Paper- 3: Rural Society in India

CO1. Examine the importance of the study of rural social structure and conflict in rural areas.
CO2. Recognize the dynamics of the social structure of Indian Rural Society, traditional caste and village community systems.
CO3. Clarify the concept of marriage, which is an integral part of social institution, rural education and rural religion.

Paper- 4: Social Movements in India

CO1. Correlate the nature and types of social movements and social change in India.
CO2. Summarize social reform movements in various states of India.

M. A. Part I: Semester – II

Paper- 1: Perspectives on Indian Society

CO1. Understanding of human society in terms of its diverse and interrelated theoretical perspectives
CO2. Acquaintance with social transactions, social relations, social formations, social control, social values and culture.
CO3. Identify the Pioneering works of Indian Sociologists.

Paper- 2: Methodology of Social Research-II

CO1. Demonstrate probability and non-probability sampling, Steps in report writing.
CO2. Estimate the uses of Measures of central tendency, Measures of Dispersion.

Paper- 3: Urban Society in India

CO1. Bring out the importance of urban sociology and urbanization in India and its implications.
CO2. Criticize the ecological systems theory that states human development is influenced by the different types of environment systems.

CO3. Point out the principles, role and agencies of urban planning.
CO4. Identify the problems of urban areas.

Paper- 4: Social Movements in India
CO1. Classify the types of marriage and kinship.
CO2. Identify Marriage, Dowry and Divorce practices for Kinship and family systems.

M.A. Semester – III & IV

Paper- 1: Theoretical and Perspectives in Sociology I & II
CO1. Identify the Structural –Functionalism theory.
CO2. Identify the concept of Conflict theory.

Paper- 2: Sociology of Change and Development I & II
CO1. Compare the economic growth and sustainable development.
CO2. Relate the cultural impact on development.
CO3. Identify the development disparities in various fields-social, general, economic fields.
CO4. Correlate the economic reforms, development

Paper-3: Industry and Society in India I & II
CO1. Interpret the introduction and importance of industrial sociology.
CO2. Sketch the process involved in the development of industrial system.
CO3. Explain the nature of trade union and labour welfare.
CO4. Classify the industrial disputes and methods of settling it.

Paper- 4: Political Sociology I & II
CO1. Interpret the nature and scope of Political sociology, Contributions of Karl Marx and Max Weber.
CO2. Explain the meaning and classifications of political systems.
CO3. Point out the meaning and types of power, distribution of power, theories of political elites.
CO4. Classify the Dimensions of political culture, agencies of political socialization and Political participation.
CO5. Enumerate the characteristics and functions of political parties, Role and types of pressure groups.
CO6. Ability to follow new stream of thoughts and theories of social thinkers and ability to deal with research in sociology.

M.A. ECONOMICS

PROGRAMME SPECIFIC OUTCOMES
On the completion of the course student are able to:
PSO 1: Analyze economic behaviour in practice
PSO 2: Candidly express an economic point of view
PSO 3: Know the role of Market in real life
PSO 4: Understand infrastructure and economic Development
PSO 5: Understand relation between population and environment.

COURSE OUTCOMES
On completion of the course, Students are able to:
CO 1: Understand the concept of Globalization

CO 2: Understand concept of budget and deficit finance
CO 3: Understand economics of Agriculture
CO 4: Understand Micro and Macro-economic analysis
CO 5: Understand classical and Keynesian theories of output and employment.

M.A. HISTORY

PROGRAMME SPECIFIC OUTCOMES

On the completion of M. A. history students are able to:

PSO1: Understand and evaluate the complexities of historical developments of various nations, societies, and cultures.
PSO2: Get acquaint with research skills, methodologies, philosophy of history and historiography as being professional historian and researcher.
PSO3: Learn to evaluate historical narratives with the approach of comparative method.
PSO4: Think and argue historically and critically.
PSO5: Identity how the Indian culture contributed to the World human civilization through the ages

COURSE OUTCOMES

On the completion of course students are able to:

CO1: Understand the meaning, nature and scope of history.
CO2: Apply the theory of historicism as a professional skill in various fields of intellect.
CO3: Understand the basic concepts of Ancient and Medieval India.
CO4: Understand the administrative set up of Sultanate and Mughals.
CO5: Describe and evaluate the various traditions and theories of Maratha historiography.

M.A. POLITICAL SCIENCE

PROGRAMME SPECIFIC OUTCOMES

On the completion of M.A. (Political Science) Students are able to:

PSO1: Recognize and apply basic research methods to political science including research design, date analysis and interpretation.
PSO2: Use critical thinking skills to analyze and evaluate the ways in which political scientists examine the world.
PSO3: Analyze the core intellectual traditions in political thought and apply their central tenets to contemporary political problems and issues.
PSO4: Use analytical skills to understand civic social and environmental challenges
PSO5: Study and understand basic theories of political science and thoughts of Indian and Western political thinkers.

COURSE OUTCOMES

On completion of the course, students are able to:

CO1: Understand nature and significance political theory.
CO2: Understand the concepts of Sovereignty, Citizenship, Liberty, Equality, Justice and Democracy.
CO3: Study and understand comparative Government and politics.
CO4: Study and understand the planning and implementation of Foreign Policy
CO5: Understand the concept of Globalization

MASTER OF COMMERCE (M.COM.)

Programme Outcome:

M.COM. SEMESTER I

ADVANCE FINANCIAL ACCOUNTING

After successful completion of this course student will

CO1. Students will be able to determine the basis of conversion applicability and will get a clarity in integral and non-integral foreign operation.

CO2. Students will be able to identify different types of deposits, advances and other facilities extended to customers.

CO3. They will also be are able to prepare the schedules of profit and loss a/c and balance sheet.

CO4. Students will be able to understand provision maintained in case of NPA's

CO5. Will be able to understand the concept of premium, claims and commission, Final Accounts as per IRDA Regulations

CO6. Students will understand the accounting system, its legislation, types and finalization of accounts of cooperative society.

INDIAN FINANCIAL SYSTEM

After successful completion of this course student will

CO1. Know the structure & function of financial system and describe nature and role of financial institutions and financial markets.

CO2. Understand definition of banking, Creation of money, Present structure of commercial banking system in India.

CO3. Know the brief history, functions and balance Sheet of Bank. Also know the liability of Bank, Assets of Bank, and importance of balance sheet of bank.

CO4. Describe the traditional and unit linked polices, individual and group policies, with profit and without profit policies as well as Constitution, objectives and functions of LIC.

CO5. Know the history of Indian capital markets, create idea about reforms in capital markets, functions of Primary Markets, Secondary Markets. Gain knowledge about Organization, membership, and management of stock exchanges.

MANAGERIAL ECONOMICS

CO1. Understand Profit Maximization, Security, Profit Satisfying, Sales Maximization, Utility Maximization, Staff Maximization, Growth Maximization.

CO2. Know Concept and Measurement of – Price Elasticity of Demand, Income Elasticity of Demand, Cross Elasticity of Demand.

CO3. Know the Importance of Elasticity of Demand in Business Decision making
Cardinal Utility approach, Indifference approach, Revealed preference and theory of consumer choice under risk.

CO4. Understand In the short run, In the long run cost analysis.

MARKETING MANAGEMENT

After successful completion of this course student will

CO1. Know the Concept, nature, scope and importance of marketing, marketing concept & its evolution.

CO2. Understand the macro and micro components and their impact of marketing decision, market Segmentation and Positioning, Buyer behavior,

CO3. Gain knowledge about Strategic amplification, new product development and consumer adoption process.

CO4. Identify and classify factor affecting price determination. Know about pricing policy and strategies, discounts and rebates.

M.COM. SEMESTER II

RESEACRH METHODOLOGY

After successful completion of this course student will

CO1. Gain knowledge meaning, characteristics & objective research methodology, classification research, fundamental research.

CO2. Skill in hands about sample procedure & types of sample, purposive sampling, mixed sampling, Probability and non- probability sampling.

CO3. Know hypothesis, use of statistical techniques for testing of hypothesis, Interpretation of Data.

CO4. Skill in hands of Data Collection

ADVACNE COST ACCOUNTING

CO1. Know the meaning, importance, object scope and limitation of cost Accounting as well as elements of cost account.

CO2. Know concept of cost account, differences between cost account, management account and management account and financial account.

CO3. Understand and describe statutory cost audit, its types, Advantages, Cost Audit in India, Cost Audit Rules, get a job cost auditor.

CO4. Know Cost Role of Cost Account Value Analysis, Cost reduction. Reduction, Control system and Control report.

CO-OPERTAION AND RURAL DEVELOPMENT

CO1. Understand the origin, development, progress in planning era and know role of co-operative movement in social economic development,

CO2. Understand functions and importance of Agriculture co-operative society primary credit co-operative society, district central co-operative bank, state co-operative bank, land development bank, national bank for agriculture and rural development (NABARD)

CO3. Know the Meaning, nature, Scope, Objectives, and characteristics of rural development 2. Role of voluntary agencies, non-government organization, Importance, limitation and strengthening voluntary agencies.

CO4. Understand Rural development poverty line; incidence of rural poverty, features of rural poverty, strategic measures needed.

HUMAN RESOURCE MANGEMENT

CO1. Understand the meaning, scope and role of human resource management.

CO2. Knowledge about image and qualities of HRM manager and Indian approach human resource management.

CO3. Know the concept and objectives of induction, orientation. Gain a knowledge of Induction in Indian industries. Inputs of induction and orientation programmes and advantages of formal induction and orientation.

CO4. Know advantages and significance to organization and employees, promotions and transfers vies-a-versa productivity efficiency.

CO5. Understand the concept, importance and objectives, methods and procedures, Job specifications and job descriptions, job design, approaches and methods.

M.COM. SEMESTER III

STATISTICAL TECHNIQUE

After successful completion of this course student will

CO1. Describe Statistical Decision Theory and Formation of Bivariate Frequency Table, Partial and Multiple correlation

CO2. **K**now Basic Concepts probability and the binomial, Normal and Poisson distribution and Elementary treatment of Law of Probability.

CO3. Know importance, measurement of Trends, Graphical Methods, Semi average Methods and the Method of Moving Average.

CO4. Gain knowledge criteria of Independence, contingency on sampling on "T" Test.

TAX PROCEDURE AND PRACTICE

After successful completion of this course student will

CO1. Know detailed information of Income tax Act – 1961

CO2. Skill in hand of Computation of Income of Firm and company

CO3. Know meaning of tax planning and management tax evasion and tax avoidance nature and scope of tax planning and management in the corporate sector.

CO4. Know basic concepts of VAT, Basic concept of GST, Constitution Act-2016, Need of GST in India, Advantage of GST, Dual GST Model, One Nation-One Tax.

COMPUTER APPLICATION AND COMMERCE

After successful completion of this course student will

CO1. Gain knowledge and operate input devices, output devices, storage devices, configuration of hardware devices, CPU, RAM, ROM,

CO2. Know Operating system, System Software needs, Types of Operating system

CO3. Gain knowledge Batch processing, real time processing, Multitasking, Multi programming, Multiprocessing, application software's, Programming

CO4. Network topology, Local Area Networks and Wide Area Network Email internet technologies, access devices

SERVICE SECTOR MANAGEMENT

After successful completion of this course student will

CO1. Know definition of Service, characteristics of services, growth of service Sector, career Opportunities of Service Sector.

CO2. Reason for Growth of Services in India, Insurance, Transport, Postal Service, Telecommunication, Software, Electricity, Tourism, Health Care.

CO3. Know Formulation of Strategies for demand management, Flexing Capacity to meet demand

CO4. Understand and describe Consumer Rights, Consumer Movement in India, The consumer Protection Act 1986 Protection to Consumers of Services.

M.COM. SEMESTER IV

INTERNATIONAL BUSINESS ENVIRONMENT

After successful completion of this course student will

CO1. Students understand Meaning, Nature, Types and Importance of International Business.

CO2. Learn about Nature, Significance and Elements of Economic Environment, Economic Systems and Business Environment.

CO3. Gain knowledge about Gap Government Policies, Industrial Policy, Fiscal Policy, Monetary Policy, Public Sector and Economic Development.

CO4. Students understand changing Dimensions of Legal Environment in India; MRTP Act, FEMA and Licensing Policy; Consumer Protection Act.

CO5. Students learn about International Economic Cooperation and Agreements, International Commodity Agreements, GPS and GSTP.

CO6. Understand Meaning and Dimensions, Features and Factors favouring of Globalization. Stages of Globalization, Essential Conditions for Globalization, Foreign Market Entry Strategies, Exporting; Licensing and Franchising,

ADVANCE MANAGEMENT ACCOUNTING

After successful completion of this course student will

CO1. Have general idea of accounting its management accounts position. Know the role and responsibilities, marginal costing and its application

CO2. Prepare financial statements, interpreted and analyse account, know role of accountant towards preparation and analysis of Financial Statement.

CO3. Understand Meaning, Advantages, Uses and Types of budgetary controls.

CO4. Gain knowledge of Anatomy of MIS, characteristics, Implementation of MIS and limitations management audit- concept, scope and object of management audit.

ENETERPRUNERIAL DEVELOPMENT

After successful completion of this course student will

CO1. Students learn Creativity and Innovation in entrepreneurial development, Relationship with the economic development, Barriers to Entrepreneurship, women entrepreneurship, and social entrepreneurship.

CO2. Know the ED Cycle, Building the Business Plan, Venturing an Enterprise, Financial Considerations. Sources of business ideas

CO3. Learn about Entrepreneurship Development in India Issues and Opportunities, Small Scale Sector in India,

CO4. Understand Ancillarization, Ancillarization in India. Ancillaries & Industrial Development, Ancillary Opportunities in different Economic Sectors like Agro-Industries, Logistics, BPO, Banking and Finance

MASTER OF SCIENCE (M.Sc.)

PROGRAM OUTCOME

MSc degree program translates to making a significant investment in one's professional career.

PO1. Enhanced career prospects that can be gained by taking a Master of Science.

PO2. Valuable personal skills and fulfil a crucial prerequisite to PhD study.

PO3. Candidates normally have to do independent research and present a thesis as requirement for graduation.

PO4. An understanding of professional, ethical, legal, security and social issues and responsibilities.

M.Sc. COMPUTER SCIENCE

Course Outcomes (COs) M.Sc. I Computer Science Semester I, Paper I : ADVANCE JAVA	
CO1	Develop understanding of basics of java programming.
CO2	Develop understanding of applets, AWT and swings in java including its introduction and working.
CO3	Develop understanding basics of database programming.
CO4	Understand concept of Servlet and JSP in java.
M.Sc. I Computer Science, Semester I Paper II : DISCRETE MATHEMATICS	
CO1	Understand fundamentals of sets and mathematical logic.
CO2	Acquire in depth knowledge of counting, relation and graphs.
CO3	Acquire knowledge graph theory, lattices, and Boolean algebra.
CO4	Understand groups, languages and finite machines.
M.Sc. I Computer Science Semester II Paper I: THEORY OF COMPUTATION & SYSTEM PROGRAMMING	
CO1	Understand basic concept of finite automata.
CO2	Acquire in-depth knowledge of push down automata.
CO3	Understand the role of device drivers.
CO4	Acquire in-depth knowledge of assembly and machine languages.
M.Sc. I Computer Science Semester II Paper II: VB.NET	
CO1	Understand how to define and initialize single and two dimensional array.
CO2	Acquire in-depth knowledge of need of structure, structure initialization, definition, array of structures and concept of union.
CO3	Understand the concept of functions.
CO4	Acquire in-depth knowledge of pointer, file concept and dynamic memory management.

M.Sc. I Computer Science Semester II Paper III: WEB TECHNOLOGIES	
CO1	Understand core of PHP including introduction, hardware and software requirements advantages and working.
CO2	Acquire in-depth knowledge of advanced PHP programming.
CO3	Understand the basics of python including data types, operators and functions.
CO4	Acquire in-depth knowledge of python strings, tuples, sets, python dictionary.
M. Sc. I Computer Science Semester II Paper IV: SOFTWARE ENGINEERING	
CO1	Understand role, history and life cycle of software engineering.
CO2	Acquire in-depth knowledge of software engineering principles.
CO3	Acquire in-depth knowledge of software specification and verification.
CO4	Understand the concept of software production process and management of software engineering.
M.Sc. II Computer Science, Semester III PAPER-I:SOFTWARE TESTING TOOLS AND METHODOLOGY	
CO1	Develop understanding of fundamentals of test process, purpose and role of testing i SDLC.
CO2	Develop understanding of flow graphs, transaction, data flow and domain testing.
CO3	Develop understanding of static testing, dynamic testing and white box testing.
CO4	Understand testing tools and object oriented software.
M.Sc.I Computer Science Semester I Paper III: DATA WAREHOUSE AND SQL	
CO1	Understand characteristics and design considerations of data warehouse.
CO2	Acquire knowledge of data mart and data mining tools including its introduction and working.
CO3	Understand the concept of SQL Server architecture and components
CO4	Acquire knowledge of data integrity, user security and concurrency control.
M.Sc. I Computer Science Semester I Paper IV: Scripting Language & Information Retrieval	
CO1	Understand what is HTML, creating HTML pages, Linking concept, working with images and tables.
CO2	Acquire in-depth knowledge of java script, its nature, writing basics, creating pages, working with windows.
CO3	Understand the concept of scripting language.
CO4	Acquire in-depth knowledge of concept of information retrieval.
M.Sc. II Computer Science, Semester III PAPER-II : SOFT COMPUTING TECHNIQUES	
CO1	Understand fundamentals of soft computing and artificial intelligence.
CO2	Acquire in depth knowledge of neural network.

CO3	Acquire knowledge of fuzzy logic.
CO4	Understand fundamental concepts and working of genetic algorithm.
M.Sc. II Computer Science, Semester III PAPER-III: RESEARCH METHODOLOGY AND OPERATIONAL TECHNIQUE	
CO1	Understand basics of research methodology
CO2	Acquire knowledge of sampling design and report writing and interpretations.
CO3	Understand the concept of large sample test and small sample test.
CO4	Acquire knowledge of CHI Square test for large samples.
M.Sc. II Computer Science, Semester III PAPER IV: C#.NET	
CO1	Understand basics of .Net framework.
CO2	Acquire in-depth knowledge C#.Net programming.
CO3	Understand the concept of advanced features in C#.
CO4	Acquire in-depth knowledge of Net assemblies and attributes.
M.Sc. II Computer Science, Semester IV PAPER I: ANDROID APPLICATION DEVELOPMENT	
CO1	Understand basic concept of android platform and android development environment.
CO2	Acquire in-depth knowledge of intents and services of android.
CO3	Understand the graphics, animation and multimedia.
CO4	Understand platform maturity with android applications.
M.Sc. II Computer Science, Semester IV Paper II: DIGITAL AND CYBER FORENSICS	
CO1	Understand basics of networking, history and future of cybercrime and basics of computer forensics.
CO2	Acquire in-depth knowledge of computer crime and criminals.
CO3	Understand the concept of collecting and preserving digital evidence and building a cyber crime case.
CO4	Acquire in-depth knowledge of computer hardware and operating system types.
M.Sc. II Computer Science, Semester IV PAPER – III: WEB DESIGNING USING ASP .NET	
CO1	Understand basic concept of web development and Asp.net
CO2	Understand how to create web form applications.
CO3	Understand how to create a user interface. Acquire knowledge of data binding.
CO4	Acquire in-depth knowledge of web services.

M.Sc. MATHEMATICS

PROGRAMME OUTCOMES

- Inculcate critical thinking to carry out scientific investigation objectively without being biased with preconceived notions.
- Equip the student with skills to analyze problems, formulate an hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.
- Prepare students for pursuing research or careers in industry in mathematical sciences and allied fields
- Imbibe effective scientific and/or technical communication in both oral and writing.
  Continue to acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematical sciences.
- Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.

ROGRAMME SPECIFIC OUTCOMES

- Understanding of the fundamental axioms in mathematics and capability of developing ideas based on them.
- Inculcate mathematical reasoning.
- Prepare and motivate students for research studies in mathematics and related fields.
- Provide knowledge of a wide range of mathematical techniques and application of mathematical methods/tools in other scientific and engineering domains.
- Provide advanced knowledge on topics in pure mathematics, empowering the students to pursue higher degrees at reputed academic institutions.
- Strong foundation on algebraic topology and representation theory which have strong links and application in theoretical physics, in particular string theory.
- Good understanding of number theory which can be used in modern online cryptographic technologies.
- Nurture problem solving skills, thinking, creativity through assignments, project work.
- Assist students in preparing (personal guidance, books) for competitive exams e.g. NET, GATE, etc.

COURSE OUTCOMES

M.SC SEMESTER-I

COMPULSORY PAPERS PAPER-1 (PSCMTH01) GROUP THEORY & RING THEORY

CO1. Understand the importance of algebraic properties with regard to working within various number systems.

CO2. Extend group structure to finite permutation groups (Caley Hamilton Theorem).

CO3. Generate groups given specific conditions.

CO4. Understand the three major concrete models of Boolean algebra: the algebra of sets, the algebra of electrical circuits and the algebra of logic.

PAPER-2 (PSCMTH02) REAL ANALYSIS

CO1. Describe fundamental properties of the real numbers that lead to the formal development of real analysis.
CO2. Comprehend rigorous arguments developing the theory underpinning real analysis.
CO3. Demonstrate and understanding of limits and how they are used in sequences and series.
CO4. Construct rigorous mathematical proofs of basic results in real analysis.

PAPER-3 (PSCMTH03) TOPOLOGY

CO1. Generalization of concepts like continuity
CO2. Generalization of theorems.
CO3. Distinguishing spaces up to homeomorphisms
CO4. Understanding of topological spaces and having a grasp on basic results

PAPER-4 (PSCMTH04) LINEAR ALGEBRA

CO1. Introduction to vector space and subspace
CO2. Use computational techniques and algebraic skills essential for the study of systems of Linear equations, matrix algebra, vector spaces, eigenvalues and eigenvectors, Orthogonality and Diagonalization,(Computational and Algebraic Skills.)

Optional paper
PAPER-5 (PSCMTH05) NUMERICAL ANALYSIS

CO1. To apply appropriate numerical methods to solve the problem with most accuracy.
CO2. Using appropriate numerical methods determine approximate solution of ODE and system of linear equation.
CO3. Compare different methods in numerical analysis with respect to accuracy and efficiency of solution.

M.SC. SEMESTER-II

COMPULSORY PAPERS PAPER-1 (PSCMTH06) FIELD THEORY

CO1. This subject is part of abstract algebra and continuation of Group theory
CO2. This course involved rings, ideal, homeomorphism rings and introduction of module.
CO3. This subject is prerequisite for commutative Algebra and some advanced algebra.
CO4. This subject increase the thinking power of students in algebra.

PAPER-2 (PSCMTH07) LEBESGUE MEASURE THEORY

CO1: The mathematical maturity of students will develop.
CO2: The student will gain confidence in proving theorems and solving problems
CO3: Student will understand the generalized concept of measure and integration
CO4: Student will understand the need to generalize the concept of integration.

PAPER-3 (PSCMTH08) ADVANCE TOPICS IN TOPOLOGY

CO1: Students will understand the concepts of metric spaces and topological spaces, and their role in mathematics.
CO2. Students will be able to prove basic results about completeness, compactness, connectedness and convergence within these structures.

CO3. Students will be able to demonstrate familiarity with a range of examples of these structures.
CO4. Students will be able to apply the theory in the course to solve a variety of problems at an appropriate level of difficulty.
CO5. Students will be able to write cohesive and comprehensive solutions to exercises and be able to defend their arguments.

PAPER-4 (PSCMTH09) CLASSICAL MECHANICS

CO1.Define and understand basic mechanical concepts related to advanced problems involving the dynamic motion of classical mechanical systems.
CO2. Describe and understand the differential equations and other advanced mathematics in the solution of the problems of mechanical systems.
CO3. Describe and understand the motion of a mechanical system using LagrangeHamilton formalism.
CO4. Describe and understand the motion of the forces in non inertial systems.
Optional paper

PAPER-5 (PSCMTH10) DIFFERENTIAL GEOMETRY

CO1: Use geometric quantities such as length, curvature, and torsion associated to planar and spatial curves
CO2: Prove the isoperimetric inequality and the "Four vertex theorem" for convex curves CO3: Define, use, and articulate the differences between normal curvature, geodesic Curvature, Gaussian curvature, and mean curvature
CO4: State, apply, and prove parts of the Gauss-Bonnet theorem
CO5: Discuss Gauss Bonnet theorem and its implication for a geodesic triangle
CO6: To understand surfaces of revolution with constant negative and positive Gaussian curvature.
CO7: Introduced to Christoffel symbols and their expression in terms of metric coefficients and their derivatives.

M.SC. SEMESTER-III

Compulsory papers PAPER-1 (PSCMTH11) COMPLEX ANALYSIS

CO1. This subject is part of analysis.
CO2. This subject gives more understanding about analysis in Mathematics
CO3. This course involved complex number , properties of them , analytic function , residues ,fundamental theorem.
CO4. With this course students are prepared to learn about advance complex analysis.

PAPER-2 (PSCMTH12) FUNCTIONAL ANALYSIS

CO1: Define and illustrate the concept of reflexivity of Hilbert space.
CO2: Understand the fundamentals of spectral theory, and appreciate some of its theorems.
CO3: Understand the statement and proofs of important theorems and be able to explain the key steps in proofs, sometimes with variation.
CO4: Define and illustrate the projection operators.

PAPER-3 (PSCMTH13) MATHEMATICAL METHODS

CO1: Students will understand the applications of vector space, matrix algebra and special functions.
CO2: Have learned how to expand a function in a Fourier series, and under what conditions such an expansion is valid. Students will be aware of the connection between this and integral transforms (Fourier and Laplace) and be able to use the latter to solve mathematical problems relevant to the physical sciences.
CO3: Have practiced formulating good questions and explaining to others.

Optional papers

PAPER-4 (PSCMTH14) GENERAL RELATIVITY

CO1: Familiar with the fundamental principles of the general theory of relativity. They shall know the meaning of basic concepts like the equivalence principles, inertial frames and time dilation.
CO2: Understand the concept of constant relative motion of different bodies in different frames of reference.

CO3: Solve Einstein's field equations for static spherically symmetric problems and for isotropic and homogeneous cosmological models.
CO4: Find out the Schwarzschild Exterior and Schwarzschild Interior solutions.
CO5: Give a mathematical description of gravitational waves in context of Einstein's relativity.

PAPER-5 (PSCMTH15) OPERATIONS RESEARCH-I

CO1: Develop all skill and technique of problem solving.
CO2: Acquire the knowledge and understanding of Queing system.
CO3: Define and illustrate Game and strategies.

M.SC SEMESTER-IV

COMPULSORY PAPERS PAPER-1 (PSCMTH16) DYNAMICAL SYSTEMS

CO1 Describe the main features of dynamical systems and their realisation as systems of ordinary differential equations
CO2 Identify fixed points of simple dynamical systems, and study the local dynamics around these fixed points, in particular to discuss their stability and bifurcations
CO3 Use a range of specialised analytical techniques which are required in the study of dynamical systems
CO4 Prove simple theoretical results about abstract dynamical systems
CO5 Analyze the chaotic behaviour of any dynamical system.

PAPER-2 (PSCMTH17) PARTIAL DIFFERENTIAL EQUATIONS

CO1: Find solutions of partial differential equations and determine the existence, uniqueness of solution of partial differential equation.
CO2: Find out the complete integral by Charpits method and also find the particular integral, singular integral .
CO3: Solve simple eigenvalue problems of Sturm-Liouville type.

CO4: Classify partial differential equations into Linear equation, Semi linear, Quasi-linear and nonlinear equations..
CO5: Understand the Dirichlet problem, Neumann problem and apply to solve problem for half plane.
CO6: Derived the Heat conduction problem and prove Kelvin's inversion theorem.

PAPER-3 (PSCMTH18) INTEGRAL EQUATIONS

CO1: Solve linear Volterra and Fredholm integral equations using appropriate methods. CO2: Understand the relationship between integral and differential equations and transform one type into another.
CO3: Formulate and solve initial and boundary value problems for the heat and wave equations in spherical and cylindrical coordinates.
CO4: Find out the iterate kernel and Resolvent kernel of Volterra, Fredholm integral equation.
CO5: Application of integral equation and greens function to solve ordinary differential equation.

Optional papers

PAPER-4 (PSCMTH19) COSMOLOGY

CO1: Derived De-sitter model and Explain Einstein Field equation with cosmological term.
CO2: Understand De-sitter model, there derivatives, properties and comparison with the actual universe.
CO3: Explains the cosmological principle, Hubble's law, Weyls Postulate and Steady State Cosmological Models.
CO4: Study the motion of particle and light rays in R-W model.
CO5: Understand and apply the knowledge of gravitational waves in curved space time.
CO6: Show how the Friedman-Robertson-Walker metric is an exact solution to the Einstein equations.
CO7: Describe the key ideas behind cosmology and the expanding universe.

PAPER-5 (PSCMTH20) OPERATIONS RESEARCH-II

CO1: Solve system of equations by Direct methods and Iteration methods.
CO2: Apply Hermite Interpolation, Piecewise and Spline interpolation to solve problems.
CO3: Obtain numerical solutions to integration problems.
CO4: Obtain numerical solutions to ODE's.

M.Sc. PHYSICS

COURCE OUTCOMES

M. Sc. Sem -I

Paper-I- Mathematical Physics

CO1: The purpose of the course is to introduce students to methods of mathematical physics
CO2: To develop required mathematical skills to solve problems in quantum mechanics, electrodynamics and other fields of theoretical physics.
CO3: The course will be taught using lectures followed up by homework assignments and periodic tests. Discussions of course topics during lectures are encouraged.

CO4: Solve differential equations like Legendre, Bessel and Hermite that are common in physical sciences.

Paper-II - Complex Analysis and Numerical method

CO1: To get equipped with the understanding of the fundamental concepts of functions of a complex variable along with the concepts of analyticity, Cauchy-Riemann relations and harmonic functions.
CO2: Evaluate complex contour integrals applying the Cauchy integral theorem, Cauchy integral formula.
CO3: Derive a variety of numerical methods for finding out solutions of various mathematical problems arising in roots of linear and non-linear equations, Solving differential equations with initial conditions and Evaluating real definite integrals.

Paper-III -Electronics

CO1: Ability to analyze PN junctions in semiconductor devices under various conditions.
CO2: Ability to design and analyze simple rectifiers and voltage regulators using diodes.
CO3: Ability to describe the behavior of special purpose diodes.
CO 4: To understand the concept of operational amplifier and MOSFET.

Paper-IV- Electrodynamics I

C01: Understand the basic mathematical concepts related to electromagnetic vector fields.
C02: Apply the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density.
CO3: Apply the principles of magneto statics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density.
CO4: Understand the concepts related to Faraday‘s law, induced emf and Maxwell‘s equations.
CO5: Apply Maxwell‘s equations to solutions of problems relating to transmission lines and uniform plane wave propagation.

M. Sc. Sem -II

Paper-I- Quantum Mechanics I

CO1: Basic non-relativistic quantum mechanics
CO2: The time-dependent and time-independent Schrödinger equation for simple potentials like for instance the harmonic oscillator and hydrogen like atoms, as well as the interaction of an electron with the electromagnetic field
CO3: Quantum mechanical axioms and the matrix representation of quantum mechanics
CO4: Approximate methods for solving the Schrödinger equation (the variational method, perturbation theory, Born approximations)
CO5: Spin, angular momentum states, angular momentum addition rules, and identical particles

Paper-II-Statistical Physics

CO1: The course provides an introduction to statistical physics, mainly for systems in thermal equilibrium.
CO2: The student should understand quantum and classical statistical mechanics for ideal systems, and be able to judge when quantum effects are important.
CO3: The student should understand the connection between microphysics and thermodynamics.
CO4: The student should be able to perform quantitative calculations on ideal systems, be able to formulate models of more realistic systems.

Paper-III- Classical Mechanics

CO1: Define and understand basic mechanical concepts related to discrete and continuous mechanical systems.
CO2: Describe and understand the vibrations of discrete and continuous mechanical systems.
CO3: Describe and understand planar and spatial motion of a rigid body.
CO4: Describe and understand the motion of a mechanical system using Lagrange-Hamilton formalism.

Paper-IV- Electrodynamics II

CO1: Use Maxwell equations in analyzing the electromagnetic field due to time varying charge and current distribution.
CO2: Describe the nature of electromagnetic wave and its propagation through different media and interfaces.
CO3: Explain charged particle dynamics and radiation from localized time varying electromagnetic sources.

M. Sc. Sem –III

Paper-I- Quantum Mechanics-II

CO1: Develop a knowledge and understanding of perturbation theory, level splitting, and radiative transitions;
CO2: Develop a knowledge and understanding of the relation between conservation laws and symmetries;
CO3: Develop a knowledge and understanding of the role of angular momentum in atomic and nuclear physics;
CO4: Develop a knowledge and understanding of the scattering matrix and partial wave analysis.

Paper-II- Solid State Physics and Spectroscopy

CO1: Be able to account for interatomic forces and bonds.
CO2: Have a basic knowledge of crystal systems and spatial symmetries.
CO3: Be able to account for how crystalline materials are studied using diffraction, including concepts like the Edwald's sphere, form factor, structure factor, and scattering amplitude.
CO4: Be able to perform structure determination of simple structures
CO5: Understand the concept of reciprocal space and be able to use it as a tool to know the significance of Brillouin zones.
CO6: Know what phonons are, and be able to perform estimates of their dispersive and thermal properties.

Paper-III- Atomic and Molecular Physics I

CO1: Developing analytical, laboratory and computing skills through problem solving, laboratory & computer-based exercises which involve the applications of atomic and molecular physics.
CO2: Carry out experimental and theoretical studies on atomic and molecular physics with focus on structure & dynamics of atoms and molecules.
CO3: Account for theoretical models, terminology & working methods used in atomic and molecular physics.
CO4: To successfully apply the theoretical techniques presented in course to practical problems.

Paper-IV- Fundamentals of Nano science and Nanotechnology

CO1: To make the students acquire an understanding the Nano science and Applications.
CO2: To help them understand in broad outline of Nano science and Nanotechnology.
CO3: Learn about the background on Nano science.
CO4: Understand the synthesis of nanomaterial and their application and the impact of nanomaterial on environment.

CO5: Apply their learned knowledge to develop Nanomaterial's.

M. Sc. Sem –IV

Paper-I- Nuclear and Particle Physics

CO1: The students gather advanced knowledge in Nuclear physics.
CO2: The different nuclear interactions and the corresponding nuclear potentials and its dependence on the couplings are learned.
CO3: The knowledge helps to choose for an Advance course in Nuclear and particle Physics.
CO4: The course gives an understanding of the nucleus at low energy.
CO5: The students develop basics to solve some of the problems of nuclear physics and their limitations in nature.

Paper-II- Solid State Physics

CO1: Can explain bonding types in crystals. 1. Defines Bonds in crystals, Inert gas crystals, Van der Waals-London interaction, Repulsive interaction and Binding energy.
CO2:. Knows Ionic crystal, Madelung energy and constant.
CO3: Defines Covalent, Metallic and Hydrogen bonds.
CO4: Can explain Phonons and Thermal properties of phonons.
CO5: Explains Phono-crystal interactions, Monoatomic and diatomic linear chain and w-k relationship.
CO6: Explains Optic and Acoustic phonon modes.

Paper-III- Atomic and Molecular Physics II

CO1: Understand the basic concepts of most of the commercially available lasers.
CO2: To design experimental setups in order to characterize a laser in the time or the frequency domain.
CO3: Know the basic principles of nonlinear optics.
CO4: Carry out numerical calculations of simpler processer for free atoms and molecules and their interactions with electric and magnetic fields.
CO5: Read and understand the literature on a subject not developed during the lecture but related to laser Optogalvanic spectroscopy or applications of lasers, fluorescence spectroscopy and Microwave Spectroscopy.
CO6: Describe, in oral and written form, and analyze example of experiments which could answer a given scientific question within the basic atomic and molecular physics.

Paper-IV- Optics and Optical Instruments

CO1: Explain the basic concepts of optical transmitting and receiving
CO2: Describe different opto- electronic devices
CO3: Elucidate different methods of interferometry
CO4: Describe selection of the appropriate optical fiber sensors for industrial application
CO5: The student will get an introduction to the discipline of optics and its role in the modern society.
CO6: The student will be able to analyze typical optical imaging systems, with emphasis on the human eye, the camera, the telescope and the microscope

M.Sc. ZOOLOGY

PROGRAMME SPECIFIC OUTCOMES

After successfully completing this programme, students will:

PSO1. Able to use knowledge to conserve nature and control pollution of natural resources, through scientific management practices relevant in modern times.

PSO2. Use the evidences from biological science to explain how the theory of evolution offers the only scientific explanation for the unity and diversity of life on earth.

PSO3. Enhance the research attitude, effective communication and skills of problem solving method through the project work and Seminar

PSO4. Be a responsible citizen having awareness about moral and ethical baseline of the country and the world and expected to identify the core ethical virtues good enough to distinguish what construes as illegal.

COURSE OUTCOMES

M.Sc. Part I - Semester I

CORE I - PAPER-I - STRUCTURE AND FUNCTION OF INVERTEBRATES (Credit 04)

After successfully completing this course students will:

CO1. Learn modern scheme of animal classification and classify animals up to six levels.
CO2. Describe Ultrastructure of locomotory organs in protozoa.
CO3. **G**ain knowledge about Polymorphism and metagenesis in coelenterates.
CO4. Learn and describe reproduction in helminths.
CO5. Explain Formation, Evolution and significance of coelom and nephridia.
CO6. Describe Respiratory organs in Arthropoda as well as mechanism of gaseous exchange
CO7. Explain neuroanatomy in Gastropod, Bivalvia and Cephalopoda
CO8. Describe water vascular system in Echinodermata.

CORE II - PAPER-II -GENERAL PHYSIOLOGY (Credit 04)

After successfully completing this course students will:

CO1. Able to classify enzymes and describe mechanism of enzyme action.
CO2. Explain Respiratory pigments and mechanism of Oxygen Transport.
CO3. Learn about Neurotransmitters, their chemical nature, biosynthesis and describe mechanism of synaptic transmission
CO4. Describe Osmoregulation in fishes and Amphibians.
CO5. Describe myogenic and neurogenic heart, phases of Cardiac cycle, ECG, Pacemaker and Heart valves.
CO6. Classify and explain metabolism of proteins, lipids and Carbohydrates.
CO7. Explain Chemistry and functions of cerebrospinal fluid.
CO8: Explain Mechanism of reflex action and Physiology of environmental stress and strain.

CORE III - PAPER-III - CELL BIOLOGY AND GENETICS

After successfully completing this course students will:

CO1. Describe structure and function cell membrane.
CO2. Explain Structural organization and functions of cell organelles.
CO3. Describe Structure and Functions of microfilaments, microtubules and their role.
CO4. Describe cell cycle, cell signalling, Cell division, and differentiate stages of mitosis and meiosis.
CO5. Discuss Mendel's work on transmission of traits, Laws of Genetics and non-Mendelian inheritance

CO6. Describe Structural and numerical alterations of chromosomes and mutations
CO7. Describe extra chromosomal inheritance

CORE IV- PAPER-IV-ADVANCED REPRODUCTIVE BIOLOGY (Credit 04)

After successfully completing this course students will:

CO1. Describe partial and complete metamorphosis in insects, identify metamorphic Forms of insects.
CO2. Describe the process of Spermatogenesis, its hormonal control and ultra-structure of spermatozoa of man
CO3. Explain process of oogenesis, the biochemical events and hormonal regulation of oogenesis.
CO4. Describe Cytological and molecular events of fertilization
CO5. Describe Types of cleavage and learned the process of blastulation, gastrulation and embryonic induction.
CO6. learn biochemical composition and identify sperm abnormality.
CO7: Explain Neurohormonal control of fish reproduction and mechanism of vitellogenesis
CO8. Describe Molecular induction (Morphogenetic gradients) and organizer concept.
CO9. Know the importance of In vitro fertilization (IVF).

PRACTICALS - M. Sc. - SEMESTER- I

CO1. Identify and classify the invertebrate animals and know the importance related to their conservation.
CO2. Describe and demonstrate digestive, nervous and reproductive system of invertebrates.
CO3. Differentiate and count RBCs and WBCs in human blood.
CO4. Describe polytene chromosome in diphtheria larva.
CO5. Count the sperms, carry out analysis of sperms measure sperm vitality using suitable stains.

M.Sc. Part I - Semester II

CORE V - PAPER- V - STRUCTURE AND FUNCTION OF VERTEBRATES

After successfully completing this course students will:

CO1. Know Origin and ancestry of Chordata.
CO2. Describe Organs and mechanism of respiration in Pisces and Amphibia.
CO3. **I**dentify and describe Vertebrate integument and its derivatives.
CO4. Describe Appendicular skeleton (Limbs and girdles) in Amphibia, Reptilia, Aves and Mammals
CO5. learn different theories of Origin of Birds
CO6. Describe Comparative anatomy of the brain in vertebrates from teleost to rat).
CO7. Describe evolution of hearts in vertebrates.
CO8. Explain structure and functions of Autonomous nervous system in vertebrates.
CO9. Know the history of man and his evolution

CORE VI - PAPER-VI - COMPARATIVE ENDOCRINOLOGY

After successfully completing this course students will:

CO1. Describe Hormones and functions in Coelenterate and Helminths.
CO2. Describe Neurosecretory system in Annelida and Neuroendocrine system in Mollusca
CO3. Describe Hormones and functions in Echinodermata
CO4. Explain Endocrine control of metamorphosis, reproduction and colour change mechanisms in crustacea.

CO5. Describe structure, hormones and functions of Pineal organ.
CO6. Explain Structure, hormones and regulatory mechanisms of Parathyroid ultimobranchial glands.
CO7. Describe Gonadal hormones in vertebrates and their hormonal actions, feedback mechanisms

CORE VII -PAPER-VII -MOLECULAR BIOLOGY AND BIOTECHNOLOGY

After successfully completing this course students will:
CO1. Explain Cot ½ and Rot ½ values, organelle genome, DNA structure and forms of DNA.
CO2. Describe the molecular mechanisms of prokaryotic and eukaryotic DNA replication and regulation of DNA replication.
CO3. Explain DNA damage and repair – types of DNA damages, excision repair system.
CO4. Explain prokaryotic and eukaryotic translation, genetic code, altered codeine elongation, termination factors, fidelity of translation, post translational modifications.
CO5. Describe Isolation and sequencing of DNA, gene amplification, PCR, RAPD, RFLP, Maxam- Gilbert, Sanger's dideoxy methods.
CO6. know about Medical biotechnology, agricultural biotechnology, immuno- biotechnology and Industrial and environmental biotechnology
.

CORE VIII -PAPER-VIII - ADVANCED DEVELOPMENTAL BIOLOGY

After successfully completing this course students will:
CO1. Describe Implantation in Mammals and Explain types structure and functions of Foetal membranes
CO2. Describe types, structure and functions and Hormones of placenta.
CO3. Describe Regeneration in vertebrates.
CO4. Explain mechanism and significance of Apoptosis and explain Ageing mechanism, concepts and models.
CO5. Describe multiple ovulation and embryo transfer technology and also Describe Application of embryonic stem cells.
CO6. Explain Immunocontraception
CO7. Gain knowledge about Anti-androgen and anti-spermiogenic compounds (LDH-CY and SP-10)

PRACTICALS - M. Sc. - SEMESTER II

CO1. Identify and classify the vertebrate animals and know the importance related to their conservation
CO2. Demonstrate anatomical observation of Brain, Cranial nerves, Arterial and venous system, urogenital system and Reproductive system of fish\rat
CO3. Demonstrate PAS reaction for glycogen and Carbohydrate.

M.Sc. Part II - Semester III

CORE IX - PAPER-IX- PARASITOLOGY AND IMMUNOLOGY

After successfully completing this course students will:
CO1. Describe Life cycle, mode of transmission, infection and treatment of Vibrio cholera and Clostridium titanic.
CO2. Explain Life cycle, mode of transmission, infection and treatment of Leishmania and Malaria.
CO3. Acquire knowledge about T cells and B cells, their maturation, activation and differentiation and T cell receptors.

CO4. Understand and describe Hypersensitivity reactions their types, mechanisms of type I to IV hypersensitivity reactions, Organ specific autoimmune diseases and their treatment.
CO5. Acquire knowledge about types and roles of tumour antigens, immune response to tumour; and explain Immuno- techniques- RIA and ELISA.

PAPER-X, SPECIAL GROUP-FISH AND FISHERIES -I (CREDIT - 4) GENERAL STUDIES

CO1. Learn Origin and Evolution of fishes through Fossil record and classify systematically, cyclostome, ostracoderms, placoderms, Shark like fishes and Bony fishes
CO2. Describe specialized characters of Dipnoid, know the facts about blood vascular system of Protopterids and affinities of Dipnoans.
CO3. Acquired knowledge about origin, development types and functions of air bladder.

PAPER-XI, SPECIAL GROUP-FISH AND FISHERIES -II (CREDIT - 4) APPLIED FISHERIES

After successfully completing this course students will:
CO1. Learn Fresh water fisheries of India and able to identify and conserve fresh water fishes.
CO2. Acquired skill in Hands in Natural and Induced breeding of major carps, obtaining eggs, spawn, fry and fingerlings from natural resources.
CO3. Know facts of Culture of exotic fishes like common carp and Composite culture.
CO4. Learned skill suitable for getting jobs in Pearl culture and Oyster culture industry.
CO5. Describe Life cycle of prawns and acquired knowledge about breeding techniques of prawns

PAPER-XII, FOUNDATION PAPER -I, HUMAN PHYSIOLOGY

After successfully completing this course students will:
CO1. Describe digestive glands their secretion and role in digestion and gastrointestinal hormones.
CO2. Identify preliminary digestive disorders like Diarrhea, constipation and peptic ulcer.
CO3. Describe respiratory system and respiratory pigments.
CO4. Identify preliminary Respiratory disorders like Asthma and Bronchitis.
CO5. Describe Structure of human kidney and mechanism of urine formation.
CO6. Explain renal function test and know importance of Dialysis.
CO7. Describe pituitary gland and its hormones, thyroid gland and its hormones and adrenal gland and its hormones

PRACTICALS - M. Sc. -SEMESTER III

CO1. Identify different types of echo and endoparasites of protozoa, helminthes.
CO2. Differentiate between different types of insect vectors and their mouth parts.
CO3. Describe life cycle of various parasites.
CO4. Identify and conserve various developmental stages of major carps.
CO5. Estimate Dissolved Oxygen, Free CO2, and chloride in water sample.
CO6. Estimate sodium and potassium in fish blood.

M.Sc. Part II - Semester-IV

PAPER-XIII, BIOTECHNIQUES, BIOSTATISTICS, ETHOLOGY, TOXICOLOGY AND BIOINFORMATICS

After successfully completing this course students will:
CO1. Learn and use sterilization techniques, media for microbial culture and inoculation methods in human welfare.
CO2. Describe basic principle of sedimentation and centrifugation expert in hands in chromatographic separation techniques like thin layer and gas chromatography, Electrophoretic separation techniques.
CO3. Able to calculate Probability and learned probability distribution theories like Basic theory and type of probability and probability distribution.

CO4. Sample different types of data and standardize it with standard error (SE), standard deviation (SD), significance tests - t- test, z- test, Chi square test etc.
CO5. Observe animal behavior and explain role of Neuronal, genetic and environmental components in development of animal behavior.
CO6. Disseminate the acquired knowledge about Environmental toxicology in well being of society.
CO7. Demonstrate toxicity tests, their Types Acute and Chronic, calculation of LC50 and LD 50, Antidotally therapy, Antidotes, type of antidotes and antidotally procedure.
CO8. Skilfully use internet and computer for Biological databases and operate Basic local alignment search tool (BLAST), and FASTA, Variants of BLAST, PSI-BLAST etc.

PAPER-XIV, SPECIAL GROUP-FISH AND FISHERIES-III

After successfully completing this course students will:
CO1. Describe Structure of alimentary canal in teleost's and their feeding habits.
CO2. Explain Osmoregulation in Freshwater forms, Marine forms, Rays, Skates and Diadromous fishes.
CO3. Describe chemoreceptors including structure of olfactory system, morphology of peripheral olfactory organ, cellular composition of olfactory epithelium, olfactory bulb and central projections.
CO4. Describe Anadromous, Catadromous and Amphidromous types of migration and factors responsible for migration (Intrinsic and environmental), periodicity of migration.
CO5. Explain Structure, hormones and functions of pituitary gland in fishes 4.2 Structure, hormones and functions of other endocrine glands.
CO6. Describe structure of Hypothalamus-hypophysial system and Neurohormones and their functions in fishes.

PAPER XV, SPECIAL GROUP- FISH AND FISHERIES -IV FISHERY TECHNOLOGY AND FISH PATHOLOGY

After successfully completing this course students will:
CO1. Learn and apply gear and crafts in inland water.
CO2. Disseminate the knowledge of conservation of fish, Fish legislation and their importance.
CO3. Aware human society about water pollution and inland fisheries and apply conservative methods.
Co4. Learned methods of culture of phytoplankton and zooplankton.
CO5. Skill in hands for manufacture and maintenance of Aquarium.
CO6. Acquired knowledge of marketing practices, information, marketing channels and systems, domestic and export marketing.
CO7. Skill in hands for gamete preservation by cryopreservation and its application.
CO8. Learned methods of curing and preservation of fish by methods like refrigeration and freezing, Drying, Salting, Smoking, and Canning etc.
CO9. Know the importance of Fish products and by-products like Fish body oil, Fish liver oil, Fish meal, Isinglass, Fish protein concentrate, Fish glue, Fish manure.
CO10. Diagnose abiotic and biotic factors causing fish diseases and apply its control.

PRACTICALS - M. Sc. - SEMESTER IV

After successfully completing this practical course student will:
CO1. Explain surgical ablation with reference to gonads with the help of ICT tools/ charts/ models / photographs etc.
CO2. Analyse normal differential count in fish blood.
CO3. Gain knowledge of effect of stress (cold) and (hot) on differential count in fish blood.
CO4. Estimate protein in blood serum of fish.

PAPER-XVI, FOUNDATION PAPER- II, APPLIED HUMAN PHYSIOLOGY

After successfully completing this programme, students will:

CO1. Know facts about Heart failure, skill in hand about Trade milk test (TMT) and acquired knowledge about Angioplasty and Angiography.

CO2. Describe structure of human brain and sense organs like Eye and Ear.

CO3. Identify nervous system Disorders like Alzheimer's and Parkinson's disease which helps human society.

CO4. Describe structure of Ovary and testis and its function.

CO5. Acquire knowledge about parturition and lactation

CO6. Disseminate knowledge about contraceptive methods in male and female for human welfare.

CO7. Aware society about Polycystic ovary syndrome, Brest cancer, Prostate cancer, IVF and Surrogacy

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M.Sc. ENVIRONMENTAL SCIENCE

Program Outcomes

After completion of the program, the students have:

- Acquired fundamental knowledge of different aspects of environment and local, regional and global environmental problems.
- Developed environmental monitoring skills, including conduct of experiments and data analysis.
- Obtained exposure to the environmental pollution control technologies.
- Acquired the knowledge and skills needed for the environmental design and management.
- Acquired skills in the preparation, planning and implementation of environmental projects.
- The students passing M.Sc. Degree in the subject Environmental Science and other relevant subjects have the opportunity of job and services in the field of Teaching, Researches, Projects, Effluent Treatment Plants of various Industries/Companies/Factories, Municipal Councils/Corporations, Central Pollution Control Board, State Pollution Control Boards, National Research Institutes/Organizations/Laboratories, NEERI, EIA, GIS, Environmental Monitoring Projects, Environmental Consultants, Different Laboratories, NGO's, Forest department, Water Purification and Treatment Plants and Various Sectors related to the field of Environment.

Program Specific Outcomes

- To create and disseminate knowledge to the students about environmental problems at local, regional and global scale.
- To provide practical training on modern instrumentation and analytical techniques for environmental analyses.
- To sensitize students towards environmental concerns, issues, and impacts of climate change and related mitigation strategies.
- To make the students to apply their knowledge for efficient environmental decision-making, management and sustainable development.
- To prepare students for successful career in environmental departments, research institutes, industries, consultancy and NGOs, etc.

Course Outcomes

M.Sc. Semester I

PAPER I (PSENVT01) ENVIRONMENTAL CHEMISTRY

At the end of the course, the student will be able to

- Explain the chemical nature and interaction of the air, water and soil
- Apply analytical tools to determine and measure pollutants in various environmental samples.

PAPER II (PSENVT02) FUNDAMENTALS OF ATMOSPHERIC SCIENCE

At the end of the course, the student will be able to

- Students will have gained basic knowledge on processes involved in earth formation, meteorological parameters, climatic system and ocean.
- Students will able to understand Global Warming, Ozone Depletion and Climate Change

PAPER III (PSENVT03) ECOLOGY

At the end of the course, the student will be understand

- Define and describe ecosystem and their types
- Explain the ecological processes and their interaction with the environment
- Explain biodiversity, its threats and conservation methods

PAPER IV (PSENVT04) ENVIRONMENTAL POLLUTION

At the end of the course, the student will be able to

- Identify the sources of all environmental pollution
- Identify the nature and types of environmental pollution
- Understand the concepts involved in control technologies

M.Sc. Semester II

PAPER V (PSENVT05) WATER SAMPLING AND ANALYSIS

At the end of the course, the student will be able to

- Understand the objectives of site environmental assessments involving the characterization of site soil, ground and surface water, and terrestrial conditions
- Describe the scientific method and the value of its use in assessing site environmental conditions
- Be aware of applicable regulatory agency guidance related to site environmental assessments
- Study the process of developing comprehensive, statistically valid, and feasible site sampling plans
- Practice methods of laboratory and field data collection, including the operation of standard sampling equipment and instruments
- Practice standard procedures for collection and preservation of site samples, data recording and analysis, and reporting

PAPER VI (PSENVT06) NATURAL RESOURCES: CONSERVATION AND MANAGEMENT

At the end of the course

- Students will have gained basic knowledge on natural resources, different conservation and restoration methods, judicious use of the resources for sustainable future

PAPER VII (PSENVT07) ENVIRONMENTAL DISASTER AND ENVIRONMENTAL BIOTECHNOLOGY

At the end of the course, the student will be able to

- Capacity to integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels, even when limited information is available.
- Capacity to describe, analyze and evaluate the environmental, social, cultural, economic, legal and organizational aspects influencing vulnerabilities and capacities to face disasters.
- Capacity to work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
- Describe the applications of various fields including biochemistry, molecular biology and/or microbiology, in understanding and addressing the above issues, as well as exploring environmental resources for new technologies.
- Demonstrate an awareness of emerging concerns such as climate change, waste management or reductions in fossil fuels, and new technologies for addressing these.

PAPER VIII (PSENVT08) ANALYTICAL TECHNIQUES FOR ENVIRONMENTAL MONITORING

At the end of the course, the student will be able to

- Trained in analytical and instrumental skills required for environmental monitoring of pollutants.
- Able to design and carry out a method of environmental chemical analysis and research.
- The students the total knowledge regarding the instruments utilized in analyzing the various variables which pollute the environment.

M.Sc. Semester III

PAPER IX (PSENVT09) WATER TREATMENT AND SUPPLY

At the end of the course, the student will be able to

- Understand the importance of advanced water treatment process
- Explain the process of carbon management and sustainable development
- Understand the advanced treated water supply system and process

PAPER X (PSENVT10) WASTEWATER TREATMENT

At the end of the course, the student will be able to

- Understand the importance of advanced waste treatment process
- Students will have gained basic knowledge on water purification techniques
- Students will have better understanding of waste water generation and its treatments process

- Students will be able to characterize the wastewater, assess the degree of treatment required for the wastewater

PAPER XI (PSENVT11) 1. AIR POLLUTION CONTROL

At the end of the course, the student will be able to

- Acquired knowledge and understanding to evaluate air quality management
- Analyze the causes and effects of air pollution.
- Understand the type and nature of air pollutants,
- Understand methods of analysis of air pollutants and instruments involved in this

PAPER XI (PSENVT11) 2. SOLID AND HAZARDOUS WASTE MANAGEMENT

At the end of the course, the student will be able to

- Carry out characterization of solid waste.
- Apply various treatment and disposal techniques to solid waste management.
- Understand the various legal framework of solid waste management.
- Students learn about solid waste management.
- Students are able to understand how we can minimize pollution due solid waste.

PAPER XI (PSENVT11) 3. ATMOSPHERE AND GLOBAL CLIMATE CHANGE

At the end of the course, the student will be able to

- understand the physical basis of the natural greenhouse effect, including the meaning of the term radiative forcing
- know something of the way various human activities are increasing emissions of the natural greenhouse gases, and are also contributing to sulphate aerosols in the troposphere
- demonstrate an awareness of the difficulties involved in the detection of any unusual global warming 'signal' above the 'background noise' of natural variability in the Earth's climate and of attributing (in whole or in part) any such signal to human activity

PAPER XI (PSENVT11) 4. LAND AND SOIL CONSERVATION

At the end of the course, the student will be able to

- Students will have gained knowledge on soil formation, soil pollution and management methods for restoring the land degradation
- Students will understand how soil fertility is determined and how plant nutrient deficiencies are identified, and means of improving soil fertility and adding nutrients for plant growth.
- Students will be able to recognize how soil type and topography affects recommended agricultural, commercial and residential use and water quality at varying locations.

PAPER XII (PSENVT12) 1. FUNDAMENTALS OF ENVIRONMENTAL SCIENCE

At the end of the course, the student will be able to

- Define environment and describe the structure and significance of the spheres of the environment
- Describe the important environmental issues and the factors responsible for their cause
- Understand the significance of environmental science as a subject

PAPER XII (PSENVT12) 2. ECOLOGY

At the end of the course, the student will be able to

- Understand ecosystem and their types
- Identifying ecological processes and their interaction with the environment
- Understand biodiversity, its threats and conservation methods
- Understand the ecology of individual, population, community and ecosystem.
- Identifying the concepts that are the ambient, environment, biome, biosphere, ecosphere, ecological relationship and factors, and homeostasis.
- categorize the living things according to their tolerance to the ecological factors.

M.Sc. Semester IV

PAPER XIII (PSENVT13) EIA AND ENVIRONMENTAL LAWS

At the end of the course, the student will be able to

- Students will have knowledge of various acts and laws and will be able to identify the industries that are violating these rules
- Students are able to understand importance of environmental rules for development of society.
- Understanding laws rules and related conventions
- Understand the major principles of environmental impact assessment
- Understand the different steps within environmental impact assessment
- Discuss the implications of current rules and regulations in relation to environmental impact assessment
- Key aspects of environmental audit and risk analysis
- Understand how to write EIA report
- Be able to access different case studies/examples of EIA in practice

PAPER XIV (PSENVT14) POLLUTION CONTROL AND INDUSTRIAL SAFETY

At the end of the course, the student will be able to

- Identify the sources of air and noise pollution
- Monitor the ambient air quality
- Understand the concepts involved in control technologies
- Analyze the effect of release of toxic substances
- Understand the industrial laws, regulations and source models.
- Apply the methods of prevention of fire and explosions.
- Understand the relief and its sizing methods.
- Understand the methods of hazard identification and preventive measures

PAPER XV (PSENVT15) 1. ENVIRONMENTAL AND ENERGY MANAGEMENT

At the end of the course, the student will be able to

- Conceptual knowledge of the technology, economics and regulation related issues associated with energy conservation and energy auditing

- Ability to analyse the viability of energy conservation projects
- Capability to integrate various options and assess the business and policy environment regarding energy conservation and energy auditing
- Advocacy of strategic and policy recommendations on energy conservation and energy auditing

PAPER XV (PSENVT15) 2. ENVIRONMENT AND SOCIETY

At the end of the course, the student will be able to

- Recognize different relationships humans have with the environment.
- Describe current sociological theories as they apply to environmental problems.
- Identify the role of social structures in the distribution of impacts and responses to environmental issues.
- Differentiate possible future implications of societal approaches to the environment.

PAPER XV (PSENVT15) 3. WILDLIFE CONFLICT AND MANAGEMENT

At the end of the course, the student will be able to

- Historical aspects of Wildlife conservation in India and India's conservation present day conservation priorities
- Ability to undertake situation analysis for conservation
- Applications of emerging tools and techniques in wildlife conservation
- To critically evaluate complex scenarios where there may be conflict between people and wildlife.
- To construct informed interventions that may mitigate these conflicts.
- To demonstrate judgement on protected area and species conservation enforcement and reasonable measures.
- Critically evaluate the moral and practical tensions between human life and wildlife conservation during hostilities.

PAPER XV (PSENVT15) 4. URBAN FORESTRY AND MANAGEMENT

At the end of the course, the student will be able to

- Demonstrate understanding and competency of forest ecology and biology;
- Demonstrate understanding and competency in the measurement of forest resources;
- Demonstrate understanding and competency in managing forest resources;
- Demonstrate understanding and competency of forest resource policy, economics, and administration.

PAPER XVI (PSENVT16) 1. SUSTAINABLE ENVIRONMENT

At the end of the course, the student will be able to

- Demonstrate an integrative approach to environmental issues with a focus on sustainability;
- Use critical thinking, problem-solving, and the methodological approaches of the social sciences, natural sciences, and humanities in environmental problem solving;
- Communicate complex environmental information to both technical and non-technical audiences;
- Understand and evaluate the global scale of environmental problems; and
- Reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world.

- Articulate a comprehensive world view that integrates diverse approaches to sustainability.

PAPER XVI (PSENVT16) 2. GREEN TECHNOLOGIES

At the end of the course, the student will be able to

- Enlist different concepts of green technologies in a project
- Understand the principles of Energy efficient technologies
- Estimate the carbon credits of various activities
- Identify the importance of life cycle assessment
- Recognize the benefits of green fuels with respect to sustainable development.
- To understand the principles of green chemistry and technology.
- To design processes those are benign and environmentally viable.
- To design processes and products those are safe and hazard free.
- To learn to modify chemical processes making hazardous products and make them green safe and economically acceptable by using biotechnology.

CHEMISTRY

Program outcome

After completing M.Sc. Chemistry programme, students will be able to:

Knowledge Outcomes:

PO1: Demonstrate and apply the fundamental knowledge of the basic principles in various fields of Chemistry

PO2: Create awareness and sense of responsibilities towards environment and apply knowledge to solve the issues related to Environmental pollution.

PO3: Apply knowledge to build up small scale industry for developing endogenous product.

PO4: Apply various aspects of chemistry in natural products isolations, pharmaceuticals, dyes, Textiles, polymers, petroleum products, forensic etc. and also to develop interdisciplinary Approach of the subject.

Skill Outcomes:

It would help students to:

PO4: collaborate effectively on team-oriented projects in the field of Chemistry or other related Fields.

PO5: communicate scientific information in a clear and concise manner both orally and in Writing.

PO6: inculcate logical thinking to address a problem and become result oriented with a positive Attitude.

PO7: Explain environmental pollution issues and the remedies thereof.

PO8: apply the knowledge to develop the sustainable and eco-friendly technology in Industrial Chemistry.

Generic Outcomes:

PO9: Have developed their critical reasoning, judgment and communication skills.

PO10: Augment the recent developments in the field of green and eco-friendly reactions,

Pharmaceutical, Bioinorganic Chemistry and relevant fields of research and development.

PO11: Enhance the scientific temper among the students so as to develop a research culture and implementation of the policies to tackle the burning issues at global and local level.

Course outcomes:

M.Sc.-I (Chemistry) Semester I, II (Effective from 2016-17)

Semester I

Course: PSCChT01: Paper I (Inorganic Chemistry)

CO1: Understanding about Stereochemistry and Bonding in Main Group Compound, VSEPR Theory and Shape-Geometry of simple Inorganic molecule.

CO2: Applications and limitations of Crystal Field Theory in Metal-Ligand Bonding.

CO3: Understanding about Metal – Ligand Equilibria in Solution, factor affecting stability of Metal complexes, Determination of formation constant by various methods, Energy Profile of a Reaction, Kinetics of Octahedral substitution.

CO4: Chemistry of Diborane, higher boranes & their utilities, structure & bonding.

CO5: knowledge about Occurrence of metal-metal bond & Isopoly, Heteropoly acids and their anions.

Course: PSCChT02: Paper II (Organic Chemistry)

CO1: Nature and Bonding in Organic Molecule, Synthetic applications of enamines and imines Anions.

CO2: Understanding of Stereochemistry of Organic molecules and there applications in Asymmetric synthesis

CO3: Knowledge of Stability and Generation of different kind of Reactive Intermediates.

CO4: Understanding about reaction mechanism and Hammond's postulate, Curtin-Hammet Principle, Effect of Structure on reactivity.

CO5: Understand Concept of neighboring group participation.

CO6: Nucleophilic and Electrophilic substitution reaction on Aliphatic and Aromatic molecules.

Course: PSCChT03: Paper III (Physical Chemistry)

CO1: Understand theories of Quantum Mechanics to study micro practical and formulation.

CO2: Know about Thermo dynamical properties and theories based system.

CO3: Understand degrees of freedom various phase-component system and their phase Transition ability.

CO4: Theories of reaction rates.

Course: PSCChT04: Paper IV (Analytical Chemistry)

CO1: Understanding of Qualitative and Quantitave Analysis of Chemical reaction.

CO2: knowledge about Separation technique such as Chromatography, Ion exchange, solvent Extraction.

CO3: Classical methods of analysis like Volumetric analysis, Gravimetric analysis, Theory of Indicators, Concepts of solubility, solubility product and precipitation equilibrium.

CO4: Understand Optical methods of analysis such as Spectrophotometry and Colorimetry.

CO5: Role of organic ligands in spectrophotometric analysis of metal ions.

Course: PSCChP01: Practical-I (Inorganic Chemistry)

CO1: Preparation of Inorganic Complexes and their characterization.

CO2: Familiar with Chemical analytic Technique such as Electronic and IR Spectra, magnetic susceptibility measurements, Thermal analysis and Molar conductance studies.
CO3: Separation and determination of Mixture of metal ions by Volumetric, Gravimetric and Spectrophotometric methods.
CO4: Understand Spot Test for individual Cations

Course: PSCChP02: Practical-II (Organic Chemistry)

CO1: Skill development and knowledge of Separation, purification and identification of the binary and tertiary mixture using chemical methods or physical techniques.
CO2: Purification of the compounds by crystallization, TLC and chromatographic techniques.

Course: PSCChP03: Seminar-I

CO1: Develop Power Point presentation skill and PPT making.

Semester II

Course: PSCChT05: Paper V (Inorganic Chemistry)

CO1: Understand about Electronic spectra of Transition Metal complexes.
CO2: Magnetic Properties of Transition Metal complexes and the effect of temperature on Magnetic properties of Complexes.
CO3: Understand Substitution mechanism of reaction in square planer complexes.
CO4: Structure and bonding, vibrational spectra of metal carbonyls and Metal nitrosyl for bonding and structure elucidation.
CO5: Understand about Back Pi Bonding and Synergism Term.

Course: PSCChT06: Paper VI (Organic Chemistry)

CO1: Understand Mechanism of Addition to carbon-carbon multiple bonds and carbon-hetero atom multiple bond.
CO2: Classification and General mechanistic treatment of electrophilic, nucleophilic and free radical molecular rearrangement.
CO3: Neighboring group assistance and effect on rate of reaction due to NGP.
CO4: Understand Elimination and pyrolytic elimination reactions mechanisms and orientation of the double bond.
CO5: Education and need of Green chemistry, Basic principles of green chemistry.

Course: PSCChT07: Paper VII (Physical Chemistry)

CO1: Understand application of quantum mechanics and calculation of energy of any single electron molecule.
CO2: Chemical and Statistical Thermodynamics of System (Surrounding Under Observation).
CO3: Understand Solid state chemistry, reactions, kinetics.
CO4: Understand about Nuclear Models, radioactivity, and Applications of Nuclear chemistry as energy sources.

Course: PSCChT08: Paper VIII (Analytical Chemistry)

CO1: Develop skill relevant with Techniques of sampling of gases (ambient air and exhaust gases), liquids (water and milk samples), solids (soil and coal samples) and particulates.
CO2: Units in chemical analysis and their interconversion.
CO3: Modern separation techniques such as Gas Chromatography, liquid chromatography and supercritical fluid chromatography and their applications.
CO4: Get familiar with Optical methods of analysis such as Fluorometry and phosphorimetry, Flame photometry, Nephelometry and turbidimetry, Optical sensors.
CO5: Electrochemical methods of analysis such as Polarography and Amperometric titration.

Course: PSCChP04: Practical-III (Physical Chemistry)

CO1: To study the variation of volume contraction with mole fraction of alcohol in alcohol - water system.
CO2: Understand determination of active parameters of viscous flow for a given liquid
CO3: Understand determination of molecular mass of polymer by viscometry.
CO4: Calculation of heat of dilution.
CO5: Understand construction of phase diagrams of two components system.

Course: PSCChP05: Practical-IV (Analytical Chemistry)

CO1: Aware of Classical methods and separation techniques such as Calibration, validation and computers
CO2: Understand Gravimetry and separation techniques
CO3: Perform and understand Conductometric titration.

Course: PSCChP06: Seminar-II

CO1: Development of skill To Prepare and Presentation of PPT

Semester III

Course: PSCHT09: Paper IX (Spectroscopy)

CO1: Be able to understand symmetry elements and operations to organic and inorganic molecules.
CO2: Learn the mass spectrometry technique and will be able to identify the molecule on the basis ofthe fragmentation pattern in mass spectrum and learn application of radioactive molecule in Mossbaer Spectroscopy
CO3: Be able to understand energy changes at very lower lcvel and capable of predicting the satellite patterns of geographical areas. ESR techniques are used to determine the presence of unpaired electron.
CO4: Elucidate the structure determination of organic molecules by IR spectroscopy.

Course: PSCHT10: Paper X Special I- Organic Chemistry

CO1: Be able to explain what happens when organic molecules are excited by imadiation and be capable to discuss the photochemistry in nature and in various photochemical reactions.
CO2: Pericyclic rcactions are uscd in a vast way in nature and also by organic chemist. This course gives thc student the theoretical basis of this kind of reaction and also helps them to find a way to carry out these types of reaction
CO3: Get well versed with the various oxidising and reducing agents and the stereochemical aspects involved in various chemical reactions.
CO4: Acquire knowledge about the chemistry ofcompounds of phosphours and sulphur and the application of organoboranes and organosilicon compounds in organic synthesis.

Course: PSCHT11: Paper XI Special I- Organic Chemistry

CO1: Be able to acquire knowledge about terpenoids and porphyrins, the stereochemistry involved along with the structure determination and synthesis of some representative molecules
CO2: Be able to build a learning about alkaloids, the stereochemistry involved along with the structure determination and acquire brief idea about prostaglandins
CO3: Be able to develop the understanding of steroids chcmistry and plant pigments.
CO4: Be able to quantify the contributions of carbohydrates in nature and get well versed with the properties of amino acids, and structural features of polypeptide.

Course: PSCHT12: Paper XII Elective -Polymer Chemistry

CO1: Be able to understand different types of polymers

CO2: Capable of understanding different techniques of molecular mass determination.
CO3:Get Knowledge about the morphology of polymers
CO4: Get Acquainted with synthesis and application of commercial polymers.

Course: PSCHP07: Practical-VII -Special organic

CO1: Be able to isolate natural products using fractional distillations, column chromatography and extraction methods, get hands on the technique involved for the qualitative analysis of a mixture of three organic compounds and be able to understand application of volumetric analysis in the estimation of organic analyte from given solutions.

Course: PSCHP08: Practical-VIIIElective-Polymer Chemistry

CO1: Be able to synthesize various polymers and get knowledge about characterization of polymers

Course: PSCHP09: Seminar-III

CO1: On completion of seminar, the student will be able to consolidate idea about the subject and thereby develop knowledge about the subject which will boost their confidence.

Semester IV

Course: PSCHT13: Paper XIII (Spectroscopy)

CO1: Be able to understand theoretical aspects of UV, NMR and electron
CO2: Be able to identifu various molecular excitations and calculations ofwavelengths of absoption.
CO3: Be able to elucidate the structure of molecule based on NMR spectra and be in a position to carry out the spectral analysis for structure determination.
CO4: Comprehend the XRD data for crystal structure determination.

Course: PSCHT14: Paper XIV Special I-Organic Chemistry

CO1: Be able to quantify the applicability ofcarbanion intermediate in organic synthesis
CO2: Be able to understand modern methods oforganic synthesis using transition metals and organometallic reagents.
CO3: Be able to be well familiar with the advanced terminologies, rules and concepts involved in stereochemistry and will have a deeper knowledge about the applicability of stereochemical and the protection deprotection concepts.
CO4: The students will be able to apply logic behind organic synthesis using retrosynthesis approach.

Course: PSCHT15 Paper XV Special II-Organic Chemistry

CO1: Get acquainted with basic terminology involved in enzyme chemistry which is important to understand several life processes.
CO2: Come to know importance of heterocyclic compounds as a part of many natural products as well as pharmaceutical drugs.
CO3: Be able to analyze structure ofnucleic acids, lipids and vitamins which are important building blocks of living systems
CO4: Be able to have a brief idea about the terminologies and concepts involved in drugs, dyes and polymer chemistry.

Course: PSCHT16 Paper XVI Elective-Polymer Chemistry

CO1: Cet knowledge aboul types of polymerization
CO2: Get acquainted with difTerent technique of polymerisation mcthods.
CO3: Be able to understand methods to study characterisation of polymers

CO4: Get knowledge ofsynthesis and application of biomedical, inorganic and coordination polymers.

Course: PSCHP10 Practical-X Organic special

CO1: Be able to carry out elemental analysis of organic compounds, get expertise in the estimation of biomolecules and some organic drug molecules. The students will get hands on training of multi-step preparation of small organic molecules and will develop ability to identify various unknown organic molecules using NMR, IR, Mass and UV spectra.

Course: PSCHP11 Practical-XI Project

CO1: Learn how to carry out literature survey in a specific area of research, work on a small idea to develop their own observations, analyze the results obtained from the experiments carried out, validate the methods developed by him/her and develop an overall research attitude so that he can become a good researcher in future

Course: PSCChP12 Seminar-IV

CO1: After successful completion these four seminars assigned to them, they will be in a position to explain the concepts they learned from the dais in front of any number of audiences. This will lead to overall personality development of the student for entering into teaching profession