

**PITHAPUR RAJAH'S GOVERNMENT COLLEGE
(AUTONOMOUS)**

College with Potential for Excellence

KAKINADA



XVIII-BOARD OF STUDIES

**DEPARTMENT OF
ZOOLOGY**

2017-18

(CHOICE BASED CREDIT SYSTEM)

P.R.GOV.T.COLLEGE (AUTONOMOUS) KAKINADA.
2017-18, XVIII BOARD OF STUDIES MEETING. Dt. 10.04.2017
DEPARTMENT OF ZOOLOGY

The members present have discussed the syllabi and model question papers (Theory and Practical) related to I to VI semesters in Zoology and made the following Resolutions.

Resolution I: Resolved to Continue CBCS System as instructed by Commissioner of Collegiate Education) CCE, Amaravathi.

Resolution II: Resolved to implement 60% external and 40% internal marks for both theory and practicals from the academic year 2017-18. **However, university nominee insisted on 75% external and 25% internal. As majority of BOS members agreed for 60% external and 40% internal, it was decided to implement 60% externals and 40% internals from the academic year 2017-18.**

Resolution III: Resolved to split 40 Marks of Theory internal as 20 Marks for mid exams and 20 marks for co-curricular activities (Seminar/Assignment/Quiz/Group Discussion).

Resolution IV: Resolved to conduct Practical examination also at the end of each semester for even I year and II year students from the academic year 2017-18

Resolution V: Resolved to follow the same syllabus and exam pattern for the coming II and III year students.

Resolution VI: Resolved to continue two Subject Electives in Fifth Semester as Advanced (Elective 1-Bioinformatics and Elective 2- Conservation Biology) and in Sixth Semester two Skill Based Electives (Elective 1-Fisheries and Aquaculture and Elective 2-Clinical Science).

Resolution VII: Resolved to follow the General stream Zoology syllabus even for B.Voc (commercial Aquaculture) students from the academic year 2017-18.

Resolution VIII: Resolved to continue the same paper setters and Examiners for all semesters.(List of Paper setters and Examiners is appended).

Resolution IX: Resolved to include Blue Prints for model question papers for all semesters.

Chairperson
Board of Studies
Dept. of Zoology

**P.R. GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF ZOOLOGY**

XVIII-BOARD OF STUDIES MEETING 2017-18
CHOICE BASED CREDIT SYSTEM
(WITH EFFECTIVE FROM 2017-18)

Time: 11.00 A.M.

Date: 10.04.2017

Venue: *Department of Zoology*

The XVIII BOARD OF STUDIES Meeting of the Department of Zoology took place 11 A.M. on **10.04.2017** in the Department of Zoology P.R. Govt. College, (A) Kakinada for the year 2017-18. The following members attended.

Sl No	Name and affiliation	Designation	Signature
01	Dr. B. Elia Lecturer in-charge Dept of Zoology P R College(Autonomous) KAKINADA.	Chairperson	
02	Dr.P.Vijaya Nirmala Asst.Prof. Dept. of Zoology Adikavi Nannaya University RAJAHMAHENDRAVARM	Vice- Chancellor's Nominee	
03	Dr.P.Ram Mohan Rao Assistant Director of Fisheries S.I.F.T KAKINADA	Collaboration	
04	Dr.D.Padmavathi Senior Lecturer in Zoology M.S.N. Degree College KAKINADA.	Subject Expert	
05	Dr.T.V.V. Satyanarayana Senior Lecturer in Zoology Ideal Degree College KAKINADA.	Subject Expert	

LIST OF EXAMINERS
DEPARTMENT OF ZOOLOGY

S.No	Name of the Examiners	Subject	Name of the College
01	Dr.K.Bala Jagannadha Rao	Zoology	AMAL College, Anakapally
02	Smt.G.Surya kala	Zoology	Arts College (A),Rajahmundry
03	B.Vijaya Bhaskara Rao	Zoology	AVN College, Vizag
04	Dr.M.Vijaya Kumar	Zoology	GDC (Men), Palakollu
05	Dr. P.Jaya	Zoology	VSK College, Vizag
06	K.Visweswara Rao	Zoology	C.R.R.College (Men) Eluru
07	P.Ramakrishna Prasad	Zoology	C.R.R.College (Men) Eluru
08	K.K.D.M.Lakshmi	Zoology	C.R.R.College (Womens) Eluru
09	Dr.K.Usha Rani	Zoology	D.N.R.College, Bhimavaram
10	Smt.D.Parvathi	Zoology	G.D.College, Ganapavaram
11	N.Suneetha	Zoology	GDC ,Nidadavolu
12	C.Vara Lakshmi	Zoology	M.R.College (W) Vizianagaram
13	M.Rajeswari	Zoology	M.R.College (W) Vizianagaram
14	B.Narayana Rao	Zoology	M.R.College (A) Vizianagaram
15	G.Mani	Zoology	M.R.College (A) Vizianagaram
16	R.Indira	Zoology	St.Theressa College, Eluru
17	V.Surya Kumari	Zoology	M.R.College (A) Vizianagaram
18	R.Prabakara Rao	Zoology	M.R.College, Peddapuram
19	Indira Ashalatha Peter	Zoology	M.R.College, Peddapuram
20	PVBKRL.Saibaba	Zoology	SKBR.College, Amalapuram
21	V.V.Padmavathi	Zoology	St.Theressa College, Eluru
22	Dr. P. Padmavathi	Zoology	MSN Degree College, Kakinada
23	Dr.V. Sandhya	Zoology	GDC, Ganapavaram

Lecturer in charge- Dept of Zoology

LIST OF QUESTION PAPER SETTERS

DEPARTMENT OF ZOOLOGY

S.No	Name of the Examiners	Subject	Name of the College
01	Dr.K.V.C.S.Appa Rao	Zoology	Y.N.College, Narasapuram
02	Y.V.K.Durgaprasad	Zoology	V.S.K. College , Vizag
03	Dr. A. Joginaidu	Zoology	V.S.K. College , Vizag
04	Dr.K.Usha Rani	Zoology	D.N .R. College, Bhimavaram
05	Mrs, R.Krishna Bharathi	Zoology	S.K.V.T.College, Rajahmundry.
06	A.Venkatapathi Raju	Zoology	S.K.B.R.College, Amalapuram.
07	Dr. Rama Murthy	Zoology	B.V.K.College, Vizag.
08	K.Sathi Reddy	Zoology	Bullayya College, Vizag.
09	G.Surya Kala	Zoology	Govt Arts College, Rajahmundry.
10	Y.Polinaidu	Zoology	C.R.R.College (A) Eluru
11	K.V.S. Reddy	Zoology	A.N.R. College, Gudivada
12	Dr.V.Surya Kumari	Zoology	M.R.College, Vijayanagaram
13	Dr. K.S.R.Prasada Rao	Zoology	S.N.K.P.& Dr.K.S.Raju Arts & Science College Penugonda
14	Smt.M.Vasanthalakshmi	Zoology	D.R.G.Govt Degree College, Tadepalligudem.
15	Dr. P.Jaya	Zoology	VSK College, Vizag
16	Dr.M.Vijaya Kumar	Zoology	GDC (Men), Palakollu
17	N.Suneetha	Zoology	GDC ,Nidadavolu
18	Chakravarthy	Zoology	DRG Govt. Degree College, Tadepalligudem

Lecturer in charge-Dept of Zoology

BOS-ZOOLOGY-2017-18

SEMESTER-I
(WITH EFFECTIVE FROM 2017-2018)

TITLE: ANIMAL DIVERSITY I (PROTOZOA TO HEMICHORDATA)

Course Code: ZO 1208

Hrs:4

Credits: 3

OBJECTIVES	LEARNING OUTCOMES
1) To instill knowledge across different areas of animal science.	1) At the end of the course, students should be able to appreciate the complexities of biological organisation and be able to address scientifically the issues of animal diversity in a rational way.
2) Provides an opportunity to familiarize with the life cycles and mode of reproduction in different animal groups.	2) Students will have the knowledge and skills to: Describe the variety of invertebrate organisms and explain their evolutionary origin and diversification.
3) To understand the systemic and functional morphology of various groups of invertebrates.	3) Investigate invertebrates in laboratory and field conditions, and identify major taxonomic groups.
4) To study their economic importance, affinities and adaptations.	4) Understand the requirements for collection and short-term maintenance of invertebrate species for photographic and scientific observation.
	5) Understand and communicate the major evolutionary innovations in invertebrate groups, and describe the functional significance of associated morphologies and behaviours.

MODULE-I (PROTOZOA & PORIFERA)

15 Hrs

Paramecium: Structure, Locomotion and Reproduction-Asexual reproduction (Binary fission), Sexual reproduction- (Conjugation) and definitions of Endomixis, Autogamy and Cytogamy

Sycon: External features, Skeleton and Reproduction., and Canal system in Sponges

MODULE-II (CNIDARIA, PLATYHELMINTHES & NEMATODA)**15Hrs**

Obelia: Morphology of colony and morphology of Medusa with reference to statocyst.

Polymorphism in Coelenterates; Corals and Coral reef formation.

Fasciola hepatica: Structure and life History only

Ascaris lumbricoides: Structure and life History only

MODULE-III (ANNELIDA, ARTHROPODA & ONYCHOPHORA)**15Hrs**

Hirudinaria: External features, digestive, excretory and reproductive systems

Palaemon: External morphology with appendages, respiratory, excretory and nervous system., Crustacean larvae; *Peripatus*- Affinities and Significance

MODULE-IV (MOLLUSCA, ECHINODERMATA AND HEMICHORDATA) 15 Hrs

Pila: External characters, digestive and nervous system. Pearl formation in Molluscs.

Asterias: External morphology and Water vascular system

Balanoglossus: Structure and affinities.

REFERENCES

1. Ekambaranatha Ayyar.M. and T.N. Ananthkrishnan, 1992. Manual of Zoology Vol. 1 [Invertebrata], parts I and II.S. Viswanathan (Printers and Publishers) Pvt. Ltd; Madras.
2. Jordan, E.L. and P.S. Verma, 1993. Invertebrate Zoology, 12th Edition. S. Chand and Co. Ltd, New Delhi.
3. Kotpal, R.L. 1988 - 1992 Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
4. Parker and Haswell, 1964. Text Book of Zoolgy. Vol I (Invertebrata). A.Z.T; B.S. Publishers and distributors, New Delhi.
5. L.A. Borrardile and F.A. Pott. The Invertebrates. Cambridge University press.UK
6. Invertebrate Zoology – B.Sc, I Year, Telugu Academy

TITLE: ANIMAL DIVERSITY I (PROTOZOA TO HEMICHORDATA)
(WITH EFFECTIVE FROM 2017-2018)
SEMESTER-I
COURSE CODE: ZO 1208
MODEL QUESTION PAPER

Time: 2 ½ hrs.

Max Marks: 60

PART – 1

Note: Answer any THREE questions choosing at least one question from each section
3X10 = 30M

SECTION- A

1. Explain conjugation in Paramecium with neat diagrams. Add a note on significance of conjugation.
2. Write an essay on Coral reef formation
3. Write an account of life history of Liver Fluke.

SECTION- B

4. Write an essay on the affinities of *Peripatus* and its systematic position.
5. Describe the nervous system of Pila with a neat labelled diagram.
6. Describe the water vascular system in *Starfish*.

Part – II

Answer any **FOUR** question

4x5=20M

7. Binary fission
8. Leucon type of Canal System.
9. Polymorphism in Hydrozoa
10. Botryoidal Tissue
11. *Zoea* Larva.
12. Antennary glands
13. Affinities of Balanoglossus.

Part – III

Answer any **FIVE** Questions

5x2=10M

14. Synchronal and metachronal rhythms.
15. Amphiblastula Larva
16. Nematocysts
17. Flame Cell
18. Nephridia
19. Statocyst.
20. Radula
21. Pedicellariae.

P.R.GOVERNMENT COLLEGE (A), KAKINADA
Ist B.Sc., (BZC), SEMESTER-I
ANIMAL DIVERSITY-I
BLUE PRINT FOR QUESTION PAPER SETTER

Max Marks: 60

Time: 2 ½ hrs

MODULE NO. & NAME	ESSAY QUESTIONS 10 MARKS	SHORT ANSWER QUESTIONS 5 MARKS	VERY SHORT ANSWER QUESTIONS 2 MARKS	MARKS ALLOTTED TO THE UNIT
MODULE – I (Protozoa & Porifera)	01	02	02	24
MODULE – II (Cnidaria, Platyhelminthes & Nematoda)	02	01	02	29
MODULE – III (Annelida, Arthropoda & Onychophora)	01	02	02	24
MODULE – IV (Mollusca, Echinodermata & Hemichordata)	02	01	02	29
Total No.of Questions	06	06	08	
Total Marks including choice				106

NOTE:The question paper setters are requested to kindly adhere to the format given in the above table.

PRACTICAL SYLLABUS-I SEMESTER (with effective from 2017-18)

I. General Characters and Classification of Invertebrate Phyla (**Protozoa to Hemichordata**)
up to the level of classes

II. DISSECTIONS-Only Demonstration

- a) Mounting of Cephalothoracic and abdominal appendages of Prawn
- b) Nervous system of Prawn

OBSERVATION OF THE FOLLOWING SLIDES / SPECIMENS / MODELS:

1. Protozoa - *Elphidium*, *Paramecium* – binary fission and Conjugation.
2. Porifera - *Spongilla*, *Euspongia*.
3. Coelenterata - *Physalia*, *Aurelia*, *Pennatula*, *Obelia colony*, *Corallium*, *Gorgonia*,
4. Platyhelminthes and Nematelminthes – *Ascaris*-male & female, *Larval stages of Fasciola*- *Miracidium*, *Redia*, *Cercaria*, *Ancylostoma duodenale*.
5. Annelida - *Nereis*, *Hirudinaria*, *Trochophore* larva.
6. Arthropoda - *Sacculina*, *Limulus*, *Julus*, *Scolopendra*, *Peripatus*.
7. Mollusca - *Chiton*, *Unio*, *Sepia*, *Octopus*, *Glochidium* larva.
8. Echinodermata - *Ophiothrix*, *Echinus*, *Cucumaria*, *Antedon*, *Bipinnaria* larva.
9. Hemichordata – *Balanoglossus*, *Tornaria* larva.

**ANIMAL DIVERSITY-I
PRACTICAL MODEL PAPER
(AT THE END OF I-SEMESTER-EFFECTIVE FROM 2017-18)**

Max marks: 50

Time : 2Hrs

- | | |
|---|---------|
| 1. Dissect and display the nervous system of Palaemon. Draw a neat labelled diagram | 15M |
| 2.. Explain the general characters of Porifera | 10M |
| 3. Identification of spotters | 3X5=15M |
| A)----- | |
| B)----- | |
| C)----- | |
| 3. Record | 5M |
| 4. Viva | 5M |
| Total | 50M |

SEMESTER-II
(WITH EFFECTIVE FROM 2017-2018)

TITLE: ANIMAL DIVERSITY II (PROTOCHORDATA TO MAMMALIA)

Course Code: ZO 2208

Hrs: 4

Credits: 3

MODULE-I (UROCHORDATA & PISCES)

18Hrs

Structure and life-history of *Herdmania*, Significance of retrogressive Metamorphosis.

Scoliodon : Morphology, respiratory system, structure of heart, excretory system, nervous system and sense organs.

Migration in fishes and types of scales

MODULE-II (AMPHIBIA)

12Hrs

Rana : Morphology, respiratory system, structure of heart and reproductive systems only.

Parental care in amphibians

MODULE-III (REPTILIA)

12Hrs

Calotes: Morphology, digestive system, urinogenital system and nervous systems.

MODULE-IV (AVES & MAMMALS)

18Hrs

Pigeon (*Columbia livia*) : Exoskeleton, respiratory system, structure of heart, circulatory system and excretory systems only.

Migration in birds and its significance

Flight adaptation in birds

Dentition in Mammals.

SEMESTER-II
TITLE: ANIMAL DIVERSITY II (PROTOCHORDATA TO MAMMALIA)
Course Code: ZO 2208
MODEL QUESTION PAPER

Time: 2 ½ hrs.

Max Marks: 60

PART - 1

Note : Answer any THREE questions choosing at least one question from each section **3 X10 = 30**

SECTION- A

1. What is retrogressive metamorphosis? Discuss with special reference to the life history of an Ascidian and write its significance
2. Explain migration in fishes
3. Write an essay on parental care in Amphibia

SECTION-B

4. Explain the urinogenital system of Calotes with a neat labelled diagram
5. Explain the various flight adaptations in birds
6. Write an essay on Dentition in mammals

Part – II

Answer any **FOUR** question

4x5=20

7. Scales in Fishes
8. Buccopharyngeal respiration
9. Structure of heart of Frog
10. Brain in Calotes
11. Digestive glands of Calotes
12. Quill feather

Part – III

Answer any **FIVE** Questions

5x2=10

13. Tunicin
14. Ampulla of Lorenzini
17. Tympanum
18. Chromatophores
19. Carotid labyrinth
21. Uricotelic
23. Syrinx
25. Filoplumes

Ist B.Sc., ZOOLOGY, II SEMESTER (W.E.F. 2017-18)

**PAPER II –ANIMAL DIVERSITY (PROTOCHORDATA TO MAMMALIA)
BLUE PRINT FOR QUESTION PAPER SETTER**

**Time: 2 ½ hours
Max marks: 60**

MODULE NO. & NAME	ESSAY QUESTIONS 10 MARKS	SHORT ANSWER QUESTIONS 5 MARKS	VERY SHORT ANSWER QUESTIONS 2 MARKS	MARKS ALLOTTED TO THE UNIT
MODULE – I (Urochordata & Pisces)	02	01	02	29
MODULE – II (Amphibia)	01	02	02	24
MODULE – III (Reptilia)	01	02	02	24
MODULE – IV (Aves & Mammalia)	02	01	02	29
Total No.of Questions	05	06	08	
Total Marks including choice				106

NOTE:The question paper setters are requested to kindly adhere to the format given in the above table.

SEMESTER-II
ANIMAL DIVERSITY-II
PRACTICAL SYLLABUS

I. General characters of Protochordates &

General characters and classification of Vertebrates (Fishes to Mammals) up to orders only

II. Dissections-Scoliodon III, VII, IX and X Cranial nerves (Only Demonstration

-Mounting of Placoid scales of Scoliodon

III Identification of slides/spotters

1. Protochordata : *Herdmania, Amphioxus, Amphioxus* T.S through pharynx.
2. Cyclostomata : *Petromyzon and Myxine*.
3. Pisces : *Pristis, Torpedo, Hippocoampus, Exocoetus, Echeneis, Labeo, Catla, Clarius, Channa, Anguilla*.
4. Amphibia : *Ichthyophis, Amblystoma, Axolotl larva, Hyla*,
5. Reptilia: *Draco, Chamaeleon, Uromastix, Testudo, Trionyx, Russels viper, Naja, Krait, Hydrophis, Crocodile*.
6. Aves : *Psittacula, Eudynamis, Bubo, Alcedo*.
7. Mammalia: *Ornithorhynchus, Pteropus, Funambulus*.

SEMESTER-II
ANIMAL DIVERSITY-II (PROTOCHORDATA TO MAMMALIA)

PRACTICAL MODEL PAPER
(AT THE END OF II-SEMESTER-EFFECTIVE FROM 2017-18)

Max marks: 50

Time : 2Hrs

- | | |
|--|---------|
| 1. Dissect and display the III & VII cranial nerves of Scoliodon. Draw a neat labelled diagram | 15M |
| 2.. Explain the classification of Amphibia up to orders | 10M |
| 3. Identification of spotters | 3X5=15M |
| A)----- | |
| B)----- | |
| C)----- | |
| 3. Record | 5M |
| 4. Viva | 5M |
| Total | 50M |

ZOOLOGY SYLLABUS
(WITH EFFECTIVE FROM 2015-16)
AT THE END OF SEMESTER-III

TITLE: ECOLOGY, ZOOGEOGRAPHY & EMBRYOLOGY

Hrs: 4

Credits: 3

OBJECTIVES	LEARNING OUTCOMES
<p>Embryology</p> <p>1. Define the listed key terms of embryology.</p> <p>2. Name the three germ layers. List tissues found in the adult that are derived from each of these three layers.</p> <p>3. Map the path on egg follows starting at the ovary to implantation. Name the major structures and stages involved.</p> <p>4. Discuss the biological strategies evolved by fertilized eggs in diverse organisms to create initial asymmetry in the embryo to initiate organization of the embryonic body plan.</p> <p>5. Depict how cellular processes such as cell proliferation, cell adhesion and cell motility contribute to the shaping of the embryo during cleavage stages, gastrulation and cell migration</p> <p>Ecology :</p> <p>1. To Know The inter-relationship between organisms in population and communities. To study the principle biogeochemical cycles.</p> <p>Population Ecology:</p> <p>1. To study the population dynamics and population control.</p> <p>Zoogeography: To study the concepts of zoogeography and, zoogeographical importance of Indian subcontinent.</p>	<p>1. Student will learn about the concepts of embryology</p> <p>2. Significance of germinal layers will be learnt by the student.</p> <p>3. Concepts of embryonic development will be learnt.</p> <p>4. Student will know the preliminary processes in the development of organisms.</p> <p>5. Student will learn about the cell proliferation mechanism, during the development.</p> <p>1. At the end of the course student will be equipped with the different types of community interactions and their significance at the community level and the mechanism and the process of bio geochemical cycles</p> <p>1. Concepts of population dynamics and the population control measures will be imparted to the students.</p> <p>1. Concept of zoogeography, zoogeographical importance of Indian subcontinent in terms of biodiversity will be learnt by the student.</p>

Syllabus

Module I : EMBRYOLOGY

18 Hrs

- Spermatogenesis, Oogenesis and Fertilization.
- Types of eggs , Types of cleavages
- Development of frog up to gastrulation and formation of primary germ layers.
- Foetal membranes and their significance ,
- Placenta : types and functions
- Regeneration with reference to Turbellarians and Lizards

Module II : Biogeochemical cycles or nutrient cycles

14 Hrs

- Gaseous cycles of Nitrogen and Carbon;
- Sedimentary cycle- phosphorus
- **Zoogeography:**
- Fauna of Oriental Realm
- Fauna of Australian Realm

Module III : Interrelation ships at the community level

14 Hrs

- Definition of Community- Habitat and ecological niche
- Community interactions: Brief account on Competition, predation, mutualism, commensalism and parasitism.

Module IV : Population Ecology

14 Hrs

- Population ecology : Density and dispersions of animal populations
- Growth curves and growth of animal populations- r-selected and k-selected species.
- Population regulation mechanisms – both biotic and abiotic
- Growth of human population and its control
- Future of human population

Reference Books

1. 'A text book of Embryology' - N. Arumugam.
2. 'Chordate Embryology' by P.S. Verma and V.K. Agarwal., S. Chand and Company.
3. 'Developmental Biology - Scott. F. Gilbert.
4. 'Developmental Genetics – G.S. Miglani.
5. 'Embryology' – Mohan P.Arora.
6. 'Elements of Ecology' – Odum.
7. ' Environmental Biology' by H.R.Singh., S.Chand Publications.
8. 'Ecology' - M.P.Arora

9. 'Environmental Biology' – P.D.Sharma.
10. 'Environmental Ecology' – P.R.Trivedi and Gurdeep Raj.
11. 'Ecology – Principles and Applications' – J.L Chapman and M.J.Reiss.
12. 'Biology' by Campbell & Reece.
13. 'Biology: The Science of Life' by R.A. Wallace, G.P. Sanders & R.J. Ferl.

BLUE PRINT

**II Year B.Sc., Course: ECOLOGY, ZOOGEOGRAPHY & EMBRYOLOGY
at the end of III Semester**

Under CBCS Pattern

Module Name	PART I Essay Type Questions		Part II Short Answer Questions	Part III Very Short Answer Type Questions	Marks Allotted to the Chapter
	Section A	Section B			
1. EMBRYOLOGY	2		01	03	31
2. Ecology (Nutrient cycles & Zoo geography)	1		02	04	28
3. Interrelation ships at the community level		1	02	04	28
4. Population Ecology		2	02	01	32
5. Total	06 Essay questions including choice of which 03 to be answered		04 Short answer Questions including choice of which 7 to be answered	10 Very short answer question including the choice of 12 to be answered	119 Marks including choice. Of which 70 Marks to be answered

II Year B.Sc., ECOLOGY, ZOOGEOGRAPHY & EMBRYOLOGY**At the end of III Semester****(CBCS)****W.E.F., 2015-16****Max Marks 70****Time 3 hrs.**

PART I

**Note: Answer any THREE questions choosing at least one question from each section
3 x 10 = 30 Marks**

SECTION – A

1. Write an essay on the spermatogenesis; write a note on the structure of the mature sperm.
2. Describe different types on placenta.
3. How the nitrogen cycle exists in the ecosystem- explain?

SECTION –B

4. Write an essay on the different types of interaction found in the community with suitable examples.
5. What are population growth curves, describe in detail about the growth curves.
6. Write an essay on the human population growth and its future.

PART –II**Answer any FOUR questions****4 x 5 = 20Marks**

7. Foetal membranes
8. Carbon cycle
9. Oriental realm
10. Parasitism
11. Mutualism
12. K selection
13. Population regulation

PART III**Answer any TEN questions****10 x 2 = 20 Marks**

14. Regeneration
15. Yolk sac
16. Delamination
17. Population crash
18. Nitrifying bacteria
19. Hyper parasitism.
20. Weathering.
21. Ecological Niche.
22. Predation.
23. Kangaroo
24. Reservoir Pool.
25. Competition

SEMESTER-IV**TITLE: CELL BIOLOGY & GENETICS, ORGANIC EVOLUTION & ETHOLOGY****Course Code: 4208**

Hrs: 4

Credits: 3

OBJECTIVES	LEARNING OUTCOMES
1. To learn the cytological techniques, the structure and functions of various cellular components.	1. At the end of the course, students should be able to understand the structure and function of various animal cell organelles
2. To understand the central dogma of Protein synthesis including DNA replication, transcription & Translation	2. Will appreciate the central dogma of protein synthesis
3. To understand the various human chromosomal disorders	3. Will understand the genetic basis of human Chromosomal disorders which forms the basis of gene therapy
4. To understand the various evolutionary theories and the different types of animal behaviours	4. Will appreciate the scientific basis of Organic evolution and the various behaviour patterns of animals

MODULE-I CELL BIOLOGY

Cell theory

Ultra structure of Animal cell

Structure of Plasma membrane - Fluid-mosaic model. Transport functions of Plasma membrane-Passive transport, active transport (Antiport, symport and uniport) and bulk transport

Structure and functions of Endoplasmic reticulum Golgi body, Ribosomes, lysosomes and Mitochondrion.

MODULE-II GENETICS

Central dogma of molecular biology – Brief account of DNA replication (Semi-conservative method), Replication fork (Continuous and discontinuous synthesis); Transcription– Brief account of initiation, elongation and termination in eukaryotes; Genetic code; Translation

Human karyotyping, barr bodies and Lyon hypothesis and Amniocentesis
chromosomal disorders – Autosomal and sex chromosomes
Human Genome Project

MODULE-III ORGANIC EVOLUTION

Genetic basis of Evolution - Gene pool and gene frequencies - Hardy-Weinberg's Law - Force of destabilization - natural selection - genetic drift –Mutation – Isolation and Migration.

Speciation – Allopatry and Sympatry.

MODULE-IV ETHOLOGY

Introduction to Animal Behaviour

Taxis, Reflexes, Instinctive Behaviour – Motivated Behaviour

Learning, Types of Learning, Physiology and Phylogeny of Learning.

REFERENCES

1. Cohn, N.S., 1979, Elements of Cytology, Freeman Book Co., New Delhi
2. De Robertis, E.D.P. and E.M.F. De Robertis, 1988. Cell and Molecular Biology, 8th edition, International edition Informes Hongkong. 734p.
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12. Dubey 2006 Text book of Biotechnology S. Chand & Co. New Delhi.
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15. Kumar H.D. 1998 A text book of Biotechnology, Affiliated East West pvt. Ltd., New Delhi.
16. Nicholls. 2002 Genetic Engineering, Cambridge University press. UK.
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SEMESTER-IV

(WITH EFFECTIVE FROM 2015-2016)

TITLE: CELL BIOLOGY & GENETICS, ORGANIC EVOLUTION & ETHOLOGY**Course Code- ZO 4208****MODEL QUESTION PAPER****Time: 3 hrs.****Marks: 70****PART – 1**

Note : Note : Answer any THREE questions choosing at least one question from each section **3 x 10 = 30**

SECTION- A

1. Give an account of molecular structure of Plasma membrane.
2. What is DNA replication? Explain the various steps in the semi-conservative mode of DNA replication
3. Explain the various chromosomal disorders in man

SECTION B

4. Explain the modern synthetic theory of Evolution
5. What is Speciation? Explain the types of Speciation
6. What is Learning? Explain the various types of Learning

Part – IIAnswer any **FOUR** question**4x5=20**

7. Endoplasmic Reticulum – Functions.
8. Active transport
9. Genetic code
10. Human Genome Project
11. Hardy Weinberg Law
12. Genetic Drift
13. Instinctive behaviour

Part – IIIAnswer any **TEN** Questions**10x2=20**

14. Cell Theory.
15. Cristae
16. Lysosomes
17. Barr bodies
18. Amniocentesis

19. Transcription
20. Gene pool
21. Mutation
22. Isolation
23. Taxes
24. Reflexes
25. Motivation

SEMESTER-IV**TITLE: CELL BIOLOGY & GENETICS, ORGANIC EVOLUTION & ETHOLOGY****Course Code- ZO 4208****BLUE PRINT FOR QUESTION PAPER SETTER****Time : 3hours****Max mark : 70**

MODULE NO. & NAME	ESSAY QUESTIONS 10 MARKS	SHORT ANSWER QUESTIONS 5 MARKS	VERY SHORT ANSWER QUESTIONS 2 MARKS	MARKS ALLOTTED TO THE MODULE
MODULE – I (Cell Biology)	01	02	03	24
MODULE– II (Genetics)	02	02	03	34
MODULE– III (Organic Evolution)	02	02	03	34
MODULE – IV (Ethology)	01	01	03	20
Total no.of Questions	06	07	12	
Total Marks including choice				112

NOTE: The question paper setters are requested to kindly adhere to the format given in the above table.

* * *

ZOOLOGY PRACTICAL PAPER – II (w.e.f.2014-15)

(EMBRYOLOGY, ECOLOGY, CELL BIOLOGY, GENETICS)

EMBRYOLOGY:

Observations of following slides / models

1. T.S. of testis and ovary (Rat / Rabbit / Human)
2. Different stages of cleavage (2-cell, 4- cell and 8- cell), Morula.
3. Blastula and gastrula of frog.

ECOLOGY:

1. Determination of pH in a given sample.
2. Estimation of dissolved oxygen in the given samples at different temperatures.
3. Estimation of salinity (chloride) of water in the given samples.
4. Estimation of hardness of water in terms of Carbonates , bicarbonates in the given Samples

CELL BIOLOGY

1. Identification of stages from prepared slides showing Mitosis and Meiosis
2. Squash preparation of Onion/ Garlic root tip for Mitotic chromosomes.
3. Squash preparation of Grasshopper Testis for Meiotic chromosomes.
4. Identification of salivary gland chromosomes and polytene chromosomes (Photographs or figures).

GENETICS

1. Identification of Human blood groups by slide method
2. Problems on Mendelian Laws
3. Problems on Human Blood group inheritance
4. Human Karyotyping & Chromosomal disorders-Display of Charts (Klinefelter, Turner, Down, Edward, Patau, Cry-du-Chat syndromes, Haemophilia, Colour blindness, Phenyl Ketonuria, Cystic fibrosis)

AT THE END OF IV SEMESTER (WITH EFFECT FROM 2015-2016)
EMBRYOLOGY, ECOLOGY, CELL BIOLOGY & GENETICS

MODEL PRACTICAL PAPER

TIME: 3hrs

MARKS: 70

EMBRYOLOGY & ECOLOGY, CELL BIOLOGY & GENETICS

- | | |
|---|---------|
| I. Estimate the amount of dissolved oxygen in the given sample of water | 10M |
| II. Identify the blood group of the given sample of blood by slide method | 05M |
| III. Problem on Mendelian Laws | 05M |
| IV. Problem on Blood group inheritance | 05M |
| V. Identification of Embryology, Cell biology slides &
Human Chromosomal disorders | 5X6=30M |
| A. Gastrula | |
| B. Cell division model | |
| C. Polytene chromosomes | |
| D. Klinefelter syndrome | |
| E. Down syndrome | |
| VI. Practical Record | 10M |
| VII. Viva | 05M |

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
ZOOLOGY SYLLABUS
(WITH EFFECTIVE FROM 2016-17)
SEMESTER-V CODE ZO 5508-C

ADVANCED CORE , TITLE: ANIMAL PHYSIOLOGY

CREDITS: 3T+2P

Hrs : 3 T+ 3 P /week

OBJECTIVES	LEARNING OUTCOMES
<ul style="list-style-type: none"> ➤ This course reviews the physiology of humans, placing particular emphasis on Digestion ,Respiration, circulation, Muscle, Excretion, Nervous system ➤ The approaches taken include those based on organ systems and a comparative approach describing similar organ systems in different taxa. ➤ Some consideration of how physiological systems are adjusted to function throughout the wide range of environments in which animals live. 	<p>On satisfying the requirements of this course, students will have the knowledge and skills to:</p> <ol style="list-style-type: none"> 1. Describe the physiology of major organs and organ systems in humans and other mammals 2. Understand and interpret the interplay between different organ systems and cellular responses to environmental change 3. Apply experimental design skills to understanding population responses and interpreting quantitative data

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
ZOOLOGY SYLLABUS
(WITH EFFECTIVE FROM 2016-17)
ADVANCED CORE, TITLE: ANIMAL PHYSIOLOGY CODE ZO 5508-C

Module I :**20 Hrs**➤ **Physiology of Digestion**

- 1.1. Definition of digestion and types of digestion – extra and intracellular.
- 1.2. Digestion of Carbohydrates, proteins, lipids and cellulose.
- 1.3. Gastrointestinal hormones- control of digestion in mammals .

➤ **Physiology of respiration**

- 1.4. Types of respiration – external and internal respiration.
- 1.5 Transport of oxygen – Oxygen dissociation curves.
- 1.6 Transport of CO₂ – Chloride shift, Bohr effect.

Module II**20 Hrs**➤ **Physiology of Circulation**

- 2.1 Structure of mammalian heart and its working mechanism-
- 2.2 Cardiac cycle., ECG.
- 2.3 Myogenic and neurogenic hearts.

➤ **Physiology of Excretion**

- 2.4 Gross organization of mammalian excretory system
- 2.5 Structure of kidney.
- 2.6 Structure and function of Nephron – Counter current mechanism.

Module III➤ **Physiology of muscle contraction****08 Hrs**

- 3.1 Ultra structure of skeletal muscle.
- 3.2 Sliding filament mechanism of muscle contraction.
- 3.3 Chemical changes during muscle contraction
- 3.4 Phasic and Tonic contractions

Module IV➤ **Physiology of nerve impulse****12 Hrs**

- 4.1 Nature of nerve impulse – resting potential and action potential.
- 4.2 Properties of nerve impulse threshold value, refractory period, all or none response.
- 4.3 Conduction of nerve impulse along an axon.
- 4.4 Structure of synapse, mechanism of synaptic transmission – electrical and chemical transmissions

➤ **Physiology of Reproduction**

- 4.5. Mammalian male & female reproductive anatomy- Male and female reproductive hormones

BLUE PRINT**III Year B.Sc., Zoology****Course: ADVANCED CORE, TITLE: ANIMAL PHYSIOLOGY****at the end of V Semester****Under CBCS Pattern**

Module Name	PART I Essay Type Questions		Part II Short Answer Questions	Part III Very Short Answer Type Questions	Marks Allotted to the Chapter
	Section A	Section B			
6. Physiology of Digestion, Physiology of respiration	2		02	03	36
7. Physiology of Circulation Physiology of Excretion		2	02	03	36
8. Physiology of muscle contraction	1		01	04	23
9. Physiology of nerve impulse Physiology of Reproduction		1	02	02	24
10. Total	06 Essay questions choice of which 03 to be answered		07 Short answer Questions choice of which 4 to be answered	12 Very short answer question choice of which 10 to be answered	Total 119 Marks Of which choice of 70 Marks to be answered

MODEL QUESTION PAPER**P R GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA****III Year B.Sc., ADVANCED CORE, TITLE ANIMAL PHYSIOLOGY****at the end of V Semester****(CBCS) W.E.F., 2016-17****Max Marks 70****Time 3 hrs.**

PART I**Note: Answer any THREE questions choosing at least one question from each section****3 x 10 = 30****Marks****SECTION – A**

1. Write an essay on the Carbohydrates digestion.
2. Describe the Oxygen transport mechanism in respiration
3. Explain in detail sliding filament mechanism of muscle contraction

SECTION –B

4. Describe the structure and function of human heart.
5. Write an essay on the mechanism of Urine formation in nephron.
6. Describe the nerve impulse transmission along the length of the axon .

PART –II**Answer any FOUR questions****4 x 5 = 20Marks**

7. Digestion of cellulose
8. Bohr effect
9. ECG
10. Structure of kidney
11. Cori cycle
12. Endocrine regulation of testicular function
13. Synaptic transmission

PART III**Answer any TEN questions****10 x 2 = 20 M**

14. Gastrin
15. Nasal cavity
16. Alveoli
17. Purkinjee fibres.
- 18.** Pace maker
19. Tubular secretion
20. Sarcomere
- 21.** Z line
22. Triad system
23. Cross bridges
24. Na-K Pump
- 25.** Progesterone

III Year B.Sc., Zoology

Course: ADVANCED CORE ANIMAL PHYSIOLOGY – PRACTICAL

CODE ZO 5508-CP

At the end of V Semester

Under CBCS Pattern

SYLLABUS

1. Identification tests for Carbohydrates, Proteins, and Lipids.
2. Action of salivary amylase enzyme .
3. Haemoglobin estimation by Sahli's method
4. Total Blood cell count (RBC & WBC)
5. Urine test for Ammonia/urea/uric acid
6. Slides: T.S of Kidney, Un-Striated, Striated and Cardiac muscles, Nerve cell.

Model paper for Practical semester End Examination

Max. Marks 50

Time: 2 Hours

- | | |
|---|------|
| 1. Test for Identification of protein/Carbohydrate/Lipid anyone test : | 20M |
| 2. Blood: Estimation of HB/RBC/WBC counting: | 10 M |
| 3. Test for excretory products/ Salivary amylase/
identification of any two slides | 10M |
| 4. Record | 05 M |
| 5. Viva-voce | 05 M |
| 6. Total | 50 M |

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
ZOOLOGY SYLLABUS
(WITH EFFECTIVE FROM 2016-17)
Course code ZO 5508-SE-1

SEMESTER-V

ADVANCED ELECTIVE 1: BIOINFORMATICS

CREDITS: 2T+2P

Hrs : 2T +3P

OBJECTIVES	LEARNING OUTCOMES
<ul style="list-style-type: none"> ➤ This course reviews the basic concepts of bio informatics ➤ The approaches taken include those based on imparting the skill orientation to the subject. ➤ Course will be useful as a bridge course for the pursuance of the applied courses in the relevant subject. 	<p>On satisfying the requirements of this course, students will have the knowledge and skills on Bio informatics</p> <p>Basics of bioinformatics will be acquired by the student at the UG level.</p> <p>Helps the students as a foundation course for the vertical mobility.</p>

Module –I. Basic Computers MS Word

15 Hrs

MS-WORD: File Operations New, Save & Print - Editing: Cut, copy, Paste, Find and Replace - Insert: Page numbers and Pictures - Format: Font, Bullet & Numbering, Paragraph and Background Tools: Spelling and Grammar - Data :Sort .

Module –II Basic Computers MS Excel

15 Hrs

MS. EXCEL: Presentation of Bio statistical data using Excel: Auto sum, Paste function, Chart wizard, sort function and Drawing - Use of Internet, Messenger and e-mail-Basic knowledge of Medical transcription and Bio-informatics.

Module –III Fundamentals of Bio Informatics

15 Hrs

Bioinformatics-Definition-Literature databases-NCBI-Pub med, Medline, Protein and nucleic sequence databases-PIR, Swiss-prot, Gene Bank, DDBJ-structure databases - PDB, SCOP, CATH, structure visualization Tools, Ras Mol, Swiss PDB viewer.

Module –IV Techniques of Bio informatics**15 Hrs**

Pair wise sequence Alignment – Scoring Matrices-PAM and BLOSUM-Statistics of alignment scored Dot plot – local and global alignment – Database Searching – FASTA and BLAST multiple sequence alignment clusters W-Phylogenetic trees-PHYLIP.

References :

1. Goutham Roy. Introduction to Computing and Computing lab and Cad[2002] Books and allied [pvt] Ltd. Kolkata
2. MS. OFFICE for Win-Microsoft office press.
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4. Developing Bioinformatics Computer Skills Cynthia Gibbs, Sheoff Publishers & Distribtors Pvt. Ltd., Mumbai.
5. Arthur. M. Lesk, Introduction to Bioinformatics, Oxford University Press, New Delhi, 2003.
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BLUE PRINT**III Year B.Sc., Zoology****Course: ADVANCED ELECTIVE 1: BIOINFORMATICS****at the end of V Semester Under CBCS Pattern**

Module Name	PART I Essay Type Questions	Part II Short Answer Questions	Part III Very Short Answer Type Questions	Marks Allotted to the Chapter
1. Basic Computers MS Word	2	01	02	29
2. Basic Computers MS Excel	1	02	03	26
3. Fundamentals of Bio Informatics	2	01	02	29
4. Techniques of Bio informatics	1	02	03	26
5. Total	06 Essay questions choice of which 04 to be answered	06 Short answer Questions choice of which 4 to be answered	10 Very short answer question choice of which 5 to be answered	Total 110 Marks Of which choice of 70 Marks to be answered

MODEL QUESTION PAPER
P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
(WITH EFFECTIVE FROM 2016-17)

Course code ZO 5508-1 SE

SEMESTER-V ADVANCED ELECTIVE 1: BIOINFORMATICS

Time:3 Hrs.

Max Marks: 70

PART I

Note: Answer any FOUR questions from the following:

4 x 10 = 40 M

1. Write an essay on different file operations in MS word.
2. Describe the format options in MS office.
3. Explain in detail the Protein and nucleic acid sequence databases.
4. Explain in detail various structure visualization Tools
5. Describe the presentation of bio statistical data using MS excel.
6. Write an essay about the medical transcription and its applications

PART –II

ANSWER ANY FOUR QUESTIONS

4 x 5 = 20 M

1. Edit option in MS word
2. Chart wizard in excel
3. Gene Bank
4. Swiss PDB viewer
5. Pair wise sequence Alignment
6. Phylogenetic trees

PART III

ANSWER ANY FIVE QUESTIONS

5 x 2 = 10 M

- | | |
|---------------------------------|------------------------|
| 13. Find and replace in MS word | 14. Bullets in MS word |
| 15. Sort in MS excel | 16. Auto sum |
| 17. Paste in excel | 18. PIR |
| 19 Swiss port | 20. PHYLIP |
| 21. FASTA | 22.Data base searching |

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
ZOOLOGY SYLLABUS
(WITH EFFECTIVE FROM 2016-17)
Course code ZO 5508-1 SE
PRACTICAL SYLLABUS
SEMESTER-V
ADVANCED ELECTIVE 1: BIOINFORMATICS

Max Marks 50

Time 2hrs.

1. Lab work : MS word – File
2. Lab Work MS Excel- work sheet, data, chart
3. Medical transcription tools
4. E-mail
5. Bio Informatics Applications - Lab work
6. Record
7. Total

P .R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
ZOOLOGY SYLLABUS
(WITH EFFECTIVE FROM 2016-17)
Course code ZO 5508-1 SE

PRACTICAL MODEL QUESTION PAPER

SEMESTER-V

ADVANCED ELECTIVE 1: BIOINFORMATICS

Max Marks 50

Time: 2 hrs.

Practical on the computer

- | | |
|--------------------------------|--------|
| 1.MS word document preparation | - 05 M |
| 2.MS Excel spread sheet | - 15 M |
| 3.Medical Transcription tool | - 10 M |
| 4.Bioinformatics tools any Two | - 10M |
| 5.Record | - 05 M |
| 6.Viva-Voce | - 05 M |

Total - 50 Marks

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
ZOOLOGY SYLLABUS
(WITH EFFECTIVE FROM 2016-17)
ADVANCED ELECTIVE 2 - CONSERVATION BIOLOGY

Course code ZO 5508-2 SE

CONSERVATION BIOLOGY -WILDLIFE CONSERVATION

Credits: 02T+2 P

HOURS : 2T+3P

Module 1. Wildlife History

15 Hrs

1. Conservation - Scope and History

1.1 History of conservation in India- Status of wildlife in India

1.2 Causes of depletion of Wildlife resources - habitat loss, construction of dams, collection for trophies, hunting, poisoning, poaching and other developmental activities.

Module 2 Wildlife Habitat

15 Hrs

2.1 Mention major animal species of Indian forests.

2.2 Afforestation & Reforestation.

2.3 Grasslands, Mangroves and Sacred groves

2.4 In Situ and Ex situ conservation (Gene banking, conservation and exchange)

Module 3 Wild life management

15 Hrs

3.1.. Role of tribals in Wildlife conservation - Joint Forest Management

3.2. . Illegal Wildlife Trade and Pet Trade in India

3.3 Protected Areas , National parks and Sanctuaries: Important National Parks and Sanctuaries in India with special importance to Andhra Pradesh

3.4. Wildlife - Laws and Regulation . RAMSAR site

Module 4 Wild life conservation

15 Hrs

4.1 Red Data Book IUCN criteria and definition regarding extinct (EX), extinct in the wild (EW), critically endangered (CD), low risk (LR), data deficient (DD) & not evaluated animals (NE).

4.2 Important Endangered wild life of India.

4.3. Conservation Schemes : Project Tiger, Crocodile breeding project, Gir Lion Project, Olive Ridley, Whale shark, Fishing cat, Mangrove Otter,

4.4 .Tourism and Wildlife - Importance of Tourism in Wildlife conservation

References:

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2. Dasmann, R.F. (1964) Wildlife biology, John Wiley and Sons, New York.
3. Gary, K., Meffe, Carroll, C.R. and Contributors (1997): Principles of Conservation Biology - 2nd Edition, Sinauer Associates, Inc Sunderland Massachusetts.
4. Giles, R.H. Jr. (Ed 1984): Wildlife management techniques - 3rd edition, The wildlife society, Washington D.C.
5. Grimmet, R., Inskipp, C. & Inskipp, T. (1999): Pocket Guide to the birds of Indian Subcontinent, Oxford University Press, New Delhi.
6. Hosetti, B.B. (2003): Wetlands Conservation and management, Pointer Publishers, Jaipur, India.
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11. Teague R.D. (Ed.). 1980. A Manual of wildlife conservation, The Wildlife society Washington D.C.
13. Essentials of Conservation Biology, Fourth Edition, by R.B. Primack

BLUE PRINT**III Year B.Sc., Zoology****Course: ADVANCED ELECTIVE 2 - CONSERVATION BIOLOGY****CONSERVATION BIOLOGY -WILDLIFE CONSERVATION****At the end of V Semester under CBCS Pattern**

Module Name	PART I Essay Type Questions	Part II Short Answer Questions	Part III Very Short Answer Type Questions	Marks Allotted to the Chapter
1. Wildlife History	1	02	03	26
2. Wildlife Habitat	1	02	03	26
3. Wild life management	2	01	02	29
4. Wild life conservation	2	01	02	29
5. Total	06 Essay questions choice of which 04 to be answered	06 Short answer Questions choice of which 4 to be answered	10 Very short answer question choice of which 5 to be answered	Total 110 Marks Of which choice of 70 Marks to be answered

MODEL QUESTION PAPER
P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
(WITH EFFECTIVE FROM 2016-17)
Course code ZO 5508-2 SE

SEMESTER-V

ADVANCED ELECTIVE 2 - CONSERVATION BIOLOGY -WILDLIFE
CONSERVATION

Max Marks: 70

Time : 3 Hrs.

PART I

Note: Answer any FOUR questions from the following 4 x 10 = 40 Marks

1. Write an essay on the status of wild life conservation in India.
2. Explain different animal species of Indian forests.
3. Explain about the Illegal wild life trade.
4. Explain the wild life laws and regulations.
5. Write an essay any four wildlife conservation schemes.
6. Describe the role of tourism in wild life conservation.

PART –II

Answer any FOUR questions

4 x 5 = 20 M

7. Poaching
8. Causes for wild life depletion
9. Mangroves
10. Sacred groves
11. Illegal wild life trade
12. Red data Book

PART III

Answer any FIVE questions

5 x 2 = 10 M

- | | |
|---------------------------------|-------------------|
| 13. Jim carbet National Park | 14. WWF |
| 15. CITES | 16. Deforestation |
| 17. Grassland ecosystem | 18. Project Tiger |
| 19. Coringa wild life sanctuary | 20. RAMSAR site |
| 21. Endangered Species | 22. Olive Ridley |

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
(WITH EFFECTIVE FROM 2016-17)
Course code ZO 5508-2 SE-2

SEMESTER-V

ADVANCED ELECTIVE 2 - CONSERVATION BIOLOGY -WILDLIFE
CONSERVATION

Maximum marks: 50

Practical Syllabus

1. Lab Work:

- a) Intertidal –Muddy shore fauna specimens

Annelids: *Arenicola*, *Aphrodite*, *Neries*

Crustaceans: *Uca*, *Scylla serrata*, *Clibamarius* (*Hermit crab*)

Molluscs: *Littorina*, *Teredo*, *Telescopium*, *Onchidium*, *Murex*

Echinoderms: *Sea cucumber*

Fishes: *Periophthalmus* (*Mud skipper*)

- b) Field Visit to Coring Wild life sanctuary – Wild life conservation- plan, observations.
- c) Preparation of conservation plan for a set of situations

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
(WITH EFFECTIVE FROM 2016-17)
Course code ZO 5508-2 SE-2

SEMESTER-V

ADVANCED ELECTIVE 2 - CONSERVATION BIOLOGY - WILDLIFE
CONSERVATION

PRACTICAL MODEL PAPER

Max. Marks 50

Time 3 Hrs

- | | |
|--|----------|
| 1. Identification of the Muddy shore specimens: A, B C, D | 4X5= 20M |
| 1 Mark for Identification | |
| 1 Mark for diagram | |
| 2 Marks for the characters, Special adaptation of the environment should be focused. | |
| 2. Filed note Book. Visit to wild life sanctuary | 10 M |
| a. Note book should depict the dates of visits, observations, outcomes and interactions. | |
| 3. Preparing a plan for the conservation for a given situation | 10 M |
| 4. Record | 05 M |
| 5. Viva-Voce | 05 M |
| 6. Total | 50 M |

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
ZOOLOGY SYLLABUS
(WITH EFFECTIVE FROM 2016-17)
SEMESTER-VI
SKILL BASED CORE COURSE CODE : ZO 6608-C
TITLE: BIOMOLECULES , ENDOCRINOLOGY & ANIMAL BIOTECHNOLOGY

Credits: 3+2

Hrs: 3+3

Module I: Bio Molecules

- **1.1 Carbohydrates:**

- 1.1.1 General properties ,Classification of Carbohydrates,
- 1.1.2 Structure of Monosaccharides (Glucose and Fructose)
- 1.1.3 Structure of Disaccharides (Lactose and Sucrose)
- 1.1.4 Structure of Polysaccharides (Starch, Glycogen and Chitin)

- **1.2 Proteins**

- 1.2.1. Amino acids: General properties, nomenclature, classification and structure.
- 1.2.2. Classification of proteins based on functions,
- 1.2.3 peptide bond and structure (Primary, secondary, tertiary and quaternary structures)

- **1.3 Lipids**

- 1.3.1 General properties ,Classification. Structure of Fatty acids (Saturated and unsaturated).
- 1.3.2 Triacylglycerols, Phospholipids (Lecithin and cephalin)
- 1.3.3 Structure of Steroids (Cholesterol).

Module II : Endocrinology -1

- 2.1 Relationship between hypothalamus and pituitary gland.
- 2.2 Hormones of hypothalamus.
- 2.3 Hormones of Adenohypophysis and Neurohypophysis

Module III: . Endocrinology-2

- 3.1 Hormones of pineal gland, thyroid gland, parathyroid, thymus, adrenal and pancreas.
- 3.2 Hormonal control of menstrual cycle in humans.
- 3.4 Homeostasis and its basic working mechanism

Module IV: Animal Biotechnology

- 4.1 Animal Biotechnology: Scope of Biotechnology
- 4.2 Cloning vectors - Characteristics of vectors, Plasmids.
- 4.3 Gene Cloning – Enzymatic cleavage of DNA, Restriction enzymes (Endonucleases) and Ligation.
- 4.4 Transgenesis and Production of transgenic animals (Fish and Goat).
- 4.5 Application of Stem Cell technology in cell based therapy (Diabetes and Parkinson's diseases).

III Year B.Sc., Zoology

**Course: BIOMOLECULES , ENDOCRINOLOGY & ANIMAL BIOTECHNOLOGY
at the end of VI Semester**

Under CBCS Pattern

Module Name	PART I Essay Type Questions		Part II Short Answer Questions	Part III Very Short Answer Type Questions	Marks Allotted to the Chapter
	Section A	Section B			
11. Bio Molecules	2		02	02	34
12. Endocrinology -1	1		02	02	34
13. Endocrinology -2		2	01	05	35
14. Animal Biotechnology		1	02	03	36
15. Total	06 Essay questions choice of which 03 to be answered		07 Short answer Questions choice of which 4 to be answered	12 Very short answer question choice of which 10 to be answered	Total 119 Marks Of which choice of 70 Marks to be answered

MODEL QUESTION PAPER
P R GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III Year B.Sc., BIOMOLECULES , ENDOCRINOLOGY & ANIMAL
BIOTECHNOLOGY

At the end of VI Semester
 (CBCS) W.E.F., 2016-17

Max Marks 70

Time 3 hrs.

PART I

Note: Answer any THREE questions choosing at least one question from each section

3 x 10 = 30 M

SECTION – A

1. Write an essay on the general characters and classification of carbohydrates.
2. Explain the peptide bond and its structure in proteins.
3. Explain in relationship between hypothalamus and hypophysis.

SECTION –B

4. Describe the structure and function of the thyroid gland.
5. Describe the hormonal control of menstrual cycle in humans
6. Write an essay on the gene cloning

PART –II

Answer any FOUR questions

4 x 5 = 20M

7. Glucose
8. Cholesterol
9. Hypothalamus
10. Neurohypophysis
11. pancreas
12. Stem cells
13. Cloning Vector

PART III

Answer any TEN questions

10 x 2 = 20 M

- | | |
|---------------------|------------------------------|
| 14. Lecithin | 20. Paratharmone |
| 15. Cephalin | 21. Thyomsin |
| 16. Hypothyroidism | 22. Ligation |
| 17. Neurosecretion. | 23. Restriction endonuclease |
| 18. Adrenal medulla | 24. Cloning vector |
| 19. Melatonin | |

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
ZOOLOGY SYLLABUS
(WITH EFFECTIVE FROM 2016-17)
SEMESTER-VI
SKILL BASED CORE COURSE CODE: ZO 6608-CP
TITLE: BIOMOLECULES, ENDOCRINOLOGY & ANIMAL BIOTECHNOLOGY
Practical syllabus

1. Estimation of Blood glucose by GOD-POD method
2. Paper Chromatography for the Amino Acids (Any Two amino acids)
3. Dissection and display of fish for the Pituitary gland
4. Charts or Models of Endocrine glands
5. Cloning vectors_ charts
6. Transgenic animals – charts/models
7. Demonstration of endonuclease action by using the PCR.

GENERAL CORE COURSE CODE: ZO 6608-CP
TITLE: BIOMOLECULES, ENDOCRINOLOGY & ANIMAL
BIOTECHNOLOGY
Practical Model paper

Max Marks: 50

Time 2hrs

- | | |
|--|------------|
| 1. Estimation of Blood glucose by GOD-POD/Paper Chromatography----- | 20M |
| 2. Identification of Charts of endocrine glands/
/Cloning vectors/ Transgenic animals | 4 x5 = 20M |
| 3. Record | 05 M |
| 4. Viva –Voce | 05 M |
| 5. Total | 50 M |

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM - ZOOLOGY SYLLABUS
(WITH EFFECTIVE FROM 2016-17)
SEMESTER-VI --- Code : ZO SE-6608-1SE

SKILL BASED ELECTIVE 1: FISHERIES AND AQUACULTURE

HOURS 2T+3 P

CREDITS 2+2

OBJECTIVES	LEARNING OUTCOMES
<ul style="list-style-type: none"> ➤ .To provide students with the knowledge, understanding and skills required to apply theoretical principles of fishery management, aquaculture and fish biology in industry. ➤ To raise student aspirations and achievement through the development of scientific, technical and vocational skills required in their chosen area of employment in the fisheries industry ➤ To develop students' practical skills such as fish surveying, fish husbandry, identification and treatment of diseases. 	<ul style="list-style-type: none"> ➤ Students will have a thorough understanding of aquaculture. Students will become familiar with the major types and components of aquaculture systems ➤ Students will have experiential learning opportunities (e.g., hands-on experiences at laboratories, farms, demonstration centers) to acquire skills and abilities including hatchery, growout, harvesting and marketing of aquaculture species to enhance their competitiveness in their future careers.

Module I : Global scenario of fisheries and aquaculture- Different riverine systems – Importance, production trends and present status. Types of fisheries cage& pen culture - Fishery resources from Freshwater, Brackish water and Marine habitat. Characters for selection of cultivable species of fish and Prawn. **15 Hrs**

Module II : Induced Breeding in *Carp & Magur* - Criteria for Site selection, Farm Management - Physico-chemical and Biological properties of water used in the Aquaculture systems. **15 hrs**

Module III: Hatchery technology of shrimp (*Penaeus monodon*) Shrimp Hatchery design and Management. Larval rearing – Pre-pond preparation Nursery ponds, rearing and grow out ponds- Shrimp feed & feeding management. **15 Hrs**

Module IV: Some important finfish and shell fish diseases, prophylaxis symptoms and treatment. Different types of Fish Preservation - processing techniques – Solar drying, salting, smoking, Freezing and canning. Fish products and their uses- fish by products and their uses.
15 Hrs

Additional Module: Value addition : Fishery products, fishery by products and fish processing (**Skill based Hands on Training in collaboration with the NFDB**)

**MODEL QUESTION PAPER
BLUE PRINT**

III Year B.Sc., Zoology

Course: SKILL BASED ELECTIVE –1 FISHERIES AND AQUACULTURE

At the end of VI Semester Under CBCS Pattern

Module Name	PART I Essay Type Questions	Part II Short Answer Questions	Part III Very Short Answer Type Questions	Marks Allotted to the Chapter
6. Introduction to Fisheries	1	02	03	26
7. Induced Breeding	1	02	03	26
8. Shrimp Hatchery	2	01	02	29
9. Fish and shrimp diseases,& Fish Preservation and processing	2	01	02	29
10. Total	06 Essay questions choice of which 04 to be answered	06 Short answer Questions choice of which 4 to be answered	10 Very short answer question choice of which 5 to be answered	Total 110 Marks Of which choice of 70 Marks to be answered

Semester end examination 70Marks

Mid semester examination 30Marks

MODEL QUESTION PAPER
P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
(WITH EFFECTIVE FROM 2016-17) Course code ZO 6508-1 SE

SEMESTER-VI SKILL BASED ELECTIVE 1: FISHERIES AND AQUACULTURE

Max Mark: 70

Time: 3 Hrs.

PART I

Note: Answer any FOUR questions from the following:

4 X10 = 40 M

1. Write an essay on different Fishery resources of our state.
2. Explain the process of induced breeding in major carps.
3. Describe various sections of shrimp hatchery.
4. Write various steps in pre-pond preparation in shrimp culture.
5. Write an on essay different preservation technique of Fishes.
6. Describe some important finfish and shellfish diseases.

PART -II

Answer any FOUR questions

4 X 5 = 20 M

7. Brackishwater fisheries and potential species cultured in brackish water
8. Characters of cultivable species of fish
9. Site selection criteria for aqua culture system
10. Biological characters of water for aqua culture
11. Shrimp seed transport
12. White spot syndrome virus

PART III

Answer any FIVE QUESTIONS

5 x 2 = 10 Marks

13. Mariculture
14. Off shore fishery
15. Cage culture
16. Sand filter.
17. Ovaprim
18. Race way culture
19. Post Larva
20. *Artemia*
21. Salting
22. Canning.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
(WITH EFFECTIVE FROM 2016-17)**

Course code ZO 6508-1 SE

SEMESTER-VI SKILL BASED ELECTIVE 1: FISHERIES AND AQUACULTURE

Project work	: 50M
Dissertation	: 30M
Seminar	: 20M
Total	: 50 M

Dissertation is on the aquaculture and fishery sector.

- Areas:
1. Different types of Aqua Culture System
 2. Fisheries Exports, trends and other standards for export.
 3. Feed- types, ingredients, proximate analysis
 4. Marketing of fish seed and feed
 5. Health management
 6. Bioremediation in aquaculture
 7. Green aquaculture
 8. Post harvesting technology and value added products

Dissertation should be prepared basing on the field visits by the students.

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
ZOOLOGY SYLLABUS
(WITH EFFECTIVE FROM 2014-2015)
SKILL BASED ELECTIVE 2: CLINICAL SCIENCE
Code ZO-6608-SE2

HOURS 2T+3P**Credits 2+2**

OBJECTIVES	LEARNING OUTCOMES
<ul style="list-style-type: none"> ➤ To perform dependable and safe pathologic diagnosis ➤ To provide integrated anatomic pathology services based on state-of-the-art technology. ➤ To reinforce the managements capacities of clinical Departments ➤ To strengthen the undergraduate and teaching activities. ➤ To expand collaborative and interdisciplinary research programs with other basic science and clinical Departments 	<ul style="list-style-type: none"> ➤ Have a systematic program of study. ➤ Demonstrate an investigatory and analytic approach to pathologic diagnosis or abnormal laboratory findings. ➤ Acquire the necessary computer skills to search the medical literature. ➤ Will be familiar with basic medical science principles and be able to apply them to clinical or pathologic problems. ➤ Will be able to synthesize clinical and pathologic findings.

Module I :Hematology**20 Hrs**

- 1.1 Blood composition and functions
- 1.2 Blood groups and transfusion problems
- 1.3 Blood diseases – Anaemia, Leukemia, Leucocytosis, Leucopaenia
- 1.4 Biopsy and autopsy – clinical importance

Module II: Immunology**15 Hrs**

- 2.1 Types of immunity – Innate and acquired
- 2.2 Antigens – Haptenes and epitopes and their properties
- 2.3 Structure and biological properties of human immunoglobulin G (IgG)
- 2.4 Hypersensitivity – immediate and delayed.

Module III Important Human Parasites**15 Hrs**

- 3.1 Blood Parasites (Structure and Clinical significance of *Plasmodium*, *Trypanosoma*, *Leishmania Sps*).
- 3.2 Intestinal parasites – Structure and clinical significance (*Entamoeba*, *Giardia*, *T.solium*, *A.duodinale*, *E.vermicularis*).

Module IV :**10 Hrs**

- 4.1 Cholesterol and its significance in Cardiovascular problems
- 4.2 Blood Sugar levels and Diabetes

MODEL QUESTION PAPER

BLUE PRINT

III Year B.Sc., Zoology

Course: SKILL BASED ELECTIVE –2 CLINICAL SCIENCE

At the end of VI Semester Under CBCS Pattern

Module Name	PART I Essay Type Questions	Part II Short Answer Questions	Part III Very Short Answer Type Questions	Marks Allotted to the Chapter
1. Haematology	2	01	02	29
2. Immunology	1	02	03	26
3. Important Human Parasites	2	01	02	29
4. Cardiovascular problems Blood Sugar levels and Diabetes	1	02	03	26
5. Total	06 Essay questions choice of which 04 to be answered	06 Short answer Questions choice of which 4 to be answered	10 Very short answer question choice of which 5 to be answered	Total 110 Marks Of which choice of 70 Marks to be answered

Semester end examination 70 Marks

Mid semester examination 30 Marks

MODEL QUESTION PAPER
P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
(WITH EFFECTIVE FROM 2016-17)
Course code ZO 6508-2 SE

SEMESTER-VI SKILL BASED ELECTIVE 2: CLINICAL SCIENCE

Max Marks: 70

Time: 3 Hrs.

PART I

Note: Answer any FOUR questions from the following:

4x 10= 40 M

1. Write an essay on blood composition and its functions.
2. Write an essay on different blood diseases
3. Explain the process of hypersensitivity.
4. Describe the life cycle of *Plasmodium*.
5. Describe the life cycle of *Tenia solium*
6. Write an essay on different cardiovascular problems

PART –II

Answer any FOUR questions

4 x 5 = 20 M

7. Anaemia
8. Immunity
9. Immunoglobulin
10. *Leishmania*
11. *Giardia*
12. Diabeties

PART III

Answer any FIVE QUESTIONS

5 x 2 = 10 M

13. Transfusion
14. Agglutination
15. Antigen
16. Delayed hypersensitivity
17. Ig E
18. Cysticercus.
19. Sporozoite
20. Good cholesterol
21. Blood Sugar
22. Diabetes

**P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
(WITH EFFECTIVE FROM 2016-17)**

Course code ZO 6508-1 SE

SEMESTER-VI SKILL BASED ELECTIVE 2: CLINICAL SCIENCE

Project work	: 70 M
Dissertation	: 30M
Seminar	:20M
Total	: 50 Marks

Dissertation is on the Clinical science sector.

- Areas:
1. Blood grouping, Estimation of Haemoglobin
 2. Identification of Blood diseases
 3. Identification of Blood parasites
 4. Identification of Intestinal parasites
 5. Qualitative analysis of glucose in blood and Urine.

Dissertation should be prepared basing on the field visits by the students to clinical labs, hospitals.
