

# **MVS Govt. Arts & Science College (A), Mahabubnagar**

## **B.Com(Computer Applications)**

**2021-2022**

### **Course Outcomes:**

#### **Semester II**

#### **Paper DSC 203:PROGRAMMING WITH C & C++**

##### **PROGRAMMING WITH C**

Upon completion of this course, students will acquire knowledge about:

- Able to implement the algorithms and draw flowcharts for solving Mathematical problems.
- An understanding of computer programming language concepts.
- To be able to develop C programs. Develop their programming skills.
- Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.
- Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures. Student must be able to define union and enumeration user defined data types.
- Develop confidence for self education and ability for life-long learning needed for Computer language.

##### **PROGRAMMING WITH C++**

- Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
- Understand dynamic memory management techniques using pointers, constructors, destructors, etc.
- Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
- Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
- Demonstrate the use of various OOPs concepts with the help of programs.

## **Course Outcomes:**

### **Semester III**

#### **Paper: (BC 307): PROGRAMMING WITH C**

Upon completion of this course, students will acquire knowledge about:

- Able to implement the algorithms and draw flowcharts for solving Mathematical problems.
- An understanding of computer programming language concepts.
- To be able to develop C programs. Develop their programming skills.
- Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.
- Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures. Student must be able to define union and enumeration user defined data types.
- Develop confidence for self education and ability for life-long learning needed for Computer language.

## **Course Outcomes:**

### **Semester IV**

#### **Object Oriented Programming Using C++**

Upon completion of this course, students will acquire knowledge about:

- Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
- Understand dynamic memory management techniques using pointers, constructors, destructors, etc c)
- Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
- Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
- Demonstrate the use of various OOPs concepts with the help of programs.

## Course Outcomes:

### Semester V

#### **Paper : (BCC 506) :EXCEL FOUNDATION**

Upon completion of this course, students will acquire knowledge about:

- Examine spreadsheet concepts and explore the Microsoft Office Excel environment.
- Create, open and view a workbook.
- Save and print workbooks.
- Enter and edit data.
- Modify a worksheet and workbook.
- Work with cell references.
- Learn to use functions and formulas.
- Create and edit charts and graphics.
- Filter and sort table data.
- Work with pivot tables and charts.
- Import and export data.

## Course Outcomes:

### Semester V

#### **BC 508 (a): WEB TECHNOLOGIES**

Upon completion of this course, students will acquire knowledge about:

- Use knowledge of **HTML** and CSS code and an **HTML** editor to create personal and/or business websites following current professional and/or industry standards.
- To understand the terms related to the Internet and how the Internet is changing the world.
- To understand how computers are connected to the Internet and demonstrate the ability to use the World Wide Web.
- Demonstrate an understanding of and the ability to use electronic mail and other internet based services
- Understand the design principles of Web pages and how they are created.
- To develop an ability to create basic Web pages with HTML.
- Use critical thinking skills to design and create websites.
- **DHTML**. • Students will be able to write a well formed / valid XML document. data sent from client and store it on database.
- Describe and utilize Javascript programming concepts such as variables, arrays, conditionals, and loops.

- Write and deploy Javascript code to solve practical web design problems.
- Describe what Javascript frameworks are and how they can be utilized to save time when writing custom Javascript code.
- You will learn the basics of creating **XML** documents, transforming **XML** documents, and validating **XML** documents.
- More specifically, you will learn the basics and history of **XML** and how to write your own **XML** documents.

## **Course Outcomes:**

### Semester VI

#### **Paper : (BCC 607) (a): E-COMMERCE**

Upon completion of this course, students will acquire knowledge about:

- Demonstrate an understanding of the foundations and importance of E-commerce
- Demonstrate an understanding of retailing in E-commerce by:
  1. analyzing branding and pricing strategies,
  2. using and determining the effectiveness of market research
  3. assessing the effects of disintermediation.
- Analyze the impact of E-commerce on business models and strategy
- Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational.
- Describe the infrastructure for E-commerce
- Describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.
- Discuss legal issues and privacy in E-Commerce
- Assess electronic payment systems
- Recognize and discuss global E-commerce issues

## **Course Outcomes:**

### Semester VI

#### **Paper : (BCC 608) (a): MANAGEMENT INFORMATION SYSTEM**

Upon completion of this course, students will acquire knowledge about:

- Understand the leadership role of Management Information Systems in achieving business competitive advantage through informed decision making.
- Analyze and synthesize business information and systems to facilitate evaluation of strategic alternatives.
- Effectively communicate strategic alternatives to facilitate decision making.

- Explain systems thinking and its implications in information systems sourcing and usage in various types of business organizations.
- Explain the importance of systems thinking and design thinking in developing systems solutions in business.
- Extract information systems requirements to create basic conceptual models and understand the importance of ethics and security issues in that process.
- Understand basic systems design and analysis modeling using systems and design thinking.

Course Outcomes of B. Com (Gen) & B. Com (Computer Applications) Programme for the Year 2021-22

After completing these courses, the students should be able to know

**Course Outcomes – Semester - I**

**Paper: DSC101 - Financial Accounting–I**

CO 1: To acquire conceptual knowledge of basics of accounting and preparation of final accounts of sole trader.

**Paper: DSC102 - Business Organization and Management**

CO 1: To acquaint the students with the basics of Commerce and Business concepts and functions, forms of Business Organization and functions of Management.

**Paper: DSC103 - Fundamentals of Information Technology**

CO 1: To understand the basic concepts and terminology of information technology and to identify issues related to information security.

**Course Outcomes – Semester - II**

**Paper: DSC201 - Financial Accounting–II**

CO 1: To acquire accounting knowledge of bills of exchange and other business accounting methods.

**Paper: DSC202 - Business Laws**

CO 1: To understand basics of contract act, sales of goods act, IPRs and legal provisions applicable for establishment, management and winding up of companies in India.

**Paper: DSC203 - Programming with C & C++**

CO 1: To understand the fundamental concepts of programming in C and Object-Oriented Programming using C++.

**Course Outcomes – Semester - III**

**Paper: DSC 301 - Advanced Accounting**

CO 1: To acquire accounting knowledge of partnership firms and joint stock companies

**Paper: DSC 302 - Business Statistics -I**

CO 1: To inculcate analytical and computational ability among the students on Business Statistics.

**Paper: DSC 303 - Relational Database Management System**

CO 1: To acquire basic conceptual background necessary to design and develop simple database system, Relational database mode, ER model and distributed databases, and to write good queries using a standard query language called SQL

## **Course Outcomes – Semester – IV**

### **Paper: DSC 401 - Income Tax**

CO 1: To acquire conceptual and legal knowledge about Income Tax provisions relating to Computation of Income from different heads with reference to an Individual Assessee.

### **Paper: DSC 401 - Excel Foundation**

CO 1: Students will learn how to start working with MS Excel right from basics to Tables, Templates, Calculations and Printing of their work.

### **Paper: DSC 402 - Business Statistics - II**

CO 1: To inculcate analytical and computational ability among the students.

### **Paper: DSC 403 - Web Technologies**

CO 1: To gain skills of usage of Web Technologies to design Web pages.

## **Course Outcomes – Semester – V**

### **Paper: DSE 501 - Cost Accounting**

CO 1: To make the students acquire the knowledge of cost accounting methods.

### **Paper: DSE 502 - Computerized Accounting**

CO 1: To make the students to acquire the knowledge of computer software in Accounting.

### **Paper: DSE 503 - Management Information Systems**

CO 1: To equip the students with the establishment MIS reporting systems.

## **Course Outcomes – Semester – VI**

### **Paper PR: Research Methodology & Project Report**

CO 1: To introduce the basics of conducting research in social sciences.

### **Paper: DSE 601 - Cost Control & Management Accounting**

CO 1: To be acquainting with Cost Control techniques, Managerial Accounting decision- making techniques and reporting methods.

### **Paper: DSE 602 - Theory & Practice of GST**

CO 1: To equip the students with the knowledge regarding Theory and Practice of GST.

### **Paper: DSE 603 - Multimedia Systems**

CO 1: To acquire the knowledge of multimedia systems

*After completing these courses, the students should be able to know*

### **Course Outcomes – Semester - I**

#### **Paper: DSC – 101 Principles of Management**

CO 1: The course focuses on the basic areas of the management process and functions from an organization role, challenges, and opportunities of management in contributing to the successful operations and performance of organizations.

#### **Paper: DSC – 102 Basics of Marketing**

CO 1: To provide an exposure to the students pertaining to the nature and Scope of marketing, which they are expected to possess when they enter the industry as practitioners.

#### **Paper: DSC - 103 Business Economics**

CO 1: The Purpose of this course is to apply micro economic concepts and tools for analyzing business problems and making accurate decision pertaining to the business firms.

### **Course Outcomes – Semester - II**

#### **Paper: DSC – 201 Organizational Behaviour**

CO 1: To explain the fundamentals of managing business and to understand individual and group behavior at work place so as to improve the effectiveness of an organization.

#### **Paper: DSC – 202 Business Statistics**

CO 1: Basic statistical tools to apply for management problems and analysis. The tools starting from data gathering, tabulation, presentation and analyzing using basic statistical techniques like measures of central tendency, dispersion, kurtosis, correlation and regression.

#### **Paper: DSC – 203 Financial Accounting**

CO 1: To familiarize students with the mechanics of preparation of financial statements, understanding corporate financial statements, their analysis and interpretation.

### **Course Outcomes – Semester - III**

#### **Paper: SEC- 1 (a) Personality Development – I**

CO 1: The objective of the course is to provide a proper perspective towards one's personality development

#### **Paper: SEC - 2 (a) Basic Quality Management**

CO 1: Quality is the most significant characteristic of product or service in today's world. This course introduces traditional and modern quality perspectives.

#### **Paper: DSC – 301 Human Resource Management**

CO 1: The basic concepts related to Human Resource Management which can form foundation to understanding advanced concepts in managing human resources in an organization.



**Paper: DSC – 302 Information Technology For Business**

CO 1: The Objective of this course is to familiarize management students to basics of IT, its applications and importance to present day management and organization.

**Paper: DSC – 302 Information Technology – Lab (Practical)**

CO 1: The aim of this course is to give a management students practical experience om working in typical office software like MS-OFFICE.

**Paper: DSC – 303 Financial Management**

CO 1: To acquaint students with the techniques of financial management and their applications for business decision making.

**Course Outcomes – Semester - IV**

**Paper: SEC - 3 (a) Business Correspondence And Communication**

CO 1: This course is intended to help the students to present themselves properly to the corporate world. It enables them to communicate formally highlighting their strengths.

**Paper: SEC - 4 (a) Startup Management**

CO 1: It helps the students to acquaint themselves with the special challenges of starting new ventures and introducing new product and service ideas.

**Paper: DSC – 401 Business Law & Ethics**

CO 1: It helps the students to understand importance of contracts companies act & ethics. It focuses on legal aspects of contracts.

**Paper: DSC – 402 Marketing Research**

CO 1: To provide an exposure to the students pertaining to the nature and Scope of marketing research, which they are expected to possess when they enter the industry as practitioners to understand the basic techniques and tools of marketing research.

**Paper: DSC - 403 Management Science**

CO 1: The objective of this course is to provide the student with adequate knowledge regarding the basic manufacturing facilities & how service activities have attained significance and need managerial skills to address the problems.

**Course Outcomes – Semester - V**

**Paper: GE -1 Mobile Commerce**

CO 1: The objective of the course is to provide the students with the Mobile Commerce concepts, environment and customer value.

**Paper: DSC – 501 (b) Brand Management(M)**

CO 1: To provide an understanding of Different Types of Brand Awareness, Equity.

**Paper: DSC - 502 (b) Retail Management (M)**

CO 1: This course introduces the role of retailing and various formats and theories. It focuses on distribution management.

**Paper: DSC – 503 (b) Customer Relationship Management (M)**

CO 1: To know the importance of customer involvement and relations with corporations making the student know and build beneficial relations.

**Course Outcomes – Semester - VI**

**Paper: GE -2 Basic Business Analytics (GE-II)**

CO 1: The course aims to provide an understanding of basics concepts related to Business Analytics and practical approach using MS-EXCEL and simple programming concepts in R.

**Paper: DSC – 601 (b) Buyer Behaviour (M)**

CO 1: To understand the depth concept & theories of Consumer buying Behaviour and the impact of culture on Buyer Behaviour

**Paper: DSC – 602 (b) Advertising and Sales Promotion (M)**

CO 1: It helps the students to understand the important of advertisements for promotion of products. It focuses on media planning, personal selling and sales promotion.

**Paper: DSC – 603 (b) Rural Marketing (M)**

CO 1: The objective of the course is to introduce rural market dynamics to the students so that they can learn about rural behavior and factor that differs from urban market.

**Paper: DSC – 604 Project Report and Viva-Voce**

CO 1: Student should choose a topic based on his elective chosen in the final year and make a study and prepare a report which will be evaluated through a viva-voce.

# BIO-CHEMISTRY COURSE OUTCOMES

## Paper- I

### Chemistry of Biomolecules

- 1.To explain the connection between molecular properties and cellular activities
- 2.To describe/demonstrate the connection between cellular activities and biological responses;
- 3.Identify by experimentation, the Cellular structure and function, including chemical composition, physiochemical and functional organization of organelles and basic cellular metabolism;
- 4.Describe and apply Major cellular processes, including DNA replication, gene regulation, protein structure and function, cell signaling, and differentiation; and
- 5.Explain the Contemporary techniques used in cell and molecular biology.

## Paper- II

# Chemistry of Nucleic acids and Biochemical Techniques

- 1. The student will learn and understand the Genome organization, Cytogenetics, Genetic Control of Development.
- 2. The student will learn and understand the Principles of Mendelian inheritance, Linkage and genetic mapping; Extrachromosomal inheritance, Sex linked inheritance and genetic disorders, Somatic cell genetics, Population genetics.
- 3. The course will aid to learn about Physical and Chemical Mutagens, Drug metabolism and detoxification; DNA damage, DNA repair mechanisms, Oncogenes, proto-oncogenes, and tumour suppressor genes from humans.
- 4. The student will learn and understand the Human Genome Project, Gene therapy, Genetic Testing, and Genetic Counseling.

## Paper- III

# Bioenergetics, Biological Oxidation and Enzymology

- 1. Describe the fundamental concept of energetics of biochemical processes
- 2. Describe the chemical logic of metabolic pathways.
- 3. Recognize the basic mechanisms of pathway regulation.
- 4. To describe structure, functions and the mechanisms of action of enzymes.
- 5. To describe kinetics of enzyme catalyzed reactions and enzyme inhibitory and regulatory process.
- 6. To perform immobilization of enzymes.
- 7. To describe the applications of enzymes in industry.

## Paper- 1V

# Intermediary Metabolisms

- 1. Establish the relation between biochemical defects and metabolic disorders.
- 2. Implement the integration of metabolic processes in cellular system.
- 3. Describe the basic tools for investigating metabolic processes.
- 4. Explain the role of membrane processes in metabolism.
- 5. Describe the basic principles and applications of immunological methods for determination of drugs and related subjects.

## Paper- V

# Nutrition, Physiology And Endocrinology

- 1. Student understand the role of nutrients in development process and effects.
- 2. The students will learn about amino acid detections, estimation of starch in wheat flour and glucose and fructose estimation in biological sample.
- 3. The students will learn to find out isoelectric point of protein and Separation of protein by Poly Acryl amide Gel Electrophoresis.
- 4. The students will learn to perform assay of clinically important enzyme: serum alkaline phosphatase, serum creatine phosphokinase and serum acid phosphatase, and the factors affecting enzyme activity and determination of  $K_m$ .
- 5. Student learn about glands, secretion of hormones and importance as well as deficiency of Hormones.

## Paper- VI

### Clinical Biochemistry and Immunology

- 1. Explain the concept of bioanalytical methods.
- 2. Describe the application of bioanalytical methods within pharmacology, biopharmaceutics, pharmacokinetics, pharmacodynamics, metabolism and toxicology
- 3. Experiment the effect of the biological sample on analysis methodology and results
- 4. Describe and apply liquid-liquid extraction and solid phase extraction for sample pretreatment .
- 5. To describe immune system, antigen-antibody interaction and their applications in various immunoassay systems.
- 6. To implement the study of protein-protein, protein-DNA/RNA interactions and tools used in microscopic sectioning and imaging.
- 7. To develop an integrated analytical approach for studying the molecular interactions in a biological system.



## Paper- VII

### Molecular Biology

- 1.To correctly maintain an accurate record of laboratory procedures, techniques and exercises.
- 2.To perform experiments and evaluate data collected from advanced DNA processing and manipulation techniques in molecular biology
- 3.To demonstrate an advanced understanding of molecular biology experimental design and data analysis.
- 4.To demonstrate an understanding of advanced molecular biology techniques, including advanced background information and theory, applications, limitations, advantages and disadvantages, common problems and troubleshooting.
- 5.To Describe the concept and principles of cell biology and physiology
- 6. To Describe Biological applications in medical science.
- 7.To apply the concept and principles of cell biology in the Modern pharmaceutical, biomedical, and biotechnological industry.
- 8.To experiment and analyse biochemical, molecular, cell biological and physiological techniques.

## Paper- VIII

# Genetic Engineering and Microbiology

- 1.They understand the significance of hereditary and variation and able to linkup with genetic diseases.
- 2.They gain knowledge on basics of rDNA technology in production of important biotechnological products and apply that for further progress in the same field. They will be able to understand the inheritance of traits by Mendel's Laws.
- 3. They apply bioinformatics tools to retrieve, analyze, annotate the data from databases.
- 4.To describe key principles of how cells work, including gene regulation, protein synthesis and signal transduction.
- 5.To locate, analyse, evaluate and synthesise information from a wide variety of sources to understand the key principles of Molecular Biology.
- 6.To develop effective, creative and innovative solutions, both independently and cooperatively, to current and future research problems in Molecular Biology.
- 7.To foster intellectual curiosity in Molecular Biology and related fields that extends well beyond the course.

## Department of Biotechnology

Program outcome : B.Sc. Biotechnology

<b>PO1</b>	<b>Knowledge:</b> Apply the knowledge and principles of basic sciences, engineering and biological sciences to address problems and find solution to the complex issues of agriculture ,environmental, health related problems through biotechnological tools and techniques.
<b>PO2</b>	<b>Problem analysis and devising solutions:</b> Identify the various fields relevant researchable issues based on survey of literature, formulate a proposal and analyze complex agricultural problems for arriving substantiated conclusions using integrated approach considering public health and safety, societal, and environmental implications.
<b>PO3</b>	<b>Conduct investigations of complex problems:</b> Ability to formulate project proposal, use research-based knowledge and methods including design of experiments, analysis and interpretation of data, for arriving logical and acceptable solutions for the problems.
<b>PO4</b>	<b>Usage of modern tools and techniques:</b> Develop modern tools and techniques, apply appropriate scientific procedures, and follow prediction and modeling based problem solving approaches to address complex agricultural ,environmental, industrial, health related problems understanding the limitations and technical feasibility.
<b>PO5</b>	<b>Biotechnology and society:</b> Apply reasoning for the issues, informed by the contextual knowledge of the problems in hand and assess the risk associated with the societal, health, safety, legal and cultural issues of the problems and the consequent responsibilities relevant to the professional practice of the discipline.
<b>PO6</b>	<b>Environment and sustainability:</b> Understand the impact of the technological solutions developed through biotechnology in contexts of society and the environment, and demonstrate the knowledge need for sustainable development in judicious use of biotechnology tools and technique.
<b>PO7</b>	<b>Professional Ethics:</b> Apply ethical principles and commit to follow professional ethics and norms and guidelines in the practice of biotechnology responsibly.
<b>PO8</b>	<b>Work efficiency:</b> Ability to function effectively as an individual and as a member or leader in diverse teams in multidisciplinary settings for carrying out challenging tasks and provides acceptable solutions involving views of members for increased productivity.
<b>PO9</b>	<b>Communication skills:</b> Make effective communication on complex agricultural ,environmental, industrial issues and solutions drawn from biotechnological activities with the scientific community and society at large, and ability to comprehend and make oral and written presentations effectively.
<b>PO10</b>	<b>Life-long learning:</b> Understanding the dynamism of biological sciences, technological changing needs are to be felt, positive attitude are to developed so as to prepare and engage in adapting to such changes through the process of life-long learning.

## Paper I : sem I: Cell Biology and Genetics (BS 104)

### Mapping of Course outcomes:

CO No	Course outcome's	PO No	BTL
CO 1	This introductory section aims to give the student an overview of basic cell biology including cell structure and types. and its application in and around the work place	1	4
CO 2	In particular, this course will focus on identifying key components that constitute living cells, dynamic attributes of cell including cell cell interaction, cell adhesion and cellular signaling.	1	4
CO 3	The focus will be orientated around 'Cell Biology at work' with emphasize on key techniques currently used in the study of cells.	4	4
CO 4	On completion of this course, students will have the knowledge and skills to explain the key concepts in population, evolutionary and quantitative genetics.	9	4
CO 5	The course also provides comprehensive knowledge how genes are transferred from generation to generation. The student understands how alteration in genes results in various genetic disorders.	8	4

### COURSE OUTCOMES:

#### Semester II

#### Biological chemistry and Microbiology (BS204)

### Mapping of Course outcomes:

CO No	Course outcome's	PO No	BTL
CO 1	The basic component or biomolecules of living organisms	1	4
CO 2	. The Definition, classification, biological function and chemical and physical properties of carbohydrates	1	4
CO 3	The Definition, classification, biological function and chemical and physical properties of Lipids	1	4
CO 4	The definition, classification, biological function, chemical and physical properties, structural characteristic of proteins and enzymes	1	4
CO 5	Students get the knowledge about chemical process within & relating to living organisms.	1	4

<b>CO 6</b>	They will learn Microbial techniques: Concept, principle and types of sterilization methods Concept and characteristics of antiseptic, disinfectant and their mode of action. Concept of culture and type of culture. Cultivation methods of bacteria, yeast, fungi and virus . Principle, working and applications of instruments viz, pH meters, centrifuge, viscometer, spectrophotometer and laminar air flow.	4	4
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**COURSE OUTCOMES:**

**Semester III**

**MOLECULAR BIOLOGY AND rDNA TECHNOLOGY: (BS 305)**

**Mapping of Course outcomes:**

<b>CO No</b>	<b>Course outcome's</b>	<b>PO No</b>	<b>BTL</b>
<b>CO 1</b>	<ul style="list-style-type: none"> <li>• Concept of gene, gene cistron relationship in prokaryotes and eukaryotes,</li> <li>• DNA regulation and replication</li> <li>• Types of DNA damage, DNA repair pathways</li> <li>• Transcription in prokaryotes</li> </ul>	<b>1,4,8</b>	<b>4</b>
<b>CO 2</b>	<ul style="list-style-type: none"> <li>• Enzymes in genetic engineering, vectors</li> <li>• Methods of gene transfer</li> <li>• Gene cloning, indirect and direct screening</li> </ul>	<b>4</b>	<b>4</b>
<b>CO 3</b>	This course presents mechanism of gene manipulation goals: to make the students to understand the concept of gene manipulation and gene transfer technologies	<b>1,4</b>	<b>4</b>

**COURSE OUTCOMES:**

**Semester IV**

**Bioinformatics and Biostatistics: (BS 405)**

**Mapping of Course outcomes:**

<b>CO No</b>	<b>Course outcome's</b>	<b>PO No</b>	<b>BTL</b>
<b>CO 1</b>	Understand biological databases and their applications, homology Bioinformatics search, multiple sequence alignment and gene annotation	1	4
<b>CO 2</b>	Learn methods of molecular modeling, retrieving and visualizing protein structure, molecular simulations Methods of phylogenetic analysis to infer genetic relatedness Understand the structure function relationship of proteins, Ramachandran plot	4,3,8	4

<b>CO 3</b>	1. Basics of Biostatistics , methods of sampling-random and non random 2. Diagrammatic and graphical representation of date 3. Measure of central tendency and measure of dispersion 4. Probability, probability distribution	1	4
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**COURSE OUTCOMES:**

**Semester V (ELECTIVE THEORY-V (A) )**

**Plant Biotechnology: (BS 504)**

**Mapping of Course outcomes:**

<b>CO No</b>	<b>Course outcome's</b>	<b>PO No</b>	<b>BTL</b>
<b>CO 1</b>	1. Laboratory organization, culture media, callus culture, suspension culture, Assessment of growth and viability, Micropropagation, Somatic embryogenesis, synthetic seed.	1,4,8	3
<b>CO 2</b>	Students will learn about basic techniques in plant tissue culture experiments.	8,	3
<b>CO 3</b>	Application of DNA technology, plant cell as biofactories for the production of Secondary metabolites.	8,10	3

**COURSE OUTCOMES:**

**Semester VI (CORE THEORY-VI )**

**IPR,BIOSAFETY,ENTERPRENEURSHIP: (BS 601)**

**Mapping of Course outcomes:**

<b>CO No</b>	<b>Course outcome's</b>	<b>PO No</b>	<b>BTL</b>
<b>CO 1</b>	<b>Detailed description on global status of genetically engineered crops, Asimolar conference on rDNA technology. Brief description on the concerns of GE crops – animal and human health, environment, agriculture, horizontal gene transfer and general concerns. Principles of safety assessment of transgenic plants and sequential steps in risk assessment.</b>	5,7	3
<b>CO 2</b>	<b>Environmental risk assessment and food and feed safety assessment. Indian biosafety regulations, Biosafety research trials and GM labeling.</b>	5,7	3
<b>CO 3</b>	<b>IPR,GOVERNMENT ACTS, COPY RIGHT,PATENTS ETC THEY WILL LEATN</b>	8	3

Gain knowledge of Crop development, Callus culture, Biotechnological applications of plants, Animal tissue culture, Animal products, production & improvement of Them

**COURSE OUTCOMES:**

**Semester VI (ELECTIVE THEORY-VI (B) )**

## Environmental Biotechnology: (BS 604)

### Mapping of Course outcomes:

CO No	Course outcome's	PO No	BTL
CO 1	*Environmental pollution *Types of pollution and pollutants * Climate changes , green house gases and global warming	1,6	3
CO 2	Students will get knowledge on awareness on environment	1,2,6	3
CO 3	Understanding the Environmental components, Ecosystems and communities evolving and the factors which will affect those communities. Study of different threats to ecosystem caused by heavy metals, toxins and its effect on Air,Water,Soil. Awareness regarding different acts for protection of environment and biotechnological practices and treatments using microbes, plants, chemicals to solve environmental issues.	1,2,6,10	

# DEPARTMENT OF BOTANY

## Course Outcomes

Sl. No	Name of the course (Paper)	Course Code	Course Outcome
1	Microbial Diversity and Lower Plants	BS 104	<b>Course Learning Outcomes:</b> <ul style="list-style-type: none"><li>• Understand concepts of Archaeobacteria and Actinomycetes</li><li>• Evaluate the importance of Cyanobacteria as biofertilizer</li><li>• Assess the ecological and economic importance of Lichens</li><li>• Assess few plant diseases caused by viruses and their control</li><li>• Classify viruses based on their characteristics and structures</li><li>• Develop critical understanding of plant diseases and their remediation. Examine the general characteristics of bacteria and their cell reproduction/recombination</li><li>• Increase the awareness and appreciation of human friendly viruses, bacteria, alga and their economic importance</li><li>• Understand the diversity among Algae</li><li>• Know the systematic, morphology and structure, of Algae</li><li>• Understand the life cycle pattern of Algae.</li><li>• Understand the useful and harmful activities of Algae</li><li>• Identify true fungi and demonstrate the principles and application of plant pathology in the control of plant disease.</li><li>• Identify the economic importance of fungi in relation to mycorrhiza and Mushrooms</li></ul>
2	Gymnosperms, Taxonomy of Angiosperms & ecology	BS 204	<b>Course Learning Outcomes: -</b> <ul style="list-style-type: none"><li>• Demonstrate an understanding of Gymnosperms</li><li>• Develop critical understanding on morphology, anatomy and reproduction of Gymnosperms</li></ul>



			<ul style="list-style-type: none"> <li>• Understanding of plant evolution and their transition to land habitat.</li> <li>• Demonstrate proficiency in the experimental techniques and methods of appropriate analysis of Gymnosperms</li> <li>• Classify Plant systematics and recognize the importance of herbarium and Virtual herbarium, Evaluate the Important herbaria and botanical gardens.</li> <li>• Interpret the rules of ICN in botanical nomenclature.</li> <li>• Assess terms and concepts related to Phylogenetic Systematics</li> <li>• Generalize the characters of the families according to Bentham &amp; Hooker's system of classification and study the economic importance of plants belonging to certain families.</li> <li>• Understand core concepts of biotic and abiotic components of Ecosystem</li> <li>• Evaluate energy sources of ecological system</li> <li>• Assess the adaptation of plants in relation to light, temperature, water, wind and fire. Understand plant communities and ecological adaptations in plants</li> <li>• Conduct experiments using skills appropriate to subdivisions</li> </ul>
3	Skill Enhancement Course 1: Nursery and Gardening	BS 301	<p><b>Course Learning Outcomes: -</b></p> <ul style="list-style-type: none"> <li>• Understand the process of sowing seeds in nursery</li> <li>• List the various resources required for the development of nursery</li> <li>• Distinguish among the different forms of sowing and growing plants</li> <li>• Analyze the process of Vegetative propagation</li> <li>• Appreciate the diversity of plants and selection of gardening</li> <li>• Examine the cultivation of different vegetables and growth of plants in nursery and gardening. Identify and practice safe use of tools, equipment and supplies used in nursery and garden management careers.</li> </ul>
4	Skill Enhancement Course 2: Biofertilizers and Organic Farming	BS 302	<p><b>Course Learning Outcomes: -</b></p> <ul style="list-style-type: none"> <li>• Develop their understanding on the concept of bio-fertilizer</li> <li>• Identify the different forms of biofertilizers and their uses</li> </ul>

			<ul style="list-style-type: none"> <li>• Compose the Green manuring and organic fertilizers</li> <li>• Develop the integrated management for better crop production by using both nitrogenous and phosphate bio fertilizers and vesicular arbuscular mycorrhizal (VAM).</li> <li>• Interpret and explain the components, patterns, and processes of bacteria for growth in crop production</li> </ul>
3	Plant Anatomy & Embryology	BS 304	<p><b>Course Learning Outcomes: -</b></p> <ul style="list-style-type: none"> <li>• Understand the scope &amp; importance of Anatomy.</li> <li>• Know various tissue systems.</li> <li>• Understand the normal and anomalous secondary growth in plants and their causes.</li> <li>• Perform the techniques in anatomy.</li> <li>• With respect to recent knowledge students should know about the different tools in the taxonomy so as to relocate the phylogenetic position of plant or taxa.</li> <li>• Understands the structure of anther and pollen; Structure and types of ovules; Types of embryo sacs, organization and ultrastructure of mature embryo sac.</li> <li>• Understands the Pollination mechanisms and adaptations; Double fertilization; Seed-structure appendages and dispersal mechanisms.</li> <li>• Develops critical understanding about endosperm types, structure and functions;</li> <li>• Develops critical understanding about dicot and monocot embryo; Embryo-endosperm relationship Definition, types and Practical applications of apomixes and polyembryony</li> </ul>

	Skill Enhancement Course 3: Greenhouse Technology.	BS 401	<b>Course Learning Outcomes: -</b> <ul style="list-style-type: none"> <li>• Study the scope and importance of greenhouse</li> <li>• Know different crops that can be grown in greenhouse</li> <li>• Understand the role of a greenhouse operator</li> </ul>
	Skill Enhancement Course 4: Mushroom Culture Technology	BS 402	<b>Course Learning Outcomes: -</b> On completion of this course, the students will be able to: <ul style="list-style-type: none"> <li>• Recall various types and categories of mushrooms.</li> <li>• Demonstrate various types of mushrooms cultivating technologies.</li> <li>• Examine various types of food technologies associated with mushroom industry.</li> <li>• Value the economic factors associated with mushroom cultivation</li> <li>• Device new methods and strategies to contribute to mushroom production.</li> </ul>
	Paper IV: Cell Biology, Genetics and Plant Physiology	BS 404	<b>Course Learning Outcomes: -</b> On completion of the course, students are able to understand <ul style="list-style-type: none"> <li>• The eukaryotic cell cycle and mitotic and meiotic cell division</li> <li>• Structure and organization of cell membrane</li> <li>• Process of membrane transport and membrane models</li> <li>• Mendelian and Neo-mendelian genetics</li> <li>• To study the phenomenon of dominance, laws of segregation, independent assortment of genes.</li> <li>• To understand the different types of genetic interaction, incomplete dominance, codominance, interallelic genetic interactions, multiple alleles and quantitative inheritance etc.</li> <li>• Know importance and scope of plant physiology</li> <li>• Understand the plants and plant cells in relation to water.</li> <li>• Learn about the movement of sap and absorption of water in plant body</li> </ul>

			<ul style="list-style-type: none"> <li>• Learn structure and general features of enzymes.</li> <li>• Understand the concept of enzyme activity and enzyme inhibition.</li> <li>• Understand the process of photosynthesis in higher plants with particular emphasis on light and dark reactions, C3 and C4 pathways.</li> <li>• Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic</li> <li>• respiration, Glycolysis, Krebs Cycle and Electron Transport System.</li> <li>• Understand the Nitrogen Metabolism in higher plants with particular emphasis on Biological Nitrogen Fixation, Amino Acid and Protein Synthesis</li> <li>• Understands the function and role of Growth Regulators and Inhibitors.</li> <li>• Understand the plant movements.</li> </ul>
	Generic Elective Course 1: Industrial Microbiology	BS 501	<p><b>Course Learning Outcomes: -</b> After completion of the course, the students will be able to;</p> <ul style="list-style-type: none"> <li>• Understand concepts of industrial microbiology</li> <li>• Apply the usage of microorganisms in industry</li> <li>• Measure the growth of microorganisms</li> <li>• Analyze the use of microbes in industries such as dairy and medicines</li> <li>• Explain the concept of fermentation</li> <li>• Understand the use of patent with respect to industrial microbiology</li> </ul>
	Biodiversity & conservation (DSE - 1A)	BS 502	<p><b>Course Learning Outcomes: -</b></p> <ul style="list-style-type: none"> <li>• Understand the morphological diversity of Bryophytes and Pteridophytes and Gymnosperms.</li> <li>• Understand the economic importance of the Bryophytes and Pteridophytes and Gymnosperms.</li> <li>• Know the evolution of Bryophytes and Pteridophytes and Gymnosperms.</li> <li>• Understand the habit of the angiosperm plant body.</li> </ul>

			<ul style="list-style-type: none"> <li>• Know the vegetative characteristics of the plant.</li> <li>• Learn about the reproductive characteristics of the plant.</li> <li>• Understand the plant morphology and basic taxonomy.</li> </ul>
	Economic Botany (DSE – 1B)	BS 502	<p><b>Course Learning Outcomes: -</b></p> <ul style="list-style-type: none"> <li>• Understand core concepts of Economic Botany and relate with environment, populations, communities, and ecosystems</li> <li>• Develop critical understanding on the evolution of concept of organization of apex new crops/varieties, importance of germplasm diversity, issues related to access and ownership</li> <li>• Develop a basic knowledge of taxonomic diversity and important families of useful plants</li> <li>• Increase the awareness and appreciation of plants &amp; plant products encountered in everyday life</li> <li>• Appreciate the diversity of plants and the plant products in human use</li> </ul>
	Seed Technology (DSE – 1C)	BS 502	<p><b>Course Learning Outcomes: -</b></p> <ul style="list-style-type: none"> <li>• Understand the theoretical orientation of seed development</li> <li>• Analyze the different ways of seed processing in different plants</li> <li>• Examine the various methods of Seed testing</li> <li>• Understand the method of seed production in different plants</li> <li>• Explain the concept of hybrid seed production</li> </ul>
	DSE – 3: Project	BS 601	<p><b>Course Learning Outcomes: -</b></p> <ul style="list-style-type: none"> <li>• Gets experience of doing a real time project.</li> </ul>

	DSE - 2A: Plant Molecular Biology	BS 602	<p><b>Course Learning Outcomes:</b></p> <ul style="list-style-type: none"> <li>• On completion of this course, the students will be able to;</li> <li>• Analyze the structures and chemical properties of DNA and RNA through various historic experiments.</li> <li>• Differentiate the main types of prokaryotes through their grouping abilities and their characteristic</li> <li>• Evaluate the experiments establishing central dogma and genetic code.</li> <li>• Gain an understanding of various steps in transcription, protein synthesis and protein modification.</li> </ul>
	DSE – 2B: Tissue Culture and Biotechnology	BS 602	<p><b>Course Learning Outcomes:</b></p> <ul style="list-style-type: none"> <li>• On completion of this course, the students will be able to:</li> <li>• Demonstrate an understanding of the concepts of plant cell &amp; tissue culture.</li> <li>• Utilize lab protocols to carry out common cell culture techniques.</li> <li>• Concepts, tools and techniques related to in vitro propagation of plants.</li> <li>• Different methods used for genetic transformation of plants, use of Agrobacterium as a vector for plant transformation.</li> </ul>
	DSE – 2C: Analytical Techniques in Plant Sciences	BS 602	<p><b>Course Learning Outcomes:</b></p> <p>On completion of this course the students will be able to:</p> <ul style="list-style-type: none"> <li>• Develop conceptual understanding of cell wall degradation enzymes and cell fractionation.</li> <li>• Classify different types of chromatography techniques.</li> <li>• Explain the principles of Light microscopy, compound microscopy, Fluorescence microscopy and confocal microscopy</li> <li>• Apply suitable strategies in data collections and disseminating research findings.</li> </ul>

**MVS GOVT ARTS AND SCIENCE COLLEGE (A)**  
**MAHABUBNAGAR**

**Department of Computer Science**  
**Course Outcomes**

**PROGRAMMING IN C**

1. Learn to develop simple algorithms and flow charts to solve a problem.
2. Develop problem solving skills coupled with top down design principles.
3. Learn about the strategies of writing efficient and well-structured computer algorithms/programs.
4. Develop the skills for formulating iterative solutions to a problem.
5. Learn array processing algorithms coupled with iterative methods.
6. Learn text and string processing efficient algorithms.
7. Learn searching techniques and use of pointers.
8. Understand recursive techniques in programming.

**OBJECT ORIENTED PROGRAMMING IN C++**

1. Learn the concepts of data, abstraction and encapsulation
2. Be able to write programs using classes and objects, packages.
3. Understand conceptually principles of Inheritance and Polymorphism and their use and program level implementation.
4. Learn exception and basic event handling mechanisms in a program
5. To learn typical object-oriented constructs of specific object oriented programming language

**DATA STRUCTURES**

1. To be familiar with fundamental data structures and with the manner in which these data structures can best be implemented; become accustomed to the description of algorithms in both functional and procedural styles
2. To have a knowledge of complexity of basic operations like insert, delete, search on these data structures.
3. Ability to choose a data structure to suitably model any data used in computer applications.
4. Design programs using various data structures including hash tables, Binary and general search trees, heaps, graphs etc.
5. Ability to assess efficiency tradeoffs among different data structure implementations.
6. Implement and know the applications of algorithms for sorting, pattern matching etc.

**DATABASE MANAGEMENT SYSTEMS**

1. Gain knowledge of database systems and database management systems software.
2. Ability to model data in applications using conceptual modelling tools such as ER Diagrams and design data base schemas based on the model.
3. Formulate, using SQL, solutions to a broad range of query and data update problems.
4. Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.

5. Be acquainted with the basics of transaction processing and concurrency control.
6. Familiarity with database storage structures and access techniques.
7. Compare, contrast and analyse the various emerging technologies for database systems such as NoSQL.
8. Analyse strengths and weaknesses of the applications of database technologies to various subject areas.

## **PROGRAMMING IN JAVA**

1. Knowledge of the structure and model of the Java programming language,
2. Use the Java programming language for various programming technologies
3. Develop software in the Java programming language,
4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements

## **SOFTWARE ENGINEERING**

1. Basic knowledge and understanding of the analysis and design of complex systems.
2. Ability to apply software engineering principles and techniques.
3. To produce efficient, reliable, robust and cost-effective software solutions.
4. Ability to work as an effective member or leader of software engineering teams.
5. To manage time, processes and resources effectively by prioritising competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain.

## **OPERATING SYSTEM**

1. Describe the important computer system resources and the role of operating system in their management policies and algorithms.
2. To understand various functions, structures and history of operating systems and should be able to specify objectives of modern operating systems and describe how operating systems have evolved over time.
3. Understanding of design issues associated with operating systems.
4. Understand various process management concepts including scheduling, synchronization, and deadlocks.
5. To have a basic knowledge about multithreading.
6. To understand concepts of memory management including virtual memory.
7. To understand issues related to file system interface and implementation, disk management.
8. To understand and identify potential threats to operating systems and the security features design to guard against them.
9. To have sound knowledge of various types of operating systems including Unix and Android.

## **COMPUTER NETWORKS**

1. Understand the structure of Data Communications System and its components. Be familiarize with different network terminologies.
2. Familiarize with contemporary issues in network technologies.
3. Know the layered model approach explained in OSI and TCP/IP network models
4. Identify different types of network devices and their functions within a network.
5. Learn basic routing mechanisms, IP addressing scheme and internetworking



- concepts.
6. Familiarize with IP and TCP Internet protocols.
  7. To understand major concepts involved in design of WAN, LAN and wireless networks.
  8. Learn basics of network configuration and maintenance.
  9. Know the fundamentals of network security issues.

## **WEB TECHNOLOGIES**

1. To understand the terms related to the Internet and how the Internet is changing the world.
2. To understand how computers are connected to the Internet and demonstrate the ability to use the World Wide Web.
3. Demonstrate an understanding of and the ability to use electronic mail and other internet based services
4. Understand the design principles of Web pages and how they are created
5. To develop an ability to create basic Web pages with HTML.

## **PHP WITH MYSQL**

1. Using PHP programming is to create dynamic websites
2. Demonstrates a working knowledge of Dynamic Web Site Design and Publishing
3. Confirms commitment to profession
4. Offers a career differentiator, with enhanced credibility and marketability
5. Takes you beyond basic user's knowledge to the IT Pros who know how to create web sites

## **PYTHON PROGRAMMING**

1. Develop and Execute simple Python programs.
2. Structure a Python program into functions.
3. Using Python lists, tuples to represent compound data
4. Develop Python Programs for file processing

# MVS GOVERNMENT ARTS AND SCIENCE COLLEGE(A),MAHABUBNAGAR

## DEPARTMENT OF CHEMISTRY

### PROGRAMME OUTCOMES (POs)

2021-22

The students at the completion of the programme will be able to

**PO1:** Demonstrate professional responsibility as an individual as well as in multifaceted teams with values and ethics.

**PO2:** Adapt to develop and upgrade skills towards independent and lifelong learning.

**PO3:** Communicate basic concepts of Chemistry with examples

**PO4:** Acquire basic knowledge in chemical principles and higher level of understanding in each of the chemistry sub-disciplines such as organic, inorganic, physical and General Chemistry.

**PO5:** Develop the working knowledge of chemical instrumentation and laboratory techniques and be able to apply skills in daily life.

### PROGRAMME SPECIFIC OUTCOMES (PSOs)

At the completion of the programme, the students will be able to

**PSO1:** Apply the knowledge gained during the course of the program to identify, formulate and solve real life problems.

**PSO2:** Apply the knowledge of ethical and management principles required to work in a team.

**PSO3:** Apply the contextual knowledge of chemistry to function effectively as an individual or a leader in a multidisciplinary environment.

**PSO4:** Synthesize, compare, evaluate, classify, interrupt and effectively apply the basic laws, principles, phenomena, processes and mechanisms involved in the domain of chemistry.

**PSO5:** Explicitly communicate and exchange their ideas with regard to theoretical and experimental aspects among the society.

### COURSE OUTCOMES (COs)

#### SEMESTER-I (B.Sc Chemistry)

##### Paper-I

**CO-1:** understand the factors influencing the geometry of molecules and MOT.

**CO-2:** Acquire the Knowledge regarding the synthesis, Properties and applications of Silicones and nitrides.

**CO-3:** Understand the factors influencing the bond polarization

**CO-4:** Understand the chemistry of alkanes, Alkenes and alkynes

**CO-5:** Explain the basic concepts in quantum chemistry and gather the knowledge of historic theoretical development of concepts related with Atomic Structure.

**CO-6:** Understand the reasons for deviations of real gases from ideal behaviour and apply the principles of Joule Thomson effect in liquefaction of gases.

**CO-7:** Understand the intermolecular forces operating between liquid molecules and get the knowledge of viscosity and surface tension.

**CO-8:** Able to explain the differences between ideal and non-ideal mixture of liquids and learn about the Critical Solution Temperature.

**CO-9:** Understand the reactions and effects of ions in qualitative analysis of salt. Carry out systematic qualitative analysis of Inorganic salt mixture.

**CO-10:** Collect the knowledge and apply it in explaining the isomerism exhibited by the organic molecules.

**CO-11:** Able to explain the laws of Crystallography and Crystal structures of NaCl and KCl.

## LABORATORY COURSE OUTCOMES

### Qualitative Analysis-Semi micro analysis of mixtures

Students gain the following practical knowledge from paper-I after completion of the semester-I.

**CO1:** students are able to understand analysis of binary salt mixture through semi-micro analysis.

**CO2:** understand classification of anions and cations into various groups based on their reactions.

## COURSE OUTCOMES (COs) SEMESTER-II (B.Sc Chemistry) Paper-II

**CO1:** students understand the types of oxides, structure and reactivity of C,N,P,S oxides.

**CO2:** students able to know the structure and acidic nature of oxyacids of B,C,N,P,S Redox properties of nitrogen oxyacids, phosphorus oxyacids, sulphur oxyacids Chlorine oxyacids, and they know the industrial importance of oxyacids.

**CO3:** classification, general properties of Interhalogens, definition and structure of polyhalide, pseudohalogen comparison with halogens. From this topic students are able to understand the above Concepts.

**CO4:** From this topic students can understand the structure and reactivity of xenon compounds.

**CO5:** students can enhance their knowledge regarding Electronic configuration, variable valency, magnetic properties, catalytic Properties of d-block elements. comparative treatment of second and Third transition series with their 3d analogues.

**CO6:** Students are able to differentiate chemical reactivity of alkyl, aryl, aralkyl Allyl, vinyl, benzyl halides. They clearly understand the mechanism and Differences between SN1 and SN2 reactions, and their stereochemistry.

**CO7:** In this topic students understand the classification, Preparation, chemical properties of alcohols, phenols, and they are able to know the advantages and disadvantages, commercial applications of The alcohols, phenols and ethers.

**CO8:** Preparations of aldehydes, Ketones. Special methods of preparations of aldehydes, ketones. Chemical reactivity, some additional reactions Cannizzaro reaction, oxidation reactions MPVR reaction etc. discussed in this Topic. From this topic students are able to get extensive knowledge, which is helpful in the chemical industry.

**CO9:** Electrical transport- conductance, equivalent conductance, molar conductance Specific conductance. Migration of ions Kohlrausch's law, Arrhenius theory Ostwald dilution law, Debye-Huckel-Onsager's equation for strong electrolytes. Transport Number, Electrolytic, galvanic cells, EMF, Nernst equation, solubility product of AgCl, Potentiometric titrations.

**CO10:** From volumetric analysis and Gravimetric analysis topics students become perfect in understanding the reactions, improve the practical knowledge to calculate concentrations of unknown compounds. Students become perfect in doing titrations, they know about indicators, nucleation, precipitation growth of precipitation, filtration, washing, drying and incineration of precipitate, coprecipitation and post precipitation etc.

**CO11:** students can understand the optical activity, chirality, Symmetry elements, asymmetry, dissymmetric molecules, D, L-configuration, R, S- configuration CIP rules.

**CO12:** Raoult's law, relative lowering of vapour pressure, molecular weight determination. Osmosis Osmotic pressure. Determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point. Students can understand the above concepts clearly.

## LABORATORY COURSE OUTCOMES

### Quantitative Analysis

Students gain the following practical knowledge from paper-II after completion of the semester-II.

**CO1:** understand estimation of carbonate, bicarbonate, alkali concentration and ammonium ion quantitatively present in their test solutions through acid-base titration.

**CO2:** understands about estimation of metal ions present in their solutions through redox and complexometric titration methods.

### COURSE OUTCOMES (COs) SEMESTER-III (B.Sc Chemistry) Paper-II

After completion of the semester-III student able to understand the following objectives from paper-III

**CO1:** able to understand nomenclature, geometries, various f-block elements compounds and also knows about spectral and magnetic properties in coordination compounds.

**CO2:** able to understand the bonding of complexes Valence Bond theory, free electron theory, electrical and thermal conductivity of metals, band theory, conductors, semiconductors and able to understand nomenclature, geometries, various theories of coordination compounds and also knows about isomerism in coordination compounds.

**CO3:** able to know Nomenclature, methods of preparations, physical and chemical properties of carboxylic acids and derivatives.

**CO4:** able to understand nomenclature, classification, physical and chemical properties of nitro hydrocarbons, amine and also understand about the properties of cyanides and isocyanides to understand the classification and importance of various heterocyclic compounds and also about structure and properties of some 5-membered and 6-membered heterocyclic compounds.

**CO5:** to understand thermodynamic laws, terminology used in thermodynamics, various thermodynamic processes and also about Carnot's cycle, Kirchhoff's equation, Joule-Thomson effect and Maxwell relations.

**CO6:** to understand the significant figures accuracy and precision, types of errors and types of deviations.

**CO7:** to understand the carbanions and reactions involving it like Aldol condensation etc.

**CO8:** able to differentiate phase rules and systems, to understand water systems, sodium chloride systems and Ag-Pb systems.

## LABORATORY COURSE OUTCOMES

### Synthesis of Organic compounds

Students gain the following practical knowledge from paper-III after completion of the semester-III.

**CO1:** able to understand about identification of organic compounds through functional group analysis.

**CO2:** able to understand about identification of organic compounds through their and their preparations

### Skill Enhancement Course-I (SEC-I)

#### Laboratory Safety Rule and Lab Reagents

Students are able to understand the following points from SEC-I after completion of paper-III.

**CO1:** able to understand about hazardous chemicals in laboratory, personal protective equipments, how to label chemicals and understanding of labels, prevention of inhaling harmful chemicals, accidents, and fire extinguishers, first aid kit in laboratory, safety symbols, calibration of fractional weights, preparation of dilute solutions from concentrated solutions, preparation of standard solutions and maintenance of observation book record.

**CO2:** able to understand about preparation of indicators and their uses in volumetric analysis, role of indicator in detecting end point, preparation of buffers, preparation of commonly used reagents.

## COURSE OUTCOMES (COs)

### SEMESTER-IV (B.Sc Chemistry)

#### Paper-IV

**CO1:** able to understand the key features of coordination compounds, including bonding, stability of complexes, Crystal Field Theory to understand the magnetic properties (and in simple terms the colour) of coordination compounds. Discuss the d-orbital splitting pattern in different geometries like octahedral, tetrahedral. Calculate magnetic moment & crystal field stabilization energy of metal complexes. Explain high spin and low spin complexes & formation of metal complexes in solution.

**CO2:** To be able to describe the stability of metal complexes by the use of formation constants and to calculate thermodynamic parameters from them and to become familiar with some applications of coordination compounds.

**CO3:** define the importance of inorganic elements in vital systems, explain the importance of minerals for living organisms, interpret situations that may occur in the absence of minerals, interpret situations that may occur in excess of minerals and to explain Metal ion binding to biomolecules and their functions.

**CO4:** Recognize carbohydrates and classify them as mono-, di-, or polysaccharides. Classify monosaccharides as aldoses or ketoses and as trioses, tetroses, pentoses, or hexoses. Distinguish between a D sugar and an L sugar, to identify the structures of D-glucose, D-galactose, and D-fructose and describe how they differ from each other.

**CO5:** to know about the synthesis, pI & one name reaction of amino acids. To know about chemistry, synthesis & sequence determination of peptides.

**CO6:** to know about the synthesis and important name reactions of pyrrole, pyridine, indole etc.

**CO7:** from this portion students can acquire knowledge about the system, surrounding, heat and work, and thermal equilibrium. From this portion students can acquire thorough background knowledge about the different reactions. From this portion students can acquire thorough background knowledge about Arrhenius equations, homogeneous catalysts. From this portion students can acquire knowledge about chemical kinetics.

**CO8:** from this portion students can acquire thorough background knowledge about basics of photochemistry with potential energy curves. From this portion students can acquire thorough background knowledge about laws of photochemistry and photochemical reactions.

**CO9:** to understand different theories of bonding in metals.

**CO10:** to know about metal enolates, alkylation, reactions with carbonyls & conjugate addition of enolates.

**CO11:** to discuss fundamental concepts in surface chemistry as well as analyse and carry out calculations of surface chemical problems relevant to these concepts.

## LABORATORY COURSE

### QUALITATIVE ANALYSIS OF ORGANIC COMPOUNDS

Students will gain an understanding of:

1. the planning and implementation of advanced organic reactions
2. the purification of molecules from reactions in a
3. detailed organic structure analysis

### Skill Enhancement Course-II (SEC-II)

#### Remedial Methods for Pollution, Drinking water and Soil Fertility Standards

Students are able to understand the following points from SEC-II after completion of semester-IV.

**CO1:** able to understand about prevention and control of air pollution, ozone layer depletion-causes and prevention methods, global warming and greenhouse effect-causes and control methods, acid rains and their effects on monuments, sources of radiation

deleterious effects of radiation on health, sources of water pollution -methods for control of water pollution and water recycling methods, dumping of plastics in rivers and oceans and their effects on aquatic life, determination of -dissolved oxygen, chemical oxygen demand in polluted water, sources of soil pollution and control of soil pollution, environmental laws in India and also about environmental benefits of planting trees.

**CO2:** able to understand about water quality and water standards, common treatments used for treatment of water, various tests used for water treatment, various water treatment techniques, basic concepts of soil chemistry, effect of pH on nutrients availability, types of plant nutrients-micronutrients and macronutrients and their importance on plant growth and also about determination of soil nitrogen by Kjeldhal method.

## **COURSE OUTCOMES (COs)**

### **SEMESTER-V**

#### **PAPER-V**

After completion of the semester-V student able to understand the following objectives from paper-V

**CO1:** to understand Crystal Field Theory (CFT) and its applications to various geometries, stability, colour and magnetic properties of transition metal complexes in various fields.

**CO2:** to gain the knowledge regarding Borane and carborane clusters and also about their structure through Wade's rules.

**CO3:** to understand amines and diazonium salts properties and their importance and also about Cyanides and Isocyanides properties.

**CO4:** to understand the classification and importance of various heterocyclic compounds and also about structure and properties of some 5-membered and 6-membered heterocyclic compounds.

**CO5:** to understand rate, molecularity, order of reaction, factors influencing rate of reaction, kinetics of various types of reactions based on order and molecularity and also expertise about order determining methods and theories of reaction rates.

**CO6:** to nature of electromagnetic radiation, principles and selection rules of Rotational, Infra-Red and UV-Visible spectroscopies and their importance in structural elucidation of sample compounds.

**CO7:** to differentiate thermal and photochemical reactions, to understand photochemical laws, various photo physical and photochemical processes.



## LABORATORY COURSE OUTCOMES

### Organic synthesis and TLC

Students gain the following practical knowledge from paper-V after completion of the semester-V.

**CO1:** able to gain knowledge about laboratory synthesis of various organic compounds.

**CO2:** able to understand the use of Thin Layer Chromatography (TLC) in separation of organic compounds.

## COURSE OUTCOMES (COs)

### SEMESTER-V

#### PAPER-VI

After completion of the semester-V student able to understand the following objectives from paper-VI

**CO1:** to understand principles, methods of solvent extraction.

**CO2:** to gain the knowledge regarding extraction of components through Thin Layer Chromatography.

**CO3:** to understand about principle methods of separation of compounds by using Paper Chromatography.

**CO4:** to understand about principle, types of phases, column packing, solvent selection and applications of column chromatography.

**CO5:** to understand principle, ion exchange resins and applications of ion exchange chromatography.

**CO6:** to understand principle, instrumentation set up and types of phases used in Gas chromatography.

**CO7:** to understand principle, instrumentation set up and types of phases used in High Performance Liquid Chromatography in analysis of paracetamol.

**CO8:** to understand principle of Beer Lambert's law and its limitations, difference between colorimetry and spectrophotometry and also about single beam and double beam spectrophotometer, verification of Beer's Lambert law.

**CO9:** to understand principle, source of radiation, sampling and Block diagram of FT-IR Spectrophotometer.

**CO10:** to understand about principle, types of electrodes and applications of potentiometry, voltammetric techniques, micro electrodes, over potential and polarization and also about conductivity, types of conductivity and applications of conductometry.

## LABORATORY COURSE OUTCOMES

### Experiments in physical chemistry-I

Students gain the following practical knowledge from paper-VI after completion of the semester-VI.

**CO1:** able to gain knowledge about distribution law and distribution coefficient with various examples.

**CO2:** able to understand determination of cell constant and dissociation constant of acetic acid by using conductometric titrations.

**CO3:** to understand about verification of Beer's law using  $\text{KMnO}_4$ .

**CO5:** to understand about acetic acid absorption on animal charcoal and verification of Freundlich adsorption isotherm.

**CO6:** to understand surface tension and viscosity of liquids.

## Skill Enhancement Course-III (SEC-III)

### Materials and their Applications

Students are able to understand the following points from SEC-III after completion of semester-V.

**CO1:** able to understand about classification of materials, advanced materials and their applications, types of materials and their importance, types of metal alloys-ferrous and non-ferrous alloys and their applications, super alloys, types and applications of ceramics, types, properties and applications of glasses, clay products, refractories and cements.

**CO2:** able to understand about various polymer additives, advanced materials-semiconductors, biocompatible materials, smart materials, advanced polymeric materials and nano-engineered materials and also about smart materials, conducting polymers and their applications.

## Generic Elective Course-I (GE-I)

### Pharmaceuticals

Students are able to understand the following point from GE-I after completion of semester-V.

**CO1:** able to understand definition of disease, drug and also about sources of drug, absorption, distribution, action at the site, metabolism and elimination process of some drugs, nomenclature of drugs with examples, drug formulation methods, oral dosage forms, parenterals, topical dosage forms, anti allergic, anti itching, antifungal, anesthetic and antiseptic drugs with examples.

**CO2:** able to understand about classification of drugs based on their therapeutic action-chemotherapeutic drugs, pharmacodynamic agents and drugs acting on metabolic processes-brief explanation about their structure and importance with some examples.

## **COURSE OUTCOMES (COs)**

### **SEMESTER-VI**

#### **PAPER-VII**

After completion of the semester-VI student is able to understand the following objectives from paper-VII.

**CO1:** able to differentiate inert and labile complexes, ligand substitution reactions in various geometries, Trans

effect and its importance to study ligand substitution reactions in square planar complexes.

**CO2:** able to understand the importance of various inorganic elements in biological systems/processes.

**CO3:** able to know about Pearson's HSAB principle and its applications.

**CO4:** able to understand classification and nomenclature of carbohydrates, properties and structure of D-glucose and D-Fructose.

**CO5:** able to understand classification, properties and importance of amino acids and also about structure of peptide/proteins.

**CO6:** able to understand thermodynamic laws, terminology used in thermodynamics, various thermodynamic

processes and also about Carnot's cycle, Kirchhoff's equation, Joule-Thomson effect and Maxwell relations.

**CO7:** able to understand principles of NMR and Mass spectrometry and their importance in structural elucidation of sample compounds.

## **LABORATORY COURSE OUTCOMES**

### **Qualitative and spectral analysis of organic compounds**

Students gain the following practical knowledge from paper-VII after completion of the semester-VI.

**CO1:** able to understand about identification of organic compounds through functional group analysis.

**CO2:** able to understand about identification of organic compounds through their IR, NMR and Mass spectrums analysis.

## COURSE OUTCOMES (COs)

### SEMESTER-VI

#### PAPER-VIII

Students gain the following practical knowledge from paper-VIII after completion of the semester-VI.

**CO1:** Students can understand the Concepts of Definition, Classification, Preparation, Chemical Structures and Applications and the impact of Pesticides on Environment as well as animal and human beings and also learnt about Pesticides preparation and formulation synthetic and Bio-Pesticides.

**CO2:** Students can acquire knowledge about Definition, Classification, Preparation, and Chemical Structure of various fertilizers. Describe and explain various Applications along with its impact on Environment and living beings. Learn and be able to explain the role of Bio-Fertilizers in Organic farming.

**CO3:** Students understand the concept of Composition of Crude Petroleum, Refining and Different types of Petroleum products and its applications. Enable the student to get understand the Fractional distillation of Crude and obtaining different fractions of different physical properties, Understand The process of Artificial synthesis of petrol by Cracking (Thermal and Catalytic), Reforming of Petroleum and Non Petroleum gases and Bio-gases derived from biomass. Enable the students to get understand about Classification, Properties and functions.

**CO4:** Students understand the concept of Composition of Crude Petroleum, Refining and Different types of Petroleum products and its applications. Enable the student to get understand the Fractional distillation of Crude and obtaining different fractions of different physical properties, Understand the process of Artificial synthesis of petrol by Cracking (Thermal and Catalytic), Reforming of Petroleum and Non Petroleum gases and Bio-gases derived from biomass. Enable the students to get understand about Classification, Properties and functions, Determination of properties of Lubricant oils, Semi and solid Lubricants also about Synthetic Lubricants.

#### LABORATORY COURSE OUTCOMES

##### Experiments in physical chemistry-II

Students gain the following practical knowledge from paper-VIII after completion of the semester-VI.

**CO1:** able to understand about determination of order of hydrolysis of methyl acetate and decomposition of hydrogen peroxide catalysed by  $\text{FeCl}_3$ .

**CO2:** to understand about determination of redox potential of iron redox couple and  $\text{Ag}^+/\text{Cl}^-$  couple by potentiometry.

**CO3:** to understand about determination of concentration of strong acid and dissociation constant of weak acid by using pH metry.

**CO4:** to understand about determination of overall order of saponification reaction by conductometry.

### **SKILL ENHANCEMENT COURSE - III (SEC-III)**

#### **Chemistry of Cosmetics and Food Processing**

**CO1:** From this course students are able to understand fundamentals of chemistry and the scientific basis for cosmetic and Perfumes formulation and the function of the active ingredients. Comprehend the efforts of scientists in cosmetic and Perfumes product design and developments. Explain/interpret how cosmetics suit for a specific intended function, e.g. how sunscreen works for its intended function

**CO2:** From this course students are able to understand the general methods of food preservation. Learn the basic principles in production of fermented foods like bread, cheese, yoghurt. Understand the Classification of various types of adulterants. Perform simple lab tests for common adulterants Know the effect of adulteration on health. Understand the legal provisions to protect the Indian public from adulterated food.

### **Generic Elective Course-II (GE-II)**

#### **Materials and their Applications**

Students are able to understand the following point from GE-II after completion of semester-VI.

**CO1:** able to understand classification of materials, advanced materials and their importance, types of materials and their applications, types and applications of ceramics- glasses, refractories, cements- their applications.

**CO2:** able to understand various polymer additives with examples, advanced materials and their applications with examples, conducting polymers and their applications with examples.

## MVS GOVERNMENT ARTS AND SCIENCE COLLEGE(A),MAHABUBNAGAR

### DEPARTMENT OF CHEMISTRY

#### PROGRAMME OUTCOMES (POs)

2021-22

The students at the completion of the programme will be able to

**PO1:** Demonstrate professional responsibility as an individual as well as in multifaceted teams with values and ethics.

**PO2:** Adapt to develop and upgrade skills towards independent and lifelong learning.

**PO3:** Communicate basic concepts of Chemistry with examples

**PO4:** Acquire basic knowledge in chemical principles and higher level of understanding in each of the chemistry sub-disciplines such as organic, inorganic, physical and General Chemistry.

**PO5:** Develop the working knowledge of chemical instrumentation and laboratory techniques and be able to apply skills in daily life.

#### PROGRAMME SPECIFIC OUTCOMES (PSOs)

At the completion of the programme, the students will be able to

**PSO1:** Apply the knowledge gained during the course of the program to identify, formulate and solve real life problems.

**PSO2:** Apply the knowledge of ethical and management principles required to work in a team.

**PSO3:** Apply the contextual knowledge of chemistry to function effectively as an individual or a leader in a multidisciplinary environment.

**PSO4:** Synthesize, compare, evaluate, classify, interrupt and effectively apply the basic laws, principles, phenomena, processes and mechanisms involved in the domain of chemistry.

**PSO5:** Explicitly communicate and exchange their ideas with regard to theoretical and experimental aspects among the society.

#### COURSE OUTCOMES (COs)

##### SEMESTER-I (B.Sc Chemistry)

##### Paper-I

**CO-1:** Acquire the Knowledge of General Characteristics of S block Elements

**CO-2:** Understand the Chemistry of Boron family elements, Carbides and Nitrides

**CO-3:** Understand the reactions and effects of ions in qualitative analysis of salt. Carry out

systematic qualitative analysis of Inorganic salt mixture

**CO-4:** Understand the factors influencing the bond polarization and Structural theory of organic chemistry and types of organic reactions.

**CO-5:** Gain the knowledge of hydrocarbons

**CO-6:** Explain the basic concepts in quantum chemistry and gather the knowledge of historic theoretical development of concepts related with Atomic Structure.

**CO-7:** Understand the reasons for deviations of real gases from ideal behaviour and apply the principles of Joule Thomson effect in liquefaction of gases.

**CO-8:** Understand the intermolecular forces operate between liquid molecules and gets the knowledge of viscosity, surface tension and liquid crystals.

**CO-9:** understand the factors influencing the geometry of molecules and MOT

**CO-10:** Differentiate the types of errors and understand the mathematical operations.

## LABORATORY COURSE OUTCOMES

### Qualitative analysis-I

Students gain the following practical knowledge from paper-I after completion of the semester-I.

**CO1:** able to understand about preparation of some inorganic compounds

**CO2:** able to understand about analysis of two ions.

## COURSE OUTCOMES (COs)

### SEMESTER-II (B.Sc Chemistry)

#### Paper-II

**CO1:** students understand the types of oxides, structure and reactivity of C,N,P,S oxides.

**CO2:** students able to know the structure and acidic nature of oxyacids of B,C,N,P,S Redox properties of nitrogen oxyacids, phosphorus oxyacids, sulphur oxyacids Chlorine oxyacids, and they know the industrial importance of oxyacids.

**CO3:** classification, general properties of Interhalogens, definition and structure of polyhalide, pseudohalogens comparison with halogens. From this topic students are able to understand the above Concepts.

**CO4:** From this topic students can understand the structure and reactivity of xenon compounds.

**CO5:** students can enhance their knowledge regarding electronic configuration, variable valency, magnetic properties, catalytic properties of d-block elements. comparative treatment of second and third transition series with their 3d analogues.

**CO6:** Students can understand aromaticity, benzenoid, non benzenoids, Preparations of benzene, chemical properties of benzene ring activating, deactivating groups.

**CO7:** from this topic students are able to know the preparations of alkyl benzenes wurtz fittig reaction, friedel craft alkylation, acylation followed by reduction, chemical reactivity. Structure of naphthalene Anthracene, reactivity, electrophilic substitution reactions.

**CO8:** Students can able to differentiate chemical reactivity of alkyl, aryl, aralkyl

Allyl, vinyl, benzyl halides. They clearly understand the mechanism and differences between SN1 and SN2 reactions, and their stereochemistry.

**CO9:** In this topic students know the knowledge of the Liquid

Liquid mixtures, ideal liquid mixtures, Raoult's and Henry's law. Non ideal systems Azeotropes, Partially miscible liquids. Lower upper consolute temperatures. Nernst distribution law. Applications of distribution law with solvent extraction.

**CO10:** Laws of crystallography, definition of space lattice, unit cell, Bravais lattices and seven crystal systems x-ray diffraction by crystals, Derivation of Bragg's equation, determination of the structure of NaCl, KCl & CsCl.

**CO11:** Students are able to understand the about Raoult's law, relative lowering of vapour pressure, Molecular weight determination, osmosis- laws of osmotic pressure. Elevation of Boiling point, depression of freezing point. Derivation of relation molecular weight and elevation in boiling point and depression in freezing point. Abnormal molar masses, van't Hoff's factor, degree of dissociation and association of solutes.

**CO12:** from this topic students know the standard solutions, indicators, end points, titration curves types of titrations. Precipitation, growth of precipitation. Filtration and washing, drying coprecipitation and post precipitation.

**CO13:** Students can understand the valence bond theory, Free Electron theory, thermal, electrical conductivity, Band theory, formation of Bands. Explanation of conductors, semiconductors.

**CO14:** From this topic students are able to understand the applications, use, classification of metals, ceramics, polymers, composites, biological material etc. The properties of super conductivity of materials. Meissner effect and thermal properties. Advanced composites, general characters of advanced composites. Fiber reinforced composites. From this topic students understand the applications and uses of above materials in daily life.

## LABORATORY COURSE OUTCOMES

### Qualitative analysis-II

Students gain the following practical knowledge from paper-II after completion of the semester-II.

**CO1:** able to understand about analysis of two anions and two cations through semi micro analysis of salt mixtures.

## COURSE OUTCOMES (COs)

### SEMESTER-III (B.Sc Chemistry)

#### PAPER-III

After completion of the semester-III student able to understand the following objectives from paper-III

**CO1:** able to understand nomenclature, geometries, various f-block elements compounds and also knows about spectral and magnetic properties in coordination compounds.

**CO2:** To understand the molecular symmetry and symmetry elements and their applications.

**CO3:** able to understand classification, physical and chemical properties of different reactants in non aqueous solvent.



**CO4:** able to understand classification of hydroxy compounds, structure, properties and importance of diazonium salts, understand nomenclature, classification, physical and chemical properties. Acidity of phenols and specific reactions of phenols able to understand classification of hydrocarbons.

**CO5:** able to know about carbonyl compounds, classifications, preparations and properties. Reactions with different reagents and named reactions.

**CO6:** able to differentiate phase rules and systems, to understand water systems, sodium chloride systems and Ag-Pb systems.

**CO7:** understanding the colloidal solutions and their optical properties, preparations and properties of different colloidal solutions, classifications, laws governing colloids. Micelles, types of adsorptions and laws governing it.

**CO8:** understanding the different nano materials, methods of preparations and their applications

**CO9:** Stereochemistry principles, chiral centres, enantiomers and diastereomers. Optical isomerism, chirality. Nomenclature of different compounds. Geometrical isomerism.

**CO10:** conformational analysis of ethane, butane and cycloalkanes. Baeyer's strain theory and Sachse-Mohr theory.

## LABORATORY OUTCOMES

### Quantitative Analysis-I

Students gain the following practical knowledge from paper-III after completion of the semester-III.

**CO1:** able to understand about laboratory volumetric analysis of compounds.

**CO2:** able to understand about redox titrations.

### Skill Enhancement Course-I (SEC-I)

#### Laboratory Safety Rule and Lab Reagents

Students are able to understand the following points from SEC-I after completion of paper-III.

**CO1:** able to understand about hazardous chemicals in laboratory, personal protective equipments, how to label chemicals and understanding of labels, prevention of inhaling harmful chemicals, accidents, and fire extinguishers, first aid kit in laboratory, safety symbols, calibration of fractional weights, preparation of dilute solutions from concentrated solutions, preparation of standard solutions and maintenance of observation book record.

**CO2:** able to understand about preparation of indicators and their uses in volumetric analysis, role of indicator in detecting end point, preparation of buffers, preparation of commonly used reagents.

**COURSE OUTCOMES (COs)**  
**SEMESTER-IV (B.Sc Chemistry)**

**PAPER-IV**

**CO1:** To understand the key features of coordination compounds, including: the variety of structures oxidation numbers and electronic configurations coordination numbers ligands, chelates bonding, stability of complexes discuss the properties of coordination compounds Categorize Coordination CompoundsNRelate Valence Bond Theory and HybridizationMDiscuss Valence Bond Theory consider Effective Atomic Number Theory and Werner Complexes

**CO2:** have a good overview of the fundamental principles of organotransition-metal chemistry and know how chemical properties are affected by metals and ligands be able to use knowledge about structure and bonding issues to understand the stability and reactivity of simple organometallic complexes know important applications of organometallic homogeneous catalysis .

**CO3:** To have a basic knowledge of. Metal carbonyls, hydrocarbon and carbocyclic ligands, 18-electron rule (saturation and unsaturation), synthesis and properties, patterns of reactivity (substitution, oxidative-addition and reductive elimination, insertion and de-insertion, nucleophilic attack on ligands, isomerization, stereochemical non rigidity).

**CO4:** Applies conversion of carboxylic acids to their derivatives for example reactions, Illustrates reactions of carboxylic acid derivatives, Illustrates preparation methods of carboxylic acid derivatives. write different preparation methods for carboxylic acids and their derivatives. design reactions of carboxylic acids and their derivatives.

**CO:5** .To know about metal enolates, alkylation, reactions with carbonyls & conjugate addition of enolates.

**CO6:** Students are able to recognize and balance oxidation-reduction reactions.Students recognize the different types of electrochemical cells.Students can calculate the cell potential from standard cell potential and use the Nernst Eqn.

**CO7:** Types and principles of pericyclic reactions. What determines whether these pericyclic reactions go forwards or backwards. Conservation of orbital symmetry and what conrotatory and disrotatory mean. Electrocyclic reactions and rules governing them.Cycloaddition reactions and rules governing them. Sigmatropic reactions and rules governing them

**CO8:** Learning Objectives Methods for the synthesis of optically active compounds will be discussed, including the principles behind asymmetric reactions. Examples of asymmetric synthesis will be taken from the recent literature.

**CO8:** Explain basic chemo-, regio-, and stereoselective concepts and apply these in synthesis, as well as construct reactions pathways of complex organic compounds using retrosynthetic analysis. Apply synthesis methodology to perform advanced organic synthesis.

## LABORATORY OUTCOMES

### Quantitative Analysis-II

Students gain the following practical knowledge from paper-IV after completion of the semester-IV.

**CO1:** able to understand about conductometric titrations of acid vs base.

**CO2:** able to understand about conductometric titrations of acid vs base. able to understand about redox titrations.

### Skill Enhancement Course-II (SEC-II)

#### Remedial Methods for Pollution, Drinking water and Soil Fertility Standards

Students are able to understand the following points from SEC-II after completion of semester-IV.

**CO1:** able to understand about prevention and control of air pollution, ozone layer depletion-causes and prevention methods, global warming and greenhouse effect-causes and control methods, acid rains and their effects on monuments, sources of radiation deleterious effects of radiation on health, sources of water pollution -methods for control of water pollution and water recycling methods, dumping of plastics in rivers and oceans and their effects on aquatic life, determination of -dissolved oxygen, chemical oxygen demand in polluted water, sources of soil pollution and control of soil pollution, environmental laws in India and also about environmental benefits of planting trees.

**CO2:** able to understand about water quality and water standards, common treatments used for treatment of water, various tests used for water treatment, various water treatment techniques, basic concepts of soil chemistry, effect of pH on nutrients availability, types of plant nutrients-micronutrients and macronutrients and their importance on plant growth and also about determination of soil nitrogen by Kjeldhal method.

## COURSE OUTCOMES (COs)

### SEMESTER-V (B.Sc Chemistry)

#### PAPER-V

After completion of the semester-V student able to understand the following objectives from paper-V

**CO1:** to understand Crystal Field Theory (CFT) and its applications to various geometries, stability, colour and magnetic properties of transition metal complexes in various fields.

**CO2:** to gain the knowledge regarding Borane and carborane clusters and also about their structure through Wade's rules.

**CO3:** to understand amines and diazonium salts properties and their importance and also about Cyanides and

Isocyanides properties.

**CO4:** to understand the classification and importance of various heterocyclic compounds and also about

structure and properties of some 5-membered and 6-membered heterocyclic compounds.

**CO5:** to understand rate, molecularity, order of reaction, factors influencing rate of reaction, kinetics of

various types of reactions based on order and molecularity and also expertise about order determining

methods and theories of reaction rates.

**CO6:** to understand nature of electromagnetic radiation, principles and selection rules of Rotational, Infra-Red

and UV-Visible spectroscopies and their importance in structural elucidation of sample compounds.

**CO7:** to differentiate thermal and photochemical reactions, to understand photochemical laws, various photo

physical and photochemical processes.

## LABORATORY OUTCOMES

### Organic synthesis and TLC

Students gain the following practical knowledge from paper-V after completion of the semester-V.

**CO1:** able to gain knowledge about laboratory synthesis of various organic compounds.

**CO2:** able to understand the use of Thin Layer Chromatography (TLC) in separation of organic compounds.

## COURSE OUTCOMES (COs)

### SEMESTER-V

### PAPER-VI

After completion of the semester-VI student able to understand the following objectives from paper-VI

**CO1:** to understand principles, methods of solvent extraction.

**CO2:** to gain the knowledge regarding extraction of components through Thin Layer Chromatography.

**CO3:** to understand about principle methods of separation of compounds by using Paper Chromatography.

**CO4:** to understand about principle, types of phases, column packing, solvent selection and applications of column chromatography.

**CO5:** to understand principle, ion exchange resins and applications of ion exchange chromatography.

**CO6:** to understand principle, instrumentation set up and types of phases used in Gas chromatography.

**CO7:** to understand principle, instrumentation set up and types of phases used in High Performance Liquid Chromatography in analysis of paracetamol.

**CO8:** to understand principle of Beer Lambert's law and its limitations, difference between colorimetry and spectrophotometry and also about single beam and double beam spectrophotometer, verification of Beer's law.

**CO9:** to understand principle, source of radiation, sampling and Block diagram of FT-IR Spectrophotometer.

**CO10:** to understand about principle, types of electrodes and applications of potentiometry, voltammetric techniques, micro electrodes, over potential and polarization and also about conductivity, types of conductivity and applications of conductometry.

### LABORATORY COURSE OUTCOMES

#### Experiments in physical chemistry-I

Students gain the following practical knowledge from paper-VI after completion of the semester-VI.

**CO1:** able to gain knowledge about distribution law and distribution coefficient with various examples.

**CO2:** able to understand determination of cell constant and dissociation constant of acetic acid by using conductometric titrations.

**CO3:** to understand about verification of Beer's law using  $\text{KMnO}_4$ .

**CO5:** to understand about acetic acid adsorption on animal charcoal and verification of Freundlich adsorption isotherm.

**CO6:** to understand surface tension and viscosity of liquids.

### Skill Enhancement Course-III (SEC-III)

#### Materials and their Applications

Students are able to understand the following points from SEC-III after completion of semester-V.

**CO1:** able to understand about classification of materials, advanced materials and their applications, types of materials and their importance, types of metal alloys-ferrous and non-ferrous alloys and their applications, super alloys, types and applications of ceramics, types, properties and applications of glasses, clay products, refractories and cements.

**CO2:** able to understand about various polymer additives, advanced materials- semiconductors, bio-compatible materials, smart materials, advanced polymeric materials and nano-engineered materials and also about smart materials, conducting polymers and their applications.

### Generic Elective Course-I (GE-I)

#### Pharmaceuticals

Students are able to understand the following point from GE-I after completion of semester-V.

**CO1:** able to understand definition of disease, drug and also about sources of drug, absorption, distribution, action at the site, metabolism and elimination process of some drugs, nomenclature of drugs with examples, drug formulation methods, oral dosage forms, parenterals, topical dosage forms, anti allergic, anti itching, antifungal, anesthetic and antiseptic drugs with examples.

**CO2:** able to understand about classification of drugs based on their therapeutic action-chemotherapeutic drugs, pharmacodynamic agents and drugs acting on metabolic processes-brief explanation about their structure and importance with some examples.

### COURSE OUTCOMES (COs)

#### SEMESTER-VI (B.Sc Chemistry)

#### PAPER-VII

After completion of the semester-VI student is able to understand the following objectives from paper-VII.

**CO1:** able to differentiate inert and labile complexes, ligand substitution reactions in various geometries, Trans

effect and its importance to study ligand substitution reactions in square planar complexes.

**CO2:** able to understand the importance of various inorganic elements in biological systems/processes.

**CO3:** able to know about Pearson's HSAB principle and its applications.

**CO4:** able to understand classification and nomenclature of carbohydrates, properties and structure of D-glucose and D-Fructose.

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**CO7:** able to understand principles of NMR and Mass spectrometry and their importance in structural elucidation of sample compounds.

### LABORATORY OUTCOMES

#### Qualitative and spectral analysis of organic compounds

Students gain the following practical knowledge from paper-VII after completion of the semester-VI.

**CO1:** able to understand about identification of organic compounds through functional group analysis.

**CO2:** able to understand about identification of organic compounds through their IR, NMR and Mass spectrums analysis.

**COURSE OUTCOMES (COs)**  
**SEMESTER-VI (B.Sc Chemistry)**

**PAPER-VIII**

Students gain the following practical knowledge from paper-VIII after completion of the semester-VI.

**CO1:** Students can understand the Concepts of Definition, Classification, Preparation, Chemical Structures and Applications and the impact of Pesticides on Environment as well as animal and human beings and also learnt about Pesticides preparation and formulation synthetic and Bio-Pesticides.

**CO2:** Students can acquire knowledge about Definition, Classification, Preparation, and Chemical Structure of various fertilizers. Describe and explain various Applications along with its impact on Environment and living beings. Learn and be able to explain the role of Bio-Fertilizers in Organic farming.

**CO3:** Students understand the concept of Composition of Crude Petroleum, Refining and Different types of Petroleum products and its applications. Enable the student to get understand the Fractional distillation of Crude and obtaining different fractions of different physical properties, Understand The process of Artificial synthesis of petrol by Cracking (Thermal and Catalytic), Reforming of Petroleum and Non Petroleum gases and Bio-gases derived from biomass. Enable the students to get understand about Classification, Properties and functions.

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**LABORATORY COURSE OUTCOMES**

**Experiments in physical chemistry-II**

Students gain the following practical knowledge from paper-VIII after completion of the semester-VI.

**CO1:** able to understand about determination of order of hydrolysis of methyl acetate and decomposition of hydrogen peroxide catalysed by  $\text{FeCl}_3$ .

**CO2:** to understand about determination of redox potential of iron redox couple and  $\text{Ag}^+/\text{Cl}^-$  couple by potentiometry.

**CO3:** to understand about determination of concentration of strong acid and dissociation constant of weak acid by using pH metry.

**CO4:** to understand about determination of overall order of saponification reaction by conductometry.

### **SKILL ENHANCEMENT COURSE - III (SEC-III)**

#### **Chemistry of Cosmetics and Food Processing**

**CO1:** From this course students are able to understand fundamentals of chemistry and the scientific basis for cosmetic and Perfumes formulation and the function of the active ingredients. Comprehend the efforts of scientists in cosmetic and Perfumes product design and developments. Explain/interpret how cosmetics suit for a specific intended function, e.g. how sunscreen works for its intended function

**CO2:** From this course students are able to understand the general methods of food preservation. Learn the basic principles in production of fermented foods like bread, cheese, yoghurt. Understand the Classification of various types of adulterants. Perform simple lab tests for common adulterants Know the effect of adulteration on health. Understand the legal provisions to protect the Indian public from adulterated food.

### **Generic Elective Course-II (GE-II)**

#### **Materials and their Applications**

Students are able to understand the following point from GE-II after completion of semester-VI.

**CO1:** able to understand classification of materials, advanced materials and their importance, types of materials and their applications, types and applications of ceramics- glasses, refractories, cements- their applications.

**CO2:** able to understand various polymer additives with examples, advanced materials and their applications with examples, conducting polymers and their applications with examples.



# MVS GOVERNMENT ARTS AND SCIENCE COLLEGE(A),MAHABUBNAGAR

## DEPARTMENT OF CHEMISTRY

### PROGRAMME OUTCOMES (POs)

2021-22

The students at the completion of the programme will be able to

**PO1:** Demonstrate professional responsibility as an individual as well as in multifaceted teams with values and ethics.

**PO2:** Adapt to develop and upgrade skills towards independent and lifelong learning.

**PO3:** Communicate basic concepts of Chemistry with examples

**PO4:** Acquire basic knowledge in chemical principles and higher level of understanding in each of the chemistry sub-disciplines such as organic, inorganic, physical and General Chemistry.

**PO5:** Develop the working knowledge of chemical instrumentation and laboratory techniques and be able to apply skills in daily life.

### PROGRAMME SPECIFIC OUTCOMES (PSOs)

At the completion of the programme, the students will be able to

**PSO1:** Apply the knowledge gained during the course of the program to identify, formulate and solve real life problems.

**PSO2:** Apply the knowledge of ethical and management principles required to work in a team.

**PSO3:** Apply the contextual knowledge of chemistry to function effectively as an individual or a leader in a multidisciplinary environment.

**PSO4:** Synthesize, compare, evaluate, classify, interrupt and effectively apply the basic laws, principles, phenomena, processes and mechanisms involved in the domain of chemistry.

**PSO5:** Explicitly communicate and exchange their ideas with regard to theoretical and experimental aspects among the society.

### COURSE OUTCOMES (COs)

#### SEMESTER-I (B.Sc Chemistry)

##### Paper-I

**CO-1:** Acquire the Knowledge of General Characteristics of S block Elements

**CO-2:** Understand the Chemistry of Boron family elements, Carbides and Nitrides

**CO-3:** Understand the reactions and effects of ions in qualitative analysis of salt. Carry out systematic qualitative analysis of Inorganic salt mixture

- CO-4:** Understand the factors influencing the bond polarization and Structural theory of organic chemistry and types of organic reactions.
- CO-5:** Gain the knowledge of hydrocarbons
- CO-6:** Explain the basic concepts in quantum chemistry and gather the knowledge of historic theoretical development of concepts related with Atomic Structure.
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- CO-8:** Understand the intermolecular forces operate between liquid molecules and gets the knowledge of viscosity, surface tension and liquid crystals.
- CO-9:** understand the factors influencing the geometry of molecules and MOT
- CO-10:** Differentiate the types of errors and understand the mathematical operations.

## LABORATORY COURSE OUTCOMES

### Qualitative analysis-I

Students gain the following practical knowledge from paper-I after completion of the semester-I.

- CO1:** able to understand about preparation of some inorganic compounds
- CO2:** able to understand about analysis of two ions.

## COURSE OUTCOMES (COs) SEMESTER-II (B.Sc Chemistry) Paper-II

- CO1:** students understand the types of oxides, structure and reactivity of C,N,P,S oxides.
- CO2:** students able to know the structure and acidic nature of oxyacids of B,C,N,P,S Redox properties of nitrogen oxyacids, phosphorus oxyacids, sulphur oxyacids Chlorine oxyacids, and they know the industrial importance of oxyacids.
- CO3:** classification, general properties of Interhalogens, definition and structure of polyhalide, pseudohalogens comparison with halogens. From this topic students are able to understand the above Concepts.
- CO4:** From this topic students can understand the structure and reactivity of xenon compounds.
- CO5:** students can enhance their knowledge regarding electronic configuration, variable valency, magnetic properties, catalytic properties of d-block elements. comparative treatment of second and third transition series with their 3d analogues.
- CO6:** Students can understand aromaticity, benzenoid, non benzenoids, Preparations of benzene, chemical properties of benzene ring activating, deactivating groups.
- CO7:** from this topic students are able to know the preparations of alkyl benzenes wurtz fittig reaction, friedel craft alkylation, acylation followed by reduction, chemical reactivity. Structure of naphthalene Anthracene, reactivity, electrophilic substitution reactions.
- CO8:** Students can able to differentiate chemical reactivity of alkyl, aryl, aralkyl

Allyl, vinyl, benzyl halides. They clearly understand the mechanism and differences between SN1 and SN2 reactions, and their stereochemistry.

**CO9:** In this topic students know the knowledge of the Liquid

Liquid mixtures, ideal liquid mixtures, Raoult's and Henry's law. Non ideal systems Azeotropes, Partially miscible liquids. Lower upper consolute temperatures. Nernst distribution law. Applications of distribution law with solvent extraction.

**CO10:** Laws of crystallography, definition of space lattice, unit cell, Bravais lattices and seven crystal systems x-ray diffraction by crystals, Derivation of Bragg's equation, determination of the structure of NaCl, KCl & CsCl.

**CO11:** Students are able to understand the about Raoult's law, relative lowering of vapour pressure, Molecular weight determination, osmosis- laws of osmotic pressure. Elevation of Boiling point, depression of freezing point. Derivation of relation molecular weight and elevation in boiling point and depression in freezing point. Abnormal molar masses, van't Hoff's factor, degree of dissociation and association of solutes.

**CO12:** from this topic students know the standard solutions, indicators, end points, titration curves types of titrations. Precipitation, growth of precipitation. Filtration and washing, drying coprecipitation and post precipitation.

**CO13:** Students can understand the valence bond theory, Free Electron theory, thermal, electrical conductivity, Band theory, formation of Bands. Explanation of conductors, semiconductors.

**CO14:** From this topic students are able to understand the applications, use, classification of metals, ceramics, polymers, composites, biological material etc. The properties of super conductivity of materials. Meissner effect and thermal properties. Advanced composites, general characters of advanced composites. Fiber reinforced composites. From this topic students understand the applications and uses of above materials in daily life.

## LABORATORY COURSE OUTCOMES

### Qualitative analysis-II

Students gain the following practical knowledge from paper-II after completion of the semester-II.

**CO1:** able to understand about analysis of two anions and two cations through semi micro analysis of salt mixtures.

## COURSE OUTCOMES (COs)

### SEMESTER-III (B.Sc Chemistry)

#### PAPER-III

After completion of the semester-III student able to understand the following objectives from paper-III

**CO1:** able to understand nomenclature, geometries, various f-block elements compounds and also knows about spectral and magnetic properties in coordination compounds.

**CO2:** To understand the molecular symmetry and symmetry elements and their applications.

**CO3:** able to understand classification, physical and chemical properties of different reactants in non aqueous solvent.

**CO4:** able to understand classification of hydroxy compounds, structure, properties and importance of diazonium salts, understand nomenclature, classification, physical and chemical properties . Acidity of phenols and specific reactions of phenols able to understand classification of hydrocarbons.

**CO5:** able to know about carbonyl compounds, classifications, preparations and properties. Reactions with different reagents and named reactions.

**CO6:** able to differentiate phase rules and systems, to understand water systems, sodium chloride systems and Ag-Pb systems.

**CO7:** understanding the colloidal solutions and their optical properties , preparations and properties of different colloidal solutions, classifications , laws governing colloids. Micelles, types of adsorptions and laws governing it.

**CO8:** understanding the different nano materials, methods of preparations and their applications

**CO9:** Stereochemistry principles, chiral centres, enantiomers and diastereomers. Optical isomerism, chirality . Nomenclature of different compounds. Geometrical isomerism.

**CO10:** conformational analysis of ethane , butane and cycloalkanes. Baeyer's strain theory and sachse mohr theory.

## LABORATORY OUTCOMES

### Qualitative Analysis-I

Students gain the following practical knowledge from paper-III after completion of the semester-III.

**CO1:** able to understand about laboratory volumetric analysis of compounds.

**CO2:** able to understand about redox titrations.

### Skill Enhancement Course-I (SEC-I)

#### Laboratory Safety Rule and Lab Reagents

Students are able to understand the following points from SEC-I after completion of paper-III.

**CO1:** able to understand about hazardous chemicals in laboratory, personal protective equipments, how to label chemicals and understanding of labels, prevention of inhaling harmful chemicals, accidents, and fire extinguishers, first aid kit in laboratory, safety symbols, calibration of fractional weights, preparation of dilute solutions from concentrated solutions, preparation of standard solutions and maintenance of observation book record.

**CO2:** able to understand about preparation of indicators and their uses in volumetric analysis, role of indicator in detecting end point , preparation of buffers, preparation of commonly used reagents.

## COURSE OUTCOMES (COs)

### SEMESTER-IV (B.Sc Chemistry)

#### PAPER-IV

**CO1:** To understand the key features of coordination compounds, including: the variety of structures oxidation numbers and electronic configurations coordination numbers ligands, chelates bonding, stability of complexes discuss the properties of coordination compounds Categorize Coordination CompoundsNRelate Valence Bond Theory and HybridizationMDiscuss Valence Bond Theory consider Effective Atomic Number Theory and Werner Complexes

**CO2:** have a good overview of the fundamental principles of organotransition-metal chemistry and know how chemical properties are affected by metals and ligands be able to use knowledge about structure and bonding issues to understand the stability and reactivity of simple organometallic complexes know important applications of organometallic homogeneous catalysis .

**CO3:** To have a basic knowledge of. Metal carbonyls, hydrocarbon and carbocyclic ligands, 18-electron rule (saturation and unsaturation), synthesis and properties, patterns of reactivity (substitution, oxidative-addition and reductive elimination, insertion and de-insertion, nucleophilic attack on ligands, isomerization, stereochemical non rigidity).

**CO4:** Applies conversion of carboxylic acids to their derivatives for example reactions, Illustrates reactions of carboxylic acid derivatives, Illustrates preparation methods of carboxylic acid derivatives. write different preparation methods for carboxylic acids and their derivatives. design reactions of carboxylic acids and their derivatives.

**CO:5** .To know about metal enolates, alkylation, reactions with carbonyls & conjugate addition of enolates.

**CO6:** Students are able to recognize and balance oxidation-reduction reactions.Students recognize the different types of electrochemical cells.Students can calculate the cell potential from standard cell potential and use the Nernst Eqn.

**CO7:** Types and principles of pericyclic reactions. What determines whether these pericyclic reactions go forwards or backwards. Conservation of orbital symmetry and what conrotatory and disrotatory mean. Electrocyclic reactions and rules governing them.Cycloaddition reactions and rules governing them. Sigmatropic reactions and rules governing them

**CO8:** Learning Objectives Methods for the synthesis of optically active compounds will be discussed, including the principles behind asymmetric reactions. Examples of asymmetric synthesis will be taken from the recent literature.

**CO8:** Explain basic chemo-, regio-, and stereoselective concepts and apply these in synthesis, as well as construct reactions pathways of complex organic compounds using retrosynthetic analysis. Apply synthesis methodology to perform advanced organic synthesis.

## LABORATORY OUTCOMES

### Quantitative Analysis-II

Students gain the following practical knowledge from paper-IV after completion of the semester-IV.

**CO1:** able to understand about conductometric titrations of acid vs base.

**CO2:** able to understand about conductometric titrations of acid vs base. able to understand about redox titrations.

## COURSE OUTCOMES (COs)

### SEMESTER-V (B.Sc Chemistry)

#### PAPER-V

After completion of the semester-V student able to understand the following objectives from paper-V.

**CO1:** able to understand nomenclature, geometries, various theories of coordination compounds and also knows about isomerism in coordination compounds.

**CO2:** able to understand the spectral, magnetic properties of complexes and also knows about experimental methods to determine magnetic susceptibility of complexes.

**CO3:** able to understand nomenclature, classification, physical and chemical properties of nitro hydrocarbons, amine and also understand about the properties of cyanides and isocyanides.

**CO4:** able to understand classification of hydrocarbons, structure, properties and importance of some 5-membered and 6-membered heterocyclic compounds.

**CO5:** able to know about rate, molecularity, order of reaction, factors influencing rate of reaction, kinetics of various types of reactions based on order and molecularity and also expertise about order determining methods and theories of reaction rates.

**CO6:** able to differentiate thermal and photochemical reactions, to understand photochemical laws, various photo physical and photochemical processes.

## LABORATORY OUTCOMES

### Synthesis of organic compounds

Students gain the following practical knowledge from paper-V after completion of the semester-V.

**CO1:** able to understand about laboratory synthesis of various organic compounds.

**CO2:** able to understand about identification of organic compounds through their functional group analysis and also about determination of melting points and preparation of their suitable derivatives.

## COURSE OUTCOMES (COs)

### SEMESTER-V (B.Sc Chemistry)

#### PAPER-VI

After completion of the semester-VI student is able to understand the following objectives from paper-VI.

**CO1:** able to understand about principle, various types of solvent extraction processes and also about determination of Iron (III).

**CO2:** to understand about absorption spectroscopy, Beer's-Lambert law and its limitations, transmittance, absorbance, molar absorbance, single and double beam spectrophotometers and also about Beer's -Lambert law applications in qualitative analysis.

**CO3:** to know about rotational, vibrational Raman spectroscopies, selection rules and its application to diatomic molecules.

**CO4:** to understand principle of NMR spectra, equivalent and non-equivalent protons, chemical shifts, splitting of NMR signals-spin-spin coupling, coupling constants and also applications of NMR spectroscopy to study structure of sample compounds with some reference compounds.

**CO5:** to understand definition of drug, disease, sources of drug, terminology of medicinal chemistry, nomenclature of drugs, classification of drugs, synthesis of some specific drugs, penicillin separation and development of various penicillins, HIV-AIDS-CD4 and CD8 cells role in immunity, prevention of AIDS, various drugs available for treatment of AIDS and also about monographs of drugs for some reference compounds.

**CO6:** to understand classification of polymers, types of polymerization, tacticity, molecular weights of polymers and its determination methods, preparation and industrial applications of some important polymers and also about biodegradability of polymers.

**CO7:** to know about superconductivity, characteristics of superconductors, Meissner effect, types and applications of superconductors, nanomaterials, synthetic techniques, properties and applications of nanomaterials.

## LABORATORY OUTCOMES

### Physical Chemistry

Students gain the following practical knowledge from paper-VI after completion of the semester-V.

**CO1:** able to understand about determination of surface tension, viscosity.

**CO2:** able to understand about determination of the strength of strong/weak and acid mixture by conductometric titration.

**CO3:** able to understand about determination of distribution coefficient for iodine b/w water and carbon tetrachloride and for benzoic acid b/w toluene and water.

### Generic Elective (GE) - I

**CO1:** able to understand about vitamins, hormones -definition, classification and applications.

**CO2:** able to understand about acids, bases, greenhouse gases- causes, effect, alloys composition and their importance.

### COURSE OUTCOMES (COs)

#### SEMESTER-VI (B.Sc Chemistry)

#### PAPER-VII

After completion of the semester-VI student is able to understand the following objectives from paper-VII.

**CO1:** able to differentiate inert and labile complexes, ligand substitution reactions in various geometries, Trans effect and its importance to study ligand substitution reactions in square planar complexes.

**CO2:** to understand the stability of complexes, factors influencing stability of complexes and also expertise about complex composition determination methods.

**CO3:** to know about Pearson's HSAB principle and its applications.

**CO4:** to understand the importance of inorganic elements in various biological processes.

**CO5:** to understand classification and nomenclature of carbohydrates, properties and structure of D-glucose and D-Fructose.

**CO6:** to understand classification, properties and importance of amino acids and also about structure of peptide/proteins.

**CO7:** to know about principle, terminology of Mass spectrometry, Mass spectra of some organic molecules.

**CO8:** to understand thermodynamic laws, terminology used in thermodynamics, various thermodynamic processes and also about Carnot's cycle, Kirchhoff's equation, Joule-Thomson effect and Maxwell relations.



## LABORATORY OUTCOMES

### TLC and spectral analysis of organic compounds<sup>9</sup>

Students gain the following practical knowledge from paper-VII after completion of the semester-VI.

**CO1:** able to understand about the laboratory synthesis of various organic compounds.

**CO2:** able to understand about identification of organic compounds through functional group analysis.

## COURSE OUTCOMES (COs)

### SEMESTER-VI (B.Sc Chemistry)

#### PAPER-VIII

**CO1:** Chromatography and Molecular Spectroscopy: from this unit student able to Know the different analytical techniques, to understand different types of separation techniques. Discuss the problem based on distribution coefficient and extraction techniques. To study principle, construction and working of GC and HPLC. To give an extended knowledge about chromatographic techniques used for separation of amino acids. Learn the molecular spectroscopy, I.R, Electron and Proton NMR spectroscopy working principle. Understand the factors affecting UV-absorption spectra, Interpret IR spectra on basic values of IR-frequencies. Discuss the problem of UV, IR and NMR

**CO2:** Formulations, Pesticides and Green Chemistry: from this unit students understand the concept of Drug and Additives and types of Formulation Students can understand the Concepts of Definition, Classification, Preparation, Chemical Learn Structures and Applications Student understand the impaction of Pesticides on Environmental as well as Also learnt about Pesticides preparation and formulation synthetic and Bio-Pesticides Student acquaint about principle, Synthetic methods and Application of Green Chemistry

**CO3:** Catalyst and Material Science: from this unit students learn about definition, types of catalyst with examples and Kinetics of various catalytic reactions, Explain the relevance of catalytic materials in organic fine chemicals. Learn about enzyme catalytic reaction, mechanism and affecting factors Describe the limitation of supported heterogeneous catalyst with reference to promoters inhibitors and poisoning. Students acquaint knowledge about definition, general characteristic properties and types of Composite materials.

## LABORATORY OUTCOMES

### Physical chemistry

Students gain the following practical knowledge from paper-VIII after completion of the semester-VI.

**CO1:** able to understand about determination of rate constant for acid hydrolysis of ethyl acetate, for Fe<sup>+3</sup> catalysed decomposition of hydrogen peroxide at room temperature and also for saponification of ethyl acetate.

**CO2:** able to understand about verification of Beer's law by using KMnO<sub>4</sub> through colorimetric method.

**CO3:** able to understand about determination of redox potential of Fe<sup>+2</sup>/Fe<sup>+3</sup> by potentiometric titration method.

### SKILL ENHANCEMENT COURSE (SEC) - III

#### Chemistry of Cosmetics and Food Processing

**CO1:** From this course students are able to understand fundamentals of chemistry and the scientific basis for cosmetic and Perfumes formulation and the function of the active ingredients. Comprehend the efforts of scientists in cosmetic and Perfumes product design and developments. Explain/interpret how cosmetics suit for a specific intended function, e.g. how sunscreen works for its intended function

**CO2:** From this course students are able to understand the general methods of food preservation. Learn the basic principles in production of fermented foods like bread, cheese, yoghurt. Understand the Classification of various types of adulterants. Perform simple lab tests for common adulterants. Know the effect of adulteration on health. Understand the legal provisions to protect the Indian public from adulterated food.

### Generic Elective (GE) - II

**CO1:** able to understand about amino acids, enzymes, proteins and carbohydrates- definition, classification and applications.

**CO2:** able to understand essential elements, Hemoglobin, chlorophyll and their biological significance.

## MVS GOVERNMENT ARTS AND SCIENCE COLLEGE(A),MAHABUBNAGAR

### DEPARTMENT OF CHEMISTRY

#### PROGRAMME OUTCOMES (POs)

2021-22

The students at the completion of the programme will be able to

**PO1:** Demonstrate professional responsibility as an individual as well as in multifaceted teams with values and ethics.

**PO2:** Adapt to develop and upgrade skills towards independent and lifelong learning.

**PO3:** Communicate basic concepts of Chemistry with examples

**PO4:** Acquire basic knowledge in chemical principles and higher level of understanding in each of the chemistry sub-disciplines such as organic, inorganic, physical and General Chemistry.

**PO5:** Develop the working knowledge of chemical instrumentation and laboratory techniques and be able to apply skills in daily life.

#### PROGRAMME SPECIFIC OUTCOMES (PSOs)

At the completion of the programme, the students will be able to

**PSO1:** Apply the knowledge gained during the course of the program to identify, formulate and solve real life problems.

**PSO2:** Apply the knowledge of ethical and management principles required to work in a team.

**PSO3:** Apply the contextual knowledge of chemistry to function effectively as an individual or a leader in a multidisciplinary environment.

**PSO4:** Synthesize, compare, evaluate, classify, interrupt and effectively apply the basic laws, principles, phenomena, processes and mechanisms involved in the domain of chemistry.

**PSO5:** Explicitly communicate and exchange their ideas with regard to theoretical and experimental aspects among the society.

#### COURSE OUTCOMES (COs)

##### SEMESTER-I (B.Sc Chemistry)

##### Paper-I

**CO-1:** Acquire the Knowledge of General Characteristics of S block Elements

**CO-2:** Understand the Chemistry of Boron family elements, Carbides and Nitrides

**CO-3:** Understand the reactions and effects of ions in qualitative analysis of salt. Carry out systematic qualitative analysis of Inorganic salt mixture

- CO-4:** Understand the factors influencing the bond polarization and Structural theory of organic chemistry and types of organic reactions.
- CO-5:** Gain the knowledge of hydrocarbons
- CO-6:** Explain the basic concepts in quantum chemistry and gather the knowledge of historic theoretical development of concepts related with Atomic Structure.
- CO-7:** Understand the reasons for deviations of real gases from ideal behaviour and apply the principles of Joule Thomson effect in liquefaction of gases.
- CO-8:** Understand the intermolecular forces operate between liquid molecules and gets the knowledge of viscosity, surface tension and liquid crystals.
- CO-9:** understand the factors influencing the geometry of molecules and MOT
- CO-10:** Differentiate the types of errors and understand the mathematical operations.

## LABORATORY COURSE OUTCOMES

### Qualitative analysis-I

Students gain the following practical knowledge from paper-I after completion of the semester-I.

- CO1:** able to understand about preparation of some inorganic compounds
- CO2:** able to understand about analysis of two ions.

## COURSE OUTCOMES (COs) SEMESTER-II (B.Sc Chemistry) Paper-II

- CO1:** students understand the types of oxides, structure and reactivity of C,N,P,S oxides.
- CO2:** students able to know the structure and acidic nature of oxyacids of B,C,N,P,S Redox properties of nitrogen oxyacids, phosphorus oxyacids, sulphur oxyacids Chlorine oxyacids, and they know the industrial importance of oxyacids.
- CO3:** classification, general properties of Interhalogens, definition and structure of polyhalide, pseudohalogens comparison with halogens. From this topic students are able to understand the above Concepts.
- CO4:** From this topic students can understand the structure and reactivity of xenon compounds.
- CO5:** students can enhance their knowledge regarding electronic configuration, variable valency, magnetic properties, catalytic properties of d-block elements. comparative treatment of second and third transition series with their 3d analogues.
- CO6:** Students can understand aromaticity, benzenoid, non benzenoids, Preparations of benzene, chemical properties of benzene ring activating, deactivating groups.
- CO7:** from this topic students are able to know the preparations of alkyl benzenes wurtz fittig reaction, friedel craft alkylation, acylation followed by reduction, chemical reactivity. Structure of naphthalene Anthracene, reactivity, electrophilic substitution reactions.
- CO8:** Students can able to differentiate chemical reactivity of alkyl, aryl, aralkyl Allyl, vinyl, benzyl halides. They clearly understand the mechanism and differences between SN1 and SN2 reactions, and their stereochemistry.
- CO9:** In this topic students know the knowledge of the Liquid

Liquid mixtures, ideal liquid mixtures, Raoult's and Henry's law. Non ideal systems Azeotropes, Partially miscible liquids. Lower upper consolute temperatures. Nernst distribution law. Applications of distribution law with solvent extraction.

**CO10:** Laws of crystallography, definition of space lattice, unit cell, Bravais lattices and seven crystal systems x-ray diffraction by crystals, Derivation of Bragg's equation, determination of the structure of NaCl, KCl & CsCl.

**CO11:** Students are able to understand the about Raoult's law, relative lowering of vapour pressure, Molecular weight determination, osmosis- laws of osmotic pressure. Elevation of Boiling point, depression of freezing point. Derivation of relation molecular weight and elevation in boiling point and depression in freezing point. Abnormal molar masses, van't Hoff's factor, degree of dissociation and association of solutes.

**CO12:** from this topic students know the standard solutions, indicators, end points, titration curves types of titrations. Precipitation, growth of precipitation. Filtration and washing, drying coprecipitation and post precipitation.

**CO13:** Students can understand the valence bond theory, Free Electron theory, thermal, electrical conductivity, Band theory, formation of Bands. Explanation of conductors, semiconductors.

**CO14:** From this topic students are able to understand the applications, use, classification of metals, ceramics, polymers, composites, biological material etc. The properties of super conductivity of materials. Meissner effect and thermal properties. Advanced composites, general characters of advanced composites. Fiber reinforced composites. From this topic students understand the applications and uses of above materials in daily life.

## LABORATORY COURSE OUTCOMES

### Qualitative analysis-II

Students gain the following practical knowledge from paper-II after completion of the semester-II.

**CO1:** able to understand about analysis of two anions and two cations through semi micro analysis of salt mixtures.

## COURSE OUTCOMES (COs)

### SEMESTER-III (B.Sc Chemistry)

#### PAPER-III

After completion of the semester-III student is able to understand the following objectives from paper-III.

**CO1:** Able to understand Characteristic properties of f-block elements, variable valence and magnetic, spectral properties.

**CO2:** able to understand the bonding of complexes Valence Bond theory, free electron theory, electrical and thermal conductivity of metals, band theory, conductors, semi conductors and insulators.

**CO3:** able to understand nomenclature, classification, physical and chemical properties of alkyl halides, and also understand about the properties, comparative study.

**CO4:** able to understand classification of hydroxy compounds, structure, properties and importance of diazonium salts, understand nomenclature, classification, physical and chemical properties. Acidity of phenols and specific reactions of phenols

**CO5:** able to know Nomenclature, methods of preparations, physical and chemical properties of carboxylic acids and derivatives.

**CO6:** to understand the concept of phases, one, two component systems like water, NaCl-H<sub>2</sub>O, silver-Lead system.

**CO7:** To understand the molecular symmetry and symmetry elements and their applications.

**CO8:** to understand the principle involved in volumetric analysis, terminology and different gravimetric analysis.

**CO9:** pericyclic reactions HOMO, LUMO concept and different examples.

## LABORATORY OUTCOMES

### Qualitative Analysis-I

Students gain the following practical knowledge from paper-III after completion of the semester-III.

**CO1:** able to understand about laboratory volumetric analysis of various compounds.

**CO2:** able to understand about identification of organic compounds through their functional group analysis and also about determination of melting points and preparation of their suitable derivatives.

## COURSE OUTCOMES (COs)

### SEMESTER-IV (B.Sc Chemistry)

#### PAPER-IV

**CO1:** f-block elements: from this unit student learn the positions of the d- and f-block elements in the periodic table; know the electronic configurations of the inner transition (f-block) elements; appreciate the relative stability of various oxidation states in terms of electrode potential values; understand the general characteristics of the f-block elements and the general horizontal and group trends in them; describe the properties of the f-block elements and give a comparative account of the lanthanoids and actinoids with respect to their electronic configurations, oxidation states and chemical behaviour.

**CO2:** Metal carbonyls: To have a basic knowledge of. Metal carbonyls, hydrocarbon and carbocyclic ligands, 18-electron rule (saturation and unsaturation), synthesis and properties,

patterns of reactivity (substitution, oxidative-addition and reductive elimination, insertion and de-insertion, nucleophilic attack on ligands, isomerization, stereochemical non rigidity

**CO3:** Carbonyl compounds: interpret reactivity of aldehydes and ketones. write different preparation methods for aldehydes and ketones using several compounds. design reactions of aldehydes and ketones.

**CO4:** Active methylene compounds: Understands acidity of active hydrogen, its applications

**CO5:** Interconversions: Familiarization about classes of organic compounds and their methods of preparation. Basic uses of reaction mechanisms. Name reactions, uses of various reagents and the mechanism of their action. Preparation and uses of various classes of organic compounds.

**CO6:** Electro chemistry: Students are able to recognize and balance oxidation-reduction reactions. Students recognize the different types of electrochemical cells. Students can calculate the cell potential from standard cell potential and use the Nernst Eqn.

**CO7:** Evaluation of analytical data: Identify quality of experimental measurements. define the different gravimetric methods. defines the properties of precipitate and precipitating reagent. uses the gravimetric calculations. interpret the complexometric titrations. interpret the redox titrations. express the titrimetric analysis methods. expresses the terms such as standard solution, titration, back titration, equivalence point, end point, primary and secondary standard. solves volumetric calculations.

**CO8:** Synthetic Strategies: Learning Objectives Methods for the synthesis of optically active compounds will be discussed, including the principles behind asymmetric reactions. Examples of asymmetric synthesis will be taken from the recent literature.

**CO9:** Asymmetric synthesis: Explain basic chemo-, regio-, and stereoselective concepts and apply these in synthesis, as well as construct reactions pathways of complex organic compounds using retrosynthetic analysis. Apply synthesis methodology to perform advanced organic synthesis.

**CO10:** Reducing agents: Apply different reagents to reactions

## LABORATORY OUTCOMES

### Qualitative Analysis-II

Students gain the following practical knowledge from paper-IV after completion of the semester-IV.

**CO1:** able to understand about laboratory volumetric analysis of various compounds.

**CO2:** able to understand about laboratory gravimetric analysis of various compounds.

## COURSE OUTCOMES (COs)

### SEMESTER-V (B.Sc Chemistry)

#### PAPER-V

After completion of the semester-V student able to understand the following objectives from paper-V.

**CO1:** able to understand nomenclature, geometries, various theories of coordination compounds and also knows about isomerism in coordination compounds.

**CO2:** able to understand the spectral, magnetic properties of complexes and also knows about experimental methods to determine magnetic susceptibility of complexes.

**CO3:** able to understand nomenclature, classification, physical and chemical properties of nitro hydrocarbons, amine and also understand about the properties of cyanides and isocyanides.

**CO4:** able to understand classification of hydrocarbons, structure, properties and importance of some 5-membered and 6-membered heterocyclic compounds.

**CO5:** able to know about rate, molecularity, order of reaction, factors influencing rate of reaction, kinetics of various types of reactions based on order and molecularity and also expertise about order determining methods and theories of reaction rates.

**CO6:** able to differentiate thermal and photochemical reactions, to understand photochemical laws, various photo physical and photochemical processes.

#### LABORATORY OUTCOMES

##### Synthesis and qualitative analysis of organic compounds

Students gain the following practical knowledge from paper-V after completion of the semester-V.

**CO1:** able to understand about laboratory synthesis of various organic compounds.

**CO2:** able to understand about identification of organic compounds through their functional group analysis and also about determination of melting points and preparation of their suitable derivatives.

## COURSE OUTCOMES (COs)

### SEMESTER-V (B.Sc Chemistry)

#### PAPER-VI

After completion of the semester-V student is able to understand the following objectives from paper-VI.



**CO1:** able to understand about principle, various types of solvent extraction processes and also about determination of Iron (III).

**CO2:** to understand about absorption spectroscopy, Beer's-Lambert law and its limitations, transmittance, absorbance, molar absorbance, single and double beam spectrophotometers and also about Beer's -Lambert law applications in qualitative analysis.

**CO3:** to know about rotational, vibrational Raman spectroscopies, selection rules and its application to diatomic molecules.

**CO4:** to understand principle of NMR spectra, equivalent and non-equivalent protons, chemical shifts, splitting of NMR signals-spin-spin coupling, coupling constants and also applications of NMR spectroscopy to study structure of sample compounds with some reference compounds.

**CO5:** to understand definition of drug, disease, sources of drug, terminology of medicinal chemistry, nomenclature of drugs, classification of drugs, synthesis of some specific drugs, penicillin separation and development of various penicillins, HIV-AIDS-CD4 and CD8 cells role in immunity, prevention of AIDS, various drugs available for treatment of AIDS and also about monographs of drugs for some reference compounds.

**CO6:** to understand classification of polymers, types of polymerization, tacticity, molecular weights of polymers and its determination methods, preparation and industrial applications of some important polymers and also about biodegradability of polymers.

**CO7:** to know about superconductivity, characteristics of superconductors, Meissner effect, types and applications of superconductors, nanomaterials, synthetic techniques, properties and applications of nanomaterials.

## LABORATORY OUTCOMES

### Physical Chemistry

Students gain the following practical knowledge from paper-VI after completion of the semester-VI.

**CO1:** able to understand about determination of surface tension, viscosity.

**CO2:** able to understand about determination of the strength of strong/weak and acid mixture by conductometric titration.

**CO3:** able to understand about determination of distribution coefficient for iodine b/w water and carbon tetrachloride and for benzoic acid b/w toluene and water.

## COURSE OUTCOMES (COs)

### SEMESTER-VI (B.Sc Chemistry)

#### PAPER-VII

After completion of the semester-VI student is able to understand the following objectives from paper-VII.

**CO1:** able to differentiate inert and labile complexes, ligand substitution reactions in various geometries, Trans effect and its importance to study ligand substitution reactions in square planar complexes.

**CO2:** to understand the stability of complexes, factors influencing stability of complexes and also expertise about complex composition determination methods.

**CO3:** to know about Pearson's HSAB principle and its applications.

**CO4:** to understand the importance of inorganic elements in various biological processes.

**CO5:** to understand classification and nomenclature of carbohydrates, properties and structure of D-glucose and D-Fructose.

**CO6:** to understand classification, properties and importance of amino acids and also about structure of peptide/proteins.

**CO7:** to know about principle, terminology of Mass spectrometry, Mass spectra of some organic molecules.

**CO8:** to understand thermodynamic laws, terminology used in thermodynamics, various thermodynamic processes and also about Carnot's cycle, Kirchhoff's equation, Joule-Thomson effect and Maxwell relations.

## LABORATORY OUTCOMES

Students gain the following practical knowledge from paper-VII after completion of the semester-VI.

**CO1:** able to understand about the laboratory synthesis of various organic compounds.

**CO2:** able to understand about identification of organic compounds through functional group analysis.

## COURSE OUTCOMES (COs)

### SEMESTER-VI (B.Sc Chemistry)

#### PAPER-VIII

**CO1:** Chromatography and Molecular Spectroscopy: from this unit student able to Know the different analytical techniques, to understand different types of separation techniques.

Discuss the problem based on distribution coefficient and extraction techniques. To study principle, construction and working of GC and HPLC. To give an extended knowledge about chromatographic techniques used for separation of amino acids. Learn the molecular spectroscopy, I.R, Electron and Proton NMR spectroscopy working principle. Understand the factors affecting UV-absorption spectra, Interpret IR spectra on basic values of IR-frequencies. Discuss the problem of UV, IR and NMR

**CO2:** Formulations, Pesticides and Green Chemistry: from this unit students understand the concept of Drug and Additives and types of Formulation Students can understand the Concepts of Definition, Classification, Preparation, Chemical Learn Structures and Applications Student understand the impact of Pesticides on Environmental as well as Also learnt about Pesticides preparation and formulation synthetic and Bio-Pesticides Student acquaint about principle, Synthetic methods and Application of Green Chemistry

**CO3:** Catalyst and Material Science: from this unit students learn about definition, types of catalyst with examples and Kinetics of various catalytic reactions, Explain the relevance of catalytic materials in organic fine chemicals. Learn about enzyme catalytic reaction, mechanism and affecting factors Describe the limitation of supported heterogeneous catalyst with reference to promoters inhibitors and poisoning. Students acquaint knowledge about definition, general characteristic properties and types of Composite materials.

## LABORATORY OUTCOMES

### Physical chemistry

Students gain the following practical knowledge from paper-VIII after completion of the semester-VI.

**CO1:** able to understand about determination of rate constant for acid hydrolysis of ethyl acetate, for Fe<sup>+3</sup> catalysed decomposition of hydrogen peroxide at room temperature and also for saponification of ethyl acetate.

**CO2:** able to understand about verification of Beer's law by using KMnO<sub>4</sub> through colorimetric method.

**CO3:** able to understand about determination of redox potential of Fe<sup>+2</sup>/Fe<sup>+3</sup> by potentiometric titration method.

## SKILL ENHANCEMENT COURSE - III (SEC-III)

### Chemistry of Cosmetics and Food Processing

**CO1:** From this course students are able to understand fundamentals of chemistry and the scientific basis for cosmetic and Perfumes formulation and the function of the active ingredients. Comprehend the efforts of scientists in cosmetic and Perfumes product design and developments. Explain/interpret how cosmetics suit for a specific intended function, e.g. how sunscreen works for its intended function

**CO2:** From this course students are able to understand the general methods of food preservation. Learn the basic principles in production of fermented foods like bread, cheese,

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**DEPARTMENT OF MATHEMATICS**  
**M.V.S. GOVT. ARTS AND SCIENCE COLLEGE(AUTONOMOUS),**  
**MAHABUBNAGAR**  
**(AFFILIATED TO PALAMURU UNIVERSITY)**  
**NAAC Reaccredited “B” Grade**

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**PROGRAM OUTCOMES (PO),**  
**PROGRAM SPECIFIC**  
**OUTCOMES (PSO)**  
**&**  
**COURSE OUTCOMES (CO)**

**For**  
**ACADEMIC YEAR:2021-22**

# B.Sc. (Mathematics)

(After completion of the programme students are able to)

## Programme Outcomes (PO) of B.Sc (Mathematics) :

- PO 1: Enabling students to develop a positive attitude towards mathematics as an interesting and valuable subject of study.
- PO 2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.
- PO 3 : Ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.
- PO 4: Introduction to various courses like group theory, ring theory, field theory, metric spaces, number theory.
- PO 5: Enhancing students' overall development and to equip them with mathematical modeling abilities, problem solving skills, creative talent and power of communication necessary for various kinds of employment.
- PO 6: Ability to pursue advanced studies and research in pure and applied mathematical science.

# **B.Sc. (Mathematics)**

(After completion of the programme students are able to)

## **Programme Specific Outcomes (PSO) of B.Sc (Mathematics) :**

- PSO 1: Knowledge
- PSO 2: Problem Skills .
- PSO 3: Critical and Analytical Thinking Skills.
- PSO 4: Communication and Presentation Skills.
- PSO 5: Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.
- PSO 6: Formulate and develop mathematical arguments in a logical manner.
- PSO 7: Acquire good knowledge and understanding in advanced areas of mathematics and statistics, chosen by the student from the given courses.
- PSO 8: Understand, formulate and use quantitative models arising in social science, Business and other contexts.
- PSO 9: Teamwork Skills.
- PSO 10: Information Technology/Techniques
- PSO 11: Ethics and Social Responsibility

# B.Sc. (Mathematics)

(On the completion of the course students are able to)

## Course outcomes (CO) of B.Sc (Mathematics)

### Semester-I

**Course Title** : BS 101 - Differential and Integral Calculus

**Course Objectives** : The course is aimed at exposing the students to some basic notions in differential calculus.

**Course outcomes** : By the time students complete the course they realize wide ranging applications of the subject.

### Semester-II

**Course Title** : BS 201 - Differential Equations

**Course Objectives** : The main aim of this course is to introduce the students to the techniques of solving differential equations and to train to apply their skills in solving some of the problems of engineering and science.

**Course outcomes** : After learning the course the students will be equipped with the various tools to solve few types differential equations that arise in several branches of science.

### Semester-III

**Course Title** : BS 301 - Real Analysis

**Course Objectives** : The course is aimed at exposing the students to the foundations of analysis which will be useful in understanding various physical phenomena.

**Course outcomes** : After the completion of the course students will be in a position to appreciate beauty and applicability of the course.

**Course Title** : **SEC I - Theory of Equations**

**Course Objectives** : Students learn the relation between roots and coefficients of a polynomial equation, Descartes's rule of signs in finding the number of positive and negative roots if any of a polynomial equation besides some other concepts.

**Course outcomes** : By using the concepts learnt the students are expected to solve some of the polynomial equations.

### **Semester-IV**

**Course Title** : **BS 401 - Algebra**

**Course Objectives** : The course is aimed at exposing the students to learn some basic algebraic structures like groups, rings etc.

**Course outcomes** : On successful completion of the course students will be able to recognize algebraic structures that arise in matrix algebra, linear algebra and will be able to apply the skills learnt in understanding various such subjects.

**Course Title** : **SEC II - Logic and Sets**

**Course Objectives** : Students learn some concepts in set theory and logic.

**Course outcomes** : After the completion of the course students appreciate its importance in the development of computer science.

### **Semester-V**

**Course Title** : **BS 501 - Linear Algebra**

**Course Objectives** : The students are exposed to various concepts like vector spaces, bases, dimension, Eigen values etc.

**Course outcomes** : After completion this course students appreciate its interdisciplinary nature.

**Course Title** : **SEC III Number Theory**

**Course Objectives** : Students will be exposed to some of the jewels like Fermat's theorem, Euler's theorem in the number theory.



**Course outcomes** : Student uses the knowledge acquired solving some divisor problems.

**Course Title** : **GE I - Basic Mathematics**

**Course Objectives** : Students will be solve the competative problems.

**Course outcomes** : Students apply their knowledge in competative examination for secureing job.

### **Semester-VI**

**Course Title** : **BS 601/A - Numerical Analysis**

**Course Objectives** : Students will be made to understand some methods of numerical analysis.

**Course outcomes** : Students realize the importance of the subject in solving some problems of algebra and calculus.

**Course Title** : **BS 601/B - Integral Transforms**

**Course Objectives** : Students will be exposed to Integral Transforms. The students also learning the Applications of Laplace Transforms to Differential Equations which arises in Physics and Engineering Problems.

**Course outcomes** : Students apply their knowledge to solve some problems on special functions and Differential Equations by using the Integral Transforms.

**Course Title** : **BS 601/C - Analytical Solid Geometry**


**Course Objectives** : Students learn to describe some of the surfaces by using analytical geometry.

**Course outcomes** : Students understand the beautiful interplay between algebra and geometry.

**Course Title** : **SEC IV - Vector Calculus**

**Course Objectives** : Concepts like gradient, divergence, curl and their physical relevance will be taught.

**Course outcomes** : Students realize the way vector calculus is used to addresses some of the problems of physics.

	<b>PROGRAMME OUTCOMES &amp; COURSE OUTCOMES</b>	<b>MVSGDCA/PCO/PHY</b>
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**PROGRAMME NAME – B.Sc (Bachelor of Science)**

**After the successful completion of the 3 years course, the students will be able to**

**SEMESTER - I**

**COURSE CODE: BS/P1/BS105      COURSE NAME: MECHANICS & OSCILLATIONS**

CO1: Good knowledge and understanding of major concepts, theoretical principles and experimental findings in Physics and its different subfields like Astrophysics and Cosmology, Material science, Nuclear and Particle Physics, Condensed matter Physics, Atomic and Molecular Physics.

CO2: Ability to transmit complex technical information relating all areas in Physics in a clear and concise manner in writing and oral ability to present complex and technical concepts in a simple language for better understanding.

CO3: Ability to employ critical thinking and efficient problem-solving skills in all the basic areas of Physics.

CO4: Capable of working effectively in diverse teams in both classroom, laboratory, Physics workshop and in industry and field-based situations.

CO5: Demonstrate Physics-related technological skills that are relevant to Physics-related job trades and employment opportunities.

**SEMESTER - II**

**COURSE CODE: BS/P2/BS205      COURSE NAME: THERMAL PHYSICS**

CO1: Comprehend the basic concepts of thermodynamics, the first and the second law of thermodynamics, the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.

CO2: Understand the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law, equitation of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.

CO3: Learn the concepts of Kinetic theory of Gases and properties of matter & to apply them to problems.

CO4: The student can able to understand situations in low temperature.

CO5: The students are expected to learn some mathematical techniques which will be useful for understanding the physical phenomena and get exposure to important ideas of statistical mechanics.

### **SEMESTER - III**

**COURSE CODE: BS/P3/305    COURSE NAME: ELECTROMAGENTIC THEORY**

CO1: Achieve an understanding of the Maxwell's equations, role of displacement current, gauge transformations, scalar and vector potentials, Coulomb and Lorentz gauge, boundary conditions at the interface between different media.

CO2: Understand the linear, circular and elliptical polarisations of EM waves. Production as well as detection of waves in laboratory.

CO3: Understand propagation of EM waves in anisotropic media, uni-axial and biaxial crystals phase retardation plates and their uses.

CO4: Understand the fundamentals of propagation of electromagnetic waves through optical fibres and calculate numerical apertures for step and graded indices and transmission losses.

CO5: In the laboratory course, the student gets an opportunity to perform experiments Demonstrating principles of Interference, Refraction and diffraction of light using monochromatic sources of light and also able to demonstrate interference, Refraction and Diffraction using microwaves.

### **SEMESTER - IV**

**COURSE CODE: BS/P4/405**

**COURSE NAME: OPTICS**

CO1: Understand the basic concepts of Principles of Superposition and Interference and their applications.

CO2: Understand the diffraction and polarization processes and applications of them in physical situations.

CO3: Understand the applications of interference in design and working of interferometers.

CO4: Understand the resolving power of different optical instruments Like Michelson Interferometer.

CO5: Understand the working of selected optical instruments like biprism, interferometer, diffraction grating, and holograms.

CO6: Practically student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment can be learnt first-hand.

## SEMESTER - V

**COURSE CODE: BS/P5/505**

**COURSE NAME: MODREN PHYSICS**

CO1: Understand the central concepts of quantum mechanics: wave functions, momentum and energy operator, the Schrodinger equation, time dependent and time independent cases, probability density and the normalization techniques, skill development on problem solving Example like one dimensional rigid box, tunneling through potential barrier, step potential, rectangular barrier.

CO2: Know main aspects of the inadequacies of classical mechanics and understand historical development of quantum mechanics and ability to discuss and interpret experiments that reveal the dual nature of matter.

CO3: Understanding the properties of nuclei like density, size, binding energy, nuclear forces and structure of atomic nucleus, liquid drop model and nuclear shell model and mass formula. Ability to calculate the decay rates and lifetime of radioactive decays like alpha, beta, gamma decay. Neutrinos and its properties and role in theory of beta decay.

CO4: Understand various interactions of electromagnetic radiation with matter. Electron positron pair creation.

CO5: During the laboratory course, the students will get opportunity to perform the experiments like Measurement of Planck's constant and Verification of the photoelectric effect and determination of the work Function of a metal.

## SEMESTER - VI

**COURSE CODE: BS/P6/605**

**COURSE NAME: ELECTRONICS**

CO1: Understand the core concepts of Semiconductor devices and their applications and identify the different electronics components used in electronic circuits.

CO2: Understand the working of solid-state Semiconductor devices used in the circuit.

CO3: Understand the basic concepts of operational amplifier: its prototype and applications as instrumentation amplifier, active filters, comparators and waveform generation.

CO4: Understand the basic electronic circuits for universal logic building blocks and basic concepts of digital communication.

CO5: Understand the basic working of different logic gates and laws of Boolean algebra, De Morgan theorem, NOR & NAND logic for simplification of circuits.

CO6: Understand the concepts of K-maps and designing of logic circuits and understand and design different controlling circuits used in digital electronics.

### PROGRAMME OUTCOMES

After the successful completion of the B.Sc (Bachelor of Science) Graduate will able to

### PROGRAMME OUTCOMES

<b>PO1</b>	Understanding of the academic field of Physics, its different learning areas and applications in basic Physics like Material science, Nuclear and Particle Physics, Condensed matter Physics, Atomic and Molecular Physics, Mathematical Physics.
<b>PO2</b>	The course builds a foundation of various applied field in science; especially in the field of mechanical core subjects. The course comprises of the study vectors, laws of motion, momentum, energy, rotational motion, gravitation, fluids, elasticity and special relativity.
<b>PO3</b>	The course makes the students able to understand the basic physics of heat and temperature and their relation with energy, work, radiation and matter. The

	students also learn how laws of thermodynamics are used in a heat engine to transform heat into work.
<b>PO4</b>	The course comprises of the study of superposition of harmonic oscillations, waves motion (general), oscillators, sound, wave optics, interference, diffraction, polarization. The course is important for the students to make their career in various branches of science and engineering, especially in the field of photonics.
<b>PO5</b>	In this course students would be able to understand Basic experiments of modern physics such as: Determination of Plank's and Boltzmann's constants, Determination of ionization potential, Wavelength of Hydrogen-spectrum, Single and double slit diffraction, Photo electric effect and determination of e/m
<b>PO6</b>	The students would gain the knowledge of Basic Electronics circuits, network theorems and measuring instruments: They would know about common solid-state devices: Semiconductor diodes and transistors. The topics also include the Rectifiers, Filters and their applications, number systems and logic gates which are foundation blocks of digital electronics.
<b>PO7</b>	Use modern tools and Software for understanding the basic concepts of Physics and derive the solutions for futuristic models for better functioning of the real-world applications.
<b>PO8</b>	Serve the society with a good heart when a Physics with computer knowledge person is required.

# **MVS GOVT.DEGREE & PG COLLEGE (A)**

**MAHABUBNAGAR**

**(Affiliated to Palamuru University, Accredited with NAAC" B" Grade  
Christianpally, Mahabubnagar)**

*Programme Outcomes, Programme specific  
outcomes and Course Outcomes*

**Department of Urdu**

**Dr. Azmatullah**

**Head of the Department**

## **Department of Urdu**

### *Programme outcomes, Programme specific outcomes & Course out comes*

The department of Urdu has been established in the year 1998. The student of Urdu medium elects the Urdu language as a Second language for first four semesters. All English medium students can also choose this subject as their Second language. The college has a language lab to horn student's communication proficiency. The department has been engaged in improving teaching methods and materials in consonance with the requirements of the fast-changing scenario of Urdu studies.

Globalization has brought effective communication skills to the forefront of academics, considering this the curriculum has been prepared by this college which has a Autonomous status with the collaboration of Osmania University, Hyderabad.

This syllabus is useful to the enhancement of writing skills, communication skills, and technical skills. There are 200 students are studying Urdu as a second language at UG level.



## **PROGRAMME OUTCOMES: -**

- 1. On completion of the programme the students should have an ability to listen, read, comprehend, summarize and draw inferences.**
- 2. Should be able to write formal and Informal letters, applications and reports etc.**
- 3. Should develop and improve their communication skills such as they should be able to communicate their Ideas, suggestions, views and opinions clearly and logically.**
- 4. Should develop an ability to recognize text elements such as style, form, images, figure of speeches and annotations and references.**
- 5. Should be able to build vocabulary and knowledge of literary terminology.**
- 6. Should be able to apply different critical, theoretical and philosophical approaches to variety of stories, poems and essays.**

## **PROGRAMME SPECIFIC OUTCOMES:**

- 1. Should develop an ability to write logically, clearly and effectively for a variety of professional and social settings.**
- 2. Student must develop an ability to understand and accept a composite view of multiculturalism.**
- 3. Students should improve the necessary communication skills (verbal & non- verbal) to meet the Global and local needs and enhance their employability.**
- 4. After the completion of four semesters as a second language they can join in Universities for higher studies like M.A, Urdu, B.Ed. and P.G in journalism and mass communication.**
- 5. On completion of the four semesters they can obtain Government and non- Government jobs like in teaching and telecommunication channels.**

## SEM & PAPER COURSE OUTCOME

<b>Course: Sem-I, Paper-I</b>	<ul style="list-style-type: none"><li>➤ Understand the contribution of classical Language (Deccani) in the development of Urdu language.</li><li>➤ Contribution of Deccani poets in the Progress of Urdu.</li><li>➤ On completion of the study the Ghazals of Qhuli Qutab Shah, Vali And Siraj the students will gain the Knowledge of History of Urdu Language and literature.</li><li>➤ Students will able to understand reading, writing of Deccani.</li><li>➤ After the completion of the Ghazals and Poems Students will able to differentiate the Deccani And Urdu.</li></ul>
<b>Course: Sem-II, Paper-II</b>	<ul style="list-style-type: none"><li>➤ Students will understand the different forms of poems like Paband Nazm, Azad Namoarrazm and Nasri Nazm etc.</li><li>➤ After the completion of prose, they will able to differentiate the forms of prose.</li><li>➤ On successful completion of all the aspects of the syllabus they know about classical and modern poets and writers.</li></ul>
<b>Course: Sem-III, Paper-III</b>	<ul style="list-style-type: none"><li>➤ Progress of Masnavi (classical and modern).</li><li>➤ Students will know the difference Between Masnavi and Marsiya.</li><li>➤ The progress of Inshaiya and letter Writing will help the students in Letter writing and essay writing skills.</li></ul>
<b>Course: Sem-IV, Paper-IV</b>	<ul style="list-style-type: none"><li>➤ In depth study of Rubaiyath and Qhatat will improve the personality and moral values.</li><li>➤ On completion of the part of poems the multi-culturalism will develop in the students.</li><li>➤ On completion of the fourth Sem Syllabus the students may join in Central and State Universities for the higher studies of Urdu literature and Journalism courses.</li></ul>

**MVS GOVERNMENT ARTS & SCIENCE DEGREE  
COLLEGE (AUTONOMOUS), MAHABUBNAGAR  
NAAC B GRADE  
DEPARTMENT OF PUBLIC ADMINISTRATION**

**COURSE OUTCOME OF PUBLIC ADMINISTRATION**

**SEM-I B.A I YEAR - : INTRODUCTION TO PUBLIC ADMINISTRATION**

**BA I Year Course-1: Introduction to Public Administration**

- \* To understand the nature and scope of Public Administration;
- \* To appreciate the methodological pluralism and synthesizing nature of knowledge in Public Administration;
- \* To comprehend the changing paradigms of Public Administration;
- \* To acquaint with the theories, approaches, concepts and principles of Public Administration;
- \* To understand the administrative theories and concepts to make sense of administrative practices.
- \* To Understand public administration theory and concepts from multiple perspectives;

**SEMESTER-II: DEVELOPMENT DYNAMICS AND EMERGING TRENDS**

- \* To Appreciate the nature, scope and changing paradigms of Public Administration;
- \* To Understand the synthesizing nature of knowledge of public administration from public Perspective.
- \* Grasp the administrative theories, concepts and principles to make sense of administrative Practices with emerging trends.
- \* Role of Public Services in the Emergence and Development of New State of Telangana
- \* To appreciate the emerging issues in New State of Telangana in the context of changing role of state, market and civil society
- \* Understand the world of public administration from the public perspective and provide foundation for further studies in Public Administration

**SEM-III: UNION ADMINISTRATION**

- \* To understand the historical evolution and socio-economic, political, cultural and global context of Indian Administration;
- \* Acquaint with India's development experience and changing role of administration

- \* To identify the transformative role of Indian Administration;
- \* To make out the multi-dimensionality of problems and processes of Indian Administration;
- \* To understand the form and substance of Indian Administration;
- \* Acquaint with the functioning of the Indian administration, at central levels and the responses of these systems in addressing the concerns of the people
- \* To appreciate the emerging issues in Indian Administration in the context of changing role of state, market and civil society.

#### **SEMESTER-IV: STATE ADMINISTRATION AND EMERGING ISSUES**

- \* Discern the connects and disconnects between structure, purpose and process and results in Indian Administration;
- \* Understand the Indian Administration role as the main instrument of State to achieve its developmental goals;
- \* Acquaint with the functioning of the Indian administration, at State levels
- \* Appreciate the varying historical, socio-economic, political and other conditioning factors that gave Indian Administration its distinct nature to the learner
- \* Acquaint the learner with the required knowledge of administrative science and government in action and the contemporary issues in public affairs management
- \* Understand the role of Public Services in the new State of Telangana.
- \* To understand the role of public services in Redressal of Citizen Grievances: Transparency, Accountability and Right to Information Act
- \* Acquaint with the functioning of the Administrative Accountability: Legislative and Judicial Control

#### **BA III YEAR (ANNUAL PATTERN) COURSE-III: HUMAN RESOURCES MANAGEMENT**

- \* To comprehend the nature, scope, structure & processes of human resource management;
- \* To identify the systems and processes of financial and material management;
- \* To appreciate institutional capacity building strategies and programmes; and
- \* To understand the changing paradigms of Resources management.
- \* Understand the way in which the public power is exercised and public resources are managed and expanded;
- \* Unravel the varying methods of performance assessment of public institutions; and
- \* Appreciate the changing paradigms of human resource management.

#### **BA III YEAR COURSE-IV C: PUBLIC OFFICE ADMINISTRATION (DSE-C)**

- To understand the concept of Office;
- To comprehend the administrative process in office;
- To identify the challenges of public office administration in the background of ICT
- To sketch out the impact of technology in office administration

- Understand the meaning and related concepts of office and office management;
- Explain the filing and record management
- Identify the issues and challenges in functioning of public office.

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Course Outcomes & Programme  
Outcomes Mapping

Name of Program- B.Sc

**Programme Outcomes (PO) of B.Sc (Statistics) :**

- PO 1: Enabling students to develop a positive attitude towards Statistics as an interesting and valuable subject of study.
- PO 2: A student should get a relational understanding of Mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.
- PO 3 : Ability to analyse a problem, identify and define the computing requirements, which may be appropriate to its solution.
- PO 4: Introduction to various courses like group theory, ring theory, field theory, metric spaces, number theory.
- PO 5: Enhancing students' overall development and to equip them with mathematical modelling abilities, problem solving skills, creative talent and power of communication necessary for various kinds of employment.
- PO 6: Ability to pursue advanced studies and research in pure and applied mathematical science.

**Programme Specific Outcomes (PSO) of B.Sc (Statistics) :**

- PSO 1: Knowledge
- PSO 2: Problem Skills.
- PSO 3: Critical and Analytical Thinking Skills.
- PSO 4: Communication and Presentation Skills.
- PSO 5: Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.
- PSO 6: Formulate and develop mathematical arguments in a logical manner.
- PSO 7: Acquire good knowledge and understanding in advanced areas of Statistics and statistics, chosen by the student from the given courses.
- PSO 8: Understand, formulate and use quantitative models arising in social science, Business and other contexts.
- PSO 9: Teamwork Skills.
- PSO 10: Information Technology/Techniques
  - PSO 11: Ethics and Social Responsibility

**Course outcomes (CO) of B.Sc (Statistics)**

Course	Course Name	Course Out Come
CO1	BSS 101: Descriptive Statistics and Probability	By the end of the course, students will have gained a broad understanding of the subject's applications.
CO2	BSS 201: Probability Distributions	After completing the course, students will be able to use a variety of techniques to solve a variety of differential equations that arise in a variety of fields.
CO3	BSS 301: Statistical Methods and Theory of Estimation	Students will be able to appreciate the course's beauty and relevance once they have completed it.
CO4	SEC I Curriculum for Life Skills-1	Students are expected to solve several polynomial equations using the concepts they have learned.
CO5	BSS 401: Statistical Inference	Students will be able to recognise algebraic structures that develop in matrix algebra and linear algebra after successfully completing the course, and will be able to utilise the abilities learned in studying many such areas.
CO6	SEC II: Data Collection, Presentation and Interpretation	Students recognise the value of the course in the advancement of computer science after completing it.
CO7	BSS 501: Sampling Theory, Time series, Index Numbers and Demand Analysis	Students like the interdisciplinary character of this course after completing it.
CO8	SEC III: Curriculum for Life Skills-1	The student applies what he has learned to solve



**DEPARTMENT OF STATISTICS,  
MVS GOVT. ARTS & SCIENCE COLLEGE(A), MAHBUBNAGAR**

CO9	GE I: Basic Statistics	several divisor problems. Students put their knowledge to the test in order to land a job.
CO10	BSS 601/A: Statistical Quality Control and Reliability	Students will have a wide understanding of the subject's applicability at the end of the course.
CO11	BSS 601/B Bio-Statistics - I	After finishing the course, students will be able to solve a number of Bio-Statistics - I that arise in a range of domains using a variety of methodologies.
CO12	BSS 601/C Actuarial Statistics - I	The fascinating connection Actuarial Statistics - I is understood by students.
CO13	SEC IV: Data Scaling Techniques and Report writing	Students understand how Data Scaling Techniques and Report writing can be utilised to solve some physics problems.

### For Mapping

3- Fully Met (For a particular CO, if there are  $\geq 4$  Key elements in a particular PO met)

2-Partially Met (For a particular CO, if there are  $\geq 2$  Key elements)

1-Poorly Met (For a particular CO, if there is 1 key element in a particular PO met)

NA-Not Applicable

**DEPARTMENT OF STATISTICS,  
MVS GOVT. ARTS & SCIENCE COLLEGE(A), MAHBUBNAGAR**

**B.Sc PO, CO & PSCO**

S.No	Programme Outcomes	P01	P02	P03	P04	P05	P05
	Course Outcomes						
1.	CO1	3	3	3	3	3	3
2.	CO2	3	3	3	3	3	3
3.	CO3	3	3	3	2	3	3
4.	CO4	3	3	2	2	2	2
5.	CO5	3	2	3	2	2	2
6.	CO6	3	3	3	3	3	3
7.	CO7	3	2	2	3	2	2
8.	CO8	3	2	2	2	2	3
9.	CO9	2	3	3	3	3	3
10.	CO10	3	3	3	3	3	3
11.	CO11	3	3	3	3	3	3
12.	CO12	2	3	3	3	3	3
13.	CO13	2	3	3	3	3	3
Average		2.8	2.8	2.8	2.7	2.7	2.8

**MVS GOVT.ARTS AND SCIENCE College ::MAHABUBNAGAR**

(AUTONOMOUS)

(Affiliated to Palamuru University Accredited with 'B' Grade 'by NAAC Christianpally, Mahabubnagar)



**Bachelor of Science (B,Sc.)**

**DEPARTMENT OF ZOOLOGY**

**Course Outcomes**

B. Sc. (Zoology) First Year

<b>Sem &amp; Paper</b>	<b>Course Outcomes (COs)</b>
<p><b>Course: Sem I Paper 1</b></p> <p><b>Animal Diversity – 1</b> <b>Invertebrates</b></p>	<p>After successfully completing this course, students will be able to:</p> <ul style="list-style-type: none"> <li>➤ Understand General characters and classification of Invertebrates From Protozoa to Echinodermata upto order levels with examples</li> <li>➤ Explain and describe the Type study –Elphidium, Sycon ,Obelia, Schistosoma ,Dracunculus, Hirudinaria granulose, Prawn, Pila</li> <li>➤ Understand Locomotion and Reproduction in Protozoa.</li> <li>➤ Explain and describe the Epidemiology of Protozoan diseases - Amoebiasis; Giardiasis; Leishmaniasis and Malaria.</li> <li>➤ Gain knowledge on General characters and classification of Porifera upto order levels with examples</li> <li>➤ Understand the concept of Canal system in sponges and Spicules.</li> <li>➤ Understand the concept of Polymorphism in Siphonophora</li> <li>➤ The student has the basic knowledge on the Corals and coral reef formation</li> <li>➤ Understand Parasitic Adaptations in Helminthes</li> <li>➤ Know various types of Crustacean larvae</li> <li>➤ Gain knowledge on Insect metamorphosis</li> <li>➤ Explain and describe the Peripatus -Structure and affinities.</li> <li>➤ The student has the basic knowledge on the Pearl formation</li> <li>➤ Understand Torsion and detorsion in gastropods</li> <li>➤ Explain Water vascular system in star fish.</li> <li>➤ Explain and describe the Echinoderm larvae and their significance</li> <li>➤ Explain and describe the General characters , classification and up to classes with examples of Hemichordates.</li> </ul>

<p><b>Course: Sem II Paper 2</b></p> <p><b>Animal Diversity – 2</b> <b>Invertebrates</b></p>	<p>After successfully completing this course, students will be able to:</p> <ul style="list-style-type: none"> <li>➤ Understand Salient features of Urochordata</li> <li>➤ Gain knowledge on Retrogressive metamorphosis and its significance in Urochordata</li> <li>➤ Know Salient features and affinities of Cephalochordata</li> <li>➤ The students will be able to Compare the Petromyzon and Myxine</li> <li>➤ Understand different types of Scales and types of Fins in fishes</li> <li>➤ Understand Parental care in amphibian; neotony and paedogenesis</li> <li>➤ Temporal fosse in reptiles and its evolutionary importance</li> <li>➤ Compare distinguished characters of Poisonous and Non poisonous</li> </ul>
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	<p>snakes.</p> <ul style="list-style-type: none"> <li>➤ Gain knowledge on Migration in Birds</li> <li>➤ Gain knowledge on Flight adaptation in Birds</li> <li>➤ Know Dentition in mammals.</li> <li>➤ Explain Aquatic adaptations in Mammals.</li> <li>➤ Compare distinguished characters of Poisonous and Non poisonous snakes.</li> <li>➤ Gain knowledge on Migration in Birds</li> <li>➤ Gain knowledge on Flight adaptation in Birds</li> <li>➤ Know Dentition in mammals.</li> <li>➤ Explain Aquatic adaptations in Mammals.</li> </ul>
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### B. Sc. (Zoology) Second Year

<p><b>Course: Sem III Paper 3</b></p> <p><b>Animal Physiology and Animal Behavior</b></p>	<p>After successfully completing this course, students will be able to:</p> <ul style="list-style-type: none"> <li>➤ Define the basic terms in biochemistry.</li> <li>➤ Explain the structure, functions and reactions of the various biomolecules.</li> <li>➤ Give examples of each group type of biomolecules.</li> <li>➤ Structure of carbohydrates</li> <li>➤ Structure of proteins.</li> <li>➤ Structure of Lipids.</li> <li>➤ Physiology of Digestion.</li> <li>➤ Physiology of Respiration.</li> <li>➤ Physiology of Circulation</li> <li>➤ Physiology of Excretion.</li> <li>➤ Concept of Homeostasis.</li> <li>➤ Justify the role of enzymes in metabolism &amp; classification.</li> <li>➤ Enzyme regulation &amp; inhibition.</li> <li>➤ Explain the structure and function of enzymes, how enzymes are able to increase speed of an biochemical reaction, mechanisms of regulation of enzymatic action, importance of enzymes in regulation of metabolism.</li> <li>➤ Explain the principles of the energy-yielding and -consuming reactions, the various catabolic pathways(including <b>fermentations and photosynthesis</b>), and the mechanisms of energy conservation in microbial metabolism</li> <li>➤ Students may come to learn different types of behaviou.</li> <li>➤ Physiology of learning &amp; phylogeny.</li> <li>➤ Student can compare classical conditioning &amp; instrumental conditioning.</li> <li>➤ Student can understand the concept of biological rhythms.</li> </ul>
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<p><b>Course: Sem IV Paper 4</b> <b>Cell Biology, Genetics and Developmental Biology</b></p>	<p>After successfully completing this course, students will be able to:</p> <ul style="list-style-type: none"> <li>➤ Differentiate prokaryotic and Eukaryotic cells.</li> <li>➤ Explain the principles of staining.</li> <li>➤ Describe the structure and functions of cell organelles.</li> <li>➤ Label the various cell parts and Cell organelles.</li> <li>➤ Explain the cell division process and its significance.</li> <li>➤ Explain Mendel's principle, its extension and chromosomal basis and determination of gene action from genotype to phenotype and concepts of inheritance.</li> <li>➤ Define the terminologies in genetics.</li> <li>➤ Describe the chromosome anomalies and associated diseases</li> <li>➤ After successfully completing this course, students will be able to:</li> <li>➤ Understand the initial development al procedures involved in Amphioxus, frog and chick.</li> <li>➤ Familiar with types of placenta Ability to explain various Prenatal Diagnosis.</li> <li>➤ Familiarize with the principle of developmental biology.</li> <li>➤ Familiarize with various Techniques and tools of Embryology.</li> </ul>
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### B. Sc. (Zoology) Third Year

<p><b>Course: Sem V Paper 5</b> <b>Immunology &amp; Biotechnology</b></p>	<p>After successfully completing this course, students will be able to:</p> <ul style="list-style-type: none"> <li>➤ Understand and describe human body's resistance mechanism against disease.</li> <li>➤ Understand the properties, structure and importance of antibiotics in immunity.</li> <li>➤ Describe and explain the reasons, classes and development of allergy in humans.</li> <li>➤ Understand and write the role of human body's various organs in natural resistance on completion of the course, students are able to Understand: Immune system, types of immunity, primary and secondary lymphoid organ.</li> <li>➤ Innate and acquired immunity, antigen, immune response primary and secondary immune response, complement system, interferons.</li> <li>➤ This course gives an overview on the immune system including organs, cells and receptors.</li> </ul>
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	<ul style="list-style-type: none"> <li>➤ The students learn about molecular basis of antigen recognition, hypersensitivity reaction, antigen-antibody reactions.</li> <li>➤ The course develops in the student an appreciation for principles of immunology and its applications in treating.</li> <li>➤ Methods of gene transfer Gene cloning, indirect and direct screening gene transfer techniques.</li> <li>➤ Polymerase chain reaction and its applications.</li> <li>➤ Concept of gene regulation.</li> <li>➤ Principals and applications of various molecular techniques.</li> <li>➤ Concept, methods and application of r-DNA technology.</li> <li>➤ Enzymes in genetic engineering, vectors , Methods of gene transfer.</li> <li>➤ Gene cloning, indirect and direct screening gene transfer techniques</li> </ul>
<p><b>Course: Sem VI Paper 6</b></p> <p><b>Ecology , Zoogeography &amp; Evolution</b></p>	<p>After successfully completing this course, students will be able to:</p> <ul style="list-style-type: none"> <li>➤ Define the basic rules and concepts of the ecology science.</li> <li>➤ Define the ecology of individual, population, community and ecosystem.</li> <li>➤ Define the concepts that are the ambient, environment, biome, biosphere, ecosphere, ecological relationship and factors, and homeostasis.</li> <li>➤ Categorize the living things according to their tolerance to the ecological factors define the ecosystems and material cycles.</li> <li>➤ Define the territorial ecosystems.</li> <li>➤ Define organic evolution.</li> <li>➤ Explain the theories of organic evolution.</li> <li>➤ Describe the concept of origin of life and theories of origin of life.</li> <li>➤ Struggle for existence; variation; and inheritance.</li> <li>➤ Describe evolution of man.</li> <li>➤ Illustrate the presence of organisms at various geological time scale.</li> <li>➤ Apply the knowledge in relevant experimentations.</li> <li>➤ Categorize different zoogeographical realms.</li> <li>➤ Compare animal distribution in different zoogeographical realms.</li> <li>➤ Define organic evolution.</li> <li>➤ Explain the theories of organic evolution.</li> <li>➤ Describe the concept of origin of life and theories of origin of life.</li> <li>➤ Struggle for existence; variation; and inheritance.</li> <li>➤ Describe evolution of man.</li> <li>➤ Illustrate the presence of organisms at various geological time scale.</li> <li>➤ Apply the knowledge in relevant experimentations.</li> </ul>

**M.V.S GOVT. ARTS & SCIENCE COLLEGE  
(AUTONOMOUS) MAHABOBNAGAR, TELANGANA  
(NAAC ACCRECATED WITH B GRADE)  
FACULTY OF ECONOMICS**

**Offering Programs**

**B.A**

**V. Program Outcome of Bachelor of Arts (B.A.)**

Student seeking admission for B.A. program are expected to imbue with following quality which help them in their future life to achieve the expected goals.

- a. Realization of human values.
- b. Sense of social service.
- c. Responsible and dutiful citizen.
- d. Critical temper
- e. Creative ability.





## ECONOMICS

### Program Specific Outcomes of Economics

- Understanding how different degrees of competition in a market affect pricing and output.
- Understanding the efficiency and equity implications of market interference, including government policy.
- Developing research knowledge in economics.
- Developing the skill of data collection & use of sampling techniques in research.
- Developing the knowledge about theories of economic growth & Development and issues of economic planning.
- Creating awareness about changing macro-economic policies and theories.
- Learn the development issues of Indian economy
- Learn the real and monetary sides of international Economics
- Learn the basic concept of monetary analysis and financial marketing in Indian financial markets.
- Facilitate the historical developments in the economic thoughts pronounced by different schools.
- Able to undertake impact studies on government programs for example MGNREGA, Mission kakatiya etc
- Able to suggest measures to improve the standard of living of rural and urban people.
- Acquaint with the measurement of development with the help of theories along with the conceptual issues of poverty and inequalities with indian perspectives.
- Acquaint with some basic theoretical concept of public finance.
- Economics is focused on learning from field studies.this makes easy to understand.
- Able to develop public policies regarding health,education,welfare etc.
- Able to quire knowledge for making decisions in every day life.
- The students of economics think logically and critically.
- Opportunities in program evaluation and policy making bodies.
- Able to manage the time.
- Acquaint with some basic statistical methods to applied in economics
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### Course Outcomes of Economics

#### B.A.-I Micro Economics (Code: DSC\*101)

- Knowing the decision making of consumer. Identifying the nature of revenue and cost of production.

- Comprehending the demand function and production function.
- Realizing various production theories.
- Clarifying the meaning of Marginal, average, total revenue, and Marginal, average and total cost and its implication.
- Awareness of different markets structure.
- Understanding pricing in different markets.
- Judging the factor pricing.

#### **B.A.-I Macro Economics (Code: DSC\*201)**

- Identifying the basic concepts and theories of Macro Economics.
- Awareness about changing Macro Economics policies and theories.
- Understanding various concepts such as; GDP, GNP NNP, Personal Income, Disposable Income, Per Capita Income, and National Income.
- Identifying the factors determining gross domestic product, employment, the general level of prices, and interest rates.
- Realizing the law of markets, consumption function and investment function.
- Judging the role of fiscal policy and monetary policy in a Developing economy.
- Knowing features, phases and theories of trade cycles.
- Evaluating types, merits and demerits of taxes.
- Comprehending the role of public finance in developing economy.

#### **B.A.-II Micro Economics (Code: DSC\*301)**

- Clarifying the meaning of Marginal, average, total revenue, and Marginal, average and total cost and its implication.
- Awareness of different markets structure.
- Understanding pricing in different markets.
- Judging the factor pricing.

#### **BA-II Public Finance (Code: DSC\*401)**

- Introduction to instruments and objective of public finance.
- Understand the possible burden, benefits and distribution of various type of taxes among various classes of people, know the general and trend and impact of general welfare and arouse them two suggest good and bad tax system.
- Understand the effects of changes in government expenditure and taxes of balanced budget multiplier, public debt and its economic effects, anti-inflation fiscal policy.

### **B.A-III Economics of Development (Code: DSC\*501)**

- Understanding the concept and aspects of economic Development.
- Knowing the theories of economic growth & Development.
- Measuring the concept and issues of economic planning.
- Discussing the need, types and necessary conditions of economic planning.

### **III Indian Economy (Code: DSE\*501)**

- Understanding characteristics, features, structural changes in Indian Economy.
- Comprehension of the nature and impact of New Economic Reforms on the Indian Economy.
- Knowing the problems of unemployment, poverty, rising economic and social inequality and problems of regional imbalances in India.
- Evaluating the changing role of agriculture, industrial and service sector and foreign sector in Indian Economy.
- Measuring the problems and prospects of cottage and Small-scale industries, and industrial sicknesses.
- Measuring the growth, volume, composition and direction of India's foreign trade and capital inflow since 1991.

### **B.A.-III International Economics (Code: DSC\*601)**

- Elaborating the importance of the study of International Economics.
- Finding similarities and dissimilarities in inter-regional and international trade.
- Knowing the changes in the import-export policies of India.
- Evaluating various types of exchange rates and its merits and demerits.
- Discussing the types and effects of tariffs and quotas.
- Judging the function, merits and demerits of Foreign Capital, and International Corporation (IMF, IBRD, WTO and SAARC).
- Realizing the volume, composition and direction of Balance of trade and Balance of payments.

### **BA-III INDUSTRIAL ECONOMICS (Code: DSE\*601)**

Industrial Economics is the study of firms, industries, and markets. It looks at firms of all sizes – from local corner shops to multinational giants such as Walmart or Tesco. And it considers a whole range of industries, such as electricity generation, car production, and restaurants.

When analyzing decision making at the levels of the individual firm and



industry, Industrial Economics helps us understand such issues as:

- the levels at which capacity, output, and prices are set;
- the extent that products are differentiated from each other;
- how much firms invest in research and development (R•&D)
- how and why firms advertise

Industrial Economics also gives insights into how firms organize their activities, as well as considering their motivation. In many micro courses, profit maximization is taken as given, but many industrial economics courses examine alternative objectives, such as trying to grow market share. There is also an international dimension – firms have the option to source inputs (or outsource production) overseas. As such, while industrial economics more frequently uses skills and knowledge from micro courses, macroeconomic concepts are sometimes employed



# **MVS GOVERNMENT ARTS & SCIENCE COLLEGE**

**(AUTONOMOUS),**

**MAHABUBNAGAR, TELANGANA**

**( NAAC with B Grade, ISO 9001:2015)**

**DEPARTMENT OF HISTORY**

## **Bachelor of Arts:-**

### **Programme Outcome (PO's) :-**

- PO 1. The students acquire knowledge in the field of social sciences, literature and humanities which make them sensitive and sensible enough.
- PO 2. The B.A. graduates will be acquainted with the social, economical, historical, geographical, political, ideological and philosophical tradition and thinking.
- PO 3. The programme also empowers the graduates to appear for various competitive examinations or choose the post graduate program of their choice.
- PO 4. The B. A. programme enables the students to acquire the knowledge with human values framing the base to deal with various problems in life with courage and humanity.
- PO 5. The students will be ignited enough to think and act over for the solution of various issues prevailed in the human life to make this world better than ever.
- PO 6. Programme provides the base to be the responsible citizen.

## **Programme Specific Out Comes:-**

PSO1. Understand background of our religion, customs institutions, administration and so on.

PSO2. Understand the present existing social, political, religious and economic conditions of the people.

PSO3. Analyze relationship between the past and the present is lively presented in the history.

PSO4. Develop practical skills helpful in the study and understanding of historical events. They are:

- (a) Draw historical maps, charts, diagrams etc.
- (b) Prepare historical models, tools etc.

PSO5 . Develop interests in the study of history and activities relating to history. They are:

- (a) Collect ancient arts, old coins and other historical materials;
- (b) Participate in historical drama and historical occasions;
- (c) Visit places of historical interests, archaeological sites, museums and archives;
- (d) Read historical documents, maps, charts etc.
- (e) Play active roles in activities of the historical organizations and associations; and
- (f) Write articles on historical topics.

PSO6. The study of history helps to impart moral education.

PSO7. History installs the feeling of patriotism in the hearts of the pupils.

### **COURSE OUTCOME (CO) :-**

After completion of this course it helps to grow ethical values, liberal values, intellectual values and social values among history students. They gathered knowledge about the socio-cultural heritage of India and world as well. Above all, it helps to grow national and international understanding among history students. Careers of history students can engage as educators in elementary schools, secondary schools and postsecondary, historic Sites and Museums etc. as a researcher they will associated in several fields like, Museums and Historical Organizations, Cultural Resources Management and Historic Preservation etc. this course provides the students as communicator like, Writers and Editors, Journalists, Documentary Editors and Producers of Multimedia Material. History Student can employ as Information Manager in different fields i.e. Archivists, Records Managers, Librarians and Information Managers. They will engage as Lawyer like, Lawyers and Paralegals, Litigation Support, Legislative Staff Work and Foundations. They might be involved in Business Associates as Historians in Corporations or Contract Historians, Historians and Nonprofit Associations. They may directly engage in different ranks of the Archaeological Survey of India according to their performances like as Heritage Manager, Historic buildings inspector or conservation Officer, Museum education Officer etc.,

**MVS GOVT. DEGREE AND PG COLLEGE::MAHABUBNAGAR**  
(AUTONOMOUS)

(Affiliated to Palamuru University Accredited with 'B' Grade 'by NAAC  
Christianpally, Mahabubnagar)



*Program Outcomes, Program Specific Outcomes and Course  
Outcomes*

**Sri M.Mallesh**  
Head of the Department

**Jasper Sukeerthi**  
Lecturer in Microbiology

**Department of Microbiology**  
**MVS Govt. Degree and PG College**  
**Mahabubnagar**



## DEPARTMENT OF MICROBIOLOGY

### *Program Outcomes, Program Specific Outcomes and Course Outcomes*

<b>Programme Outcomes (POs)</b>	<p>After completion of B.Sc. Microbiology programme, the students will be able to</p> <ul style="list-style-type: none"><li>❖ Perform the basic techniques related to screening, isolation and cultivation of microorganisms from various sources</li><li>❖ Study the microorganism with regard to morphology, cultural and biochemical characters. It will help to classify the microbes to certain extent.</li><li>❖ Follow the aseptic techniques and conduct the process of sterilization as well as perform the techniques to control the microorganism</li><li>❖ Understand microorganisms and their relationship with the environment,</li><li>❖ Produce and analyze the microbial products at laboratory level</li><li>❖ Conduct the basic research with these microorganisms and perform the diagnostic procedures required in food, milk and pharmaceutical industries.</li></ul> <p>M.Sc. (Microbiology) completion of M.Sc. (Microbiology), students are able to:</p> <ul style="list-style-type: none"><li>❖ Instill the intellectual skills to analyze the molecules using advance biophysical techniques such as HPLC, GC, AAS, PCR etc.</li><li>❖ Perform the quantitative/ qualitative analysis of Biomolecules and understand various biochemical pathways</li><li>❖ Acquire knowledge and understanding the concepts of Microbial genetics, Molecular biology, Immunology, Enzymology.</li><li>❖ Explore the scientific literature effectively and use computational tools such as bio-statistical and bioinformatics</li><li>❖ Implement the knowledge in industry with regard to scale up, production, scale down and quality control of the various microbial products</li><li>❖ Conduct the basic research related to industry-environmental issues and use of agricultural for sustainable products</li></ul>
<b>Programme Specific Outcomes (PSOs)</b>	<ul style="list-style-type: none"><li>❖ Understand the contributions of various scientist in microbiology and scope of various branches</li><li>❖ Understand various kinds of prokaryotic &amp; eukaryotic microbes and their interactions</li><li>❖ Explain and describe importance of organic compounds and its chemistry found in living cells</li><li>❖ Understand and explain various processes of metabolism of carbohydrates amino acids and vitamins</li><li>❖ Explain DNA, RNA and protein structure and their synthesis</li><li>❖ Understand the concept of disease development, spread, control and eradication from society</li><li>❖ Understand the basic concepts of gene and their regulation of action</li><li>❖ Have developed a good knowledge of the development of the discipline of Microbiology and the contributions made by prominent scientists in this field.</li><li>❖ Have developed a very good understanding of the characteristics of different types of microorganisms, methods to organize/classify these into and basic tools to study these in the laboratory.</li><li>❖ Are able to explain the useful and harmful activities of the microorganisms.</li><li>❖ Are able to perform basic experiments to grow and study microorganisms in the laboratory</li><li>❖ Explain and write various industrial fermentations and bioinstrumentation.</li></ul>

<b>Sem &amp; Paper</b>	<b>Course Outcomes (COs)</b>
<b>Course: Sem I Paper 1 : History</b>	<ul style="list-style-type: none"> <li>❖ Understand the contributions of eminent scientists in the development of microbiology</li> <li>❖ On successful completion of this subject the students will gain basic knowledge about Microbiology starting from history, Basic laboratory techniques and basic knowledge about the micro organisms.</li> <li>❖ Students will get basics and importance of Microbiology. Theory &amp; practical's of Microscopy, staining, sterilization, characterization of microbes along with microbial structure will be studied.</li> <li>❖ Get an idea about the historical events in microbiology.</li> <li>❖ Understand the diversity in microbiology.</li> <li>❖ Know the scope of Microbiology.</li> <li>❖ Understand the taxonomic classification of microorganisms</li> </ul>
<b>Course: Sem I Paper 1 : Microscopy and staining Method</b>	<ul style="list-style-type: none"> <li>❖ Understand and explain basic principles and different kinds of microscope</li> <li>❖ Explain the process of different staining techniques</li> <li>❖ Understand and compare various types of stains and dyes the determination of specific nutrients by bacteria</li> <li>❖ Know parts of microscope, type and its principal</li> <li>❖ Get the theoretical concepts of related stain</li> <li>❖ Understand different methods of staining techniques</li> </ul>
<b>Course: Sem I Paper 1 : Isolation and Identification of Micro Organisms</b>	<ul style="list-style-type: none"> <li>❖ Design an experiment to isolate specific bacteria in pure form from sample</li> <li>❖ Determine the sensitivity of specific bacteria.</li> <li>❖ Understand different methods of staining techniques to given antibiotics</li> <li>❖ Concept of culture and type of culture</li> <li>❖ Cultivation methods of bacteria, yeast, fungi and virus</li> <li>❖ The students in this course learn different types of pure culture techniques, preservation of pure culture and culture collection centers.</li> <li>❖ This topic also introduces the students to the different types of media and teaches about isolation of strain and improvement.</li> <li>❖ Develop and have thorough knowledge of developing pure cultures and methods of preservation techniques.</li> <li>❖ The students will be able to isolate Cultures in pure form and preserve cultures for further use</li> </ul>
<b>Course: Sem I Paper 1 : Structure and General Characteristics of Microorganisms</b>	<ul style="list-style-type: none"> <li>❖ Compare prokaryotic organism with eukaryotic organism</li> <li>❖ Understand the importance of methane producing bacteria</li> <li>❖ Write the method of reproduction in algae fungi and protozoa</li> <li>❖ Understand and compare the characteristics properties of virus with other microbes</li> <li>❖ Understand various kinds of positive and negative interactions of different microbes</li> <li>❖ Microbial taxonomy – concepts and techniques for identification</li> <li>❖ Concept related to extremophilic microbes and archea</li> <li>❖ Characters and significance of algae and fungi</li> <li>❖ Characters and significance of virus</li> </ul>
<b>Course: Sem II Paper 2 : Microbial Nutrition and Growth</b>	<ul style="list-style-type: none"> <li>❖ Understand the basic nutritional requirements of bacteria.</li> <li>❖ Describe various types of nutrient media for cultivation and isolation of bacteria.</li> <li>❖ Explain typical growth curve of bacteria.</li> <li>❖ Understand the factors responsible for bacterial growth</li> </ul>
<b>Course: Sem II Paper 2 : Microbial Metabolism</b>	<ul style="list-style-type: none"> <li>❖ Understand the general strategy of metabolism.</li> <li>❖ Understand and explain various metabolic processes operating in living cell</li> </ul>

	<ul style="list-style-type: none"> <li>❖ Understand the mechanism by which energy is generated in human body</li> <li>❖ Explain and describe the process of protein formation in living cell</li> <li>❖ Explain and describe the process of replication of DNA</li> </ul>
<b>Course: Sem II Paper 2 : Biomolecules</b>	<ul style="list-style-type: none"> <li>❖ Understand the classification of organic compounds like carbohydrates</li> <li>❖ Understand the chemistry of different kinds of carbohydrates</li> <li>❖ The basic component or biomolecules of living organisms</li> <li>❖ The Definition, classification, biological function and chemical and physical properties of carbohydrates.</li> <li>❖ The Definition, classification, biological function and chemical and physical properties of Lipids</li> <li>❖ Detection of biomolecules,</li> <li>❖ Structure and properties of Biomolecules.</li> <li>❖ Transport and energy metabolism.</li> <li>❖ Metabolism of carbohydrates, lipids, amino acid, nucleotide.</li> <li>❖ Metabolic pathways and Bioenergetics.</li> <li>❖ Understand the fundamental biochemical principles, such as the structure/function of biomolecules.</li> <li>❖ Gain knowledge on current <i>biochemical</i> and molecular technique and carry out experiments.</li> </ul>
<b>Course: Sem II Paper 2 : Biochemical Techniques</b>	<ul style="list-style-type: none"> <li>❖ This skill based course will teach the students the various instrumentations that are used in the analytical laboratories.</li> <li>❖ This topic covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules</li> <li>❖ The student has the basic knowledge on the theory, operation and function of analytical instruments</li> </ul>
<b>Course: Sem III Paper 3 : Microbial Nutrition and Photosynthesis</b>	<ul style="list-style-type: none"> <li>❖ Understand the basic nutritional requirements of bacteria</li> <li>❖ Describe various types of nutrient media for cultivation and isolation of bacteria</li> <li>❖ Explain typical growth curve of bacteria.</li> <li>❖ Understand the factors that responsible for bacterial growth Identify the various physiological groups of bacteria with their special features.</li> <li>❖ Detail the macromolecules required for cell synthesis and growth as well as explain the various transport systems involved in the uptake of nutrients by bacteria.</li> <li>❖ Prepare media for isolation and growth of microorganisms, describe the different stages, methods and measurement of microbial growth and how environmental factors (pH, temperature, salt concentration) effect microbial growth, metabolism, and physiology.</li> </ul>
<b>Course: Sem III Paper 3 : Microbial Growth</b>	<ul style="list-style-type: none"> <li>❖ Understand the general strategy of metabolism</li> <li>❖ Understand and explain various metabolic processes operating in living cell</li> <li>❖ Understand the mechanism by which energy is generated in human body</li> <li>❖ Explain and describe the process of protein formation in living cell</li> <li>❖ Explain and describe the process of replication of DNA</li> </ul>
<b>Course: Sem III Paper 3 : Enzymes</b>	<ul style="list-style-type: none"> <li>❖ Describe importance of vitamins to human body and their deficiency syndrome</li> <li>❖ Compare DNA and RNA</li> <li>❖ Understand the mechanism of enzyme. On completion of the course, students learn about: <ul style="list-style-type: none"> <li>○ Basic Enzymology</li> <li>○ Enzyme kinetics and inhibitions</li> <li>○ Catalytic mechanisms and regulation,</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Industrial applications of enzymes and extremozymes</li> <li>○ Regulation of enzyme</li> <li>○ Various methods used for enzyme purification</li> <li>○ Enzyme assays</li> </ul> <ul style="list-style-type: none"> <li>❖ Explain the structure and function of enzymes, how enzymes are able to increase speed of a biochemical reaction, mechanisms of regulation of enzymatic action, importance of enzymes in regulation of metabolism</li> <li>❖ Explain the principles of the energy-yielding and -consuming reactions, the various catabolic pathways (including <b>fermentations and photosynthesis</b>), and the mechanisms of energy conservation in microbial metabolism</li> </ul>
<b>Course: Sem IV Paper 4 : Genetics</b>	<ul style="list-style-type: none"> <li>❖ On completion of this course, students will have the knowledge and skills to explain the key concepts in population, evolutionary and quantitative genetics.</li> <li>❖ The course also provides comprehensive knowledge how genes are transferred from generation to generation.</li> <li>❖ The student understands how alteration in genes results in various genetic disorders.</li> <li>❖ To make the student to understand the concept of cell and their activities. student will understand the concept of genes and their behavior</li> <li>❖ Students will be taught cell division, genetic materials, their structure and types, mechanism of replication of DNA.</li> <li>❖ Students gain knowledge in gene concepts and genetic code, gene expression, gene regulation and also learn about mutation.</li> <li>❖ The student will be able to identify and distinguish genetic regulatory mechanism.</li> <li>❖ Analyze the basic concepts of hereditary and the process of inheritance, understand the functions and molecular structures of DNA and RNA and how they serve as genetic information and concept of plasmids and transposons.</li> </ul>
<b>Course: Sem IV Paper 4 : Mutations</b>	<ul style="list-style-type: none"> <li>❖ Understand and describe various concepts – related with gene and its regulation</li> <li>❖ Understand and explain various processes by which gene transfer occurs amongst microbes</li> <li>❖ Explain the causes of gene mutation and their effect on cell.</li> <li>❖ Understand concept of genes and chromosomes.</li> <li>❖ Familiar with concept of mutations.</li> <li>❖ Know the concepts of spontaneous mutations.</li> <li>❖ Understand basics of immunology</li> </ul>
<b>Course: Sem IV Paper 4 : Gene Expression</b>	<ul style="list-style-type: none"> <li>❖ On completion of course students are able to understand</li> <li>❖ Concept of gene, gene-cistron relationship in prokaryotes and eukaryotes,</li> <li>❖ DNA regulation and replication</li> <li>❖ Types of DNA damage, DNA repair pathways</li> <li>❖ Transcription in prokaryotes</li> <li>❖ Protein synthesis and processing, posttranslational modifications of protein</li> <li>❖ Gene regulation Enzymes in genetic engineering, vectors</li> </ul>
<b>Course: Sem IV Paper 4 : Recombinant DNA Technology</b>	<ul style="list-style-type: none"> <li>❖ Methods of gene transfer Gene cloning, indirect and direct screening gene transfer techniques.</li> <li>❖ Polymerase chain reaction and its applications</li> <li>❖ Concept of gene regulation.</li> <li>❖ Principles and applications of various molecular techniques.</li> <li>❖ Concept, methods and application of r-DNA technology.</li> <li>❖ Gene library and gene mapping</li> <li>❖ Enzymes in genetic engineering, vectors</li> <li>❖ Methods of gene transfer</li> <li>❖ Gene cloning, indirect and direct screening gene transfer techniques</li> </ul>

	<ul style="list-style-type: none"> <li>❖ This course teaches RDNA technology techniques and their application in the field of genetic engineering</li> <li>❖ They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries</li> <li>❖ Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area of genetic engineering</li> </ul>
<b>Course: Sem V Paper 5 : Microbes in Agriculture</b>	<ul style="list-style-type: none"> <li>❖ Understand the role of microbes of soil in various important processes</li> <li>❖ Describe and explain the applications of bacteria and fungi in bio fertilizers</li> <li>❖ Approaches used in agriculture to control disease in plant</li> <li>❖ Microbial ecology and microbial interaction</li> <li>❖ Pathogenic interactions with plant</li> <li>❖ Microbial biocontrol agents</li> <li>❖ Concepts related to Plant pathology</li> <li>❖ Various plant pathogens and disease</li> <li>❖ Soil microbiology and xenobiotics</li> <li>❖ The aim of this course is to impart knowledge in soil microflora, plant pathology and post harvest pathology.</li> <li>❖ The students learn about water and waste water microbiology, air microbiology and their treatment processes.</li> <li>❖ The student at the end of the course would have gained knowledge about microbial associations with soil and plants, plant diseases and their management, water treatment techniques and solid waste</li> </ul>
<b>Course: Sem V Paper 5 : Plant diseases and Bio control</b>	<ul style="list-style-type: none"> <li>❖ Different environmental cycles, plant growth promoting microbes, Biological nitrogen fixation, Biocontrol in agricultural Microbiology were covered.</li> <li>❖ Begin to understand the role of microbes in causing several common diseases, Know concepts related with of microbial interaction</li> <li>❖ Get an idea regarding microbes and their relation with environment</li> <li>❖ Understand the enumeration technique for microbes</li> <li>❖ The aim of this course is to introduce the students to the role of biopesticides and biofertilizers in enhancing the fertility of soil</li> <li>❖ The students also learn about the large scale production of biofertilizers and biopesticides and their mechanism of action and application.</li> <li>❖ By the end of the course, the student will be able to gain knowledge about their commercialization.</li> </ul>
<b>Course: Sem V Paper 5 : Microbial Ecology</b>	<ul style="list-style-type: none"> <li>❖ Plant growth promoting microorganisms, biocontrol, nitrogen fixing microbes role in favour of environment can be explored</li> <li>❖ Students gain insights into microbial evolution and ecology.</li> <li>❖ Get an idea regarding microbes and their relation with environment</li> <li>❖ Understand the enumeration technique for microbes</li> <li>❖ Understand Principle, working, ray diagram and application of advance microscopes</li> <li>❖ Know concepts related with of microbial interaction</li> <li>❖ Get an idea regarding microbes and their relation with environment</li> <li>❖ Understand the enumeration technique for microbes</li> </ul>
<b>Course: Sem V Paper 5 : Role of Microbes and Environmental Pollution</b>	<ul style="list-style-type: none"> <li>❖ Understand and explain the significance of bacteriological analysis of drinking water</li> <li>❖ Understand and describe various methods applied for treatment of water and waste water</li> <li>❖ Explain the methods for disposal of industrial wastes</li> <li>❖ Bioremediation and biodegradation of xenobiotic compound, biomarkers and bioreporters</li> </ul>

	<ul style="list-style-type: none"> <li>❖ Understand the role of microorganisms as plant growth promoting bacteria and understanding the characteristics of soil.</li> <li>❖ To understand the concepts and approaches to manage plant pathogens and diseases in crops and natural plant communities by measures that have minimal impact on the environment.</li> <li>❖ To understand the concept of nitrogen fixation and role of microorganisms in the geochemical cycles and host- microbe interactions</li> <li>❖ Understand the role of microorganisms as agents of environmental change &amp; recognize microorganisms as indicators &amp; to understand microbial processes aimed to solve environmental problems.</li> </ul>
<p><b>Course: Sem V Paper 6 : History of Immunology and immunity</b></p>	<ul style="list-style-type: none"> <li>❖ Understand and describe human body's resistance mechanism against disease</li> <li>❖ Understand the properties, structure and importance of antibiotics in immunity .</li> <li>❖ Describe and explain the reasons, classes and development of allergy in humans.</li> </ul>
<p><b>Course: Sem V Paper 6 : Cells and Organs of Immune system</b></p>	<ul style="list-style-type: none"> <li>❖ Understand and write the role of human body's various organs in natural resistance on completion of the course, students are able to Understand: Immune system, types of immunity, primary and secondary lymphoid organ.</li> <li>❖ Innate and acquired immunity, antigen, immune response primary and secondary immune response, complement system, interferons.</li> <li>❖ This course gives an overview on the immune system including organs, cells and receptors</li> <li>❖ The students learns about molecular basis of antigen recognition, hypersensitivity reaction, antigen-antibody reactions</li> <li>❖ The course develops in the student an appreciation for principles of immunology and its applications in treating.</li> </ul>
<p><b>Course: Sem V Paper 6 : Antigens and Antibody reactions Immunological Processes and applications</b></p>	<ul style="list-style-type: none"> <li>❖ On completion of the course, students are able to Understand:</li> <li>❖ Immune system, types of immunity, primary and secondary lymphoid organ.</li> <li>❖ Innate and acquired immunity, antigen, immuneresponse primary and secondary immune response, complement system, interferons.</li> <li>❖ Ag-ab interactions,precipitation, agglutination, RIA, ELISA, monoclonal antibodies.</li> <li>❖ Immunosuppresion, Vaccines, passive immunization, immunodeficiency disorder.</li> <li>❖ structureofimmunoglobulin,typesandfunctions ofimmunoglobulins (IgG,IgA,IgM,IgD,IgE).</li> <li>❖ Monoclonal Antibodies production and its applications.</li> <li>❖ Hypersensitivity- types (I,II,III,IV).</li> <li>❖ Understand various mechanism by which antibiotic destroys antigens</li> <li>❖ Concept related to cells and organs related to immune system</li> <li>❖ Immune response and immune mechanism</li> <li>❖ Immunological disorders</li> <li>❖ Concepts related to Immunodeficiency</li> <li>❖ Demonstrate a comprehensive and practical understanding of basic immunological principles involved in research and clinical/applied science.</li> <li>❖ Differentiate between humoral and cell mediated immunity and Learn about the different cells in immune system and their role in immunity.</li> <li>❖ Understand the concept of antigens, antibodies and their in structures brief.</li> <li>❖ Understand about the types of hypersensitivity and</li> </ul>

	<p>autoimmunity.</p> <ul style="list-style-type: none"> <li>❖ Discuss current immunology news and issues</li> </ul>
<p><b>Course: Sem VI Paper 7 : Introduction to Medical Microbiology</b></p>	<ul style="list-style-type: none"> <li>❖ Various concepts of medical microbiology</li> <li>❖ Role of international organizations such as CDC and WHO</li> <li>❖ Anatomy of human system</li> <li>❖ Various chemotherapeutic agent and their mode of action</li> <li>❖ Isolate and identify microorganism from laboratory sample,</li> <li>❖ Antibiotics sensitivity and resistance test</li> <li>❖ Detection of parasite</li> <li>❖ Handling of blood and body fluids</li> <li>❖ This interdisciplinary course teaches the students interactions between human and microbes, diseases caused by microbes.</li> <li>❖ They learn about culture, collection, handling and transport of clinical samples</li> <li>❖ They also learn about diagnosis of various microbial diseases</li> <li>❖ At the end of the course students will be able to identify diseases and understand the treatment plan</li> <li>❖ Understand the importance and the role of normal flora, diagnosis and treatment.</li> <li>❖ Description , classification, structure, and pathogenesis of bacteria that infect humans.</li> <li>❖ To understand the importance of pathogenic bacteria in human disease with respect to infections of the respiratory tract, gastrointestinal tract, urinary tract, skin and soft tissue and explain the methods of microorganisms control, e.g. chemotherapy &amp; vaccines. Solve problems in the context of this understanding.</li> <li>❖ Recall the relationship of this infection to symptoms, relapse and the accompanying pathology.</li> </ul>
<p><b>Course: Sem VI Paper 7 : Diagnostic and Therapeutical Microbiology</b></p>	<ul style="list-style-type: none"> <li>❖ Course outcomes: By the end of this course, the students will be able to:</li> <li>❖ Understand and explain the stages of infections diseases</li> <li>❖ Describe various modes by which infections spread in community</li> <li>❖ Describe various methods that can be adopted to control spread of infection in community</li> <li>❖ Understand and explain various hospital borne, air borne and water-borne diseases</li> <li>❖ Understand how to educate the people about taking care of health</li> <li>❖ Isolate and identify microorganism from laboratory sample</li> <li>❖ Perform MIC of antibiotics</li> <li>❖ ELISA test for disease diagnosis</li> <li>❖ Immuno-diffusion techniques</li> </ul>
<p><b>Course: Sem VI Paper 7 : Medical Bacteriology, virology and parasitology</b></p>	<ul style="list-style-type: none"> <li>❖ To inculcate knowledge in relationship between human disease and micro organisms, pathogenicity, laboratory diagnosis and treatment methods</li> <li>❖ This course is designed to impart knowledge on infectious disease epidemiology, investigating the outbreak and the role of public health laboratories in disease surveillance.</li> <li>❖ The students are taught on the various infectious diseases, mode of transmission and different evaluation and control strategies. The students would also be able to appreciate behavioral changes in HIV patients, blood safety and immigrant health.</li> <li>❖ The student at the end of the course will be able to gain knowledge about vaccination, screening of various diseases</li> <li>❖ To inculcate It provides knowledge of pathogenic microorganisms, their characterization, pathogenesis and control</li> <li>❖ Student can safeguard himself &amp; society and can work diagnostics and hospitals</li> </ul>

	<p>knowledge about virus, their role in causing disease Various viral disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxis</p> <ul style="list-style-type: none"> <li>❖ Various bacterial disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxis</li> <li>❖ Various fungal disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxis</li> <li>❖ Various protozoal disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxis</li> </ul>
<p><b>Course: Sem VI</b>  <b>Paper 8:</b>  <b>Food</b>  <b>Microbiology</b></p>	<ul style="list-style-type: none"> <li>❖ Enable the student to get sufficient knowledge in relationship between food and microbes, techniques used in food processing. Primary Source of microbes in various foods</li> <li>❖ Definition, general features and different products of milk</li> <li>❖ Microbial analysis of milk</li> <li>❖ Microbial production of fermented food viz. cheese, bread etcMilk microbiology- technique used in milk industry,</li> <li>❖ Food microbiology – technique used in food industries,</li> <li>❖ Microbial food poisoning Students in this course will learn about microbes in food, spoilage of food and preservation techniques of food.</li> <li>❖ Through this course, they also learn about microbiology of milk, fermented diary products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms.</li> <li>❖ At the end of the course, the student will be able to use the preservation techniques for food and use this experience to be employed as quality control Experts</li> <li>❖ Understand the role microorganisms in food spoilage &amp; to use predictive microbial growth programs with various food case studies to examine growth of foodborne pathogens and spoilage microbes.</li> <li>❖ Understand theoretical background of functional micro-organisms (lactic acid bacteria, yeasts and molds), their behavior as fermentation starters, process engineering aspects of the formation of biomass and products, and of modern biotechnology in food fermentation.</li> <li>❖ Understand the concept of food preservation and food poisoning.</li> <li>❖ Understand microbial processes aimed to solve environmental problems.</li> </ul>





**MVS GOVT. ARTS & SCIENCE COLLEGE  
(AUTONOMOUS), MAHABOONAGAR, TELANGANA.  
(NAAC ACCREDITED WITH 'B' GRADE)  
DEPARTMENT OF POLITICAL SCIENCE**

**COURSE CODE: PSCM 101: (Understanding political Theory – Semester-1)**

**COURSE OUTCOME OF POLITICAL SCIENCE:(Semester-1)**

**CO1: Discusses the development of political science as an academic discipline, approaches to the study of political science and political theory(Normative and Empirical)**

**CO2: Delineates the normative and Marxist ways of defining state, origin of state, divine origin, social contract, utilitarian perspective and the decline of state.**

**CO3: Points out the political values,theoretical perspective and concepts of liberty, equality, sovereignty, power and authority.**

**CO4: Discuss the political ideologies-Liberalism,Nationalism,Multiculturalism.**

**CO5: Highlights the variants of democracy, and authoritarian and totalitarian governments.**

**CO6: Covers political institutions and functions-Legislature,Executive and Judiciary.**

**CO7: Discuss the political parties,PressureGroups,Media.**

**COURSE OUTCOME OF POLITICAL SCIENCE: (Semester-2)  
(Western Political Thought)**

**COURSE CODE: PSCM 101:**

**CO1: Covers the Greek political thought of Plato and Aristotle.**

**CO2: It highlights the medieval and early Modern political thought as reflected in the philosophy of St. Augustine and St. Thomas Aquinas and Niccolo Machiavelli.**

**CO3: Delineates the political thought of Niccolo Machiavelli.**

**CO4: Discuss Social contract theories of Thomas Hobbes, John Locke and J.J.Rousseau.**

**CO5: It highlights the Utilitarian Thought of Jermy Bentham, J.S Mill.**

**CO6: Covers Philosophy of Dialectics-G.W.F. Hegal,Karl Marx.**

**CO7: Enlightenment politicalthoughtasreflected in theworksof JJ**

**RousseauandJSMill****COURSE CODE: PSCM 201: (INDIAN GOVERNMENT AND POLITICS)**

### **Basics of Indian Conistitution and Citizebship (Semister 3)**

**CO1: Glimpses of the background of the Indian Constitution, federal features, judicial review, parliamentary supremacy, concept of basicstructure.**

**CO2: Covers the preamble, funadamental rights, directive principles of state policy, fundamental duties and amendment procedure.**

**CO3: Deals with Statutory commissions for protection of rights(National Huma Rights Commission,SC&ST Commission and Minority Commission)**

**CO4: Delineates the Social and Political Movements in India-Farmers**

**Movements,DalitMovements,TribalMovements,Environmental movements and Women's Movemen.**

### **COURSE CODE: PSCM201: INDIAN GOVERNMENT AND POLITICS**

#### **Government and Politics (Semistr-4)**

**CO 1: Deals with the Indian administration and Cultural, Social, Political, Economic and Constitutional environment.**

**CO 2 Analysis of the Union Government and administration.**

**CO 3: Covers the various aspects of the State Government.**

**CO 4: Outlines the various aspects of local self government(Panchayat Raj and Urban) and democratic decentalisation.**

**CO5: Analysis the union and state relations.**

**CO6: Discuss the nature of Indian political system and electoral politics.**

**COURSE CODE: PSCM 301: POLITICAL THOUGHT**

**Ancient and Medieval Political Thought (Semester-5)**

**CO1: To demonstrate knowledge of key thinkers and concepts.**

**CO2: To understand the nature, methods and significance of political thought.**

**CO3: To analyse theory of ancient & medieval political thought of Greek and India.**

**CO4: To understand the relationship between religion and politics in early modern political thought.**

**CO5: To acquire knowledge about modern political thinkers and their views on state craft.**

**CO6: To compare with the social contract theorists thoughts.**

**CO7: To analyse the Marxist philosophy in making a better society.**

**CO8: To appreciate the various social and political ideas of Indian political thinkers.**

**COURSE CODE: PSCM 302: (INTERNATIONAL RELATIONS-1, Semester 5)**

**CO1: Acquaints with the origin and growth of International Relations (IR) as an academic discipline, meaning and scope of IR, Emergence of Sovereign System.**

**CO2: Covers the history of IR and highlights the great power system, Colonialism, the two world wars, the cold war and the post cold war era.**

**CO3: Explains the concept of IR like national power, Super power, regional power, Detente and national security, human security, diplomacy, conflict and conflict resolution.**

**CO4: Underlines the working of UN system, collective security, peace keeping machinery, regional organisations (EU, ASEAN, SAARC, BRICS).**

**COURSE CODE: PSCM 303: POLITICAL THOUGHT**

**(Western and Indian Political thought – Semester 6)**

**CO1: Covers Idealists thoughts of GWF Hegel Dialectics and theory of state, The Green-Rights and political obligation.**

**CO2: Explains Marxian philosophy-Karl Marx Dialectical and Historical Materialism.**

**CO3: Explains the ancient Indian political thoughts of Buddha- social and political ideas, Basava's social ideas.**

**CO4: To appreciate the various social and political ideas of Indian political**

thinkers.

**CO5: Highlights the liberal; political thinking of MK Gandhi and Jawaharlal**

**Nehru.**

**CO6: Discuss the political thinking of depressed class movements with reference to Jyotiba Phule and BR Ambedkar.**

**COURSE CODE: PSCM 304: (INTERNATIONAL RELATIONS**

**International Relations in 19<sup>th</sup> & 20<sup>th</sup> Century-II (Semester-6 Optional)**

**CO1: Discuss the International political economy- Neo Colonialism, IBRD, IMF, WTO, MNCs.**

**CO2: Assess India's bilateral relations- India and major powers (USA, Russia), India and neighbouring countries (China and Pakistan)**

**CO3: Covers Foreign policy determinants, features and Non-alignment-Relevance.**

**CO4: Covers international security- Arms race, Arms control, Disarmament, Issues in Nuclear Politics and international political economy.**

**CO5: Deals with contemporary issues like environment, feminism, self determination, globalization and terrorism.**



**MVS Govt. Arts & Science College, (A)  
Mahabubnagar**

*Affiliated to Palamuru University*

**Department of English (PO's & CO's)**

B.A/B.Sc/ B.Com and other UG Courses—GENERAL ENGLISH

**After the successful completion of the TWO years (CBCS pattern),  
students will learn,**

**SEMESTER - I**

**COURSE CODE: BA/BC/BS 102**

**COURSE NAME: English Made Easy**

CO1: Unit 1. Students can understand human behavior and perspectives through the characters from the lesson- ***The Curb in the Sky***. And also Students can comprehend 'Reading Skills-Speaking Skills', Consonant Sounds, Nouns, Word roots, Prefixes & Suffixes, Spelling, capitalization, Soft Skills, Value orientation, and conversational skills with the help of story. (***The Curb in the Sky***)

CO2: Unit 2. Students can explore and comprehend the human psychology, and how people run after material things for finding happiness. Provided some examples by the author, students can understand how to lead a happy life through the story '***Happy People***'- The learners will be able to learn formal conversation Monophthongs, Pronouns, Forming antonyms using *Un,-* and *Dis*, Reading Comprehension Skills, how to build self-confidence through Soft Skills and, raising doubts for comprehensive learning under 'Value orientation'

CO3: Unit 3. Students can explore the poet views at the meaning of life and maintains a positive outlook despite a life of hardships through the poem ***The psalm of life***- Additionally they can understand, Diphthongs, Auxiliary verbs, Homonyms, Homographs, and Homophones, punctuation, Conversational Skills through describing college and course of study, through *Bathukamma* passage- understand Telangana state's floral festival while focusing on its vocabulary learning, Descriptive writing, Importance of Verbal- Non-Verbal Communication, and how "action speaks louder than Words" under Value Orientation.

CO4: Unit 4. Students can understand about drama and its characteristics through the play ***The Dear Departed***, -And also they can cope up with how the human relations are sustaining in the modern world. Apart from the play, students can enhance their reading skills, writing Skills as well through dialogue writing. Besides that students can enhance their reading- writing style by following Main & Auxiliary Verbs, Tenses, and Collocations. Coming

to Skills, they are able to learn Interpersonal Skills, and the value orientation.

## SEMESTER - II

**COURSE CODE: BA/ BC/ BS 202      COURSE NAME: English Made Easy**

CO1: Unit-1. Students can understand –What is real Charity through the character Marian from the lesson **A Visit of Charity**. Apart from the story, students can understand Plosive sounds, Non-finite Verbs, Literary figures like Simile and, Metaphor, Conversation skills through Asking for information, Reading passage about Hyderabad, Note-Making, Time-management and the value of time through Value orientation.

CO2: Unit-2. Students can learn people behavior at the time of Solar Eclipse and how the writer remarks on the irony that it is humankind's capacity for thought and imagination that has led to belief in superstition through the lesson **BENARES**. Besides the lesson, students can learn Fricatives, Adjectives, Figures of Speeches like, Oxymoron and Hyperbole, *Burrakataha* through reading passage, Informal letter writing, Leadership Qualities, as well Value Orientation- The pen is Mightier than Sword.

CO3: Unit-3. Students can explore the depression status of the poet through the poem Stanzas **Written in Dejection, Near Naples**. Apart from the poem, students can comprehend Portmanteau words & loan words, How to reading a poem, How to conducting a meeting, how to write formal letter, Stress management, and the value orientation- Practice makes perfect. Additionally, they can learn Articles, Affricates and Fricatives, and punctuation marks.

CO4: Unit-4. Students can be familiar and learn William Shakespeare's plays and his life history specifically the great play **Julius Caesar** – Act-III, Scene-II. Through this short extract demonstrates two instances of the power of words, students can realize the power & Skills of public speech. Besides, students can learn Adverbs, palindromes, Derived forms of the words, punctuation, Interview Skills, **The Handicrafts of Telangana** through reading a passage, Soft skills like Etiquette and Grooming , and also the value orientation- Necessity is the mother of Invention.

## SEMESTER - III

**COURSE CODE: BA/BC/BS 302      COURSE NAME: English in Use**

CO1: Unit-1. Students can study and understand comprehensively how to face disappointments in life, and how to regain balance through the poem of **Life**, and also they can understand the human emotions, opportunities and challenges by presenting the poetess, Charlotte Bronte. Through the Tagore's prose piece, **A Wrong Man in Workers' Paradise**, students can be impressed and learn the writing style of Tagore and emphasizing the significance of Art. Besides, students can learn Synonyms and Antonyms, and

prepositions- related the above said a poem and a prose piece.

CO2: Unit-2. Students can comprehend poet's experience in her school days through the poem ***Punishment in Kindergarten***. Through a prose ***Toasted English***, students can study and realize the views of the writer on English language and noticed the importance of 'Bharat Brand of English' and the readers can go through the experiences of the writer in English countries. Additionally, students can aware and differentiate between the variants of British and American English (common words only), and, a grammar topic-Voice.

CO3: Unit-3. Students can examine and learn in a critical perspective the concept of ***Racism and Discrimination*** through the poem, ***As I Grew Older***. And also learn the essential qualities in democracy at the perspective of Indian constitution through a speech entitled ***The Grammar of Anarchy***, which emphasizes the Trinity. Additionally, students can go through vocabulary and grammar topics- Phrasal Verbs and Concord.

CO4: Unit-4. Students learn in a detail description of ***Essay Writing***. Essay writing is perhaps the most common form of writing that a student encounters during their academic life and later in the process of securing employment. Students learn after studying scrupulously, the four main types of essays- Narrative, Descriptive, Discursive and Argumentative. For displaying mastery and fluency in the language, students are motivated to learn ***IDIOMS*** properly in speech and writing. Students learn through a grammar topic- ***Connectives***, which help in establishing connections within and between sentences.

CO: Unit-5. Students will be practiced through ***Report Writing***, which plays a key role in any organization and students can differentiate what is formal and informal in writing. Specifically- ***Business Reports*** which can be described as organized, written statement of facts related to business or commercial interests, and another one is ***Media Reports***, which can be categorized into print, electronic, and Digital media.

## SEMESTER - IV

**COURSE CODE: BA/BC/BS 402**

**COURSE NAME: *English in Use***

CO1: Unit-1. Students can comprehend and analyze in a critical perspective regarding courage of convictions, and how to act in accordance with beliefs, unmindful of praise or criticism, and also able to differentiate between familiar and unfamiliar; envy and jealousy as well as some figures of speeches like fable; parable; metaphor and allegory through the poem ***The Flower***. Finding enjoyment in learning is absolute statement from a prose piece ***The Kite Maker***; through this lesson students explore human psyche and past experience of an old man about his kite making profession. Additionally, they go through the language enhancement topics such as '***Commonly confused words, Determiners*** as well.

CO2: Unit-2. Students take a *tour de force* through the poem ***Ecology*** in which students can understand the inextricable relationship between human beings and nature and the need

for protecting our environment. An excerpt entitled **what's the Language of the Future**; students comprehensively understand English language and its insights in modern world and even in future. They learn the factors that helped the spread of English in the past and also the reasons of 'English Fever' and 'challenges in English language' in near future. Furthermore, Students will be familiar with **Indianisms** under Vocabulary enhancement; subsequently they will go through the phrases 'local color of English,' 'Indian English,' and can differentiate between American and British English. Additionally, they will frame the **questions** and **question tags** under the category of 'English Grammar.'

CO3: Unit-3. Using a satirical device, the poet explains how he '*imagination*' will be rotten by watching television persistently in the poem Television; students can get to the bottom of exploitation of human senses through watching television and they grasp the verity of reading books as healthier alternative to watching T.V. Through a prose piece entitled **The Fringe Benefits of Failure, and the importance of Imagination**, students make sense of a specific goal or ambition in life, the definition of success and failure, empathy and sympathy, human capacities, discover new things and new ideas and also accept challenges and responsibilities. Apart from these, students can learn **One-word substitutes** under the category of vocabulary enhancement and **Relative Clauses** under the part of Grammar.

CO4: Unit-4. Students can cognize about the process of **Review Writing: Film Review, Book Review**. They will be experienced a critical assessment of a book, product or service; Students learn how to express their opinions, ideas impartially. In this unit they are able to write film and book reviews and also the adequate vocabulary. Another essential part of language enhancement **Vocabulary: Technical Vocabulary (Film and Literature)**, which provides the information related to technical like rom-com, slice-of-life, film, genre, protagonist, melodrama, laugh-aloud-humor, etc. Besides, they learn Conditionals under the category of Grammar.

CO5: Unit-5. Students can differentiate between C.V, Bio-Data, and Resume through **C.V Writing: Chronological CV, Functional CV**, Which is an essential topic for all U.G students by preparing C.V as they are going to apply for jobs after completion of degree in future. Furthermore, in preparing CV, they comprehend by following general guidelines, types of CVs, Chronological CVs, how to conclude, writing a Covering Letter and also practicing. Additionally, they are going to learn Appropriacy and Common Errors.

## PROGRAMME OUTCOMES

Two text books – **English Made Easy** for the first and the second semesters and **English in Use** for the third and the fourth semesters – have been prescribed. Both these text books aim at:

1. Making the students realize the importance of the language – both written and spoken – in the present day scenario
2. Provide thorough grounding in the basics of soft-skills
3. Equipping the students with communication skills and people skills



After the successful completion of two years, students will be able to comprehending,

## PROGRAMME OUTCOMES

<b>P01</b>	<ol style="list-style-type: none"> <li>1. Infusing passion for reading and writing</li> <li>2. Filling up the gaps in language abilities left due to formal education</li> <li>3. Creating thorough grounding in all four language abilities-reading, writing, listening and speaking</li> <li>4. Improving their skills in the areas of grammar and vocabulary</li> <li>5. Developing reading and writing skills</li> <li>6. Familiarizing the students with the culture of the region</li> </ol>
<b>P02</b>	<ol style="list-style-type: none"> <li>1. Addressing the English language needs of students.</li> <li>2. Enhancing the critical thinking capabilities</li> <li>3. Emphasizing on the use rather than usage of English; on how the language is used rather than how it should be used.</li> <li>4. Exposing the students to a range of real-life contexts where the English language is in usage.</li> <li>5. Enabling the students to communicate information, opinions, ideas and feelings</li> </ol>
<b>P03</b>	<ol style="list-style-type: none"> <li>1. The main benefit for students, they gain when committing to learning English (or any language) is the ability to communicate with the language itself and create connections with a wider range of the world's population.</li> <li>2. Language learning showed an increase in memory capacities, this was especially strong in short-term memory.</li> <li>3. Language learning allows the brain to keep information in the brain for longer durations while thinking processes are activated.</li> <li>4. Language learning helps "exercise" the brain to keep it flexible and agile.</li> <li>5. Students get benefits from language learning by gaining increased problem-solving abilities.</li> </ol>
<b>P04</b>	<ol style="list-style-type: none"> <li>1. Providing value orientation through passages and anecdotes</li> <li>2. Enhancing knowledge of various aspects of language such as pronunciation, grammar, vocabulary, spelling, punctuation, Conversation and writing.</li> <li>3. Emphasizing the importance of extensive practice.</li> <li>4. Integration of knowledge and skills.</li> <li>5. Equipping the students to engage with the practical, emotional, intellectual and creative aspects of language</li> <li>6. The culmination of all these advantages results in one last benefit: an increased ability in digital literacy.</li> </ol>