DEPARTMENT OF ZOOLOGY

Vision:

To create an innovative atmosphere for teaching and learning to achieve excellence in biology education. Leading to the sustainable development of the society. The department promotes the discovery and broad knowledge about the biology of animals, evolution and their environments. The holistic development of the student and make them able to contribute effectively for their welfare and society in this dynamic era.

Mission:

To encourage the spirit of enquiry, creativity, intellectual capacity, and research in Zoology.

To provide students with quality education through the latest and all possible best teaching –learning-evaluative methodologies in the knowledge disciplines of Zoology and other biological sciences.

Objectives:

- The Zoology major offers scientific training in the organismal biology, ecology, diversity and evolution of animals.
- The major core provides a solid foundation in the biological sciences, while electives allow students to cater coursework to meet specific interests in animal biology.
- Conducting educational tour to giving exposure to the students by visiting Animal park, dairy industry, Sericulture, fisheries, poultry forms, zoo etc.
- To motivate students to conduct seminars, workshops on the topics included in the curriculum. It will help in achieving academic excellence and exposure.
- To provide a comprehensive training in theoretical and practical Zoology and Environmental Biology to students.
- To equip students with adequate practical skills that will enable them function productively in society.
- To produce leadership in science and technology.
- To sensitize human society for animal welfare, conservation and protection of biodiversity.
- To create awareness of INSITU conservation of wild life.
- To develop the attitude of the students to concentrate on applied science aspects
- Transform society through the empowerment of women
- To develop research aptitude and a scientific advancement.

Scope:

They can work as Animal Behaviourist, Conservationist, Wildlife biologists, Zoo curators, Wildlife educators, Zoology faculty, Forensic experts, lab technicians, and Veterinarians, Embryologist, transplant Immunolgy , dietician, Molecular biologist, Geneticist and Research Scientist in biotech companies.

Methods Adopted:

The following methods were adopted in teaching Zoology.

*Student centric method

* Projects

*Assignments

*Quiz

*Group Discussion

*Flip Teaching

*Practical Demonstration

*Peer Teaching

FLIPPEFD CLASS

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PRACTICAL DEMONSTRATION

Evaluation

Evaluation is done by conducting **Internal assessment 1,2**

Practical exam followed by **Semester exam** as per university norms at the end of each semester. Continuous evaluation is done throughout the course to increase critical awareness in

students.

WORKSHOP:

Activities include seminars, workshops, guest lectures, interclass, interdisciplinary competitions, field trips etc. The department also organizes activities related to the field of Life science to coincide with the National Science day

1.Feild trip sericulture to Gudipet 2018

2.Visit to NIN Hyderabad 2019

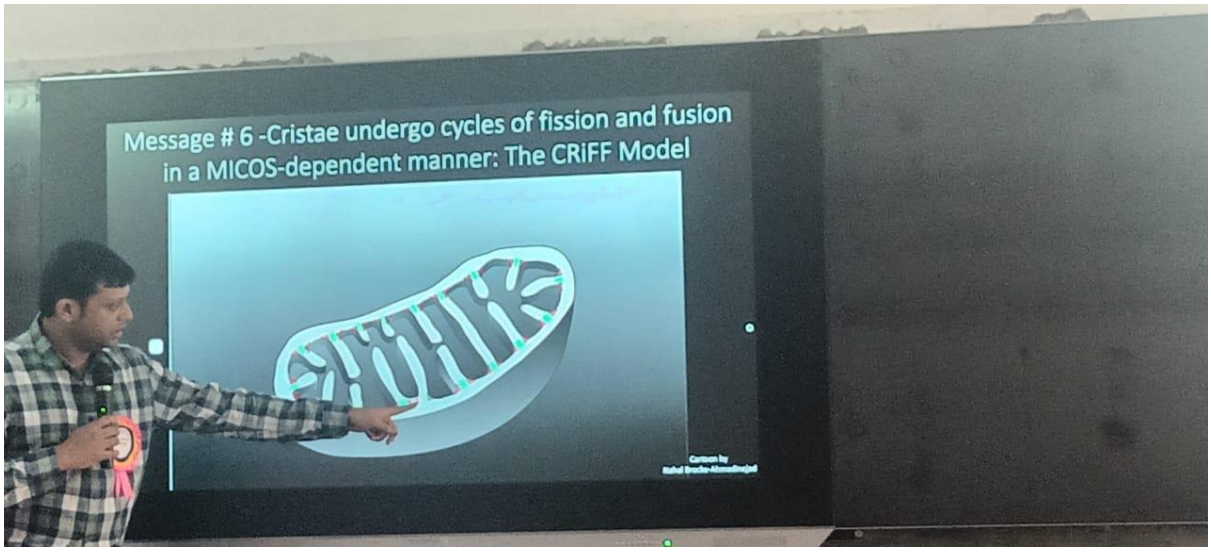
3.Conducted Gene Connect program in collaboration with CCMB

Hyderabad 2023

4. Importance of Millets in health and disease

5.Awareness on cervical cancer 2024

6. Participated in Mitochondrial DNA International seminar 2024



Projects:

1.Cervical Cancer

2. Importance of Millets in health and disease

3.CRISPR

4.Myasthenia Gravis

5.Next Generation Sequencing

6.Alzhimers Disease

7.Parkinson disease

8.DNA Finger Printing

9. Corona virus

10.Air Pollution

11.Respiratory disease

12. Wet lands

FACULTY PROFILE

Dr. S. Purnima (HOD ZOOLOGY DEPARTMENT).

EDUCATIONAL QUALIFICATIONS -

Educational details:

SSC	ST. Anns High School – Kazipet WARANGAL	70%
INTERMEDIATE	CKM COLLEGE Warangal	58 %
Graduation	CKM College, WARANGAL	69%
POST GRADUATION	Kakatiya University Campus	74% secured Goldmedal with Distinction.
Ph.D	Department of Zoology Osmania University	Secured Distinction
B.Ed	Andhra Mahila Sabha College Osmania University	76.8% secured Gold medal with Distinction

RESULT ANALYSIS :

Year	Subject	PASS PERCENTAGE
2019	Animal Physiology and Biochemistry Cell Biology,Molecular Biology,Genetics.Evolution	100%
2020	Immunology and Animal Biotechnology Aquatic Biology	100%
2021	Immunology and Animal Biotechnology Aquatic Biology	100%
2022	Immunology and Animal Biotechnology Ecology, Zoogeography, Evolution	100%
2023	Immunology and Animal Biotechnology Ecology, Zoogeography, Evolution	100%

Acheivements:

Year	**Event**	
2024 2023	Organized Awareness on Cervical Cancer on International Science day 2024 Participated in International Seminar on Mitochondrial DNA and diseases associated with treatment. February Conducted GENE CONNECT in collaboration with CCMB IN 2023 September In TSWRDC Mancherial FDP on Implementing Learning design to enhance higher education students – Woxsen University, Hyderabad -May	

2022	Participated in BIO ASIA 2023 Conference February Organizing member for BIOME DST – STUTI January for Faculty Development Programme (Advanced Techniques in Biomedical research Participated in BIO ASIA Conference February Served as Chief Judge for zonal level Science Fair at Bellampally on 26-11-2022. Attended workshop on I THINK BIOLOGY April 2022. Organized 150 years of DNA International conference. Organised DNA 150 International Conference TSWREIS, Hyderabad. India Oct Academic Coordinating Officer Zoology, North Zone, TSWRDC, Telangana since 2022 till date.	
2021	Conducted workshop on Principles of Teaching at TSWRDC (W) Mancherial in	

Name : B.Pranavi

QUALIFICATION- MSc. B.Ed.

DATE OF APPOINTMENT: 9-01-2021

TYPE OF APPOINTMENT : Guest / Part time faculty .

Educational details:

SSC	Oxford creativity English Medium High School , CCC NASPUR.	**72%**
INTERMEDIATE	Chaitanya Jr. College . Mancherial.	**83%**
Graduation	Singareni Colleries Women's Degree College, Kothagudem .	**89% with distinction , Double gold medallst on the memorial of ANUPAMA DAMERA**
POST GRADUATION	Vijetha Degree and P.G College, Miryalaguda,	82% **with distinction.**
B.Ed	Saisudha college of education , Dhone .	**8.0 GPA**

RESULT ANALYSIS :

Year	Subject	PASS PERCENTAGE
2021	Applied Zoology , Aquatic Biology	100%
2022	Animal Physiology and Animal Behaviapur Cell and molecular Biology , Genetics and Embryology .	100%

2023	Animal Physiology and Animal Behaviapur Cell and molecular Biology , Genetics and Embryology .	97%

ACHIEVEMENTS :

Year	**Event**	
2022	Participated in 150 years of DNA Celebration WEBINAR . Drawing competition Received 2nd prize in the competition.	

Name : PUSHPALATHA ANE

QUALIFICATION- M.Sc. B.Ed. TS-SET

DATE OF APPOINTMENT: 11-09-2022

TYPE OF APPOINTMENT : Guest faculty .

Educational details:

SSC	SCH High School CCC. Naspur Mancherial.	**62%**
INTERMEDIATE	Gauthami Jr. College . Mancherial.	**58%**
Graduation	MVN Degree College Mancherial	62%
POST GRADUATION	NIZAM College Osmania University. Hyderabad.	69% **with distinction.**
B.Ed	Dravidian University . Kuppam, AP.	**79%**

RESULT ANALYSIS :

Year	Subject	PASS PERCENTAGE
2022	Animal diversity - Invertebrates. Animal diversity- Vertebrates	97%
2023	Animal diversity - Invertebrates. Animal diversity- Vertebrates . Immunology and Animal Biotechnology. Ecology, Zoogeography and Evaluation.	97%

ACHIEVEMENTS :

Year	**Event**	
	Nil	

DEPARTMENT SYLLABUS SEMESTER WISE.

KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY I Year

SEMESTER – I

ANIMAL DIVERSITY – INVERTEBRATES

(Core Paper –I)

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Protozoa

1.1.1 General Characters and Classification of Protozoa up to Orders with examples
1.1.2 Type Study –***Elphidium***
1.1.3 Locomotion and Reproduction
1.1.4 Epidemiology of Protozoan diseases – Amoebiasis, Giardiasis, Leishmaniasis, Malaria

1.2 Porifera

1.2.1 General characters and Classification of Porifera up to Orders with examples
1.2.2 Type study - ***Sycon***
1.2.3 Canal system in Sponges
1.2.4 Types of Cells and Spicules in Porifera.

UNIT – II

2.1 Cnidaria

2.1.1General characters and Classification of Cnidaria up to classes with examples
2.1.2 Type study -***Obelia***
2.1.3 Polymorphism in Cnidarians with examples
2.1.4 Corals and Coral Reef formation

2.2 Helminthes

2.2.1 General characters and Classification of **Platyhelminthes** up to classes with examples
2.2.2 Type study -***Schistosoma***
2.2.3 General characters and Classification of **Nemathelminthes** up to classes with examples
2.2.4 Type study –***Dracanculus;*** Parasitic Adaptations in Helminthes

UNIT– III

3.1 Annelida

3.1.1 General characters and Classification of Annelida up to classes with examples
3.1.2 Type study – ***Hirudinaria granulosa***
3.1.3 Evolutionary significance of Coelome and Coelomoducts and Metamerism
3.1.4 Economic Importance of Annelida (Polychaeta, Oligochaeta and Hirudinea)

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3.2Arthropoda

3.2.1 General characters; Classification of Arthropoda upto classes with examples
3.2.2Type study –***Palaemon***(Prawn*)*
3.2.3Crustacean Larvae; Insect metamorphosis; Useful and Harmful Insects
3.2.4***Peripatus***- Structure and affinities

UNIT – IV

4.1 Mollusca

4.1.1 General characters; Classification of Mollusca upto classes with examples
4.1.2Type study -***Pila*** *(*Snail*)*
4.1.3 Pearl formation; Torsion and Detorsion in Gastropods
4.1.4 Molluscs as Bio-indicators, Vectors and Pests; Economic importance

4.2 Echinodermata

4.2.1 General characters and Classification of Echinodermata upto classes with examples
4.2.2 Type study- ***Star Fish***
4.2.3Echinoderm larvae and their evolutionary significance
4.2.4 Autotomy, Regeneration and Symmetry of Echinoderms

Suggested Readings:

1. **L.H. Hyman** '*The Invertebrates' Vol I, II and V.* – M.C. Graw Hill Company Ltd.
2. **Kotpal, R.L. 1988 - 1992** Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. **E.L. Jordan and P.S.** Verma'*Invertebrate Zoology'* S. Chand and Company.
4. **R.D. Barnes** '*Invertebrate Zoology'* by: W.B. Saunders CO., 1986.
5. **Barrington. E.J.W.**, '*Invertebrate structure and Function'* by ELBS.
6. **P.S. Dhami and J.K. Dhami.**Invertebrate Zoology. S. Chand and Co. New Delhi.
7. **Parker, T.J. and Haswell**'*A text book of Zoology'* by, W.A., Mac Millan Co. London.
8. **Barnes, R.D. (1982).***Invertebrate Zoology*, V Edition"

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY I Year

SEMESTER – I

ANIMAL DIVERSITY - INVERTEBRATES (PRACTICAL)

Instruction: 3 hrs per week
No. of Credits: 1

1. Study of museum slides / specimens/models (Classification of animals up to orders)

i) **Protozoa:***Amoeba, Paramoecium, Paramoecium Binary fission and Conjugation, Vorticella, Entamoebahistolytica, Plasmodium vivax*

ii) **Porifera**:*Sycon, Spongilla,Euspongia, Sycon-* T.S &L.S, Spicules, Gemmule

iii) **Coelenterata:** *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula*

iv) **Platyhelminthes:***Planaria, Fasciolahepatica, Fasciola*larval forms – Miracidium, Redia, Cercaria, *Echinococcusgranulosus, Taeniasolium, Schistosomahaematobium*

v) **Nemathelminthes:***Ascaris(Male & Female), Drancunculus, Ancylostoma,Wuchereria*

vi) **Annelida:** *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva

vii) **Arthropoda:** *Cancer, Palaemon*, Scorpion, *Scolopendra, Sacculina, Limulus, Peripatus,* Larvae -Nauplius, Mysis,Zoea,Mouth parts of male & female *Anopheles* and *Culex,* Mouthparts of Housefly and Butterfly.

viii) **Mollusca:** *Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva

ix) **Echinodermata:** *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria,Antedon,* Bipinnaria larva

2. Demonstration of dissection / dissected / virtual dissection:
Prawn: Appendages, Digestive system, Nervous system, Mounting of Statocyst

3. Laboratory Record work shall be submitted at the time of practical examination

4. An **"Animal album"** containing photographs, cut outs, with appropriate write up about the abovementioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

5. Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals:

1. Practical Zoology- Invertebrates by S.S.Lal
2. Practical Zoology – Invertebrates by P.S.Verma
3. Practical Zoology –Invertebrates by K.P.Kurl

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY I Year

SEMESTER – II

ANIMAL DIVERSITY – VERTEBRATES

(Core Paper – II)

Theory	**4 Hours/Week**	**4 Credit**	**Internal marks = 20**
Practical	**3 Hours/Week**	**1 Credit**	**External Marks = 80**

UNIT – I

1.1 Hemichordata

1.1.1 General characters and Classification of Hemichordates upto classes with examples
1.1.2*Balanoglossus*- Structure and affinities
1.1.3. Larval Significance (Tornaria)

1.2. Protochordata

1.2.1 General Characters and Classification of Chordates up to orders with examples
1.2.2 Salient features of Urochordata; Retrogressive metamorphosis in Urochordata
1.2.3 Salient features and affinities of Cephalochordata
1.2.4 General Characters of Cyclostomata; Comparison of *Petromyzon*and *Myxine*

UNIT – II

2.1 Pisces

2.1.1 General characters of and Classification of Pisces up to orders with examples
2.1.3*Scoliodon*- Digestive,Respiratory, Circulatory and Nervous system
2.1.4 Types of Scales, Types of Fins
2.1.5 Migration in Fishes

2.2 Amphibia

2.2.1 General characters and Classification of Amphibians up to orders with examples.
2.2.2***Rana tigrina***- Respiratory, Circulatory and Nervous systems
2.2.3 Parental care in Amphibians; Neoteny and Paedogenesis
2.2.4 Metamorphosis in Amphibians and its hormonal control

Unit – III

3.1 Reptilia

3.1.1 General characters and Classification of Reptilia up to orders with examples
3.1.2***Calotes***–Digestive,Respiratory, Circulatory and Nervous systems
3.1.3 Temporal fossa in Reptiles and its evolutionary importance
3.1.4 Distinguished characters of Poisonous and Non-poisonous snakes

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3.2 Aves

3.2.1 General characters and Classification of Aves upto orders with examples.
3.2.2***Columba livia***- Digestive, Respiratory,Circulatory and Nervous systems
3.2.3 Migration in Birds
3.2.4 Flight adaptation in Birds

Unit – IV

4.1 Mammalia

4.1.1 General characters and Classification of Mammalia upto orders with examples
4.1.2***Rabbit***- Digestive, Respiratory,Circulatory and Nervous systems
4.1.3Dentition in Mammals
4.1.4 Aquatic adaptations in Mammals

Suggested Readings:

1. E.L.Jordan and P.S. Verma'*Chordate Zoology*' -. S. Chand Publications.

2. Mohan P.Arora. '*Chordata – I*, Himalaya Publishing House Pvt.Ltd.

3. Marshal, Parker and Haswell'*Text book of Vertebrates*'. ELBS and McMillan, England.

4. Alfred Sherwood Romer. Thomas S. Pearson '*The Vertebrate Body*, Sixth edition, CBS CollegePublishing, Saunders College Publishing

5. George C. Kent, Robert K. Carr. *Comparative Anatomy of the Vertebrates*, 9th ed. McGrawHill.

6. Kenneth Kardong*Vertebrates: Comparative Anatomy, Function and Evolution*, 4th ed,'McGraw Hill.

7. J.W. Young, *The Life of Vertebrates*, 3rd ed, Oxford University press.

8. Harvey Pough F, Christine M. Janis, B. Heiser, *Vertebrate Life,* Pearson, 6th ed, Pearson Education Inc.2002.

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY I Year

SEMESTER – II

ANIMAL DIVERSITY - VERTEBRATES (PRACTICAL)

Instruction: 3 hrs per week
No. of Credits: 1

I. Study of museum slides / specimens / models (Classification of animals up to orders)

1. **Hemichordata:** *Balanoglossus, Tornmaria larva*
2. **Protochordata:** *Amphioxus, Amphioxus* T.S. through pharynx
3. **Cyclostomata:** *Petromyzon, Myxine, Ammocoetus larva*
4. **Pisces:** *Sphyrna, Pristis, Torpedo, Channa, Pleuronectes, Hippocampus, Exocoetus, Echieneis, Labeo, Catla, Clarius, Auguilla, Protopterus,* Scales: Placoid, Cycloid, Ctenoid
5. **Amphibia:** *Ichthyophis, Amblystoma, Siren,Hyla, Rachophous,Bufo, Rana,* Axolotal larva
6. **Reptilia :** *Draco, Chemaeleon, Gecko, Uromastix, Vipera russeli, Naja, Bungarus, Enhydrina, Typhlops, Ptyas, Testudo, Trionyx, Crocodilus*
7. **Aves:** Archaeopteryx**,** *Passer, Psittacula, Bubo, Alcedo, Columba, Corvus, Pavo* ,Collection and study of different types of feathers: Quill, Contour, Filoplume, Down
8. **Mammalia:** *Ornithorthynchus, Tachyglossus, Pteropus, Funambulus, Manis, Loris,* Hedgehog;
9. **Histology:**T.S. of Liver, Pancreas, Kidney, Stomach, Intestine, Lung, Artery, Vein, Bone T.S, Spinal Cord. T.S.

II. Osteology:
Rabbit – Axial Skeleton (Bones of Skull and Vertebral Column),
Varanus, Pigeon and Rabbit - Appendicular skeleton (Bones of Limbs and Girdles

III. Demonstration of dissection / dissected / virtual dissection: Labeo / Tilapia
1. Digestive system 2. Brain, Weberian Oscicles3. V, VII, IX, X cranial nerves

IV. Laboratory Record work shall be submitted at the time of practical examination

V. An **"Animal album"** containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

VI. Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals:

1. **S.S.Lal,** Practical Zoology – Vertebrata
2. **P.S.Verma,** A manual of Practical Zoology– Chordata

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY II Year

SEMESTER – III

ANIMAL PHYSIOLOGY AND ANIMAL BEHAVIOUR

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Digestion

1.1.1 **Enzymes:** Definition, Classification, Inhibition, Regulation
1.1.2 Digestion of Carbohydrates, Proteins, Lipids and Cellulose
1.1.3Absorption and Assimilation of digested food
1.1.4 Role of Gastrointestinal hormones in digestion

1.2 Excretion, Homeostasis and Osmoregulation

1.2.1 Classification of Animals on the basis of excretory products: Ammonotelic, Ureotelic, and Uricotelic; Structure and function of Nephron
1.2.2Urine formation and Counter current mechanism
1.2.3 Concept and Mechanism of Homeostasis
a) Hormone regulation of Blood Glucose levels in Human being
b) Water and Ionic Regulation by Marine and Fresh water Animals
c) Thermo regulation in Human being
1.2.4. Osmoregulation in Marine, Fresh and Brackish water Animals

UNIT – II

2.1 Respiration

2.1.1 Definition of Respiration, Respiration mechanism, External, Internal and Cellular Respiration.
2.1.2 Respiratory Pigments; Transport of Oxygen, Oxygen dissociation curves, and Bohr's Effect;
2.1.3 Transport of Carbon dioxide, Chloride shift
2.1.4 Regulation of Respiration; Nervous and Chemical Mechanism

2.2 Circulation

2.2.1 Types of Circulation Open and Closed; Structure of Mammalian Heart
2.2.2 Types of Hearts: Myogenic and Neurogenic
2.2.3 Heart functions - Conduction and Regulation of Heart beat, Regulation of Heart rate; ECG
2.2.4 Tachycardia and Bradycardia; Blood Clotting mechanism

UNIT– III

3.1 Muscle Contraction

3.1.1 Types of Muscles
3.1.2 Ultra structure of skeletal muscle fibre
3.1.3 Mechanism and Chemical changes during Muscle Contraction (Sliding filament theory)
3.1.4 Twitch Tetanus summation and Treppe fatigue

3.2 Nerve Impulse

3.2.1 Structure of Neuron
3.2.2 Nerve impulse - Resting potential, Threshold potential and Action potential, Conduction of Nerve impulse
3.2.3 Transmission of Nerve impulse
3.2.4 Synapse and Synaptic transmission; Neurotransmitters-EPSP, IPSP

3.3 Endocrine System

3.3.1 Endocrine glands - Structure, secretions and functions of Pituitary gland
3.3.2 Thyroid, Parathyroid, Adrenal glands and Pancreas
3.3.3 Hormone action and Concept of Secondary messengers
3.3.4 Male and Female Hormones; Hormonal control of Menstrual cycle in human beings

UNIT – IV

4.1 Animal Behaviour

4.1.1 Types of Behaviour- Innate and Acquired; Instinctive and Motivated behaviour
4.1.2 Taxes, Reflexes, Tropisms

4.2 Learning and Memory

4.2.1 **Types of Learning**: Trial and Error Learning, Imprinting, Habituation
4.2.2 **Conditioning:** Classical Conditioning; Instrumental conditioning, Examples of Conditioning, Pavlov's Experiment

4.3 Social Behaviour and Communication

4.3.1 Social behaviour of insects (Dance language of honey bees)Colonial Existence of Bees and Termites; Pheromones

4.4 Biological Rhythms

4.4.1 Biological Clocks, Circadian Rhythms; solar and lunar Rhythms; Circannual Rhythms

Suggested Readings:

1. **Gerard J. Tortora and Sandra Reynolds Garbowski** *Principles of Anatomy and Physiology*, Tenth Ed., John Wiley & Sons
2. **Arthur C. Guyton MD**, *A Text Book of Medical Physiology*, Eleventh ed., JohnE. Hall, Harcourt Asia Ltd.
3. **William F. Ganong**, *A Review of Medical Physiology*, 22 ed, McGraw Hill, 2005
4. **Sherwood, Klandrof, Yanc, Animal** *Physiology*, Thompson Brooks/Coole, 2005.
5. **Sherwood, Klandrof, Yanc,** *Human Physiology*, Thompson Brooks/Coole, 2005.
6. **Knut Scmidt-Nielson,** *Animal Physiology*, 5th edition, Cambridge Low Price Edition.
7. **Roger Eckert and Randal,** *Animal Physiology*, 4th ed, Freeman Co, New York.
8. **Singh. H.R,** Text Book of Animal Physiology and Biochemistry
9. **Nagabhushanam**, Comparative Animal Physiology
10. **Veer Bal Rastogi,** Text Book of Animal Physiology
11. **Dasmann**, "Wild Life Biology"
12. **ReenaMathur,** "Animal Behaviour"
13. **Alocock,** "Animal Behaviour- an Evolutionary Approach

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY II Year

SEMESTER – III

ANIMAL PHYSIOLOGY AND ANIMAL BEHAVIOUR (PRACTICAL)

Instruction: 3 hrs per week
No. of Credits: 1

1. Qualitative tests for identification of carbohydrates, proteins and fats
2. Qualitative tests for identification of ammonia, urea and uric acid (Nitrogenous excretory products)
3. Zonation of gut in Cockroaches
4. Study on effect of pH and Temperature on salivary amylase activity
5. Study of permanent histological sections of mammalian endocrinal glands: Pituitary, Thyroid, Pancreas, Adrenal gland
6. Estimation of Haemoglobin by Sahli's method
7. Estimation of Blood Clotting time
8. Estimation of total protein by Biuret's method
9. Estimation of unit metabolism of fish

- **Laboratory Record work shall be submitted at the time of practical examination**
- **Computer aided techniques should be adopted as per UGC guide lines.**

Suggested manuals:

Tortora, G.J. and Derrickson, B.H. (2009). *Principles of Anatomy and Physiology*, XII Edition, John Wiley & Sons, Inc.
Widmaier, E.P., Raff, H. and Strang, K.T. (2008) *Vander's Human Physiology*, XI Edition., McGraw Hill
Guyton, A.C. and Hall, J.E. (2011). *Textbook of Medical Physiology*, XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company
Berg, J. M., Tymoczko, J. L. and Stryer, L. (2006). *Biochemistry*.VI Edition. W.H Freeman and Co.
Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009). *Principles of Biochemistry*. IV Edition. W.H. Freeman and Co.
Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009). *Harper'sIllustrated Biochemistry*. XXVIII Edition.Lange Medical Books/Mc Graw3Hill.

KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY II Year

SEMESTER – IV

CELL BIOLOGY, GENETICS & DEVELOPMENTAL BIOLOGY

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Cell Biology

1.1.1 Ultra structure of Animal cell

1.1.2 Structure (Fluid mosaic model) and Functions of Plasma membrane

1.1.3 Structure and functions of cell organelles – Endoplasmic reticulum, Golgi complex, Ribosomes, Lysosomes, Mitochondria and Nucleus

1.1.4 Chromosomes - Structure, types, Cell Division- Mitosis, Meiosis, Cell Cycle and its regulation.

UNIT – II

2.1 Molecular Biology

2.1.1 DNA (Deoxyribo Nucleic Acid) –Structure-RNA (Ribo Nucleic Acid)-Structure, types, DNA Replication

2.1.2 Protein Synthesis – Transcription, Translation.

2.1.3 Gene Expression - Genetic Code, Operon concept.

2.1.4 Molecular Biology Techniques – Polymerase Chain Reaction (PCR), Electrophoresis.

UNIT – III

3.1 Genetics

3.1.1 Mendel's laws of Inheritance and Non-Mendelian Inheritance , Linkage and Crossing over.

3.1.2 .Sex determination and Sex-linked inheritance.

3.1.3 Chromosomal Mutations- Deletion, Duplication, Inversion, Translocation; Aneuploidy and Polyploidy; Gene mutations- Induced versus Spontaneous mutations

3.1.4 Inborn errors of metabolism.

UNIT – IV

4.1 Developmental Biology

4.1.1 Gametogenesis (Spermatogenesis and Oogenesis), Fertilization, Types of eggs, Types of cleavages

4.1.2 Development of Frog upto the formation of primary germ layers

4.1.3 Formation of Foetal membrane in chick embryo and their functions

4.1.4 Types and functions of Placenta in Mammals,Regeneration in Turbellarians and Lizards

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Suggested Readings:

1. **Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnell** *'Molecular Cell Biology'* W.H. Free man and company New York.

2. **Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008).** *Principles of Genetics.* VIII Edition. Wiley India.

3 Snustad, D.P., Simmons, M.J. (2009). *Principles of Genetics.* V Edition. John Wiley and Sons Inc.

4 Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). *Concepts of Genetics.* X Edition. Benjamin Cummings.

5. **Russell, P. J. (2009).** *Genetics- A Molecular Approach.* III Edition. Benjamin Cummings.

6. **Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B.** *Introduction to Genetic Analysis.* IX Edition.W. H. Freeman and Co.

7. **Ridley, M. (2004).** *Evolution.* III Edition. Blackwell Publishing

8.**Campbell, N. A. and Reece J. B. (2011).** *Biology.* IX Edition, Pearson, Benjamin, Cummings.

9.**James D. Watson, Nancy H. Hopkins** *'Molecular Biology of the Gene'*

10. **Gupta P.K.**, 'Genetics'

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY II Year

SEMESTER – IV

CELL BIOLOGY, GENETICS & DEVELOPMENTAL BIOLOGY PRACTICAL

Instruction: 3 hrs per week
No. of Credits: 1

I. Cytology

1. Preparation and Identification of slides of Mitotic divisions with onion root tips
2. Preparation and Identification of different stages of Meiosis in Grasshopper Testes
3. Identification and study of the following slides

i). Different stages of Mitosis and Meiosis

ii) Lamp brush and polytene chromosomes

II. Genetics

1. Problems on Genetics - Mendelian inheritance, Linkage and Crossing over, Sex linked inheritance

III. Embryology

1. Study of T.S. of Testis and Ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8, 16 cell stages); Morula, Blastula
3. Study of chick embryos of 18 hours, 24 hours, 33 hours and 48 hours of incubation

IV. Laboratory Record work shall be submitted at the time of practical examination

V. An **"Album"** containing photographs, cut outs, with appropriate write-up about Genetics and Embryology

- **Computer aided techniques should be adopted as per UGCguide lines.**

Suggested manuals:

1. Manual of laboratory experiments in Cell Biology by **Edward, G.**
2. Freeman and Bracegirdle – An Atlas of Embryology.

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY III Year

SEMESTER – V

IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Basics of Immune system

1.1.1 Cells of the Immune system and the Lymphoid organs (Primary and Secondary)
1.1.2 First line of defences-physical and chemical barriers; second line of defences – inflammation and phagocytosis.
1.1.3 Types of Immunity- Inherent (Active and Passive) and Acquired Immunity (Active and Passive) Humoral and Cell mediated immunity.
1.1.4 Major Histocompatibility complex (MHC)- structure and function of class I and Class II proteins. Significance of MHC in organ transplantation; MHC restriction

UNIT – II

2.1 Antibodies and Antigens and Immune system diseases

2.1.1 Antibodies(Immunoglobulins) – Structure, functions and classification, antibody diversity, Monoclonal antibodies and applications
2.1.2 Antigens structure, antigenic determinants/epitopes, haptens, adjuvants and antigenicity.
2.1.3 Antigen-antibody reactions; Agglutination; Precipitation, Opsonization, Cytotoxicity
2.1.4 Hypersensitivity reactions.
Autoimmunity and Immunodeficiency diseases.

Unit – III

3.1 Animal Biotechnology and Genetically modified organisms

3.1.1 Concept and Scope of Animal Biotechnology
3.1.2 Recombinant DNA Technology and its applications.
3.1.3 Cloning Vectors- Plasmids, Cosmids and shuttle vectors, Cloning methods(Cell, Animal and Gene cloning); Restriction enzymes and Ligases
3.1.4 Transgenesis – Methods of Transgenesis
Production of Transgenic animals- Sheep and Fish

Unit – IV

4.1 Applications of Biotechnology

4.1.1 In vitro fertilization and embryo transfer
4.1.2 Hybridoma technology – concepts and applications
4.1.3 Stem cells- Types and their applications
4.1.4 Recombinant insulin and human growth hormone; Polymerase Chain Reaction (PCR)
Animal Bioreactors- Concepts and Applications.

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Suggested Readings:

1. Text Book of Immunology – Ivan Riott
2. Text Book of Immunology – C.V.Rao
3. Text Book of Immunology – Nandinin Shetty
4. Text Book of Immunology – Kubey
5. Culture of Animal Cells – R. Ian Freshney, Wiley Liss
6. Biotechnology – S. Mitra
7. Animal Cell Culture - Practical Approach – Ed. John. RW. Masters, Oxford
8. Biotechnology – B.D.Singh
9. Brown, T.A. (1998). *Molecular Biology Labfax II: Gene Cloning and DNAAnalysis*. II Edition, Academic Press, California, USA.
10. Glick, B.R. and Pasternak, J.J. (2009). *Molecular Biotechnology - Principles and Applications of Recombinant DNA*. IV Edition, ASM press, Washington, USA.

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY III Year

SEMESTER – V

IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY PRACTICAL

Instruction: 3 hrs per week
No. of Credits: 1

I. Immunology

1. Identification of Blood grouping (Demonstration of Agglutination) using kit.
2. Demonstration of Precipitation (VDRL/RPR) using kit.
3. Histological study of Lymphoid organs -Spleen, Thymus, Lymph node, Bone marrow (through prepared slides).
4. Enumeration of Total RBC from a given blood sample.
5. Enumeration of Total WBC from a given blood sample.
6. Enumeration of Differential count of WBC from a given blood sample.

II. Animal Biotechnology

1. Study the following techniques through Photographs / Virtual Lab

a) Identification of Vectors
b) Identification of Transgenic animals
c) DNA sequencing (Sanger's method)
d) DNA finger printing
e) Southern blotting
f) Western blotting

2. PCR (demonstration) on site or of site demonstration.

- **Laboratory Record work shall be submitted at the time of practical examination**
- **Computer aided techniques should be adopted as per UGC guide lines.**

Suggested manuals:

1. A Hand Book of Practical Immunology – **Ivan Riott**
2. Animal Biotechnology – **P.K. Gupta.**
3. Immunology, VI Edition. W.H. Freeman and Company **Kindt, T. J., Goldsby, R.A., Osborne, B. A. and Kuby, J (2006).**
4. Immunology, VII Edition, Mosby, Elsevier Publication **David, M., Jonathan, B., David, R. B. and Ivan R. (2006).**
5. Cellular and Molecular Immunology. V Edition. Saunders Publication, **Abbas, K. Abul and Lechtman H. Andrew (2003.)**

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY III Year

SEMESTER – VI

ECOLOGY, ZOOGEOGRAPHY AND EVOLUTION

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Ecology- I

1.1.1 Ecosystem Structure and Functions; Types of Ecosystems – Aquatic and Terrestrial
1.1.2 Bio-geo chemical nutrient cycles - Nitrogen, Carbon, Phosphorus and Water
1.1.3 Energy flow in ecosystem
1.1.4 Food chain, food web and ecological pyramids
1.1.5 Animal Associations-Mutualism; Commensalism;Parasitism; Competition, Predation

UNIT – II

2.1 Ecology – II

2.1.1 Concept of Species, Population dynamics and Growth curves
2.1.2 Community Structure and dynamics and Ecological Succession
2.1.3 Ecological Adaptations
2.1.4 Environmental Pollution- Sources, Effect and Control measures of Air, Water, Soiland Noise Pollution
2.1.5 Wildlife conservation - National Parks and Sanctuaries of India, Endangered species; Biodiversity and Hotspots of Biodiversity in India.

UNIT – III

3.1 Zoogeography

3.1.1 Zoogeographical regions
3.1.2 Climatic and faunal peculiarities of Palaearctic, Nearctic, Neotropical, Oriental, Australian and Ethiopian regions
3.1.3 Wallace line, Discontinuous distribution
3.1.4 Continental Drift

Unit – IV

4.1. Evolution

4.1.1 Theories of Evolution – Lamarckism, Neo-Lamarckism, Darwinism, Neo-Darwinism, Modern synthetic theory, Evidences of Evolution.
4.1.2 Forces of Evolution–Natural Selection, Genetic drift, Gene flow, Genetic load, Organic variations,Hardy Weinberg Equilibrium.
4.1.3. Isolation –Premating and post mating isolating mechanisms.
4.1.4 Speciation: Methods of Speciation - Allopatric and Sympatric; Causes and Role of Extinction in Evolution.

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Suggested Readings:

1. Ecology – Himalaya Publising company – M.P Arora
2. Environmental Biology – P.D. Sharma
3. Environmental Ecology – P.R. Trivedi and Gurdeep Raj
4. Indian Wildlife Threats and Prervation – Buddhadev Sharma and Te Kumar
5. Ecology-Principles and Application II Edn. Cambridge Univ Press, London, Champan. JL and Re.iss MJ.
6. Environmental Studies, TATA McGraw Hill Com. New Delhi, Benny Joseph.
7. Fundamentals of Ecology Third Edn., Nataraj Publishers, Dehradun, Eugene.P. Odum.
8. Ecology and Animal Distribution, Veea Bala Rastogi.
9. Text Book of Ecology and Environment, P.K. Gupta.
10. Ecology and Wildlife Biology, Bhatnagar and Bansal.
11. Evolution 3rd Edn. Blackwell Publishing, Ridley, M (2004).
12. Evolutionary Biology, Addison –Wesley; Minkoff,E(1983).
13. *Evolution.* Cold Spring, Harbour Laboratory Press Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007).
14. *Evolution.* IV Edition. Jones and Bartlett Publishers; Hall, B. K. and Hallgrimsson, B. (2008).
15. *Evolution*, 2nd Edn, Oxford and IBH Publishing Co., New Delhi, Jan M. Savage.

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY III Year

SEMESTER – VI

ECOLOGY, ZOOGEOGRAPHY AND EVOLUTION PRACTICAL

Instruction: 3 hrs per week
No. of Credits: 1

Ecology

1. Determination of pH of Soil and Water.
2. Estimation of Salinity (Chlorides) of water in given samples.
3. Estimation of Carbonates and Bicarbonates in the given water samples.
4. Estimation of dissolved Oxygen of Pond water, sewage, effluents.
5. Identification of Zooplankton from different water bodies.
6. Study of Pond Ecosystem / Local polluted site – Report submission.

Zoogeography

1. Study of at least 3 endangered or threatened wild animals of India through photographs/specimens/models
2. Field visit to Zoo Park to study the management, behavior and enumeration of wild animals.
3. Identification of Zoogeographical realms from the Map and identify specific fauna of respective regions.

Evolution

1. Museum Study of fossil animals: **Peripatus; Coelacanth fish, Dipnoi fishes; Sphenodon; Archaeopteryx.**
2. Study of homology and analogy from suitable specimens and pictures
3. Problems on Hardy-Weinberg Law
4. Macroevolution using Darwin finches (pictures)

- **Laboratory Record work shall be submitted at the time of practical examination**
- **Computer aided techniques should be adopted as per UGC guide lines.**

Suggested manuals:

1. Ecology Student Lab Manual, Biology Labs – Robert Desharnais, JeffreyBell.
2. Ecology Lab manual – Darrell S Vodopich.

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DEPARTMENT TIMETABLE YEAR WISE

YEAR- 2022-23

DAYS	**9-10**	**10-10.50**	**11.10-12.00**	**12.00-12.50**	**2.00-2.50**	**2.50-3.40**
MON	MZC-III Dr.S. Purnima. BZC-II B.Pranavi	BZC-I A.Pushpalatha	MZC-II B.Pranavi BZC-III, Dr.S.Purnima	Remedial class- BZC-II B.Pranavi MZC-I A.Pushpalatha	-BZC-II batch-1 practical, B.Pranavi	BZC-II batch-1 practical, B.Pranavi
TUES	MZC-III Dr.S. Purnima. BZC-II B.Pranavi	MZC-II B.Pranavi BZC-I A.Pushpalatha	BZC-III, Dr.S.Purnima BZC-II batch-2 practical, B.Pranavi	BZC-II batch-2 practical, B.Pranavi MZC-I A.Pushpalatha	MZC-I LAB A.Pushpalatha B-1	MZC-I LAB A.Pushpalatha B-1
WED	MZC-III Dr.S. Purnima. BZC-II B.Pranavi	BZC-I A.Pushpalatha	MZC-II B.Pranavi BZC-III, Dr.S.Purnima	BZC-I LAB A.Pushpalatha B-2	MZC-III LAB Dr.S.Purnima B-2	P.G CLASS- BZC-III MZC-III LAB Dr.S.Purnima B-2
THURS	MZC-III Dr.S. Purnima MZC-I A.Pushpalatha	BZC-III, Dr.S.Purnima BZC-I A.Pushpalatha	MZC-II B.Pranavi MZC-I A.Pushpalatha	Remedial class- MZC-II B.Pranavi	BZC-I LAB A.Pushpalatha B-1	BZC-I LAB A.Pushpalatha B-1
FRI	MZC-I A.Pushpalatha		BZC-II B.Pranavi	MZC-II B.Pranavi	MZC-I LAB A.Pushpalatha B-1	P.G CLASS- MZC-III B.Pranavi MZC-I LAB A.Pushpalatha B-1
SAT	MZC-III LAB Dr.S.Purnima B-1	MZC-III LAB Dr.S.Purnima B-1	MZC-II batch-2 practical, B.Pranavi	MZC-II batch-2 practical, B.Pranavi	Remedial class- BZC-II B.Pranavi	

YEAR- 2021-22

DAYS	9-10	10-10.50	11.10-12.00	12.00-12.50	2.00-2.50	2.50-3.40
MON	BZC-II B.Pranavi MZC-III Dr.S.Purnima	MZC-II B.Pranavi BZC-I A.Pushpalatha	BZC-III Dr.S.Purnima	MZC-I A.Pushpalatha		EVS- B.A-I A.PushpalathaEVS
TUES	BZC-II B.Pranavi MZC-III Dr.S.Purnima	MZC-II B.Pranavi BZC-I A.Pushpalatha	BZC-III Dr.S.Purnima	MZC-I A.Pushpalatha	MZC-I YEAR LAB A.pushpalatha	MZC-I YEAR LAB A.pushpalatha
WED	BZC-II B.Pranavi MZC-III Dr.S.Purnima	MZC-II B.Pranavi BZC-I A.Pushpalatha	BZC-III Dr.S.Purnima	MZC-I A.Pushpalatha	BZC-II YEAR LAB B.PRANAVI	BZC-II YEAR LAB B.PRANAVI
THURS	MZC-III Dr.S.Purnima	MZC-II B.Pranavi BZC-I A.Pushpalatha	BZC-I YEAR LAB A.pushpalatha BZC-III Dr.S.Purnima	BZC-I YEAR LAB A.Pushpalatha		
FRI			BZC-II B.Pranavi		BZC-III LAB Dr.S.Purnima	BZC-III LAB Dr.S.Purnima
SAT	MZC-III lab Dr.S.Purnima	MZC-III LAB Dr.S.Purnima MZC-I A.Pushpalatha		EVS- B.A-I A.Pushpalatha		

YEAR- 2020-21

DAYS	9-10	10-10.50	11.10-12.00	12.00-12.50	2.00-2.50	2.50-3.40
MON	MZC-III (5) Dr.S.Purnima	EVS-MZC-I K.SHARADA.	BZC-I K.Sharada BZC-III (5) Dr.S.Purnima BZC-II B.PRANAVI	MZC-I K.Sharada MZC-III (6) B.PRANAVI	BZC-III (6) B.PRANAVI	
TUES	MZC-III (5) Dr.S.Purnima	EVS-MZC-I K.SHARADA	BZC-I K.Sharada BZC-III (5) Dr.S.Purnima BZC-II B.PRANAVI I	MZC-I K.Sharada MZC-III (6) B.PRANAVI	BZC-III (6) B.PRANAVI	
WED	MZC-III (5) Dr.S.Purnima	BZC-III (6) B.PRANAVI	BZC-I B.PRANAVI BZC-III (5) Dr.S.Purnima BZC-II B.PRANAVI	MZC-I K.SHARADA MZC-III (6) B.PRANAVI	BZC-II LAB B.PRANAVI	BZC-II LAB B.PRANAVI
THURS	MZC-III (5) Dr.S.Purnima BZC-I LAB K.SHARADA	BZC-I LAB K.SHARADA	BZC-I K.SHARADA BZC-III (5) Dr.S.Purnima BZC-II B.PRANAVI	MZC-I B.PRANAVI MZC-III (6) B.PRANAVI	BZC-III (6 B.PRANAVI	
FRI	MZC-I LAB K.SHARADA	MZC-I LAB K.SHARADA			MZC-III LAB Dr.S.Purnima,	MZC-III LAB Dr.S.Purnima
SAT					BZC-III LAB B.PRANAVI	BZC-III LAB B.PRANAVI

YEAR- 2019-20

DAYS	9-10	10-10.50	11.10-12.00	12.00-12.50	2.00-2.50	2.50-3.40
MON	MZC-III (5) Dr.S.Purnima	EVS-BA-I B.PRANAVI	BZC-I B.PRANAVI BZC-III (5) Dr.S.Purnima BZC-II R,TRIVENI	MZC-I B.PRANAVI MZC-III (6) R,TRIVENI	BZC-III (6) R,TRIVENI	
TUES	MZC-III (5) Dr.S.Purnima	EVS-BA-I B.PRANAVI	BZC-I B.PRANAVI BZC-III (5) Dr.S.Purnima BZC-II R.TRIVENI	MZC-I B.PRANAVI MZC-III (6) R,TRIVENI	BZC-III (6) R,TRIVENI	
WED	MZC-III (5) Dr.S.Purnima	BZC-III (6) R,TRIVENI	BZC-I B.PRANAVI BZC-III (5) Dr.S.Purnima BZC-II R.TRIVENI	MZC-I B.PRANAVI MZC-III (6) R,TRIVENI	BZC-II LAB (R,TRIVENI	BZC-II LAB (R,TRIVENI
THURS	MZC-III (5) Dr.S.Purnima BZC-I LAB B.PRANAVI	BZC-I LAB B.PRANAVI	BZC-I B.PRANAVI BZC-III (5) Dr.S.Purnima BZC-II R,TRIVENI	MZC-I B.PRANAVI MZC-III (6) R,TRIVENI	BZC-III (6) R,TRIVENI	
FRI	MZC-I LAB B.PRANAVI	MZC-I LAB B.PRANAVI			MZC-III LAB Dr.S.Purnima,	MZC-III LAB Dr.S.Purnima
SAT					BZC-III LAB R.TRIVENI	BZC-III LAB R,TRIVENI

COURSES OFFERED ; BZC & MZC

RESULT ANALYSIS ;

YEAR	BZC	MZC	TOTAL	PASSED	PERCENTAGE
2022-23	22	28	50	49	98%
2021-22	27	27	54	54	100%
2020-21	29	17	46	46	100%
2019-20	37	27	64	64	100%
2018-19	34	30	64	64	100%