

ANDHRA KESARI UNIVERSITY



B.A./B.SC. GEOGRAPHY HONORS WITH SINGLE MAJOR

w.e.f AY 2023-24 onwards

COURSE STRUCTURE

Semester I

S.No		Title of the Course	Hrs/Week	No. of Credits
1	Major 1	Fundamentals of Social Sciences	5	4
2	Major 2	Perspectives on Indian Society	5	4

Semester II

	Theory	Hrs/Week	Credits	Practical	Hrs/Week	Credits
3	Major 3: Fundamentals of Geography	3	3	Geographical Tools	2	1
4	Major 4: Earth System Science	3	3	Relief Features	2	1

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), archaeobacteria, 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 &
 - Types RNA –
 - 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.

SEMESTER - II
Major –3: Fundamentals of Geography

Course Objectives:

- To Introduce the Geography as discipline
- To describe Universe, Solar system and Earth and its elements

Course Outcome:

After the completion of the course the Students will able to

- Understand the Geography as Discipline.
- Obtain the knowledge on universe Earth and Life.
- Understand Globe and need of Latitudes and Longitudes.
- Improve the knowledge on earth rotation and revolution.
- Understand the importance of Maps and scale.

UNIT-I

Geography as a Discipline- Geography as Integrating Discipline- Branches of Geography: Systematic and Regional approach.

UNIT-II

The Earth :Origination of Universe and solar System- Evolution of the earth- Evolution of Lithosphere, Atmosphere and Hydrosphere- Evolution of life.

UNIT-III

Globe: Globe, Parallels of Latitudes and Longitudes- Longitudes and Time calculation of time- International Date Line.

UNIT-IV

Movements of the Earth: Earth rotation and revolution – Occurrence of Day and nights – Leap Year - Occurrence of Seasons.

UNIT-V

Maps: Meaning, Classification- Scale: Classification - Direction

References:

1. K.Siddhatha (2014) The Earth Dynamic Surface, Kisalaya Publication, New Delhi
2. Strahler, A. H. and Strahler, A N., (2001) Modern Physical Geography (4thEdition), John Wiley and Sons, Inc., New York.
3. Bartholomeo, R. B., (1984) Earth Science, Heath and Co., Toronto.
4. Dury, G. H., (1980) The Face of the Earth, London: Penguins.
5. Ernst, W. G., (Ed.) (2000) Earth Systems: Process and Issues, Cambridge University Press, Cambridge.
6. Recent Earthquakes in India and World –A global view of Tsunami-Volcanoes

SEMESTER - II
Major –4: Earth System Science

Course objectives:

- The course deals about the origin and evolution of earth
- The course describes various processes of dynamic earth.

Course Outcome:

After the completion of the course the Students will able to

- Understand the Historical aspects of the earth.
- Obtain the knowledge on Rocks and its cycle.
- Understand planet earth dynamism.
- Develop the knowledge on earth surface relief.
- Describe the occurrences of Volcanoes and Earthquakes.

UNIT – I

THE HISTORY EARTH: Origin of the Earth - modern theories – Earth's orbital parameters - internal and external heat engines of the Earth - internal processes of earth – earth's internal structure – mantle and core - Earth's crust - isostasy – Earth's magnetism.

UNIT – II

ROCKS: Igneous - sedimentary - metamorphic (origin and Types)- rock cycle

UNIT – III

THE DYNAMIC PLANET: Continental drift – Wegener's continental drift theory – palaeomagnetism – sea floor spreading – plates and plate motion – diverging, converging and transforming plate boundaries.

UNIT – IV

EARTH'S SURFACE RELIEF: Earth's topography - orders of relief - Earth's hypsometry – stress and strain – fold – fault – orogenesis - features of the sea floor.

UNIT – V

EARTHQUAKES AND VOLCANISM: Earthquakes: causes – seismic waves – measurement of earthquakes – effects – tsunamis – world distribution – volcanism:types – ejecting materials - distribution of volcanoes – intrusive bodies – types.

References:

1. K.Siddhatha (2014) The Earth Dynamic Surface, Kosalaya Publication, NewDelhi
2. Strahler, A. H. and Strahler, A N., (2001) Modern Physical Geography (4thEdition), John Wiley and Sons, Inc., New York.
3. Bartholomeo, R. B., (1984) Earth Science, Heath and Co., Toronto.
4. Dury, G. H., (1980) The Face of the Earth, London: Penguins.
5. Ernst, W. G., (Ed.) (2000) Earth Systems: Process and Issues, CambridgeUniversity Press,Cambridge.

SEMESTER – II
Major 3-Practical - Geographical Tools

Course objectives:

Understanding the Different Geographical Tools.

Course Outcome:

On the completion of syllabus students must be able to:

- Draw and compute map scales of different kinds.
- Measure the distance, areas and find the directions on maps.
- Reduce and enlarge maps of different scales manually to the required size.
- Depict landforms by contours.
- Represent the data related to climate by means of graphs and diagrams.

Ex. 01: Preparation Maps classification flow chart

Ex. 02: Drawing Globe and marking important parallels of latitudes and Longitudes.

Ex. 03: Drawing different Weather measuring Instruments

Ex. 04: Map Symbols

Ex. 05: Digital versions of aerial photographs, satellite images and GPS.

References:

1. Singh, R.L, (1991) Elements of Practical Geography – Kalyani Publishers, New Delhi.
2. Monk house and Willkinson (1976) Maps and Diagrams, Metuhuen& Co, London.
3. Gobal Singh Map Work and Practical Geography, Vikas Publishing House Pvt Ltd, New Delhi.
4. Worthington, B.D.R. and Robert Gent (1975): Techniques in Map Analysis, Ebenzer Baylis and Sons, USA.
5. Anson, R.W. (Ed.) (1984) Basic Cartography for Students and Technicians, Volume 2,
6. International Cartograhic Association, Elsevier Applied Science Publishers, London.
7. Dorling, D. and David Fairbairn (1997), Mapping: Map of representing the world, Addisson Wesley Longman Ltd., U.K.

SEMESTER – II
Major 4-Practical -Relief Features

Course objective:

Acquiring knowledge on map enlargement and reduction and depiction of landforms by contours.

Course Outcome:

On the completion of syllabus students must be able to:

- Draw and compute map scales of different kinds.
- Measure the distance, areas and find the directions on maps.
- Reduce and enlarge maps of different scales manually to the required size.
- Depict landforms by contours.
- Represent the data related to climate by means of graphs and diagrams.

Ex. 01: Methods of Relief Representation

Ex. 02: Representation of Elevation Profiles

Ex. 03: Methods of Average Slope Determination

Ex. 04: Gradient and Slope Calculation

Ex. 05: Representing Hypsometric Curves

Ex. 06: Representation of Relief on a Block Diagram

References:

1. Singh, R.L, (1991) Elements of Practical Geography – Kalyani Publishers, New Delhi.
2. Monk house and Willkinson (1976) Maps and Diagrams, Metuhuen& Co, London.
3. Gobal Singh Map Work and Practical Geography, Vikas Publishing House Pvt Ltd, New Delhi.
4. Worthington, B.D.R. and Robert Gent (1975): Techniques in Map Analysis, Ebenzer Baylis and Sons, USA.
5. Anson, R.W. (Ed.) (1984) Basic Cartography for Students and Technicians, Volume 2,
6. International Cartographic Association, Elsevier Applied Science Publishers, London.
7. Dorling, D. and David Fairbairn (1997), Mapping: Map of representing the world, Addisson Wesley Longman Ltd., U.K.

SECTION-D (1 MARK FILL IN THE BLANKS):: 5x1=5

ANSWER ALL OF THE FOLLOWING QUESTIONS

- 21. _____.
- 22. _____.
- 23. _____.
- 24. _____.
- 25. _____.

SECTION-E (1 MARK MATCH THE FOLLOWING) :: 5x1=5

PARTS OF THE CONSTITUTION - ITEMS

26. Match the following

- | | | |
|----|--------|----|
| A. | () | 1. |
| B. | () | 2. |
| C. | () | 3. |
| D. | () | 4. |
| E. | () | 5. |

KEYS

SECTION-C

16	
17	
18	
19	
20	

SECTION-D

21	
22	
23	
24	
25	

SECTION-E

26A	
26B	
26C	
26D	
26E	

A.

B.

C.

D.

SECTION-D (1 MARK FILL IN THE BLANKS):: 5x1=5

ANSWER ALL OF THE FOLLOWING QUESTIONS

21. _____.

22. _____.

23. _____.

24. _____.

25. _____.

SECTION-E (1 MARK MATCH THE FOLLOWING) :: 5x1=5

PARTS OF THE CONSTITUTION - ITEMS

26. Match the following

A. () 1.

B. () 2.

C. () 3.

D. () 4.

E. () 5

KEYS

SECTION-C

16	
17	
18	
19	
20	

SECTION-D

21	
22	
23	
24	
25	

SECTION-E

26A	
26B	
26C	
26D	
26E	

SECTION-A (10 MARKS QUESTIONS):: 5Qx10M=50M

ANSWER ANY FIVE OF THE FOLLOWING QUESTIONS

1. ?
2. ?
- 3. ?**
4. ?
5. ?
6. ?
7. ?
8. ?
9. ?
10. ?

SECTION-B (05 MARKS QUESTIONS) :: 2Qx05M=10M

ANSWER ANY TWO (02) OF THE FOLLOWING QUESTIONS

11. ?
12. ?
13. ?
- 14. ?**
- 15. ?**

SECTION-C (1 MARK MCQs) :: 5Qx1M=5M

ANSWER ALL OF THE FOLLOWING QUESTIONS

16.

- A. B. C. D.

17.

- A. B. C. D.

18.

- A. B. C. D.

19.

- A. B. C. D.

20.

- A. B. C. D.

SECTION-D (1 MARK FILL IN THE BLANKS):: 5x1=5

MAP POINTING

- 21. _____.
- 22. _____.
- 23. _____.
- 24. _____.
- 25. _____.

SECTION-E (1 MARK MATCH THE FOLLOWING) :: 5x1=5

PARTS OF THE CONSTITUTION - ITEMS

26. Match the following

- | | | |
|----|--------|----|
| A. | () | 1. |
| B. | () | 2. |
| C. | () | 3. |
| D. | () | 4. |
| E. | () | 5 |

KEYS

SECTION-C

SECTION-D

SECTION-E

16	
17	
18	
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26A	
26B	
26C	
26D	
26E	