Pathari Taluka Shikashan Prasarak Mandal's

K.K.M. College, Manwat Dist Parbhani 431505

CRETRION II- 2.6.1- PROGRAMME OUTCOMES, PROGRAMME SPECIFIC OUTCOMES, COURSE OUTCOMES

PROGRAMME OUTCOMES

B SC

BOTANY – CURRICULUM B.Sc. General (CBCS Pattern)

Introduction:

The University Grants Commission (UGC) has initiated several measures to bring equity, efficiency and excellence in the Higher Education System of country. The important measures taken to enhance academic standards and quality in higher education include innovation and improvements in the curriculum, teaching-learning process, examination and evaluation systems, besides governance and other matters.

As a result, the grading system is considered to be better than the conventional marks system and hence it has been followed by our university. So, it is desirable to introduce uniform Choice Based Credit System CBCS system. This will facilitate student mobility across institutions, within and across countries and also enable potential employers to assess the performance of students.

The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses). The choice based credit system provides a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning. Our university has already introduced the choice based credit system. The semester system accelerates the teaching-learning process and enables vertical and horizontal mobility in learning.

Keeping in mind BoS in Botany prepared the curriculum to ensure up-to-date level of understanding of plant sciences. Studying plant sciences prepares the student for a career working in either an educational institution or an industry in which you can be directly involved in the research and development and Knowledge of modern and applied plant science and excellent career prospects.

The study of Botany aims to expand and increase current knowledge about plants in order to solve problems in many fields including agriculture, ecology, medicine, biotechnology and horticulture. These are some of the objectives kept in mind during drafting the syllabi.

How plants function at the cellular, tissue, organ, and organismal levels? How evolution of plants and how they contribute to biodiversity. How interactions with each other impact their

physical environment are the core objectives.
The addition of Skill enhancement course aims to develop skills in plant sciences and practical experience to the students.
At the end of the curriculum, the student should have increased an aptitude towards science and nature , undertakes the fundamental and applied research in plant science for the benefit of the human and nature.
At last comments, suggestions are welcome from all the teachers, stakeholders and students for the upbringing the curriculum.
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Salient Features :
The syllabus of B Sc IIIrd year Botany has been framed to meet the requirement of Choice based Credit System. The courses offered here in will train and orient the students in the field of Botany.
The Section A of DSEB deals with Plant Physiology, Plant Metabolism, Biochemistry and Biotechnology. The Section B of DSEB with choice provides an option to learn courses like Plant Pathology-I & II, Systematic Botany-I & II and Herbal Technology-I & II.
This would help students to lay a strong foundation in the field of Botany.
Overall after completion of this course, students will also acquire fundamental knowledge in Plant Science and also understand that Botany is an integral part of the human life and developments.
Skill Enhancement Courses like Fruit and vegetable processing, Herbal drug technology, Floriculture, Bioinstrumentation, Medicinal plant product preparation skill, Fungal biomass production skill (Mushroom cultivation), Fungal biomass production for biocontrol and Algal biomass production skill (Spirulina cultivation) offered during this program are designed with the aim of imparting specific skills to the students which will lead to the self employability through development of their own enterprises.
Utility of Course
This program will train and orient the students in the field of Genetics and Molecular Biology , Plant Breeding , Diversity of Plants, Anatomy and Embryology of Angiosperms, Environmental Biology, Plant Physiology, Biochemistry and Biotechnology, Plant Pathology, Systematic Botany and Herbal Technology in relation to Environment and Agriculture as well as Biotechnological, Pharmaceutical and Herbal Industries. This will help the students for their career development.
Skill Enhancement Courses offered during this program will provide additional specific skills to the students for self employability through the development of their own enterprises.
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Learning Objectives :
The Objective of this program are :
1. To provide an updated education to the students at large in order to know the importance and scope of the discipline and to provide mobility to students from one university or state to other.
2. To update curriculum by introducing recent advances in the subject and enable the students to face NET, SET, UPSC and other competitive examinations successfully.

3. To impart knowledge of plant science as the basic objective of Education.
4. To develop a scientific attitude to make students open minded, critical and curious.
5. To develop an ability to work on their own and to make them fit for the society.
6. To expose themselves to the diversity amongst life forms.
7. To develop skill in practical work, experiments, equipments and laboratory use along with collection and interpretation of plant materials and data.
8. To make aware of natural resources and environment and the importance of conserving the same.
9. To develop ability for the application of the acquired knowledge in the fields of life so as to make our country self reliant and self sufficient.
10. To appreciate and apply ethical principles to plant science research and studies.
Prerequisite :
The optional courses are offered to the students registered for undergraduate programs. Such students should have the basic knowledge of Plant Science and willing to gain additional knowledge in the field of Botany

Chemistry

B. Sc. First Year (Chemistry) Semester-I & II

Aims and Objectives.
1 B. Sc. First year, Chemistry syllabus has been framed as per UGC-CBCS pattern.
2 The students are expected to understand the fundamentals, principles, mathematical concepts and recent developments in the subject area.
3 To enable the students to understand basic concepts, nomenclature, functional groups, hydrocarbons, aromaticity, and fundamental term in organic chemistry.
4 The students are able to know the elements present in nature & its properties.
5 The practical course is in relevance to the theory courses to improve the understanding of concepts in chemistry.
6 It would help in development of practical skills of the students.
7 It is expected to inspire the students towards competitive exams in chemistry

B.Sc. Chemistry First Year (Semester-II) Paper-III: Organic + Inorganic Chsemistry, (CCC-II) Credits: 02 Periods: 45 Section-A (Organic Chemistry)

Outcomes:
After completion of syllabus students will be able to understand following outcomes.
1. Student should learn basic concept of organic chemistry, Nomenclature.
2. Student get well acquainted with functional group in organic chemistry.
3. To understand the basic concepts and differences aliphatic hydrocarbons.
4. To know about term cycloalkane , cycloalkene and diene.
5. Learn and practice about organic compounds with their names.
6. Students learn some exceptional electronic configuration, trends and Periodicity in the following properties like atomic size, ionization energy, electron affinity & electronegativity.
7. To understand the inert gases forms compounds, different fluoride compounds of xenon.

Section –B : Inorganic Chemistry.

Outcomes: After completion of syllabus students will be able to understand following outcomes.

1. Student should learn the concept of aromatic hydrocarbons, Aromaticity and antiaromaticity.
2. Student should understand the phenols and synthesis of phenols
3. Student knows about the haloalkene and haloarenes compounds.
4. To know the concepts of carboxylic acids and their derivatives.
5. To know about the types of alcohols and reaction of epoxide.
6. To study the different properties of P- block elements.
7. To know the acids & Bases by different concepts.

Paper-IV (CCC-II) Physical + Inorganic Chemistry

Outcomes: After completion of syllabus students will be able to understand following outcomes.

1. To impart knowledge of atomic structure, different theories of atomic structure, rules of electronic configuration and quantum numbers.
2. Learning of properties of liquid phase as surface tension, Viscosity and parachor.
3. Student will learn the basic knowledge of colloidal state, types, preparation, properties and applications of colloidal state.
4. Learning and understanding of catalysis, types of catalysis and characteristics of catalyzed reactions.
5. To understanding the chemical bond and its different types of bonds.
6. Learning the Concept of hybridization and study of VSEPR & Molecular Orbital theory

Mathematics

B.Sc. (Mathematics)

Course Description: This course provides an elementary knowledge of Limit, Continuity, Differentiation, higher order Derivatives, Expansion of functions, Equation of Tangent and Normal, Mean Value Theorem, Partial Differentiation.

Objectives: A primary objective of the course is to learn elementary knowledge of Differential Calculus

Outcomes: After successful completion of the course student will be able to

1. Understanding concept of Limit, Continuity of Single and two variable Functions.
2. Find the Higher order derivatives of Product of Functions
3. Expand functions in terms of infinite series.
4. Find Equation of Tangent, Normal and Length of Tangent, Normal, Sub-tangent, Sub-normal.
5. Understanding of Mean Value Theorem concepts.
6. Understand the concept of Partial differentiation.
7. Use the results to solve problems.
8. Differentiate difference between derivative of single variable and two variables.

CCM-1,(Section B) Paper II: Algebra and Trigonometry

Course Description: This course provides an elementary knowledge of Matrix, Types of Matrices, Adjoint of a Square Matrix, Rank of a Matrix, Linear Equations, Characteristic Roots and Characteristic Vectors, Trigonometry, and Complex Quantities.
Objectives: A primary objective of the course is to learn elementary knowledge of Matrices, Complex Numbers, and Trigonometry.
Outcomes: After successful completion of the course student will be able to
1. Add, Subtract and Multiply two Matrices.
2. Recognize the different types of Matrices.
3. Find the Inverse of invertible Matrices.
4. Determine the Rank of a Matrix.
5. Transform matrix to Row Echelon form
6. Solve the System of Linear Equations.
7. Find the Characteristic Roots and Characteristic Vectors of a Square Matrix.
8. Check that every square matrix satisfies its own Characteristic Polynomial.

CCM-2, Section-A Paper III: Calculus-II (Integral Calculus)
Course Description: This course provides the methods of finding integration, concept of integral and Its applications to find Area and Volume.
Objectives: The main objective of the course is to study methods of finding Integration of Algebraic Rational Functions, Irrational Algebraic Functions, Transcendental Functions, Study Gamma and Beta Functions, Multiple Integral and Applications of integration to find Area and Volume.
Outcomes: After successful completion of the course student will be able to
1. Apply method of integration to find the integral of function.
2. Solve examples of definite integrals using Properties definite integrals.
3. Find the area and volume of given shape.
4. Understanding concept of Gamma and Beta Functions.
5. Solve problems on Multiple Integrals.

CCM-2, Section-B Paper IV: (Geometry)
Course Description: This course provides an elementary knowledge of Co-ordinates, Transformation of Co-ordinates, Direction Cosines, Plane, Right Line, Sphere, Cones, and Cylinder.
Objectives: A primary objective of the course is to learn elementary knowledge of Three Dimensional Geometry.
Outcomes: After successful completion of the course student will be able to
1. Understanding concepts on Three Dimensional Geometry.
2. Find equations of Right lines, Planes, Spheres, Cones and Cylinders.
3. Find the Direction cosines of any line under the different given conditions.
4. Understand the intersection of any two or three, three dimensional geometrical figures.
5. Transform the equation of a plane to the normal form.
6. Transform equation of line from the unsymmetrical to the symmetrical form.
7. Find the length of perpendicular from a point to a plane.

8. Find the angle of intersection of two spheres.
9. Understanding concepts of plane of contact.

CCMP-1, Based on CCM-1 and 2, Section-A (Annual pattern) Paper V: (PRACTICAL PAPER)
SOFTWARES: MATLAB or Related Freeware.
Note: PRACTICAL PAPER IS ONLY FOR B.Sc. Students.
Course Description: This course provides the Introduction to MATLAB , Interactive computation, Plotting of Graphs using MATLAB Software.
Objectives: The main objective of the course is to study MATLAB software and its application to solve problems in matrices and to plot the graphs of different functions.
Outcomes: After successful completion of the course student will be able to
1. Vertify associativity of matrix addition, left distributive law and right distributive law of matrices.
2. Find determinant, eigen values, eigen vectors, inverse, powers and characteristics polynomial of a square matrix.
3. To draw the graph of different functions with the help of MATLAB software and related Freeware.

Physics
B. Sc. First Year Physics (Semester I & II) CBCS Pattern syllabus effective from 2019-20
Learning objectives: The objective of this course is to introduce the students to the world of mechanics and properties of the matter that exists in different phases i.e., solid, liquid and gas. Laws of motion and its applications to various systems studied in this paper is of fundamental nature and enable the students to handle different types of problems and is the pre-requisite for several other advanced courses in physics and chemistry. The pre-requisite for this course is knowledge of calculus, wave theory and modern physics. This course is the core course and every student pursuing B Sc with physics as one of the optional is required to study this course.

CCP I - (Section B) P-II Core Course: Mathematical Methods in Physics
Learning objectives: This course is also aimed to develop knowledge in mathematical physics and its applications, to develop expertise in mathematical methods required in the study of Physics, to develop
critical thinking and problem solving skill.After completion of this course students will be able to apply the concept of vectors and complex variables to various physical quantities. This course will also enable
the students to solve the problems related to partial differentiation. Fourier Analysis unit will enable the
studetns to analyze the periodic functions.

CCP II - (Section A) P-III Core Course: Heat and Thermodynamics
Learning objectives: This course will introduce the students to the world of heat and thermodynamics and the behaviour of the physical systems at different thermodynamical

conditions. After completing this course students will understand the difference in the behaviour of the ideal and real gases, transport phenomenon in gases. Students will also understand the working of various heat engines and the ways to increase their working efficiency.

CCP II - (Section B) P-IV Core Course: Electricity and Magnetism

Learning objectives: The objective of this course is to introduce the students to the concepts of static and dynamical electrical magnetic fields, the sources for generating such fields, polarization and induction effects, understand the basic difference between the DC and AC circuits and their functioning. This course is of most applied nature and will enable the students to understand the role of electricity in everyday life, relate electrical conduction, vlate using Ohm's law and will also enable the students to understand the working principles of various electrical components and gadgets.

CCPP I (Section A & B) : Laboratory Course (P-V) : Physics Practical Paper

Learning Objectives: Objective of this Laboratory course is to introduce the students to the practical applications of the four core courses in Physics that the students have studied in Semester I and II. The Laboratory course also includes experiments based on the computational methods applicable for solving
problems in physical situations. The course will consist of lectures (both theory and practical) in the Computer Lab. Evaluation of the computational method does not include the programming skill of the students but will only analyze the basis of formulating the problem. Each student appearing for examination must produce a journal showing that he has completed not less than 12 experiments during the
year; out of which at least two should be based on the computational methods.

Zoology

B.Sc. First Year (Semester I & Semester II) Syllabus w.e.f. June, 2019 Semester Pattern; Subject: Zoology

B. Sc. First Year Syllabus w.e.f. June, 2019
Zoology
Semester -I
Paper: CCZ-I: Biodiversity of Invertebrates and Chordates
Section –A Title of Paper: Paper-I :Biodiversity of Invertebrates
Objectives:
1. To broadly understand Biodiversity, Habitat, Adaptation, Anatomical organization and taxonomic status of invertebrates phyla in relation to other animal taxa.
2. Understanding the basis of biological classification and its conceptual framework.
3. Appreciating the structural and functional correlation between different invertebrate groups.

Outcome of the Course:
1. The student will be able to identify a given invertebrate upto class level.
2. Ability to understand the contribution of Invertebrates in the biodiversity index of any

given habitat.
3. Ability to understand and appreciate the ecological and economic importance of invertebrates and vertebrates.
4. Ability to identify and describe external morphology and internal anatomical features of representative invertebrate species.

B. Sc. First Year Syllabus w.e.f. June, 2019 Zoology Semester -I Paper: CCZ-I: Biodiversity of Invertebrates and Chordates Section –B Title of Paper: Paper-II : Biodiversity of Chordates

Objectives:
1. To understand Biodiversity, Habitat, Adaptation organization and taxonomic status of Chordates.
2. Explaining the basic aspects of classification of chordates.
3. Develop the ability to understand structural and functional details of Chordates.
4. Develop a broad and correlated view of all chordate groups: extinct and living.
5. Acquire the skill to correlate anatomical and morphological aspects of different chordate groups

Outcome of the Course:
1. The student will be able to identify and understand the Biodiversity of Chordates.
2. Ability to understand anatomical relation between different vertebrate classes.
3. The learner will be able to understand the economic importance of Chordates.

B. Sc. First Year Syllabus w.e.f. June, 2019 Zoology Semester –II Paper: CCZ-II: Comparative Anatomy and Developmental Biology of Vertebrates Section –A Title of Paper: Paper-III: Comparative Anatomy of Vertebrates

Objectives:
1. To understand Anatomical structure of Vertebrates.
2. Explaining the basic aspects of evolution of various organs of vertebrates.
3. Understand the phylogenetic progression in vertebrate body and its systems.
4. To know about the extreme specialization in different organ systems in vertebrate groups in response to the environment.

Outcome of the Course:
1. The student will be able to identify and understand comparative anatomical structure of vertebrate organ systems.
2. The learner will be able to understand the evolution of various organs and systems in the vertebrate body according to its environment.
3. Understand the plasticity of organ systems to adapt to the environment and acquire different novel forms.

B. Sc. First Year Syllabus w.e.f. June, 2019 Zoology Semester –II Paper: CCZ-II: Comparative Anatomy and Developmental Biology of Vertebrates Section –B Title of Paper: Paper-IV :Developmental Biology of Vertebrates

Objectives:

1. To get an insight into embryonic development of vertebrates.
2. To correlate developmental stages of different vertebrate groups.
3. To identify and describe the different embryonic structures of vertebrates.
4. To grasp the basic processes of human development.

Outcome of the Course:

1. The student will be able to explain the basics processes of vertebrate embryonic development.
2. Ability to describe the various steps in vertebrate development.
3. Identify and explain about the different embryonic structures.
4. Describe the functions of different extra-embryonic structures.
5. Understanding of the Assisted Reproductive Technologies.

B. Sc. First Year Syllabus w.e.f. June, 2019 Zoology Semester –I &II Paper: CCZP-I Section –A&B Title of Paper: Practical Paper V:Biodiversity of Invertebrates and Chordates & Comparative Anatomy and Developmental Biology of Vertebrates(Based on P-I,II,III&IV)

Objectives:

1. To understand the anatomical organization of any species.
2. To identify and handle different body parts of invertebrates and vertebrates.
3. To understand and perform temporary and permanent mountings.
4. To identify and describe structure and functions of different bones.

1. Study of at least two museum specimens from Invertebrate Phyla. (Protozoa to Echinodermata and Hemichordata).
2. Study of at least two museum specimens from Protochordata to Mammalia.
3. Demonstration based on Models, Charts and Computer Aided Techniques: i) Cockroach: Digestive system, Nervous system. ii) Scoliodon: Digestive system, Heart and ventral Aorta, Afferent arteries, Brain.
4. Key for Identification of poisonous and non-poisonous snakes.
5. Permanent Mountings - i) Mouth parts of Cockroach; ii) Trachea of Cockroach; iii) Salivary glands of Cockroach; iv) Nereis Parapodia; v) Mounting of different types Scales (From Locally Available Fishes): Cycloid, Ctenoid and Placoid.
6. Osteology: a) Disarticulated skeleton of fowl and rabbit/rat; b) Carapace and plastron of turtle /tortoise; c) Mammalian skulls: One herbivorous and one carnivorous animal. (Models / Charts); d) preparation of articulated complete skeleton of any locally available animal.
7. Frog Embryology: Study of developmental stages, whole mounts and sections by permanent slides – cleavage stages, blastula, gastrula, neurula, tail bud stage, tadpole, external and internal gill stages.
8. Study of the different types of placenta- histological sections using permanent slides or photomicrographs.
9. Study of placental development in humans by using ultrasound scan images.

10. Examination of gametes - frog/rat - sperm and ova using permanent slides or photomicrographs.
11. Study of permanent slides of Chick Embryology: 18 hrs.; 24 hrs.; 36 hrs.; 48 hrs.; 72 hrs. Stages
12. Demonstration of rat so as to expose its reproductive system.
13. An “Animal Album” containing photographs, cut outs, with appropriate write up about the different taxa. Different taxa/ topics may be given to different sets of students for this purpose.
14. Short excursion/ study Tour is compulsory.
15. Submission:
i) Practical record book duly signed by the teacher in charge/Head of the Department.
ii) Five permanent stained micro preparations.
iii) Animal Album or Articulated complete skeleton of any locally available animal
iv) Excursion report.
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Outcomes:
1. Ability to understand the anatomical organization of organs and systems in representative species.
2. Ability to identify and describe structure and functions of different body parts of invertebrates and vertebrates.
3. Students would be able to prepare temporary and permanent mountings of biological material.
4. Students would be able to relate different bones and be able to articulate them to form an skeleton.
5. Students would make observations of organisms in their natural environment and document them.

MCOM

PO 1. Get advance knowledge in the field of business and management
PO 2. Acquire the basic skills required for carrying out business activities, research, stock market operation, accounting practices etc.
PO 3. Learn adequate knowledge and skill for providing consultancy service in financial and marketing.
PO 4. Confidently prepare for NET, SET and other competitive examination of their choice.