ANDHRA KESARI UNIVERSITY

B. Voc. Honours Agriculture: Single Major

w.e.f AY 2023-24 onwards

COURSE STRUCTURE

Year	Semester	Course	Title	No. Hrs./ Week	No. of Credits
I	I	1	Introduction to Classical Biology	5	4
		2	Introduction to Applied Biology	5	4
I	II	3	Principles of Agronomy	5	4
		4	Introduction to soil science	5	4

I -Semester

Course: 1 INTRODUCTION TO CLASSICAL BIOLOGY

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

Learning objectives

The student will be able to learn the diversity and classification of living organisms and 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 – Eichler system of classification.

2.2. Vegetative parts of a Plant and physiological processes –outlines of water & mineral absorption, Ascent of sap, transpiration, Photosynthesis, Respiration and Growth hormones.

2.3. Structure of flower – Essential and Non – Essential organs, microsporangium - structure of anther, megasporangium, structure of ovule, pollination & fertilization.

2.4. floriculture, landscaping & plant Nursery (Basics)

Unit 3: Essentials of Zoology

3.1. The classification of Kingdom Animalia and Chordata.

3.2 Heart, lung, kidney, Organ Systems & their functions in Humans; 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.

4.2. Chromosomes and heredity – Structure of chromosomes nucleosome, DNA & RNA.

4.3. Cell Cycle, Mitosis & Meiosis.

4.4. Mendel's laws & Darwin theory of evolution.

Unit 5: Essentials of chemistry

5.1. Definition and scope of Chemistry, applications of Chemistry in daily life. Branches of Chemistry.

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

5.3. Green chemistry principles, prevention of waste, prevention of hazardous components,

5.4. Green synthesis of catechol, accident prevention & safety measures.

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 the life cycle of nonflowering plants.
2. Make a display chart of the 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. Draw the Ultrastructure of Prokaryotic and Eukaryotic Cell
8. Visit to Zoology Lab and observe different types of preservation of specimens
9. Hands-on experience of various equipment – Microscopes, Centrifuge, pH Meter, Electronic Weighing Balance, Laminar Air Flow
10. Visit to Zoo / Sericulture / Apiculture / Aquaculture unit
11. List out different hormonal, genetic and physiological disorders from the societ

I -Semester

Course: 2 INTRODUCTION TO APPLIED BIOLOGY

Hour/Weeks: 5 **Credits: 4**

Learning objectives

The student will be able to learn the foundations and principles of microbiology, immunology, biochemistry, biotechnology, analytical tools, quantitative methods, and bioinformatics.

Learning Outcomes

1. Learn the history, ultrastructure, diversity and importance of microorganisms.
2. Understand the structure and functions of macromolecules.
3. Knowledge on biotechnology principles and its applications in food and medicine.
4. Outline the techniques, tools and their uses in diagnosis and therapy.
5. Demonstrate the bioinformatics and statistical tools in comprehending the complex biological data.

Unit 1: Essentials of Microbiology

1.1. History and Major Milestones of Microbiology; Contributions of Edward Jenner, Louis Pasteur, Robert Koch.

1.2. Groups of prokaryotic microbes – Bacteria (Structure, and Types), archaebacteria, Mycoplasma; Eukaryotic Microbes(outlines)

1.3. Applications of microorganisms in – Food, Agriculture, Environment, and Industry.

1.4. Viruses – plant virus – TMV (Structure and Disease Symptoms) Animal virus – polio virus (Structure and Disease Symptoms) & Bacteriophage(Structure and Reproduction Outlines)

Unit 2: Essentials of Biochemistry and Immunology

2.1. Biomolecules I

Introduction of carbohydrates & classification – mono di and Polysaccharides.

Lipids. Introduction, Structure & types – Biological importance.

2.2. Biomolecules II

Amino acids – classification, properties, structure & functions.

Proteins – classification, properties, structure & functions.

2.3. Biomolecules III

DNA – Structure &

TypesRNA – Structure & Types

2.4. Immune **System –** Immunity, types of Immunity, cells & organs of Immune Systems.

Unit 3: Essentials of Biotechnology

3.1. History, scope, and significance & branches of biotechnology.

3.2. Recombinant DNA Technology and Vectors-PBR322 & PUC18

3.3. Transgenic plants – Uses and applications-B. T Cotton. Transgenic animals – Dolly Sheep.

3.4. Environmental Biotechnology – Bioremediation, Bio – Fuels, Bio-fertilizers & Biopesticides.

Unit 4: Analytical Tools and Applications

4.1. Microscopy – Simple, compound and electron microscope.

4.2. Southern Blotting Northern Blotting and western blotting

4.3. Electrophoresis

4.4. Monoclonal antibodies and Its applications. Applications in forensics-DNA Fingerprinting and PCR

Unit 5: Biostatistics and Bioinformatics

5.1. Data collection and sampling. Measures of central tendency – Mean, Median, Mode.

5.2. Measures of dispersion – Range, standard deviation, Basics of Chi-square Test and t-test

5.3. Introduction to Bioinformatics – Genomics, Proteomics, types of biological databases – NCBI, EBI.

5.4. Accessing Nucleic Acid and Protein databases, NCBI, Genome Workbench

REFERENCES

1. Gerard J., Tortora, Berdell R. Funke, Christine L. Case., 2016. Microbiology: An Introduction. 11th Edition. Pearson publications, London, England.

2. Micale, J. Pelczar Jr., E.C.S. Chan., Noel R. Kraig., 2002. Pelczar Microbiology. 5th Edition. McGraw Education, New York, USA.

3. Sathyanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.

4. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamentals of Biochemistry. S. Chand

publishers, New Delhi, India.
5. R.C. Dubey, 2014. Advanced Biotechnology. S. Chand Publishers, New Delhi, India.
6. Colin Ratledge, Bjorn, Kristiansen, 2008. Basic Biotechnology. 3rd Edition. Cambridge Publishers.
7. U. Sathyanarayana, 2005. Biotechnology. 1st Edition. Books and Allied Publishers pvt. ltd., Kolkata.
8. Upadhyay, Upadhyay and Nath. 2016. Biophysical Chemistry, Principles and Techniques. Himalaya Publishing House.
9. Arthur M. Lesk. Introduction to Bioinformatics. 5th Edition. Oxford publishers. 10. AP Kulkarni, 2020. Basics of Biostatistics. 2nd Edition. CBS publishers.

ACTIVITIES

1. Identification of a given organism as harmful or beneficial.
2. Observation of microorganisms from house dust under microscope.
3. Finding microorganisms from pond water.
4. Visit to a microbiology industry or biotech company.
5. Visit to a wastewater treatment plant.
6. Retrieving a DNA or protein sequence of a gene'
7. Performing a BLAST analysis for DNA and protein.
8. Problems in biostatistics.
9. Field trip and awareness programs on environmental pollution by different types of wastes and hazardous materials.
10. Demonstration on basic biotechnology lab equipment.
11. Preparation of 3D models of genetic engineering techniques.
12. Preparation of 3D models of transgenic plants and animals.

[**NOTE**: In the colleges where there is availability of faculty for microbiology and biotechnology, those chapters need to be handled by microbiology and biotechnology faculty. In other colleges, the above topics shall be dealt by Botany and Zoology faculty.

ANDHRA KESARI UNIVERSITY-ONGOLE, PRAKASAM DISTRICT

Single Major Programme from the Year 2023-24 Onwards

Programme- B.Sc. Honours in Agriculture Question Paper, Semester-I

Course 1 - Introduction to Classical Biology

Time: 3 Hours Total Marks: 75

SECTION –A

Section –A Contains Eight Short Answer Questions and Answer any Five Questions

5X5=25 Marks

Note: Draw diagrams wherever necessary

1.

2.

3.

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5.

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7.

8.

9.

10.

SECTION –B

Section –B Contains Ten Essay Answer Questions. Answer any Five Questions

10X5=50 Marks

Note: Draw diagrams compulsory

11a.

or

11b.

12a

or

12b

13a

or

13b

14a

or

14b

15a

or

15b

ANDHRA KESARI UNIVERSITY-ONGOLE, PRAKASAM DISTRICT

Single Major Programme from the Year 2023-24 Onwards

Programme- B.Sc. Honours in Agriculture Question Paper, Semester-I

Course 2 - Introduction to Applied Biology

Time: 3 Hours Total Marks: 75

SECTION –A

Section –A Contains Eight Short Answer Questions and Answer any Five Questions

5X5=25 Marks

Note: Draw diagrams wherever necessary

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10.

SECTION –B

Section –B Contains Ten Essay Answer Questions. Answer any Five Questions

10X5=50 Marks

Note: Draw diagrams compulsory

11a.

or

11b.

12a

or

12b

13a

or

13b

14a

or

14b

15a

or

15b

ANDHRA KESARI UNIVERSITY
B. Voc. Agriculture
I Year Semester- II
Course - 3PRINCIPLES OF AGRONOMY(CREDITS 4+0=4)

UNIT- I

- Crops and their classification
- Factors affecting crop production

UNIT _ II-

- Tillage- Types - Objectives
- Modern concepts of tillage-Crop establishment methods

UNIT _ III-

- Manures and fertilizers- Fertilizer application

UNIT _ IV-

- Irrigation management, methods of irrigation
- Cropping patterns and cropping systems

UNIT _ V-

- Weed management- Sustainable agriculture
- Integrated farming systems- organic agriculture

Reference Books

Reddy, S R and Reddi Ramu 5th edition 2016, -kalyani publishers, Ludhiana.
Principles of agronomy Authors: T. Yellamanda Reddy and G.H Sankara Reddy

ANDHRA KESARI UNIVERSITY
B. Voc. Agriculture
I Year Semester – II
Course - 3INTRODUCTION TO AGRONOMY
MODEL QUESTION PAPER

Time: 3 Hours **Maximum: 75 Marks**

SECTION – A

Answer any FIVE questions. Each question carries equal marks. (5*5 = 25)

1. What do you mean by sustainable agriculture? Mention the Features of Sustainable agriculture.
2. Write a note on tillage and list out the importance of tillage.
3. Discuss about zero tillage and Stubble nuclear tillage.
4. Differentiate between manners and fertilizers.
5. What do you mean by Cropping system and Cropping pattern.
6. What is a Crop? Classify the crops.
7. Write about green manuring.
8. Explain the factors effecting crop production.

SECTION – B

Answer All the questions. Each question carries TEN marks (5*10 = 50)

1.a) Write a detailed note on Integrated Farming System (IFS).

(OR)

b) Discuss about Organic Farming.

2. a) What do you mean by fertilizers? Write a note on methods of fertilizer application.

(OR)

b) Future Scope of Organic agriculture.

3. a) What is a Weed? Describe the methods of Weed control.

(OR)

b) What do you mean by manners? List out the most Familiar manners.

4. a) Write a detailed note on modern concepts of tillage.

(OR)

b) Write an essay on Crop establishment methods.

5. a) What is irrigation? List out the methods or types of irrigation.

(OR)

b) Mention the objectives and importance of tillage.

ANDHRA KESARI UNIVERSITY
B. Voc. Agriculture
I Year Semester II
Course – 4 INTRODUCTION TO SOIL SCIENCE
(CREDITS 4+0=4)

UNIT – I

- Soil Components- Soil air, Soil water, Organic and inorganic solids
- Properties of Soil Mixture, Pore Space, Bulk Density, Particle Density, Aeration, Drainage, compaction, Surface area, Soil water relations.

UNIT – II

- Morphology of Colloids & Biological Properties of Soil - Chemistry of clays, Ionic exchange, Acidity, alkalinity, PH, and salinity relations
- Liming and Acidification, Soil Organic matter, C:N relations, N Transformations, Soil organisms, Sulphur transformation.

UNIT – III

- Genesis and Classification - Profile, Soil forming factors, Soil distribution, Classification of Systems
- Drainage, Erosion: Mechanisms and Control.

UNIT – IV

- Soil fertility and productivity, plant nutrition – essential nutrients
- Functions, deficiency symptoms, correction measures and toxicity symptoms of nutrients in plants. Primary nutrients, secondary nutrients and micro nutrients

UNIT V

- Sources, forms, mobility, transformations, fixations and losses of plant nutrients
- Nutrient interactions
- Soil fertility analysis

References

1. Indian Society of Soil Science.2012. Fundamentals of Soil Science. IARI, New Delhi.
2. Yawalkar K.S, Agarwal, T.P and Bokde, S 1995. Manures and Fertilisers. Agril. Publishing House, Nagpur
3. Samuel Tisdale, Nelson Werner L, Beaton James D and Havlin John L. 2005. Soil Fertility and Fertilizers: An Introduction to Nutrient Management, Macmillian Publishing Co., New York.
4. D. K .Das 2014. Introductory Soil Science. Kalyani Publishers, New Delh

ANDHRA KESARI UNIVERSITY
B. Voc. Agriculture
I Year Semester–II
Course - 4INTRODUCTION TO SOIL SCIENCE
MODEL QUESTION PAPER

Time: 3 Hours Maximum: 75 Marks

SECTION – A

Answer any **FIVE** questions. Each question carries equal marks. (5*5 = 25)

1. Discuss about the profile of the Soil.
2. Write a note on soil Air and Soil water.
3. Write a note on classification of soil.
4. Write briefly about soil forming factors
5. What are inorganic solid and explain.
6. Give a brief account on soil organic matter
7. Difference between soil fertility and productivity.
8. What are the criteria of essentiality and classify the essential nutrients.

SECTION – B

Answer **All** the questions. Each question carries **TEN** marks (5*10 = 50)

1. a) What do you mean the seep out of top soil? What were types of it.

   (OR)

   b) What is drainage? Write its types.
2. a) Write a detailed note on soil relations.

   (OR)

   b) What is ion? What do you mean by ionic exchanger? Discuss about cat ion exchange capacity.
3. a) Write an essay on soil organic matter? Its importance for flora & Fauna of soil.

   (OR)

   b) Write about the chemistry of soil? Discuss about bulk and practical density.
4. a) Write a note on Porosity of soil.

   (OR)

   b) Discuss about nitrogen transformation in detailed manner.
5. a) What are the functions of primary nutrients and their deficiency symptoms

   (OR)

   b) Write a note on sulphur transformation.