BOARD OF STUDIES

IN

B.Sc BOTANY

2024-2025

DEPARTMENT OF BOTANY

SYLLABUS FOR B.Sc BOTANY Honours
&
B.Sc BOTANY

PITHAPUR RAJAH'S GOVERNMENT COLLEGE

Autonomous and Accredited with 'A' Grade by NAAC (3.17 CGPA)
KAKINADA – 533 001, E G Dist., ANDHRA PRADESH

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc.Honours -Botany-Major / I Semester End (W.E.F. 2024-25)

INTRODUCTION TO CLASSICAL BIOLOGY

Hours/Week: 5 **Credits: 4**

Learning objectives

The student will be able to learn the diversity and classification of living organismsand understand their chemical, cytological, evolutionary and genetic principles.

Learning Outcomes

1. Learn the principles of classification and preservation of biodiversity
2. Understand the plant anatomical, physiological and reproductive processes.
3. Knowledge on animal classification, physiology, embryonic development and their economic importance.
4. Outline the cell components, cell processes like cell division, heredity and molecular processes.
5. Comprehend the chemical principles in shaping and driving the macromolecules and life processes.

Unit 1: Introduction to systematics, taxonomy and ecology.

1.1. Systematics – Definition and concept, Taxonomy – Definition and hierarchy.
1.2. Nomenclature – ICBN and ICZN, Binomial and trinomial nomenclature.
1.3. Ecology – Concept of ecosystem, Biodiversity and conservation.
1.4. Pollution and climate change.

Unit 2: Essentials of Botany.

2.1. The classification of plant kingdom.
2.2. Plant physiological processes (Photosynthesis, Respiration, Transpiration, phytohormones).
2.3. Structure of flower – Micro and macro sporogenesis, pollination, fertilization and structure of mono and dicot embryos.
2.4 Mushroom cultivation, floriculture and landscaping.

Unit 3: Essentials of Zoology

3.1. The classification of Kingdom Animalia and Chordata.

3.2 Animal Physiology – Basics of Organ Systems & their functions, Hormones and Disorders

3.3 Developmental Biology – Basic process of development (Gametogenesis, Fertilization, Cleavage and Organogenesis)

3.4 Economic Zoology – Sericulture, Apiculture, Aquaculture

Unit 4: Cell biology, Genetics and Evolution

4.1. Cell theory, Ultrastructure of prokaryotic and eukaryotic cell, cell cycle.

4.2. Chromosomes and heredity – Structure of chromosomes, concept of gene.

4.3. Central Dogma of Molecular Biology.

4.4. Origin of life

Unit 5: Essentials of chemistry

5.1. Definition and scope of chemistry, applications of chemistry in daily life.

5.2. Branches of chemistry

5.3. Chemical bonds – ionic, covalent, noncovalent – Vander Waals, hydrophobic, hydrogen bonds.

5.4. Green chemistry

References

1. Sharma O.P., 1993. Plant taxonomy. 2nd Edition. McGraw Hill publishers.
2. Pandey B.P., 2001. The textbook of botany Angiosperms. 4th edition. S. Chand publishers, New Delhi, India.
3. Jordan E.L., Verma P.S., 2018. Chordate Zoology. S. Chand publishers, New Delhi, India.
4. Rastogi, S.C., 2019. Essentials of animal physiology. 4th Edition. New Age International Publishers.
5. Verma P.S., Agarwal V.K., 2006. Cell biology, genetics, Molecular Biology, Evolution and Ecology. S. Chand publishers, New Delhi, India.
6. Satyanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.
7. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamentals of Biochemistry. S. Chand publishers, New Delhi, India.
8. Karen Timberlake, William Timberlake, 2019. Basic chemistry. 5th Edition. Pearson publishers.
9. Subrata Sen Gupta, 2014. Organic chemistry. 1st Edition. Oxford publishers.

ACTIVITIES:

1. Make a display chart of life cycle of nonflowering plants.
2. Make a display chart of life cycle of flowering plants.
3. Study of stomata
4. Activity to prove that chlorophyll is essential for photosynthesis
5. Study of pollen grains.
6. Observation of pollen germination.
7. Ikebana.
8. Differentiate between edible and poisonous mushrooms.
9. Visit a nearby mushroom cultivation unit and know the economics of mushroom cultivation.
10. Draw the Ultrastructure of Prokaryotic and Eukaryotic Cell
11. Visit to Zoology Lab and observe different types of preservation of specimens
12. Hands-on experience of various equipment – Microscopes, Centrifuge, pH Meter, Electronic Weighing Balance, Laminar Air Flow
13. Visit to Zoo / Sericulture / Apiculture / Aquaculture unit
14. List out different hormonal, genetic and physiological disorders from the society

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I Year B.Sc. HONOURS BOTANY
Examinations at I Semester End
Botany Paper I: INTRODUCTION TO CLASSICAL BIOLOGY
(2024-25)

Time: 2 Hrs. **Max. Marks: 50**

SECTION – A

3 × 10 =30 M

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary

PART- I

1. Define taxonomy and its Hierarchy
2. Detailed note on photosynthesis.
3. Explain hormones and its disorders

PART- II

4. Explain cell cycle in detail
5. Detailed note on Branches of chemistry
6. Write a note on Mushroom Cultivation

SECTION – B

Answer any **FOUR** of the following questions. Each question carries **5** marks **4 X 5 = 20 M**

7. Binomial Nomenclature
8. Rules of ICBN and ICZN
9. Structure of flower
10. Fertilization
11. Gametogenesis
12. Difference between prokaryotic and eukaryotic cell
13. Covalent bond

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., -Botany/ I Semester End (W.E.F. 2024-25)
Course 1 :- Introduction to Classical Biology
Mapping as per Blooms Taxonomy

S. NO	Subject	Semester	Title of the course (Paper)	Topic	Parameters as per Blooms Taxonomy (knowledge/ Application / Creativity/ Innovation)	Experiential learning component	Scope (skill/ employability/entrepreneurship)
1	Botany	I	Introduction to classical Biology	Introduction to systematics, taxonomy and ecology	Knowledge	Lecture & Field Visit	Skill
2	Botany	I	Introduction to classical Biology	Essentials of Botany	Knowledge	Shall be shown by Photographs & models	Skill
3	Botany	I	Introduction to classical Biology	Cell Biology, Genetics & Evolution	Knowledge	Shall be shown by Photographs & models	Skill

CO-PO Mapping

	Pithapur Rajah's Government College (Autonomous) Kakinada	Program & Semester I B.Sc. Honours (I Semester)			
Course1	**TITLE OF THE COURSE Introduction to Classical Biology**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:		3	1	2	4

Course Objectives

1. The student will be able to learn the diversity and classification of living organismsand understand their chemical, cytological, evolutionary and genetic principles.

Course Outcomes

On Completion of the course, the students will be able to-	
CO1	Learn the principles of classification and preservation of biodiversity
CO2	Understand the plant anatomical, physiological and reproductive processes.
CO3	Knowledge on animal classification, physiology, embryonic development and theireconomic importance.
CO4	Outline the cell components, cell processes like cell division, heredity and molecularprocesses.
CO5	Comprehend the chemical principles in shaping and driving the macromolecules and lifeprocesses.

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High], '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	3	2	3	3	3	3	3	3	3
CO2	3	2	2	2	2	3	2	3	3	3
CO3	2	3	3	3	2	2	2	3	3	3
CO4	3	2	2	3	3	3	2	3	3	3
CO5	2	2	2	2	2	2	2	1	1	1

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I Honours -Botany-Major / I Semester (W.E.F. 2024-25)

PRINCIPLES OF BIOLOGICAL SCIENCES

MULTI DISCIPLINARY COURSE IN I SEMESTER

SYLLABUS

Credits : 2 2 hrs/week

Learning Objectives: By the end of this course the learner can:

1. Acquire logic to evaluate fundamental biological concepts at various levels of biological organisation including the molecular, cellular, organismal and systems levels.
2. Communicate fundamental biological knowledge between tiers of biological organisation.
3. Apply common biological principles across all levels of biological organization.

Learning Outcomes: On completion of this course students will be able to:

1. Understand the relationship between structure and function at all levels.
2. Recognise the mechanisms underlying biological evolution, its patterns, and itssignificance as biology's overarching unifying principle.
3. Understand the contributions of biology to the resolution of medical, ethical, social, andenvironmental concerns in human affairs.

UNIT-I Diversity of Life

1.1 Introduction to Biology, Branches of Biology, Basic Principles of Biology
1.2 Biological Classification-Two kingdom and Five kingdom classification, Viruses, Viroid'sand Lichens
1.3 Diversity in the living world, Taxonomic categories, Taxonomic aids
1.4 Plant organization-The form, structure and function of plant vegetative and reproductiveorgans, Classification of Plant Kingdom,
1.5 Basis of Animal Classification, Classification of Animal Kingdom

UNIT-II Biomolecules and metabolisim

2.1 Ultra structure of cell and Cell organelles (Structure and Functions), Plant cell vs Animalcell
2.2 Plant Physiology: Photosynthesis, Respiration, Transportation, Mechanisms of Nitrogenfixation.
2.3 Plant growth and development, physiology of flowering.
2.4 Human Physiology: Digestion, Respiration, Circulation
2.5 Male and female reproductive organs, gametogenesis, fertilization.

UNIT-III Principles of Biology

3.1 Genetics: Mendel's laws of inheritance, Genetic disorders- Colour blindness, Sickle cellanaemia.

3.2 Evolution: Geological time scale for evolution of plants and vertebrates, Origin andevolution of plants and man

3.3 Common Human Diseases: causing organism, prevention and treatment- malaria, dengue,AIDS, cancer, corona.

3.4 Common Plant Diseases: causing organism, prevention and treatment- Black spot, Leafspots, Powdery mildew, Blight, Canker.

3.5 Biotechnology: Tools and process of recombinant DNA technology, Applications ofbiotechnology in agriculture, food industry, medicine and transgenic animals.

Text Books

1. Pandey, B.P. (2013) College Botany, Volume-I, S. Chand Publishing, New Delhi.
2. Kotpal, R.L.2022. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut).
3. Verma P.S., Agarwal V.K., 2006. Cell biology, genetics, Molecular Biology, Evolutionand Ecology. S. Chand publishers, New Delhi, India.

Reference Books

1. Sreekrishna V. 2005. Biotechnology –I, Cell Biology and Genetics. New AgeInternational Publ. New Delhi, India.
2. Rastogi, S.C., 2019. Essentials of animal physiology. 4th Edition. New Age InternationalPublishers.

Model question paper for theory examination at the end of I Semester
Multidisciplinary Course

Principles of Biological Science

Max. Time : 2 Hrs. **Max. Marks: 50**

Max. Marks: 50 Time: 1 1/2 hrs (90 Minutes

Section -A (Total: 4x5=20 Marks)

(Answer any **four questions**. Each answer carries **5 marks**

(Total 8 questions. At least 1 question should be given from each Unit)

1.
2.
3.
4.
5.
6.
7.
8.

Section- B (Total: 3x10 = 30 Marks)

(Answer any **three questions**. Each answer carries **10 marks**

(Total five questions. At least 1 question should be given from each Unit)

1.
2.
3.
4.
5.

Note: Questions may be set in such a way to test the outcomes instead of recalling of information.
