A.G& S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
VUYYURU-521165, KRISHNA Dt., A.P. (Autonomous)

Accredited by NAAC with "A" Grade
2021-2022

DEPARTMENT OF ZOOLOGY
MINUTES OF BOARD OF STUDIES
EVEN SEMESTER
01-04-2022

Minutes of the meeting of Board of studies in Zoology for the Autonomous courses of AG & SG Siddhartha Degree College of Arts & Science, Vuyyuru, held at 2:30 pm on 01.04,2022 in the Department of Zoology.

Smt.D.A. Kiranmayee. ... Presiding

Members Present:

1) D.A.Kiranmayee. **(Smt. D.A.Kiranmayee.)**	Chair person	Head, Department of Zoology, A.G&S.G.S Degree College of Vuyyuru-521165.
2)..... **(Smt. Dr.L.Suseela.)**	University Nominee	Bio Sciences & Bio technology Krishna University Machilipatnam.
3)..... **(Sri Dr.M.Viyay kumar.)**	Academic Council Nominee	Head,Department of Zoology, SRR & CVR Govt. Degree College, Vijayawada.
4)..... **(Sri Ch. Venkateswaralu.)**	Academic Council Nomine	Head, Department of Zoology, P.B. Siddhartha College, Vijayawada.
5)..... **(Smt. K. Padmaja.)**	Member	Lecturer in Zoology, A.G&S.G.S Degree College Vuyyuru-521165.
6)..... **(B. Appala Naidu.)**	Industrialist	Asst. Project Manager, RGCA Manikonda.
7)..... **(Ch.Chiranjeevi)**	Student Represent	P.hd –Research Scholar, Dept.of Botany & Microbiology, Acharya Nagarjuna University, Guntur.

ZOOLOGY

Agenda for B.O.S Meeting.

1. To recommend the syllabi (Theory & Practical), Model question paper for II Semester of I B.Sc (B.Z.C) for the academic year 2021 - 2022.

2. To recommend the syllabi (Theory & Practical), Model question paper for IV Semester of II B.Sc (B.Z.C) for the academic year 2021 - 2022.

3. To discuss to the syllabus of Elective & Clusters in VI semesters to be for the academic year 2021-2022.

4. To recommend the syllabi (Theory & Practical), Model question paper for VI Semester of III B.Sc (B.Z.C) for the academic year 2021 - 2022.

5. To recommend the Blue print for the semester end exam for I, IV& VI semester of I,II,III B.Sc (B.Z.C) for the academic year 2021 - 2022.

6. To recommend the conduction of Value Added Course in Sericuture

6. To recommend the teaching and evaluation methods to be followed under Autonomous statues.

7. Any other matter.

CHAIRMAN

.

ZOOLOGY- RESOLUTIONS

1. It is resolved to continue the revised syllabi (Theory & Practical), model question paper & guide lines to be followed by the question paper setters of Zoology II semester of I B.Sc. (B.Z.C) under Choice Based Credit System (CBCS) to be approved by the Academic Council of 2021 – 2022. The syllabus is revised in all the units of II semester of I B.Sc. (B.Z.C) according to the suggestions of BOS members.

2. It is resolved to implement the Revised syllabi (Theory & Practical) as per the instructions of APSCHE, under Choice Based Credit System (CBCS) for Zoology IV Semester of II B.Sc. (B.Z.C) to be approved by the Academic Council of 2021 –2022. Two Papers are introduced in Sem IV with Titles Animal Physiology, Cellular metabolism and Embryology-Course Code-Zoo 401, and Immunology and Animal Bio-Technology Course-code Zoo-402

3. It is resolved to follow Elective – A (Immunology) in VI Semester from the Academic year 2021-2022for IIIB.Sc. BZC

4. It is resolved to continue the following teaching & evaluation methods for the Academic year 2021-22.

Teaching methods:

Besides the conventional methods of teaching, we use modern technology i.e. Using of OHP and LCD projector to display on U boards etc; for better understanding of concepts.

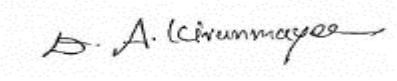
Evaluation of a student is done by the following procedure:

Internal Assessment Examination:

- Out of maximum 100 marks in each paper for II, III B.Sc, 30 marks shall be allocated for internal assessment.
- Out of these 30 marks, 20 marks are allocated for announced tests (i.e . IA-1& IA-2). Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, 5 marks are allocated on the basis of candidate's percentage of attendance and remaining 5 marks are allocated for the assignment for II, III B.SC.
- Out of maximum 100 marks in each paper for II B.Sc, 25 marks shall be allocated for internal assessment.
- Out of these 25 marks, 15 marks are allocated for announced tests (i.e . IA-1& IA-2). Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, 5 marks allocated on the basis of candidate's percentage of attendance / assignment for II semester.There is no pass minimum for internal assessment for I, II, III B.Sc

Semester – End Examination:

- The maximum mark for II (BZC) semester – End examination shall be 75 marks and duration of the examination shall be 3 hours.
- The maximum mark for II, III B.Sc semester- End examination shall be 70 marks and duration of the examination shall be 3 hours. Even through the candidate is absent for two IA exams / obtain zero marks the external marks are considered (if the candidate gets 40/70) and the result shall be declared as "PASS"
- Semester – End examination shall be conducted in theory papers at the end of every semester, while in practical papers, these examinations are conducted at the end of I, IV, & VI semester for I, II & III B.Sc.
- Discussed and recommended for organizing Seminars, Guest lectures, Work – Shops to upgrade the Knowledge of students, for the approval of the Academic Council.



Chairman

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P. (AUTONOMOUS).

NAAC reaccredited at 'A 'level

Autonomous –ISO 9001-2015 Certified

Title of the Paper: **Animal Diversity Biology of Chordates.**

Semester: - II

Course Code	ZOO T21A	Course Delivery Method	Class Room/Blended Mode - Both
Credits	4	CIA Marks	25
No. of Lecture Hours/ Week	4	Semester End Exam Marks	75
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2021-22	Year of Offering 2020-2021	Year of Revision – 2021-22	Percentage of Revision: 70%

Course Description:

This course will provide one with a basic and comprehensive understanding of *Pro chordates* and pisces origin, type study, respiratory, circulatory and nervous system etc., Enable the student with depth of topics and helps then to gain appreciation of Amphibia and Reptilia type studies, Aves and mammals type studies. On the other hand, importance of understanding parental care in amphibians, south indian chelonians, birds as glorified reptiles and significance of birds migration and flight adaptations in birds are learnt. A part from these the students will be enhanced with the knowledge of aquatic mammals and dentition in mammals.

Course Objectives:

- To understand the structural organization of animals of prochordates and cyclostomes.
- To understand the type study belonging to Pisces.
- To understand type study belonging to amphibian.
- To understand the type study belonging to reptilia and identification of piousness snakes.
- To understand the type study belonging to Aves and Aquatic mammals.

Course Outcomes:

CO1	Gain knowledge in the major Chordate groups, describe their salient features, appreciate the diversity and analyze the uniqueness of different groups.
CO 2	Understand the fundamental organization of chordates and evaluate the similarities and differences among the different groups of chordates in the light o evolutionary significance.
CO 3	Comprehend and compare the morphology and anatomy of different classes of chordates and apply the same to their fitness in the ecological habitats
CO 4	Develop the skill of identifying the vertebrate fauna in general and South Indian fauna in specific.
CO 5	Acquaint with the significance of unique mechanisms and behavioral patterns exhibited by different groups of chordates.

Syllabus

Unit	Learning Units	Lecture Hours
I	UNIT I Protochordates to cyclostomes Protochordates Salient features of UrochordataandCephalochordata 1 hour Structure and life-history of *Herdmania*, 2 hours Significance of retrogressive metamorphosis. 2 hours General organization of vertebrates 1 hour General characters of cyclostomes 1 hour Comparison of *Petromyzon*and*Myxine*1 hour	8 hrs
II	UNIT II Fishes Type study – *Scoliodon* - Morphology, respiratory, circulatory, excretory and nervous systems and sense organs. 8hrs Migration in fishes. 1hour Viviparity in fishes 1 hour Types of scales 1 hour Accessory respiratory organs in fishes 2 hours	13 HOURS
III	UNIT III Amphibia South Indian Amphibians. 1 hour Type study - *Rana*: Morphology, digestive system, respiratory system circulatory system,excretory system, nervous system and reproductive system 9 hours Parental care in amphibians 1 hour	11 HOURS
IV	UNIT IV Reptilia South Indian Chelonians. 2 hours Type study – *Calotes*: Morphology, digestive, respiratory, circulatory, urinogenital and nervous systems. 8hrs Identification of poisonous snakes 1hour	11 HOURS
V	UNIT V Aves and Mammalia **Aves** Birds as Glorified Reptiles. 2hours Type study-Pigeon (*Columbialivia*): Exoskeleton, respiratory, circulatory and excretory systems 7 hours Significance of migration in birds 2 hours Flight adaptations in birds 2 hours **Mammalia** Aquatic Mammals 2 hours Dentition in Mammals. 2 hours	17 HOURS

****

Textbooks
1. R.L. Kotpal, *Modern Text Book of Zoology - Invertebrates*.
2. P.S. Dhami and J.K. Dhami*Invertebrate Zoology*.

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 college Publishing, Saunders College Publishing

Course Delivery method: Face-to-face / Blended.
Course has focused on: Foundation

Websites of Interest:

https://www.youtube.com/watch?v=-mcfPHd_sH8https://www.youtube.com/watch?v=U8F9IzuwdzQhttps://www.youtube.com/watch?v=jhXqIy49YEw
https://www.youtube.com/watch?v=ywD50XyayFk

Co-curricular Activities:

- Preparation of charts on Chordate classification (with representative animal photos) and retrogressive metamorphosis
- Thermocol or Clay models of Herdmania and Amphioxus.
- Visit to local fish market and identification of local cartilaginous and bony fishes.
- Maintaining of aquarium by students.
- Thermocol model of fish heart and brain.
- Preparation of slides of scales of fishes.

A.G. &S.G.Siddhartha Degree College of Arts & Science, Vuyyuru – 521165, Krishna Dt. A.P. (Autonomous)

Semester II

(Model question paper)

Title of the paper:- ANIMAL DIVERSITY - BIOLOGY OF CHORDATES

Course Code: ZOO T21A

Time: 3 Hrs Max. Marks: 75M

Draw neat labeled diagrams wherever necessary.

SECTION-A

Answer any Five of the following. 5X5= 25M

1. Describe the structure of *Herdmania*– CO1 L2
2. Enumerate the general characters of Cephalochordata – CO1 L1
3. Explain the different types of Scales in fishes –CO2 L2
4. Enumerate the different South Indian Amphibians – CO3, L4
5. Describe the Female Genital System in *Calotes*– CO4, L2
6. Describe the structure of a Quill feather – CO5, L1
7. Explain and Illustrate the structure of Tooth – CO5, L3
8. Give an account of the lateral line system in *Scoliodon*- CO2, L2

SECTION-B

Answer the following Questions. 5X10=50M

9. (a). What is meant by Retrogresssive Metamorphosis? Apply the phenomenon with reference to the development of *Herdmania* – CO1, L3

(Or)

(b). Enumerate the General characters of Cyclostomes – CO1 L3

10. (a). Describe the Respiratory system in *Scoliodon*– CO2, L2

(Or)

(b)Explain the significance of Accessory respiratory organs –CO3, L2

11.(a)Describe Respiratory system in *Rana*– CO3, L2

(Or)

(b). Discuss Parental Care in Amphibians – CO3 L2

12.(a). Explain about the South Indian Chelonians – CO4, L2

(Or)

(b). Describe the Arterial System in *Calotes*- CO4, L2

13.(a) Describe the Respiratory system in Pegion – CO,5 L2

(Or)

(b). Explain about the Aquatic Mammals – CO5, L2

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt.,A.P.
(AUTONOMOUS)

PRACTICAL - II

w.e.f. 2021-2022.

Code: ZOO T21A

Title of the paper: - Animal Diversity Biology of Chordates.

MAX.MARKS: 50.

(2hrs/week)

Course Prerequisites:

Knowledge of vertebrates acquired in Intermediate

Course Description:

This course will provide one with a basic and comprehensive understanding of *Pro chordates* and pices origin, type study, respiratory, circulatory and nervous system etc., Enable the student with depth of topics and helps then to gain appreciation of Amphibia and reptalia type studies, Aves and mammals type studies. On the other hand, importance of understanding parental care in amphibians, south indian chelonians, birds as glorified reptailes and significance of bird's migration and flight adaptations in birds are learnt. A part from these the students will be enhanced with the knowledge of aquatic mammals and dentition in mammals.

LEARNING OUTCOMES:

By the end of the course students will be able to

1. to Understand the general characters and classification from Pisces to Mammalia
2. to Understand the importance of preservation of museum specimens
3. to Identify chordates based on special identifying characters
4. to Understand different organ systems through demo or virtual dissections

COURSE OUTCOMES:

CO1	To identify the systematic position of Protochordata, Cyclostomata and Pisces.
CO2	To identify the systematic position of Amphibians and Reptiles.
CO3	To identify the systematic position of Aves and mammals.
CO4	To Study the Appendicular skeleton of *Varanus, Gallus and Oryctolagus.*
CO5	To understand the various systems of Fish by Dissecting and process of Mounting

SYLLABUS:

General characters and classification of the following phyla and sub-phyla up to classes with suitable examples: Pisces (up to subclass only), Amphibia (up to orders), Reptilia (up to orders) Aves (up to subclass only) and Mammalia (up to infraclass only).

I. SPECIMENS.

1. Protochordata: Herdmania, Amphioxus.
Slides: Amphioxus T.S through pharynx.
2. Cyclostomata: Petromyzon, Myxine.
3. Pisces: Pristis, Torpedo, Channa, Pleuronectes, Labeo, Catla, Hippocampus, Exocoetus, Echeneis, Clarias, Anguilla.
Slides: Fish scales.
4. Amphibia: Ichthyophis, Amblystoma, Siren, Axolotl larva, Hyla, Rhacophorus.
5. Reptilia: Trionyx, Testudo, Draco, Chamaeleon, Uromastix, Daboia (=Vipera russelli,)
Naja, Enhydrina, Bungarus, Crocodilus.
6. Aves: Psittacula, Bubo, Alcedo, Passer, Eudynamis, Corvus
Different types of feathers- quill, contour, filoplume and down.
7. Mammalia: Ornithorhynchus, Didelphys, Pteropus, Funambulus, Manis, Erinaceus.

II. OSTEOLOGY.

Appendicular skeleton of *Varanus, Gallus and Oryctolagus* - limbs and girdles.

III. DEMONSTRATION OF DISSECTIONS
1. Mounting of fish scales.
2. *Channa:* Digestive system
3. *Scoliodon:* V, VII, IX and X cranial nerves.

Suggested Manuals:
Suggested manuals
1. Practical Zoology – Vertebrata - S.S.Lal
2. A manual of Practical Zoology – ChordataP.S.Verma
Co-curricular Activities:
Preparation of slides of scales of fishes

- Visit to local/nearby river to identify migratory fishes and prepare study notes
- Preparation of Charts on topics by students (Eg: comparative account of vertebrate heart/brain/lungs, identification of snakes etc.)
- Collecting and preparation of Museum specimens with dead frogs/snakes/lizards etc., and/or their skeletons

****

A. G & S. G. S. DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU 521165, KRISHNA Dt., A.P. (AUTONOMOUS

II B.Sc. ZOOLOGY PRACTICAL EXAMINATION

PRACTICAL- II COURSE CODE: ZOO P21A
TITLE OF THE PAPER: ANIMAL DIVERSITY - BIOLOGY OF CHORDATES
Time: 3hrs. Max. Marks 40M

SEE MODEL PAPER

1. List out the general characters of Class Mammalia. CO5, L1 5 M

2. Identify and draw a neat labelled diagram of digestive system of *Channa*. CO2, L3 10 M
Identification: 2M
Diagram: 4 M
Labelling: 4 M

3. Identify, draw a labelled diagram, classify and write notes on A, B, C, D and E CO1,2,3,4,5 L2
5 X 3 = 15 M
A. Protochordata and Cyclostomata
B. Pisces
C. Amphibia and Reptilia
D. Aves and Mammalia
E. Osteology
Identification: 1 MP
Diagram : ½ M
Classification: ½ M
Comment 1 M

4. Practical Record Book CO1, 2,3,4,5 L3 5 M

5. VIVA CO1, 2,3,4,5 L5 5 M

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P. (AUTONOMOUS).

NAAC reaccredited at 'A 'level

Autonomous –ISO 9001-2015 Certified

Title of the Paper: **ANIMAL PHYSIOLOGY, CELLULAR METABOLISM ANDEMBRYOLOGY**

Semester: - IV

Course Code	***ZOO-401***	Course Delivery Method	Class Room/Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours/ Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2019-20	Year of Offering 2021-2022	Year of Revision – 2021-22	Percentage of Revision: 100%

CourseOutcomes:

This course will provide students with a deep knowledge in Physiology, Cellularmetabolism and Molecular Biology and by the completion of the course the graduate shallable to–

CO1:Understandthefunctionsofimportantanimalphysiologicalsystemsincludingdigestion,cardio-respiratoryand renal systems.

CO2:Understandthemuscularsystemandtheneuro-endocrineregulationofanimalgrowth,development andmetabolismwithaspecialknowledgeofhormonalcontrolofhumanreproduction.

CO3:Describe the structure,classification and chemistry of biomolecules andenzymesresponsiblefor sustenanceof lifein livingorganisms

CO4:Developbroadunderstandingthebasicmetabolicactivitiespertainingtothecatabolismand anabolismof various biomolecules

CO5 :Describe the key events in early embryonic development starting from the formationofgametes upto gastrulationand formation ofprimarygerm layers**.**

LearningObjectives

- Toachieveathoroughunderstandingofvariousaspectsofphysiologicalsystemsand theirfunctioninginanimals.
- Toinstiltheconceptofhormonalregulationofphysiology,metabolismandreproductionin animals.
- Tounderstand the disordersassociated with thedeficiencyofhormones
- Todemonstrateathoroughknowledgeoftheintersectionbetweenthedisciplinesof Biologyand Chemistry.
- Toprovideinsightfulknowledgeonthestructureandclassificationofcarbohydrates,proteins,lipids and enzymes
- To demonstrate an understanding of fundamental biochemical principles suchas the function of biomolecules, metabolic pathways and the regulation ofbiochemicalprocesses
- To make students gain proficiency in laboratory techniques in biochemistryandorientthemtoapplythescientificmethodtotheprocessesofexperimentationand hypothesis testing.

Syllabus
Course Details

Unit	Learning Units	Lecture Hours
I	**AnimalPhysiology -I** Processofdigestionandassimilation Respiration - Pulmonary ventilation, transport of oxygen and CO_2(Note:Need not studycellularrespiration here) Circulation-Structureandfunctioningofheart,Cardiaccycle Excretion - Structure and functions of kidney urine formation, counter currentMechanism	**10**
II	**Animal Physiology –II** Nerveimpulsetransmission- Restingmembranepotential,originandpropagationofactionpotentialsalongmyelinatedandnon-myelinatednervefibers Muscle contraction - Ultra structure of muscle, molecular and chemical basis ofmusclecontraction Endocrine glands - Structure, functions of hormones of pituitary, thyroid,parathyroid,adrenalglands and pancreas Hormonalcontrolof reproductionina mammal	**15**
III	**CellularMetabolism–I (Biomolecules)** Carbohydrates-Classificationofcarbohydrates.Structureofglucose Proteins-Classificationofproteins.Generalpropertiesofaminoacids Lipids-Classificationoflipids Enzymes:ClassificationandMechanismofAction	**15**
IV	**CellularMetabolism–II** Carbohydrate Metabolism - Glycolysis, Krebs cycle, Electron Transport Chain,Glycogenmetabolism,Gluconeogenesis LipidMetabolism–β-oxidationofpalmiticacid Proteinmetabolism–Transamination,DeaminationandUreaCycle	**10**
V	**Embryology:** Gametogenesis Fertilization Typesofeggs Typesofcleavages Developmentof Frogup toformationofprimarygerm layers	**10**

****

REFERENCEBOOKS

1. EckertH.*AnimalPhysiology:MechanismsandAdaptation.*W.H.Freeman&Company.
2. FlorayE.*AnIntroductiontoGeneralandComparativeAnimalPhysiology.*W.B.Saunders Co.,Philadelphia.
3. GoelKAandSatishKV.1989.*ATextBookofAnimalPhysiology*,RastogiPublications,Meerut, U.P.
4. HoarWS.*GeneralandComparativePhysiology.*PrenticeHallofIndia,NewDelhi.
5. LehningerAL.NelsonandCox.*PrinciplesofBiochemistry.*LangeMedicalPublications,New Delhi.
6. ProsserCLandBrownFA.*ComparativeAnimalPhysiology.*W.B.SaundersCompany,Philadelphia.
7. DevelopmentalBiologybyBalinksy
8. DevelopmentalBiologybyGerardKarp
9. ChordateembryologybyVarmaandAgarwal
10. EmbryologybyV.B.Rastogi
11. AustenCRandShortRV.1980.*ReproductioninMammals*.CambridgeUniversityPress.
12. GilbertSF.2006.*DevelopmentalBiology*,8thEdition.SinauerAssociatesInc.,Publishers,Sunderland,USA.
13. Longo FJ.1987.*Fertilization.*Chapman&Hall, London.
14. Rastogi VB and Jayaraj MS. 1989. *Developmental Biology.*KedaraNath Ram NathPublishers,Meerut, Uttar Pradesh.
15. Schatten H and Schatten G. 1989. *Molecular Biology of Fertilization.* AcademicPress,NewYork.

****

A.G. &S.G.Siddhartha Degree College of Arts & Science, Vuyyuru – 521165, Krishna Dt. A.P. (Autonomous)

Semester IV*w.e.f. 2021-2022*
(Model question paper)

Title of the paper: **ANIMAL PHYSIOLOGY, CELLULAR METABOLISM ANDEMBRYOLOGY**

Code – ZOO-401C
Time: 3hrs. ***max.marks: 70***

Section – A ***4 x 5= 20.***

Answer any **four** questions. Each question carries **five** marks. Draw neat labeled diagrams wherever necessary.

1. Cardiaccycle

2. Non-myelinatednervefibers

3. pituitary gland

4.Structureofglucose

5. Glycolysis

6.UreaCycle

7. Fertilization

8. Typesofcleavages

Section – B5 x 10 =50.

Answer any **five** questions. Each question carries **Ten** marks. Draw neat labeled diagrams wherever necessary.

9.Give an account of process of digestion in mammals?

10. Describe the Structureand functionsofMammal heart?

11.Explain about the production of Nerve Impulse?

12. Explain about the hormonal control of reproduction in mammals?

13.Give an account of Classificationofcarbohydrates?

14. Discourse about Generalpropertiesofaminoacids?

15. Explain aboutKrebs cycle ?

16Write an essay ontypesofeggs?

****

A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru – 521165,
Krishna Dt. A.P. (Autonomous)
Semester -IV

Guide lines to the Paper Setter. **W.e.f. 2021-2022**

Title of the paper: ANIMAL PHYSIOLOGY, CELLULAR METABOLISM ANDEMBRYOLOGY **Code – ZOO-401C**

Time: 3hrs. **Max. Marks: 70.**

1. Answer any **four** questions out of eight in Section – A. Each question carriesfive marks. 4x5 = 20M.

2. Answer any **five** questions out of eight in Section – B. Each question carriesTen marks. 5x10= 50M.

	Section	UNIT-I	UNIT-II	UNIT-III	UNIT-IV	UNIT-V
5 Marks Questions	**A**	**1**	**2**	**1**	**2**	**2**
10 Marks Questions	**B**	**2**	**2**	**2**	**1**	**1**
Weightage		**25**	**30**	**25**	**20**	**20**

Note: 1. please provide the scheme of valuation for the paper.
2. Question paper should be in English medium.

****

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt.,A.P.
(AUTONOMOUS)

PRACTICAL - IV

w.e.f. 2021-2022. **Code: ZOO- 401P**

ANIMAL PHYSIOLOGY, CELLULAR METABOLISM AND EMBRYOLOGY

MAX.MARKS: 50.

(2hrs/week)

PRACTICAL SYLLABUS

LearningObjectives:

- Identificationofanorgan systemwith histological structure
- Deducinghumanhealthbasedontheinformationofcompositionof bloodcells
- Demonstrationofenzymeactivity*invitro*
- Identification of various biomolecules of tissues by simple colorimetric methods andalsoquantitative methods
- Identificationofdifferentstagesofearlembryonicdevelopmentinanimals

I. ANIMALPHYSIOLOGY

1. Qualitativetestsforidentificationofcarbohydrates,proteinsandfats
2. Studyof activityof salivaryamylaseunder optimumconditions
3. T.S.ofduodenum,liver,lung,kidney,spinalcord,boneandcartilage
4. Differentialcount ofhuman blood

II. CELLULARMETABOLISM

1. EstimationoftotalproteinsingivensolutionsbyLowry'smethod.
2. Estimationof total carbohydratebyAnthronemethod.
3. Qualitativetestsforidentification ofammonia, ureaanduricacid
4. Protocolfor IsolationofDNAinanimalcells

III. EMBRYOLOGY

1. Studyof T.S. oftestis, ovaryofamammal
2. Studyofdifferent stagesof cleavages(2, 4,8 cellstages)
3. Constructionoffate mapof frogblastula

REFERENCEBOOKS:

- Harper'sIllustrated Biochemistry
- Cellandmolecularbiology: Concepts&experiments. VIEd.JohnWiley&sons.Inc.
- LabManualonBloodAnalysisandMedicalDiagnostics,S.ChandandCo.Ltd.
- LaboratorytechniquesbyPlummer

****

A. G & S. G. S. DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU 521165, KRISHNA Dt., A.P. (AUTONOMOUS)

PAPER – IV

(Animal physiology, Cellular Metabolism and Embryology) w.e.f.2021-22.

*Model Question paper (External)*Max.Marks: 25 M.
Paper Code: ZOO-401P

I.Embryology:

1. Identify, draw neat labeled diagram & comment on. 2x $1^{½}$ = 3M.

A & B

II. Physiology& Cellular Metabolism

2. Identify, draw neat labeled diagram & comment on .2x $1^{½}$ = 3M. **A & B**

3. Studyof activityof salivaryamylaseunder optimumconditions 4M

4. Identify the Qualitative test for in the given samples A & B, each with two tests. 4x $1^{½}$ = 6M.

(Sample A- 2X1½ =3 Marks & sample B -- 2X1 ½ =3 Marks)

5. Identify the Qualitative test for in the given samples A & B, each with two tests. 4x $1^{½}$ = 6M.

(Sample A- 2X1 ½ =3 Marks & sample B -- 2X1 ½ =3 Marks)

6. Identify, draw neat labeled diagram &comment on. 2x $1^{½}$ = 3M.

A & B

****

A. G.& S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165
ZOOLOGY PRACTICAL -IV

(INTERNAL)
w.e.f. 2021-2022.

(2hrs/week).

(Animal physiology, Cellular Metabolism and Embryology)
Code: ZOO-401P.

Max.marks:25M.

Time: 3hrs.

1. Attendance ---------- 5M.
2. Record ---------- 10M.
3. Assignment ----------10M.

Total ------ 25M.

****

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P. (AUTONOMOUS).

NAAC reaccredited at 'A 'level

Autonomous –ISO 9001-2015 Certified

Title of the Paper: **IMMUNOLOGYANDANIMALBIOTECHNOLOGY**

Semester: - IV

Course Code	***ZOO-402***	Course Delivery Method	Class Room/Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours/ Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2019-20	Year of Offering 2021-2022	Year of Revision – 2021-22	Percentage of Revision:100%

CourseOutcomes:

Thiscoursewillprovidestudentswithadeepknowledgeinimmunology,genetics,embryologyand ecologyand bythecompletion ofthe coursethegraduateshall able to–

CO1:TogetknowledgeoftheorgansofImmunesystem,typesofimmunity,cellsandorgansof immunity.

CO2:Todescribeimmunologicalresponseastohowitistriggered(antigens)andregulated (antibodies)

CO3:UnderstandtheapplicationsofBiotechnologyinthefieldsofindustryandagricultureincluding animalcell/tissueculture, stemcelltechnologyandgeneticengineering.

CO4:Getfamiliarwiththetoolsandtechniquesofanimalbiotechnology.

LearningObjectives

- Totracethehistoryanddevelopment of immunology
- Toprovidestudentswithafoundationinimmunological processes
- Tobeabletocompareandcontrasttheinnateversusadaptiveimmunesystemsandhumoral versuscell-mediated immuneresponses
- UnderstandthesignificanceoftheMajorHistocompatibilityComplexintermsofimmuneresponse and transplantation
- Toprovideknowledgeonanimalcell andtissueculture andtheirpreservation
- Toempowerstudentswithlatestbiotechnologytechniqueslikestemcelltechnology, genetic engineering, hyridoma technology, transgenic technology andtheirapplication in medicineand industryforthebenefit of livingorganisms
    - Toexplain*invitro*fertilization,embryotransfertechnologyandotherreproductionmanipulation methodologies.
    - To get insight in applications or recombinant DNA technology in agriculture,productionoftherapeuticproteins.
    - Tounderstandprinciplesofanimalculture,mediapreparatio

Syllabus
Course Details

Unit	Learning Units	Lecture Hours
I	Immunology –I(OverviewofImmunesystem) IntroductiontobasicconceptsinImmunology InnateandadaptiveimmunityVaccinesandImmunizationprogramme Cellsofimmunesystem Organsofimmunesystem	**10**
II	Immunology –II (Antigens,Antibodies, MHCandHypersensitivity) Antigens:Basicpropertiesofantigens,BandTcellepitopes,haptensandadjuvants;Factors influencingimmunogenicity Antibodies:Structureof antibody,Classesand functionsofantibodies Structureandfunctionsofmajor histocompatibilitycomplexes ExogenousandEndogenouspathwaysofantigenpresentationandprocessing Hypersensitivity–ClassificationandTypes	**15**
III	Techniques AnimalCell,TissueandOrganculturemedia:NaturalandSyntheticmedia, Cellcultures:Establishmentofcellculture(primaryculture,secondaryculture, types of cell lines; Protocols for Primary Cell Culture); EstablishedCell lines (common examples such as MRC, HeLa, CHO, BHK, Vero); Organculture;Cryopreservation of cultures Stemcells:Typesofstemcellsandapplications Hybridoma Technology: Production & applications of Monoclonal antibodies(mAb)	**15**
IV	Genetic Engineering:Basic concept, Vectors, Restriction Endonucleases andRecombinantDNAtechnology Gene delivery:Microinjection, electroporation, biolistic method (gene gun),liposomeand viral-mediated genedelivery Transgenic Animals:Strategies of Gene transfer; Transgenic - sheep, - fish; applications Manipulationofreproductioninanimals:Artificial Insemination,*Invitro* fertilization,superovulation,Embryotransfer,Embryo cloning	**10**
V	PCR:BasicsofPCR. DNA Sequencing: Sanger's method of DNA sequencing- traditional andautomatedsequencing (2 hrs) Hybridizationtechniques:Southern,Northernand Westernblotting DNAfingerprinting:Procedureandapplications Applicationsin IndustryandAgriculture: Fermentation:Different types of Fermentation and Downstream processing; Agriculture: Monocultureinfishes, polyploidyinfishes	**10**

A.G. &S.G.Siddhartha Degree College of Arts & Science, Vuyyuru – 521165, Krishna Dt. A.P. (Autonomous)

Semester IV*w.e.f. 2021-2022*
(Model question paper)

Title of the paper:IMMUNOLOGY AND ANIMALBIOTECHNOLOGY

Code – ZOO-402C
Time: 3hrs. ***max.marks: 70***

Section – A ***4 x 5= 20.***

Answer any **four** questions. Each question carries **five** marks. Draw neat labeled diagrams wherever necessary.

1. Organsofimmunesystem

2. Haptens

3. Typesofstemcells

4.BHK

5. Electroporation

6.Transgenic - sheep

7. Westernblotting

8. polyploidyinfishes

Section – B5 x 10 =50.

Answer any **five** questions. Each question carries **Ten** marks. Draw neat labeled diagrams wherever necessary.

9. Give an account of Innateandadaptiveimmunity?

10. Describe theCellsofimmunesystem ?

11.Explain about the Structureandfunctionsofmajor histocompatibilitycomplexes?

12. Explain about the Hypersensitivity–ClassificationandTypes?

13. Give an account of Cryopreservation of cultures ?

14. Discourse aboutProduction& applications of Monoclonal antibodies(mAb)

15. Explain aboutendonucleases andRecombinantDNAtechnology?

16Different types of Fermentation and Downstream processing ?

A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru – 521165,
Krishna Dt. A.P. (Autonomous)
Semester -IV

Guide lines to the Paper Setter. **w.e.f. 2021-2022**

Title of the paper:IMMUNOLOGYANDANIMALBIOTECHNOLOGYCode – ZOO-402C

Time: 3hrs. ***Max. Marks: 70.***

1. Answer any **four** questions out of eight in Section – A. Each question carriesfive marks. 4x5 = 20M.

2. Answer any **five** questions out of eight in Section – B. Each question carriesTen marks. 5x10= 50M.

	Section	UNIT-I	UNIT-II	UNIT-III	UNIT-IV	UNIT-V
5 Marks Questions	**A**	**1**	**1**	**2**	**2**	**2**
10 Marks Questions	**B**	**2**	**2**	**2**	**1**	**1**
Weightage		**25**	**25**	**30**	**20**	**20**

Note: 1. please provide the scheme of valuation for the paper.
2. Question paper should be in English medium.

****

****

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt.,A.P. (AUTONOMOUS)

PRACTICAL - IV

***w.e.f. 2021-2022.*Code: ZOO- 402P**

IMMUNOLOGYANDANIMALBIOTECHNOLOGY

MAX.MARKS: 50.

(2hrs/week)

PRACTICAL SYLLABUS

LearningObjectives:

- Acquaintingstudentwithimmunologicaltechniquesvis-à-vistheorytaughtintheclassroom
- Interconnect the theoretical and practical knowledge of immunity with the outer worldforthe development of a healthierlife.
- Demonstratebasic laboratoryskillsnecessaryforBiotechnologyresearch
- Promotingapplicationofthelab techniquesfor takingup researchin higherstudies

I. IMMUNOLOGY

1. Demonstrationoflymphoidorgans(asperUGCguidelines)
2. Histologicalstudyofspleen,thymusandlymphnodes(throughpreparedslides)
3. Blood groupdetermination
4. Demonstrationof
    a. ELISA
    b. Immunoelectrophoresis

II. Animalbiotechnology

1. DNAquantificationusingDPAMethod.
2. Techniques:Western Blot,SouthernHybridization,DNAFingerprinting
3. Separation, Purification of biological compounds by paper, Thin-layer and Columnchromatography
4. Cleaningandsterilizationofglassandplasticwaresforcellculture.
5. Preparationofculturemedia.

REFERENCEBOOKS

1.ImmunologyLabBiology477LabManual; Spring2016Dr. JulieJameson

2.PracticalImmunologyALaboratoryManual;**LAPLAMBERTAcademic Publishing**

3.Manual of laboratoryexperiments in cell biology byEdward, GLaboratoryTechniques byPlummer

****

A. G & S. G. S. DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)
PAPER – IV

(IMMUNOLOGYANDANIMALBIOTECHNOLOGY)
w.e.f.2021-22.
*Model Question paper (External)*Max.Marks: 25 M.

Paper Code: ZOO-402P

---

1. Blood groupdetermination. 5 m

2,Demonstrationof ELISA. 5m

3.Preparationofculturemedia. 5m

4. Study the following techniques given on photographs & Write notes on. 4X2=8

.A.spleen,

B.Lymphnodes

C.Western Blot,

D. DNAFingerprinting

5. Cleaningofglasswaresforcellculture. 2m

****

A. G.& S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165

ZOOLOGYPRACTICAL -IV

(INTERNAL)
w.e.f. 2021-2022.

(2hrs/week).

(IMMUNOLOGYANDANIMALBIOTECHNOLOGY)

Code: ZOO-402P.

Max.marks:25M.
Time: 3hrs.

4. Attendance ---------- 5M.
5. Record ---------- 10M.
6. Assignment ----------10M.

Total ------ 25M.

****

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P. (AUTONOMOUS).

NAAC reaccredited at 'A 'level

Autonomous –ISO 9001-2015 Certified

Title of the Paper:**Immunology**

Semester: - VI

Course Code	***ZOO-601C***	Course Delivery Method	Class Room/Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours/ Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2019	Year of Offering 2021-2022	Year of Revision – 2021-22	Percentage of Revision: 0%

Objective of the course: To facilitate students to understand the role of immune system in the body, cells and organs of immune system, their structures and functioning

Course out comes:

- Students grow in understanding of immune system, to improve their immunity and to protect them from pathogens.
- They identify their blood groups, their compatibility and the need to donate blood to save life.

- Students identify the classes, structures and functions of antibodies, antigen – antibody reactions.
- This study enables students to take care of themselves and take timely precautions against various diseases.
- They identify the cure of different diseases through various vaccines, the instruments involved in identification of immune reactions etc.

Syllabus
Course Details

Unit	Learning Units	Lecture Hours
I	UNIT- I: **Overview of Immune system** Introduction to basic concepts in Immunology. Innate and adaptive immunity ***Cells and organs of Immune system** Cells of immune system Organs of immune system	10
II	UNIT-II:**Antigens** Basic properties of antigens B and T cell epitopes, haptens and adjuvants Factors influencing immunogenicity	**10**
III	UNIT-III: **Antibodies** Structure of an antibody Classes and functions of antibodies Antigen and antibody interactions. Monoclonal antibodies and their production.	**15**
IV	UNIT-IV: **Working of an Immune system** Structure and functions of major histocompatibility complexes Exogenous and Endogenous pathways of antigen presentation and processing Basic properties and functions of mediator molecules. (cytokines, interferonsand complement proteins). Mechanisms of humoral and cell mediated immunities	**15**
V	UNIT-V: **Immune system in health and disease** Classification and brief description of various types of hyper sensitivities Introduction to concepts of autoimmunity and immunodeficiency ***Vaccines** General introduction to vaccines Types of vaccines	**10**

****

A.G& S.G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU – 521165, KRISHNA Dt.,A.P. (AUTONOMOUS)
SEMESTER-VI (Model Question paper)

Paper Title: ***Immunology*** ***Paper Code***:***ZOO-601GE***w.e.f. 2021 – 2022.

Time: 3 hrs ***Max.Marks:70***

SECTION-A

Answer **any four** questions out of eight in Part - A. Each question carries five marks. **4 X 5 = 20*m***

1. Active immunity
2. Monoclonal antibodies .
3. T Cell Epitope
4. Structure of antibody.
5. Functions of major histo compatibility complexes (MHC)
6. Humoral immunity.
7. Causes of autoimmune diseases .
8 .BCG Vaccine .

Part – B

Answer **any five** questions out of eight in Part – B. Each question carries ten marks **5 X 10 =50m**

9. Give an account of innate immunity.

10. Write an essay on primary lymphoid organs.

11. Discuss about the basic properties of Antigen.

12. Write an essay on immunogenicity.

13. Describe about different types of immunoglobulins.

.

14. Give an account of basic properties and functions of Cytokines.

15. Define Hypersensitivity. Explain it in detail.

16. Explain different types of vaccines.

****

A.G & S.G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU 521165, KRISHNA Dt., A.P. (AUTONOMOUS)

SEMESTER-VI

ZOOLOGY ELECTIVE PAPER-VII (A)

Guide lines to the paper setterw.e.f. 2021 – 2022.

Paper Title: Immunology**. Paper Code: ZOO-601GE**

Time: 3 hrs **Max.Marks:70**

Note: 1. Answer **any four** questions out of eight in Part-A. Each question carries five mark4 X 5= 20M.

2. Answer any **five** questions out of eight in Part-B. Each question carries 10 marks. 5 X 10= 50M.

	PART	Unit – I	Unit – II	Unit – III	Unit – IV	Unit – V
5 Marks Questions	**A**	**1**	**1**	**2**	**2**	**2**
10 Marks Questions	**B**	**2**	**2**	**1**	**1**	**2**
Weightage		**25**	**25**	**20**	**20**	**30**

Note: 1. please provide the scheme of valuation for the paper.

2. Question paper should be both in English and Telugu media.

****

A. G & S. G. S. DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU 521165, KRISHNA Dt., A.P. (AUTONOMOUS)

ZOOLOGY PRACTICAL SYLLABUS

PAPERS – VI w.e.f. 2021 – 2022.

Period: 24
Max.Marks:50
Credits: 2
Paper Title: Immunology. Paper Code: ZOO-601GE (P)

Part – A

1. Demonstration of lymphoid organs (as per UGC guidelines).

2. Histological study of spleen, thymus and lymph nodes (through prepared slides).

3. Blood group determination.

4. Demonstration of

   a. ELISA

   b. Immunoelectrophoresis

****

REFERENCES BOOKS

William F. Ganong, *A Review of Medical Physiology*, 22 ed, McGraw Hill, 2005
Sherwood, Klandrof, Yanc, *Human Physiology*, Thompson Brooks/Coole, 2005.
Knut Scmidt-Nielson, *Animal Physiology***,** 5th ed, Cambridge Low Price Edition.
Richard A. Glodsby, Thomas J Kind, Barbara A. Osborne, Janis Kuby, *Immunology*, 5th ed, Freeman and Co. New York
Ivan Roitt, *Immunology***,** 4th ed, JohanthanBrostoff, Moshy, London.
Thomas C. Chung, *General Parasitology***,** Hardcourt Brace and Co ltd. Asia. New Delhi.
Gerard D. Schmidt and Larry S Roberts, *Foundations of Parasitology***,** McGraw Hill
Kindt, T. J., Goldsby, R. A., Osborne, B. A., Kuby, J. (2006). VI Edition. Immunology. W.H. Freeman and Company.
Delves, P. J., Martin, S. J., Burton, D. R., Roitt, I.M. (2006). XI Edition. Roitt's Essential Immunology, Blackwell Publishing.

A.G & S. G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU - 521165, KRISHNA Dt., A.P. (AUTONOMOUS)

Immunology w.e.f. 2021 – 2022.

Model Question Paper **(External)** Paper Code: ZOO-601GE (P)

Practical - VI ***Max.marks:25m***

---

1. Demonstration of lymphoid organs (as per UGC guidelines)5m

2. Blood group determination 5m

3.Study the following techniques given on photographs & Write notes on. 2x5=10m
A & B

4. ELISA &. Immunoelectrophoresis (demonstration) on site or of site demonstration. 5m

Total: 25m.

. Total: 25m

Guide lines for the Practical Examiners.

1. Demonstration of lymphoid organs
(5 marks for Procedure)

2. Blood group determination. .
(5 marks for Procedure)

3. Study the following techniques given on photographs & Write notes on A & B.
(1 mark for identification & 4 marks for diagram and notes, for each photographs)

4. ELISA (demonstration) on site or of site demonstration.
(5 marks for ELISA demonstration)

A.G & S. G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU - 521165, KRISHNA Dt., A.P. (AUTONOMOUS)

Immunology.

Model Question Paper **(Internal)** Paper Code: ZOO-601GE (P)

Practical - VI Max. Marks: 25

1. Attendance	--	5 M
2. Record	--	10M
3. Assignments	--	10M
	Total --	25M

****