GOVT. P.G. COLLEGE, KHARGONE(M.P.)

21/09/2022

COURSE LEARNING OUTCOMES (CLO)

SCIENCE MAJOR & MINOR

GOVT. P.G. COLLEGE, KHARGONE(M.P.)

Course Learning outcomes (CLO)

Subject: Biotechnology

Course Title Basic Molecular Biology

Course Type Major-1

1. Students will be able to explain role of different protein/ enzymes involved in cell signaling.
2. They will be able to understand mechanism of genetic damage caused by mutation and role of various repair system in neglecting the effect of these mutation.
3. Students will be able to explain mechanism of DNA replication, transcription, translation and other related processes.

Subject: Biotechnology

Course Title Recombinant DNA Technology

Course Type Major-2 / Minor

1. The objectives of this course are to teach students with various approaches to conduct genetic engineering and their applications in biological research as well as in biotechnology industries.
2. Genetic engineering is a technology that has been developed based on our fundamental understanding of the principles of molecular biology and this is reflected in the contents of this course.
3. Given the impact of genetic engineering in modern society, the students should be endowed with strong theoretical knowledge of this technology.

4. In conjunction with the practicals in molecular biology and genetic engineering, the students should be able to take up biological research as well as placement in the relevant biotech industry.

Course Learning outcomes (CLO)

Subject: Botany

Course Title Plant Anatomy and Embryology

Course Type Major - 1

1. Students will learn the internal structure of plants. It will enhance the basic understanding of organization of plant body by cells and tissues.
2. Students will understand the dynamic mechanism of plant pollination, fertilization and development.
3. They will have hands on training on section cutting, preparation of slides, study of pollen and ovules.

Subject: Botany

Course Title Industrial Botany

Course Type Major-2 / Minor

1. This course will provide knowledge on plants and their parts used in various industries.
2. Students will get an idea to establish plant based natural product industry.
3. This course will make the students self-reliant.

Course Learning outcomes (CLO)

Subject: Chemistry

Course Title Reactions, Reagents and Mechanisms in Organic

Course Type Major - 1

By the end of this course students will acquire the knowledge of following aspects of chemistry:

1. Various organic reactions, reagents and their mechanisms, which will be helpful in understanding organic synthesis.
2. Application of the reactions in the various industries like pharmaceutical, polymer, pesticides, textile, dyes etc.
3. Important key reactions used in further study and research work.

Subject: Chemistry

Course Title Transition Elements, Chemi-energetics, Phase Equilibria

Course Type Major-2 / Minor

By the end of this course students will learn the following aspects of Chemistry

1. Introductory, idea about Traditional Indian Chemistry
2. Chemistry, of d & f-block Elements, Basic Concepts of Coordination Chemistry.
3. Stereochemistry of Transition Metal Complexes.
4. Laws of Thermodynamics.
5. Concept of Phase Equilibrium with reference to Solid Solution, Liquid-Liquid Mixtures, Partially Miscible Liquids.
6. Basic Concepts of Electrochemistry.

Course Learning outcomes (CLO)

Subject: Computer Science

Course Title Computer Networks & Information Security

Course Type Major - 1

After completing this course student will be able to:

1. Define and describe the components of Data Communications System such as various protocols, OSI Model, data transmission in analog and digital format.
2. Identify and differentiate among the network devices and drivers.
3. Learn and describe various error detection and correction methods. Define the various terminologies used in Network and Application layers.
4. Compare the various network technologies and can decide the suitable technology installation as per requirement and environment at any work place.
5. Describe the various protocols and can identify the application areas of each protocol.
6. Know the fundamentals of network and information security issues, laws, and various security technologies which can be applied on work place.

Subject: Computer Science

Course Title Object Oriented Programming with Java

Course Type Major-2 / Minor

After the completion of this course, a successful student will be able to do the following:

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to a specific problem.
3. Demonstrates how to achieve reusability using inheritance,

interfaces and packages and describes faster application development can be achieved.

4. Demonstrate understanding and use of different exception handling mechanisms and concepts of multi-threading for robust faster and efficient application development.
5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events.
6. Identify, Design & Develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.

Course Learning outcomes (CLO)

Subject: Microbiology

Course Title Microbial Physiology and Metabolism

Course Type Major – 1

On completion of this course, learners will be able to understand -

1. Role of various biomolecules.
2. Structure and metabolism of Carbohydrates.
3. Structure and metabolism of Amino acids and Proteins.
4. Mechanism of enzyme action.
5. Structure and metabolism of lipids.
6. Structure, types and roles of Nucleic Acids.

Subject: Microbiology

Course Title Microbial Diversity and Growth

Course Type Major-2 / Minor

On completion of this course, learners will be able to –

1. Classify bacteria into groups and their salient characteristics.
2. Describe the nutritional requirements of bacteria for growth.
3. Understand viruses and viral diseases.
4. Know about diversities in Fungi and Algae
5. Develop a basic idea about Protozoa.

Course Learning outcomes (CLO)

Subject: Physics

Course Title Waves and Optics

Course Type Major – 1

After the completion of the course, the student should be able to

1. Develop an understanding of various aspects of harmonic oscillations and waves specially superposition of collinear and perpendicular harmonic oscillations.
2. Explain several phenomena of daily life that can be explained as wave phenomena.
3. Understand various optical phenomena, principles, workings and applications.
4. Use the principles of wave motion and superposition to explain the Physics of polarization, interference and diffraction.

Subject: Physics

Course Title Electricity Magnetism and Electromagnetic Theory

Course Type Major-2 / Minor

After the completion of the course, the student should be able to

1. Understand the basic concepts of electricity and magnetism and their applications.
2. Apply various network theorems and their applications in electronics, electrical circuit analysis, and electrical machines.
3. Understand the construction and working of ballistic galvanometer and cathode ray oscilloscope.
4. Understand the concept of electromagnetic waves and their reflection and refraction from a plane surface.

Course Learning outcomes (CLO)

Subject: Zoology

Course Title Diversity of Chordates and Comparative Anatomy

Course Type Major – 1

After completion of the course students will able to:

1. Understand chordate diversity of animals and their taxonomic position.
2. Identify the morphological and anatomical features and basis of chordate classification
3. Know economic importance and present status that will develop positive attitude towards conservation of biodiversity.
4. Differentiate the organism belonging to different taxa by studying comparative anatomy.
5. The project, assignment will give them a flavor of research in studying biodiversity, taxonomy besides improving their writing skills and lay foundation of career in Zoology.

Subject: Zoology

Course Title Physiology and Biochemistry

Course Type Major-2 / Minor

Upon completion of the course, Students will be able to

1. Understand how organs function at different levels i.e. from cellular to system levels.
2. Examine internal harmony of different body systems by learning inherent disorders and deficiencies, which is needed to maintain good health.
3. Understand functions of biomolecules & their role in metabolism by studying biochemistry.
4. Develop a strong foundation for research & employability Skills.
5. Improve the student's perspective of health biology through deep study of physiology.

Course Learning outcomes (CLO)

Subject: Mathematics

Course Title Abstract Algebra and Linear Algebra

Course Type Major – 1

The course will enable the students to:

1. Recognize the algebraic structures as a group, and classify them as abelian, cyclic and permutation groups, etc.
2. Link the fundamental concepts of groups and symmetrical figures.
3. Analyze the subgroups of cyclic groups.
4. Explain the significance of the notion of cosets, normal subgroups, and quotient groups.
5. The fundamental concept of rings, fields, subrings, integral domains and the corresponding morphisms.
6. Analyse whether a finite set of vectors in a vector space is linearly independent. Explain the concepts of basis and

dimension of a vector space.

7. Understand the linear transformations, rank and nullity, matrix of a linear transformation, algebra of transformations and change of basis.
8. Compute the characteristic polynomial, eigenvalues, eigenvectors, and eigenspaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result.

Subject: Mathematics

Course Title Advanced Calculus and Partial Differential Equations

Course Type Major-2 / Minor

The course will enable the students to:

1. Understand many properties of the real line R and sequences.
2. Calculate the limit superior, the limit inferior, and the limit of a bounded sequence.
3. Apply the mean value theorems and Taylor's theorem.
4. Apply the various tests to determine convergence and absolute convergence of an infinite series of real numbers.
5. Formulate, classify and transform partial differential equations into canonical form.