AdusumilliGopalakrishnaiah& Sugarcane Growers

Siddhartha Degree College of Arts &ScienceVuyyuru

(AnAutonomousCollegeinthe JurisdictionofKrishnaUniversity,Machilipatnam)

Accredited by NAAC with "A" Grade

2024-25

MINUTES OF BOARD OF STUDIES

B.SC. AQUACULTURE MAJOR(HONOURS)

2024-2025

II, IV SEMESTERS

15th February2025

DEPARTMENT OF ZOOLOGY

EVEN SEMESTER

ADUSUMILLIGOPALAKRISHNAIAH& SUGARCANE GROWERS
SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU
(An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam)
Accredited by NAAC with "A" Grade ISO 9001-2015 Certified Institution

DEPARTMENT OF ZOOLOGY
BOARD OF STUDIES MEETING: 15th February 2025

Minutes of meeting of Board of Studies of Department of Zoology in B.Sc. Aquaculture Major was convened at 11AM on **15/02/2025** under the chairmanship of Smt. D.A. Kiranmayee, Head of the Department. The members present have discussed various aspects such as changes to be made in the Syllabi, Scheme of Evaluation and Blue print both for theory and practical papers, Departmental activities for II, & IV semesters for the academic year 2024-2025 through off line.

Members Present:

1) ……. **(Smt. D.A.Kiranmayee.)**	Chair person	Head, Department of Zoology, A.G&S.G.S Degree College of Arts & Science, Vuyyuru-521165.
2)…… **(Smt. Dr.L.Suseela.)**	University Nominee	Bio Sciences & Bio technology Krishna University Machilipatnam.
3)…… **(Sri Dr.K.Daniel.)**	Academic Council Nominee	Head, Department of Zoology, JKC College, Guntur.
4)…… **(Sri G.Ravi Teja.)**	Academic Council Nomine	Lecturer, Department of Zoology, Govt. College Autonomous Rajamundry.
5)…… **(Smt. K. Padmaja.)**	Member	Lecturer in Zoology, A.G&S.G.S Degree College Vuyyuru-521165.
6)…… **(Smt. Dr.V.Subhashini.)**	Member	Lecturer in Zoology, A.G&S.G.S Degree College Vuyyuru-521165.
7)…… **(Ch.Chiranjeevi.)**	Student Represent	P.hd –Research Scholar, Dept.of Botany &Microbiology, Acharya Nagarjuna University, Guntur**.**

ADUSUMILLIGOPALAKRISHNAIAH& SUGARCANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU

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DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES MEETING: 15th February 2025

Minutes of Meeting of Board of Studies of Department of Zoology for B.Sc. Zoology Major was convened at 11.00AM on**15/02/2025**under the chairmanship of Smt. D.A.Kiranmayee,Head of the Department of Zoology and Aquaculture. The members present have discussed various aspects such as changes to be made in the Syllabi, Scheme of Evaluation and Blue print both for theory and practical papers, departmental activities for II, & IV semesters for the academic year 2024-2025 through off line.

Members Present:

1) ..... **(Smt. D.A.Kiranmayee.)**	Chair person	Head, Department of Zoology, A.G&S.G.S Degree College of Arts & Science, Vuyyuru-521165.
2)..... **(Smt. Dr.L.Suseela.)**	University Nominee	Bio Sciences & Bio technology Krishna University Machilipatnam.
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5)..... **(Smt. K. Padmaja.)**	Member	Lecturer in Zoology, A.G&S.G.S Degree College Vuyyuru-521165.
6)..... **(Smt. Dr.V.Subhashini.)**	Member	Lecturer in Zoology, A.G&S.G.S Degree College Vuyyuru-521165.
7)..... **(Ch.Chiranjeevi.)**	Student Represent	P.hd –Research Scholar, Dept.of Botany &Microbiology, Acharya Nagarjuna University, Guntur.

Agenda for B.O.S Meeting.

1.Torecommend the syllabi (Theory & Practical) for **Second Semester ofI B.Sc. Aquaculture Major Honours** for the academic year 2024-2025

2.To recommend the Model Question paper, Blue Print and Guidelines for Question paper setters for Second Semester of **I B.Sc. Aquaculture Major Honours** for the academic year 2024 – 2025

3. To recommend the syllabi (Theory & Practical), **for IV Semester of II B.Sc. Aquaculture Major** for the academic year 2024 - 2025.

4. To recommend the Model question paper, Blue Print and Guidelines for Question paper setters for IV Semester of II B.Sc. Aquaculture Major for the academic year 2024 - 2025.

5.To implement **Semester End Internship** for III B.Sc. Aquaculture in VI Semester.

6.To introduce Value Added Course(Non-Credits)on Poultry Farming for IV Semester of II B.Sc. Aquaculture Major (Honours)for the academic year 2024-2025.

7. To recommend the teaching and evaluation methods to be followed under Autonomous status.

8. Any other matter.

D. A. Kiranmayee

Chairman.

RESOLUTIONS:

1.It is resolved to implement the same syllabiof 2023-24 for Second Semesterof I B.Sc. Aquaculture Major Honours for the academic year 2024-2025 without any changes.

2. It is resolved to implement the model question paper, Blue Print and Guidelines for Question paper setters for second Semester of I B.Sc. Aquaculture Major, Honours for the academic year2024-2025 as recommended by BOS members.

3. It is resolved to implement the same syllabus (Theory & Practical), as prescribed by APSCHE, and as recommended by BOS members for IV Semester ofII B.Sc. Aquaculture Major, Honours for the academic year2024-2025

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4. It is resolved to implement the Model question paper, Blue Print and Guidelines for Question paper setters for IV Semester of II B.Sc.IV Semester ofII B.Sc. Aquaculture Major, Honours for the academic year2024-2025 as recommended by BOS members.

5. It is resolved to implement Semester End Internship for III B.Sc. Aquaculture in VI Semester.

6.It is resolved to conduct Value Added Course (Non-Credits) on Poultry Farming for IV Semester of II B.Sc. Aquaculture Honours students for theacademicyear 2024-2025.

7. It is resolved to implement the following Teaching and Evaluation methods to be followed under Autonomous status.

Evaluation procedure:

Internal Assessment Examination:

- Out of maximum 100 marks in each paper for II semester of I B.Sc. Aquaculture Major. Honours 30 marks are allocated for internal assessment.
- Out of these 30 marks, 20 marks are allocated for Announced tests (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.
- Out of maximum 100 marks in each paper for IV Semester of II B.Sc. Aquaculture Major. Honours 30 marks are allocated for internal assessment.
- Out of these 30 marks, 20 marks are allocated for announced tests (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. There is no pass minimum for internal assessment for IV Semester.

Semester – End Examination:

- 70 marks are allocated for II Semester ofFirst B.Sc. Aquaculture Major (Honours) in Semester end Examination. Even though 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"
- 70 marks are allocated for IV Semester of II B.Sc. Aquaculture Major in Semester End Examination. Even though 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"

D. A. Kiranmayee

Chairman.

ADUSUMILLI GOPALAKRISHNAIAH& SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS)

Department of Zoology

COURSE STRUCTURE

ALLOCATION OF CREDITS

B.SC. AQUACULTURE MAJOR HONOURS

SEM	CourseCode	Course Title	Hours / Week	CIA	SEE	No.of credits	Core/LSC/ SDC/MDC Elective/ Cluster
II	**23AQMAL121**	Taxonomy and Functional Anatomy of fin fish and shell fish	3	30	70	3	Core
	23AQMAP121	Taxonomy and Functional Anatomy of fin fish and shell fish **Practical Course**	2	15	35	1	Lab
IV	**24AQMAL241**	Fish Health Management	3	30	70	3	Core
	24AQMAP241	Fish Health Management **Practical Course**	2	15	35	1	Lab
	24AQMAL24	Shrimp Health Management	3	30	70	3	Core
	24AQMAP242	Shrimp Health Management- **Practical Course**	2	15	35	1	Lab
	24AQMAL243	Fish nutrition & Feed technology	3	30	70	3	Core
	24AQMAP243	Fish nutrition & Feed technology **Practical Course**	2	15	35	1	Lab
VI		**SEM END INTERNSHIP**					

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Title of the Paper: **Taxonomy and functional Anatomy of fin fish and shell fish**

Semester: - II

Course Code	**23AQMAL121**	Course Delivery Method	Class Room/Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours/ Week	3	Semester End Exam Marks	70
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction: 2023-2024	Year of Offering:2024-2025	Year of Revision –	Percentage of Revision: 0%

S. No	COURSE OBJECTIVES
1	To identify key taxonomic groups and the distinguishing characteristics of Finfish and Shell Fish Utilize taxonomic keys for accurate identification of finfish and shellfish species.
2	Analyse the anatomical structures and physiological processes involved in digestion and respiration in finfish and shellfish, including prawns.
3	Examine the structural differences in the heart of various fish species (Shark, Labeo, Lates, Channa punctatus) and their physiological adaptations to diverse aquatic environments.
4	To understand the anatomy and functions of the nervous system (central, peripheral, and sympathetic) in fish and shellfish, including prawns, with a focus on their physiological adaptations to aquatic environments.
5	Compare the urino-genital systems in fish and prawns, examining the differences and similarities in their reproductive and excretory systems.

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S. No	COURSE OUTCOMES	BTL	PO	PSO
CO1	Students will remember the general characters and Classification of major groups of Finfish and Shellfish	K1	PO1	PSO1
CO2	Gain knowledge on the structure and functions of Digestive and Respiratory systems	K2	PO1	PSO1
CO3	Students will understand the structural differences in the heart of various fish species and their physiological adaptations to diverse aquatic environments.	K2	PO2	PSO2
CO4	Students will acquire knowledge of the nervous systems of fish and shellfish, enabling them to understand their physiological adaptations and biological processes.	K2	PO2	PSO2
CO5	Learners will develop the ability to compare the urino-genital and nervous systems of fish and shellfish, analyzing their functional and ecological roles in aquatic environments.	K4	PO2	PSO2

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyse; K5: Evaluate; K6: Create

CO-PO MATRIX

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M						
CO2	M						
CO3		M					
CO4		H					
CO5	H						

SYLLABUS

Unit	Learning Units	Lecture Hours
I	**General characters & Classification of Cultivable fin fish and shell fish** 1.1General Characters of Crustacea 1.2Classification of Crustacean:Major groups up to orders and their important characters. 1.3 General Characters of fishes 1.4 Classification of Fishes**:** Majorgroups up to sub classes and their important characters	9
II	**Digestive and Respiratory systems of Fishand shell fish** 2.1Digestive system of fish – Digestion process & physiology 2.2Respiratory system of fish- Respiratory organs & Mechanism 2.3Accessory Respiratory organs in fishes 2.4Digestive system of prawn- Digestion process & physiology 2.5 Respiratory system in prawn - Respiratory organs & Mechanism	9
III	**Circulatory systems of Fish and shell fish** 3.1Cardio vascular system:Structure of heart in fishes- Shark 3.2 Structure of heart in fishes-Labeo,Lates, Channa punctatus 3.3 Blood vascular system &course of circulation in prawn	9
IV	**Nervous system of Fish and shell fish** 4.1Nervous system in fish: Central nervous system 4.2 Peripheral Nervous system in fish 4.3 Central Nervous system in prawn 4.4 Peripheral nervous system, Sympathetic Nervous System in prawn	9
V	**Reproductive system of Fish and shell fish** 5.1Urino-genital system in fishes- Male and female reproductive system 5.2 Excretory system in fishes 5.3 Reproductive system in prawn- Male & female reproductive system	9

PRESCRIBED BOOK(S):

1. Bone Q et al., 1995. Biology of fishes, Blackie academic & Professional, LONDON
2. Saxena AB 1996. Life of Crustaceans.Anmol Publications Pvt.Ltd., New Delhi

REFERENCES:

1.Tandon K.K &Johal M.S 1996.Age and Growth in Indian Fresh Water Fishes. Narendra Publishing
2. Raymond T et al., 1990. Crustacean Sexual Biology, Columbia University Press, New York
3. Guiland J.A (ed) 1984. Penaeid shrimps- Their Biology andManagement.
4. Barrington FJW 1971. Invertebrates: Structure andFunction. ELBS
5. Parker F &Haswell 1992. The text book of Zoology, Vol I.Invertebrates.

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

II SEMESTER END EXAMINATIONS

PAPER – II MODEL PAPER Course Code: 23AQMAL121
Title of the paper: Taxonomy and functional Anatomy of fin fish and shell fish

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

Note: Draw neat labeled Diagrams wherever necessary.

SECTION-A

Answer any Five of the following Questions. 5X4= 20M

1. a) Write a short note on general characters of fishes CO1, L2

Or

b) Write a short note on Decapoda CO5, L2

2.a) Explain the physiology of digestion in prawn CO2, L1

Or

b) Write a short note onstructure of gillin fish CO2, L1

3. a) Describe the course of circulation in prawn CO4, L4

Or

b) Explain the structure of heart in shark CO4, L2

4. a) Explainstructure ofbrain in fish CO4, L2

Or

b)Explain the structure of brain in prawn CO2, L5

5. a) Write a short note on reproductive organs in fishes CO3, L2

Or

b) Explain thefemale reproductive system in prawn CO5, L2

SECTION-B

Answer all the Questions. 5X10=50M

6.a) Write an essay on general characters and classification of crustaceaupto orders with suitable examples CO1, L2

(Or)

b) Explain the followingi) Placodermi ii) Chondrichthyesiii) Osteichthyes CO1, L2

7.a)Explain the structure and process of digestion in fish CO2, L4

(Or)

b) Describe the respiratory system in prawn CO2, L4

8.a)Describe the cardio vascular system in Labeo CO3, L2

(Or)

b) Explain the blood vascular system in prawn CO3, L2

9.a)Explain theperipheral nervous system in fish CO4, L2

(Or)

b) Explain the following sympathetic nervous system in prawn CO4, L3

10. a) Describe the excretory system in fishes CO5, L2

(Or)

b) Describe the male reproductive system in prawn CO5,L2

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS).

PRACTICAL- 1 (At the end of II Semester)

Title of the paper: Taxonomy and functional Anatomy of fin fish and shell fish

No of Hours: 30 **Credits: 01**

WEF: 2023-2024Course Code:23AQMAP121

1. Study of mouth parts in herbivorous and carnivorous fishes
2. Comparative study of digestive system of herbivorous and carnivorous fishes
3. Demonstration of brain of fish
4. Demonstration of cranial nerves of fish
5. Demonstration of Nervous system of prawn
6. Exposure of gillsof prawn
7. Exposure of gills of fish

REFERENCEBOOKS

1. BondE.Carl.1979, BiologyofFishes,Saunders.
2. HalverJE.1972. Fish Nutrition. AcademicPress.
3. HoarWSandRandallDJ.1970. FishPhysiology, Vol.I-IX,AcademicPress,NewYork.
4. LaglerKF,Bardach,JE,Miller,RR,PassinoDRM.1977. Ichthyology,2nd Ed.John Wiley &Sons, New York.
5. LovellJ.1989. NutritionandFeeding ofFish.VanNostrandReinhold, NewYork.
6. MoylePBandJosephJ.CechJr.2004.Fishes:AnIntroduction to Ichthyology 5th Ed.PrenticeHall.
7. NikolskyGV.1963. EcologyofFishes,Academic Press.
8. NormanJRandGreenwoodPH. 1975.AHistoryofFishes, HalstedPress.

A.**G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS)**

B.Sc. AQUACULTURE MAJOR HONOURS

PRACTICAL - I

w.e.f. 2023-2024.

Course Code:23AQMAP121

MODEL QUESTION PAPER -II

MAX.MARKS: 35.

(2hrs/week)

Title of the paper: -Taxonomy and functional Anatomy of fin fish and shell fish

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A. Semester End Lab ExamMax Marks: 25

I Answer the following **5X5=25**

Q1:

Q2:

Q3:

Q4:

Q5:

II. Viva **2M**

III.Record **8M**

Total = **35M**

B. Continuous Internal Assessment **15M**

Total (A+ B**)** **50M**

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS)

NACC reaccredited at 'A 'level

Autonomous –ISO 9001-2015 Certified

Title of the Paper: **Biology of Fin fish and Shell fish**

Semester: - II

Course Code	**23AQMAL122**	Course Delivery Method	Class Room/Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours/ Week	3	Semester End Exam Marks	70
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction: 2023-2024	Year of Offering2024-2025	Year of Revision –	Percentage of Revision: 0%

S. No	COURSE OBJECTIVES
1	To understand the structure and functions of specialized organs like electric organs, venom, and toxins in fish.
2	To learn about natural fish food, feeding habits, feeding stimuli, and gut content analysis.To study the principles and methods of age and growth determination in fish and shellfish.
3	To explore the breeding habits, cycles, and reproductive strategies of fish in both natural and artificial environments.
4	To analyse parental care strategies and reproductive modes such as oviparity, ovo-viviparity, and viviparity in fish.
5	To understand the endocrine system in fish, including neurosecretory cells and their role in regulating growth and reproduction.

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S. No	COURSE OUTCOMES	BTL	PO	PSO
CO1	Students will gain in-depth knowledge and remember about the specialized sense organs in fish and crustaceans.	K1	PO1	PSO1
CO2	Learners will understand the Insights into Food, Feeding, and Growth Patterns	K2	PO1	PSO1
CO3	Students can apply the induced breeding techniquespractically by learningabout reproductive cycles of fish, shrimp, and mollusks.	K3	PO2	PSO2
CO4	Learners will explore embryonic and larval development in fish and shellfish, along with parental care strategies	K2	PO2	PSO2
CO5	Students can evaluate Hormonal Regulation and Growth Mechanisms in fish	K5	PO2	PSO2

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyse; K5: Evaluate; K6: Create

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M						
CO2	M						
CO3		H					
CO4		M					
CO5	H						

SYLLABUS

Unit	Learning Units	Lecture Hours
I	**Specialized organsinfish** 1.1Sense organs of fishes and crustaceans. 1.2Specialized organs in fishes–electricorgan, venom and toxins 1.3Buoyancy infishes: swim bladder and mechanism of gassecretion 1.4Fish and Crustaceans of commercial importance	9
II	**Food,Feeding andGrowth** 2.1Natural fish food, feeding habits, feeding intensity, stimuli for feeding, utilization of food, gut content analysis, forage ratio 2.2 Principles of Age and growth determination; Growth regulation, Growth rate measurement–scale method, otolith method, skeletal parts as age indicators 2.3 Length-frequency method, age composition, age-length keys, absolute and specific growth, 2.4 Back calculation of length and growth, annual survival rate,Length-weight relationship	9
III	**Reproductive Biology** 3.1Breeding in fishes, breeding places, breeding habits & places 3.2 Breeding in natural environment and in artificial ponds,courtship and reproductive cycles. 3.3 Induced breeding in fishes 3.4Breeding in shrimp,oysters,mussels,clams,pearloyster, pila,and cephalopods.	9
IV	**Development** 4.1Parental care in fishes, ovo-viviparity,oviparity,viviparity,nest building and brooding 4.2Embryonic and larval development of fishes 4.3Embryonic and larval development of shrimp, crabs and molluscans of commercial importance 4.4Environmental factors affecting reproduction and development of cultivable aquatic fin & shell fish	9
V	**Hormones & Growth.** 5.1Endocrine system in fishes. 5.2Neuro-secretory cells, androgenic gland, ovary, chromatophores 5.3Molting, molting stages, metamorphosis in crustacean shell fish	9

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- Micale,J.PelczarJr.,E.C.S.Chan.,NoelR.Kraig.,2002.PelczarMicrobiology.5thEdition.McGraw Education, NewYork,USA.
- SatyanarayanaU.,Chakrapani, U.,2013. Biochemistry.4thEdition.Elsevierpublishers.
- JainJ.L.,SujayJain,NitinJain,2000.FundamentalsofBiochemistry.S.Chandpublishers,NewDelhi, India.
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- U. Satyanarayana, 2005. Biotechnology. 1st Edition. Books and Allied Publishers pvt. ltd.,Kolkata.
- Upadhyay,UpadhyayandNath.2016.BiophysicalChemistry,PrinciplesandTechniques.HimalayaPu blishingHouse.
- ArthurM.Lesk.IntroductiontoBioinformatics.5th Edition.Oxfordpublishers.
- APKulkarni, 2020. Basics of Biostatistics. 2ndEdition. CBSpublishers.

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS).

I SEMESTER END EXAMINATIONS

PAPER – II **MODEL PAPER** **Course Code: 23AQMAL122**

Title of the paper: Biology of Fin fish and shell fish

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

Note: Draw neat labeled Diagrams wherever necessary.

SECTION-A

Answer any Five of the following Questions. 5X4= 20M

1. a)Write a short note on commercial importance of cultivable fin fishes– CO1, L1

Or

b) Explain the structure and function of Sense organs in fishes – CO1, L2

2.a) Explain the different fish feeding habits –CO2, L1

Or

b) Write a short note on growth regulation - CO2, L1

3. a) Describe the breeding process in pearl oyster - CO4, L4

Or

b).Explain different breeding habits in fishes – CO4, L2

4. a) Explain Ovo-viviparity in Fishes – CO4, L2

Or

b) Explain the Embryonic and larval Development in Crabs - CO5, L5

5. a) Write a short note on Neurosecretory cells – CO3, L2

Or

b) Explain the endocrine system in fishes –CO5, L2

SECTION-B

Answer all the Questions **5X10=50M**

6.a)Classify the Crustaceans up to the level of subclass- CO1, L2

(Or)

b) Give an account of Buoyancy in fishes– CO1, L2

7.a) Explain different factors that determine the longevity of fishes – CO2, L4

(Or)

b)Describe the different methods of estimating age and growth of fish – CO2, L4

8.a)Describe the process of Induced breeding in Fishes- CO2, L2

(Or)

B) Explain the breeding technique in shrimp- CO2, L2

9.a) Explain the role of environmental factors on reproduction and development of finfish - CO2, L2

(Or)

b) Write an essay on Embryonic and larval development in shrimp - CO2, L2

10. a) Describe the structure of Pituitary gland and explain the functions of its hormones - CO2, L2

(Or)

b) Describe the process of Molting in Crustaceans- CO2, L2

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS)

Practical Syllabus (At the end of II Semester)

Title of the paper: Biology of Fin fish and shell fish

No of Hours: 30 **Credits: 01**
WEF: 2023-2024 **Course Code:23AQMAP122**

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1. Length-weight relationship of fishes
2. Gutcontent analysis in fishes and shrimp
3. Mouth partsandappendagesofcultivableprawns, shrimps and other crustaceans
4. Study of eggs of 4. fishes,shrimps, prawns and other crustaceans
5. Studyof oyster eggs
6. Embryonic and larval development of fish
7. Study of gonadal maturity and fecundity in fishes and shellfish
8. Observation of crustacean larvae
9. Study of nest building and brooding of fishes

PRESCRIBEDBOOKS

BoneQet al.,1995. Biologyoffishes,Blackie academic&professional, LONDON.
SaxenaAB1996.LifeofCrustaceans.AnmolPublicationsPvt.Ltd.,NewDelhi

REFERENCES:

- TandonKK&JohalMS1996.AgeandGrowthinIndianFreshWaterFishes.NarendraPublishing House, New Delhi.
- Raymond T etal.,1990.CrustaceanSexual Biology, Columbia UniversityPress,NewYork
- GuilandJ.A(ed) 1984. Penaeidshrimps: TheirBiologyandManagement.1.18BarringtonFJW1971.Invertebrates: StructureandFunction.ELBS
- ParkerF&Haswell1992.Thetextbookof Zoology, VolI.Invertebrates(eds.MarshalAJ&Williams). ELBS& Mc Millan&Co.

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU
(AUTONOMOUS)

AQUACULTURE
PRACTICAL - II

w.e.f. 2023-2024
Code: 23AQMAP122

MODEL QUESTION PAPER -II

MAX.MARKS: 35

(2hrs/week)
Title of the paper: -Biology of Fin fish and shell fish

A. Semester End Lab Exam **Max Marks: 25**

I Answer the following **5 X 5 = 25**

Q1:

Q2:

Q3:

Q4:

Q5:

II. Viva **2M**

III.Record **8M**

Total **35M**

B. Continuous Internal Assessment **15M**

Total (A+ B**)** **50M**

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU(AUTONOMOUS)

NAAC reaccredited at 'A 'level

Autonomous –ISO 9001-2015 Certified

Title of the Paper:**Fish Health Management**

Semester: - IV

Course Code	**24AQMAL241**	Course Delivery Method	Class Room/Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours/ Week	3	Semester End Exam Marks	70
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction: 2024-25	Year of Offering 2024-25	Year of Revision	Percentage of Revision:

Course Aims and Objectives:

S. No	COURSE OBJECTIVES
1	To Encourage critical thinking by exploring how diseases are linked to environmental factors, and their effects on tissues, healing, and regeneration.
2	Tto enhance understanding of fungal and viral fish diseases, their management, and develop practical skills in diagnosis and treatment while fostering teamwork, presentation, and problem-solving abilities.
3	Learn about bacterial fish diseases, how to recognize them, and find ways to treat them sustainably while thinking critically.
4	Learn to diagnose fish diseases caused by protozoans, understand the parasites, and find ways to prevent and control them in fish farms.
5	Learn to diagnose fish health problems and understand how nutrition affects them. Think critically about how to manage fish farms sustainably.

COURSE OUTCOMES

Course Outcomes: At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Provide students with knowledge about fish diseases and pathological aspects of diseases	**K2**	**PO1**	**PSO1**
CO2	Explore Fungal and Viral diseasesof finfish.	**K2**	**PO1**	**PSO1**
CO3	To gain knowledge about emerging bacterial diseases and its prevention and therapy.	**K2**	**PO1**	**PSO1**
CO4	To learntheimportanceofdiagnostictoolsinidentificationofdiseases andapplication in development of vaccines.	**K3**	**PO2**	**PSO2**
CO5	Gain knowledge of Nutritional deficiency related diseases and the use of antibiotic andchemotherapeutics	**K4**	**PO2**	**PSO2**

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyse; K5: Evaluate; K6: Create

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M						
CO2	M						
CO3		H					
CO4		M					
CO5	H						

SYLLABUSFISH HEALTH MANAGEMENT

Unit	Learning Units	Lecture Hours
I	**Pathology andparasitology** 1.1Introductiontofishdiseases–Definition and categories of diseases (Infectious Diseases – bacterial, Viral, fungal and Parasitic; Non- infectious Diseases - Environment, nutritional and genetic) 1.2 Disturbance in cell structure – changes in cell metabolism, progressive and retrogressive tissuechanges,typesof degeneration,infiltration,necrosis, celldeathandcauses 1.3 Atrophy,Hypertrophy,Neoplasm's,inflammation,healingandrepair **Activity:** Case study of any disease outbreak, causes and its effect and analyse. To enhance understanding of cellular and tissue-level changes associated with fish diseases.	9
II	**FungalandViral Diseasesoffinfish.** 2.1Fungal diseases – Saprolegniasis, Brachiomycosis, (Gill Rot) Icthyophonus diseases,preventionandtherapy 2.2Viral diseases – Emerging viral diseases in fish, Hemorrhagic septicemia, Infectious hematopoietic necrosis in trout, Infectious pancreatic necrosis in salmonids 2.3 Viral diseases- Spring Viremia of carps, Swim-bladder inflammation in cyprinids, Channel catfish viral disease, Prevention and therapy 2.4 Common Chemicals and drugs used for treatment of Fungal andViral diseasesoffinfish **Activity:** Students should present their findings to the class, using visuals like charts, models, or slides on the assigned disease, focusing on its causes, symptoms, affected species, prevention, and treatment.	**9**
III	**BacterialDiseasesoffin fish** 3.1Diagnosis and Detection Methods for Bacterial Diseases in Fish---Molecular**, S**erological**,** and Traditional microbiological techniques 3.2.Emerging bacterial diseases- Aeromonas diseases- Furunculosis, Epizootic Ulcerative Syndrome Infectious abdominaldropsy, Tail and FinRot 3.3 Pseudomonas diseases - Bacterial Gill Disease, Hemorrhagic Septicemia, Ulcerative Dermatitis 3.4Vibrioinfections- Vibrio Cholerae Infection, Red Boil Disease,Vibriosis (Generalized Septicemia) 3.5Other bacterial Infections- Columnaris, Enteric Redmouth, Bacterial kidney disease **Activity:** Prepare flashcards with Furunculosis, Columnaris, Redmouth disease and bacterial kidney disease. **Assignment:**Diagnosis and Detection Methods for Bacterial Diseases in Fish	**9**
IV	**ProtozoanDiseasesoffinfish-** 4.1Principles of disease diagnosis in fish culture 4.2 Protozoandiseases: Ichthyophthiriasis (WhitespotDisease), Costiasis,Whirlingdisease. 4.3Metazoan Diseases-- Helminth diseases-Dactylogyrus,Diplostomumspathaceum 4.4Metazoan Diseases--Crustacean diseases-Argulosis (Fish Louse	**9**

	Infestation), Lernaeosis (Anchor Worm Infestation) Ergasilosis **Assignment:** MetazoanCrustacean Diseases	
V	**Nutritionaldiseases** 5.1Nutritionalpathology – lipidliverdegeneration,Vitaminandmineraldeficiencydiseases. 5.2 Aflatoxinand dinoflagellates. 5.3Antibiotic and chemotherapeutics- Nutritional cataract. 5.4 Genetically induced diseases-- Inherited Muscular Dystrophy, Ichthyosis (Fish Scale Disease), Albinism and Cystic Kidney Disease (CKD) **Activity:** Organize a classroom debate on the advantages and disadvantages of using antibiotics and chemotherapeutics in aquaculture. Include discussions on resistance, environmental impact, and alternative therapies. **Assignment:** Genetically induced diseases	**9**

PRESCRIBEDBOOKS:

1. Shaperclaus W.1991FishDiseases-Vol.I&II. OxonianPressPvt.ltd
2. RobertsRJ1989.Fishpathology.BailliereTindall,NewYork
3. Lydia Brown 1993. Aquaculture for veterinarians- fish husbandray and medicine.PergamonPress. Oxford

REFERENCES:

- Shankar KM & Mohan CV. 2002. Fish and Shellfish Health Management. UNESCOPubl.Sindermann CJ. 1990
- Walker P &Subasinghe RP. (Eds.). 2005 Principal Diseases of Marine Fish andShellfish.Vols. I,II. 2ndEd.AcademicPress
- DNABasedMolecularDiagnosticTechniques: Research Needs forStandardizationandValidation of the Detection of Aquatic Animal Pathogens and Diseases. FAO Publ.Widmeyer, G,Meyer FP &Smith L.1999.
- BullockGet.al.,1972Bacterialdiseasesoffishes.TFHpublications,NewJersey
- PostG1987.TextbookofFish Health.TFHpublications,NewJersey
- JohnsonSK1995. Handbookofshrimpdiseases. TexasA& MUniversity, Texa

A.G. & S.G.Siddhartha Degree College of Arts & Science, (Autonomous)

Semester –IV

w.e.f. 2024-2025 (Model question paper)

Title of the paper**:Fish Health Management** Course Code – **24AQMAL241**

Time: 3hrs. Max.marks: 70

Note: Draw neat labeled Diagrams wherever necessary.

SECTION-A

Answer any Five of the following Questions. 5X4= 20M

1. a) Explain the effects of neoplasm in fishes K1

Or

b) What is atrophy? Explainthe typesof Atrophy. K1

2.a) Explain the Infectious pancreaticnecrosis in salmonids K2

Or

b) Write a short note on prevention andtherapyof viraldisease K1

3. a) Write short notes on Vibrio infectious K1

Or

b) Explain bacterialkidney diseaseK2

4. a) Analyse the symptoms WhitespotDisease (ICH) K4

Or

b) Explain the Helminth diseases of fish K2

5. a) Write a short note on Aflatoxin K1

Or

b) Explain the chemotherapeuticsK2

SECTION-B

Answer all the Questions. 5X10=50M

6a) Explain the role of diseases inthe cell structuredisturbances of fishes K1

OR

b) Define fish diseaseandgive differences between infectious and non-infectious diseases K2

7a). Give an account of fungal diseases in fish.

OR

b) Give an account of chemicals and drugs used for treatment of Fungal and Viral diseases offinfish.K3

8. a) Explain the diagnosis and detection Methods for Bacterial Diseases in Fish K2

OR

b) Write about the diseases caused by Aeromonas species in fish K2

9 a) Describe the principles of disease diagnosis in fish culture K2

OR

b) Compare the symptoms, treatment and prevention for Argulosis and Ergasilosis diseases in fish.K3

10. a) Describe theVitaminandmineraldeficiencydiseases.K2

OR

b) ExplainGeneticallyinduced diseases. K2

A.G. & S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS)

AQUACULTURE

PRACTICAL - VII

w.e.f. 2024-2025

Code: 24AQMAP241
MAX.MARKS: 50

(2hrs/week)

Title of the paper: -Fish Health Management **Credits:01**

LEARNING OUTCOMES:

By the end of the course students will be able to

- Identify the pathological changes in the visceral organs of fish, prawn and shrimp.
- Analyse the data for epidemiological investigations of viral diseases.
- Isolate culture and characterize the bacterial pathogens.
- Identify the external parasites, prepare and evaluate antibiograms
- Develop skill in molecular and immunological techniques.
- Estimate the dose of antibiotics and probiotics used in aquaculture practices and methods of administering various chemotherapeutics.
- Maintain a neat record of experiments and exhibit the hidden creative talent.

SYLLABUS:

1. EnumerationofBacteriabyTPC Method
2. EnumerationofTotalColiforms
3. Observation of gross pathology and external lesions of fish with reference tothe commondiseasesin aquaculture
4. Examinationofpathologicalchangesingillsandgutlumen,lymphoidorgan,musclesandnerveso ffish
5. Collection, processing and analysis of data for epidemiological investigations of viraldiseases
6. Bacterialpathogens–isolation,cultureandcharacterization
7. Identificationofparasitesinfishes:Protozoan,Helmiths,Crustaceans
8. Estimation of dose, calculation of concentration, methods of administration of variouschemotherapeuticstofish and shell fish
9. Estimationofantibioticsusedinaquaculturepractices

PRESCRIBED BOOKS:

1. Shaperclaus W. 1991 Fish Diseases- Vol.I& II. Oxonian PressPvt.ltd
2. Roberts RJ 1989. Fish pathology. BailliereTindall, NewYork
3. Lydia Brown 1993. Aquaculture for veterinarians- fish husbandry and medicine. Pergamon Press.Oxford
4. Jayaraman R 1996. Fisheries Economics. Tamil Nadu Veterinary and Animal Science University.Tuticorn
5. SubbaRao N 1986. Economics of Fisheries. Daya publishing house,Delhi

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU
(AUTONOMOUS)
AQUACULTURE
PRACTICAL - VII

w.e.f. 2024-2025.
Code: 24AQMAP241

MODEL QUESTION PAPER -VII

MAX.MARKS: 35

(2hrs/week)

Title of the paper: -Fish Health Management

A. Semester End Lab Exam

I Answer the following **Max Marks: 25**

Q1:

Q2:

Q3:

Q4:

Q5:

II. Viva **2M**

III.Record **8M**

Total **35M**

B. Continuous Internal Assessment **15M**

Total (A+ B**)** **50M**

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, (AUTONOMOUS)

NAAC reaccredited at 'A 'level
Autonomous –ISO 9001-2015 Certified

Title of the Paper:**Shrimp Health Management**

Semester: - IV

Course Code	**24AQMAL242**	Course Delivery Method	Class Room/Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours/ Week	3	Semester End Exam Marks	70
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction: 2024-25	Year of Offering 2024-2025	Year of Revision –	Percentage of Revision:

COURSE OBJECTIVES

S.NO	COURSE OBJECTIVES
1	To identify and treat shrimp diseases caused by viruses and its effect.
2	Strengthening the diagnostic skills to understand bacterial infections
3	To enhance understanding of the lifecycle and transmission of protozoan and Metazoan parasites.
4	Learn to detect diseases using DNA/RNA techniques, prevention, quarantine and control.
5	To know and learn the management of fish health, usage of probiotics

COURSE OUTCOMES

Course Outcomes: At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	To recognize different viral diseases, identification and its effect on shrimp.	**K2**	**PO1**	**PSO1**
CO2	To identify and treat bacterial diseases in shellfish	**K4**	**PO1**	**PSO1**
CO3	To identify the protozoan and Metazoan diseases and its life cycle and effects	**K2**	**PO1**	**PSO1**
CO4	Understand and learn the importance of diagnostic tools in identification of diseases and application and development of vaccines.	**K6**	**PO2**	**PSO2**
CO5	Toknowaboutproductionofdisease-freeseedsandgoodfeedmanagement	**K5**	**PO2**	**PSO2**

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyse; K5: Evaluate; K6: Create

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M						
CO2	M						
CO3		H					
CO4		M					
CO5	H						

SYLLABUS:

Unit	Learning Units	Lecture Hours
I	**ViralDiseasesofshellfish (Symptoms,TreatmentandProphylaxis)** 1.1Major shrimp viral diseases –Bacculovirus penaeid, Monodon Bacculovirus, Baculoviral midgut necrosis 1.2 Infectious hypodermal and hematopoietic Necrosis Virus (IHHNV) Hepato pancreatic Parvo like virus 1.3Yellow Head bacculovirus, White spot bacculovirus. **Activity:** Assign each group of students a specific shrimp viral disease. Students create visual diagrams or presentations outlining the lifecycle of the virus, including infection mechanisms, host impact, and prevention strategies.	**9**
II	**Fungal and BacterialDiseasesofshellfish(Symptoms,TreatmentandProphylaxis)** 2.1Fungal diseases: Larval Mycosis, Black Gill disease 2.2 Bacterial diseases of shell fish – Aeromonas, pseudomonas and Vibrio infections 2.3Filamentous bacterial disease, Luminousbacterial disease, Vibriosis-Symptoms, therapy and Prevention 2.4 White Gut Disease (WGD), Acute hepatopancreatic necrosis disease (AHPND), Loose shell syndrome **Assignment:** Filamentous bacterial disease-etiology, symptoms, treatment and Prophylaxis	**9**
III	**Protozoan and Metazoan Diseases of shell fish (Symptoms, Treatment and Prophylaxis)** 3.1Protozoan diseases- Types, modes of Infection, prophylaxis 3.2 Ichthyophthiriasis, Costiasis, Whirlingdiseases,trypanosomiasis 3.3 Metazoan Diseases- 1. Monogenean Infestation-- Causative Agents,Symptoms, treatment and prevention 3.4 Copepod Diseases in shrimp- Causative Agents: Symptoms, treatment and prevention **Activity:** Create a visual presentation or poster illustrating the lifecycle of the protozoan parasite, how it infects fish, the symptoms, and potential methods for prevention and control.	**9**
IV	**Healthmanagement** 4.1Diagnostic tools–immune detection-DNA/RNA techniques, General preventive methods and prophylaxis. 4.2Application and development of vaccines. 4.3 Quarantine–Significance,methodsand regulations for transplants. **Assignment:** Application and Development of Vaccines	**9**
V	**Productionof disease-freeseeds** 5.1 Productionofdisease-freeseeds.Evaluationcriteriaofhealthyseeds. 5.2 Good Feed management for healthy organisms, Zero water exchange 5.3Probiotics and antibiotics in Aquaculture **Assignment:**Role of Probioticsand antibiotics in Aquaculture	**9**

PRESCRIBEDBOOKS:

1.Shaperclaus W.1991FishDiseases-Vol.I&II. OxonianPressPvt. Ltd
2.RobertsRJ1989.Fishpathology.BailliereTindall,NewYork
3.Lydia Brown 1993. Aquaculture for veterinarians- fish husbandry and medicine.PergamonPress. Oxford

REFERENCES:

- Shankar KM & Mohan CV. 2002. Fish and Shellfish Health Management. UNESCOPubl.Sindermann CJ. 1990
- Walker P &Subasinghe RP. (Eds.). 2005 Principal Diseases of Marine Fish andShellfish.Vols. I,II. 2ndEd.AcademicPress
- DNABasedMolecularDiagnosticTechniques: Research Needs forStandardizationandValidation of the Detection of Aquatic Animal Pathogens and Diseases. FAO Publ.WedmeyerG,Meyer FP &Smith L.1999.
- BullockGet.al.,1972Bacterialdiseasesoffishes.TFHpublications,NewJersey
- PostG1987.TextbookofFish Health.TFHpublications,NewJersey
- JohnsonSK1995. Handbookofshrimpdiseases. TexasA& MUniversity, Texas

A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru (Autonomous)

Semester –IV
Model QuestionPaper

Title of the paper: Shrimp Health Management **Code: 24AQMAP242**

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

Note: Draw neat labeled Diagrams wherever necessary.

SECTION-A

Answer any Five of the following Questions. 5X4= 20M

1. a) Write a short note on Monodon Bacculovirus K1
Or
b) Explain the about prophylaxis of Viral disease K2

2.a) Explain the Vibrio infections K2
Or
b) Write a short note on White Gut Disease K1

3. a) Describe the Ichthyophthiriasis K1
Or
b) Explain Costiasis K1

4. a) Explain DNA/RNAtechniques K2
Or
b) Explainthe Quarantine–Significance K2

5. a) Write a short note on disease- freeseeds K2
Or
b) Explain the Zerowater exchange K2

SECTION-B

Answer all the Questions. **5X10=50M**

6 a) Discuss aboutInfectioushypodermalandhematopoieticNecrosisVirus (IHHNV) K2
OR
b) Explain the Viral diseases of Shell fish
i) Yellowheadbaculoviral ii) Whitespotbacculovirus K3

7 a)Give an account of fungal diseases in shrimp K2
OR
b) Compare the filamentous bacterial disease and Luminousbacterial disease K3

8. a) Write an essay ontypes, modes of Infection and prophylaxis ofProtozoan diseases K1
OR
b) Write about the causative agents,symptoms, treatment and prevention of Copepod Diseases in shrimp K2

9a) Explain the applicationanddevelopmentof vaccines K4
OR
b) Write an essay on methodsand regulationsfortransplants K3

10.a) Describe the evaluationcriteriaofhealthyseeds K2
OR
b) Explain GoodFeedmanagementforhealthyorganisms K2

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS)

AQUACULTURE

PRACTICAL - VIII

w.e.f. 2024-2025

Code:24AQMAP242 **MAX.MARKS: 50**

(2hrs/week)

Title of the paper: -Shrimp Health Management **Credits: 01**

LEARNING OUTCOMES:

By the end of the course students will be able to

15 Identify the pathological changes in the visceral organs of fish, prawn and shrimp.
16 Analyse the data for epidemiological investigations of viral diseases.
17 Isolate culture and characterize the bacterial pathogens.
18 Identify the external parasites, prepare and evaluate antibiograms
19 Develop skill in molecular and immunological techniques.
20 Estimate the dose of antibiotics and probiotics used in aquaculture practices and methods of administering various chemotherapeutics.
21 Maintain a neat record of experiments and exhibit the hidden creative talent.

SYLLABUS

1. EnumerationofBacteriabyTPC Method
2. Observation of gross pathology and external lesions of fish and prawn with reference tothecommon diseases in aquaculture
3. Examination of pathological changes in gut lumen, hepatopancreas, lymphoid organ,musclesand nerves of prawn and shrimp
4. Collection,processingandanalysisofdata forepidemiologicalinvestigationsofviraldiseases
5. Bacterialpathogens–isolation,cultureandcharacterization
6. Antibiograms–preparationandevaluation
7. Molecular and immunological techniques; Biochemical tests; PCR; ELISA;Agglutination test; Challenge tests; Purification of virus for development of vaccines(Demonstrationat institutes/labs)
8. Estimation of dose, calculation of concentration, methods of administration of variouschemotherapeuticstofish and shell fish
9. Estimationofantibioticsusedinaquaculturepractices
10. Estimationofprobiotics usedinaquaculture

PRESCRIBED BOOKS:

- Shaperclaus W. 1991 Fish Diseases- Vol.I& II. Oxonian PressPvt.ltd
- Roberts RJ 1989. Fish pathology. BailliereTindall, NewYork
- Lydia Brown 1993. Aquaculture for veterinarians- fish husbandray and medicine. Pergamon PressOxford
- Jayaraman R 1996. Fisheries Economics. Tamilnadu Veterinary and Animal Science University.Tuticorn
- SubbaRao N 1986. Economics of Fisheries. Daya publishing house,Delhi

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU
(AUTONOMOUS)
AQUACULTURE
PRACTICAL - VIII

w.e.f. 2024-2025.
Code: 24AQMAP242

MODEL QUESTION PAPER -VIII

MAX.MARKS: 50

(2hrs/week)

Title of the paper: -Shrimp Health Management

A. Semester End Lab Exam

I Answer the following **Max Marks: 25**

Q1:

Q2:

Q3:

Q4:

Q5:

II. Viva **2M**

III.Record **8M**

Total **35M**

B. Continuous Internal Assessment **15M**

Total (A+ B**)** **50M**

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

NAAC reaccredited at 'A 'levelISO 9001-2015 Certified
Title of the Paper: **FISH NUTRITION & FEED TECHNOLOGY**

Semester: - IV

Course Code	**24AQMAL243**	Course Delivery Meth	Class Room/Blended Mode - Both
Credits	3	CIA Marks	25
No. of Lecture Hours/ Week	3	Semester End Exam Marks	75
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction: 2024 -25	Year of Offering2024-2025	Year of Revision –	Percentage of Revision:

COURSE OBJECTIVES

S.NO	COURSE OBJECTIVES
1	To understand the specific nutritional needs at various life stages, tailored feeding strategies nutrient interactions, protein-sparing effects, for optimal growth and health.
2	To understand evaluation and importance of optimizing feed conversion of feed types, feeding methods, efficiency.
3	To improve the knowledge on feed manufacture and feedstorage and feed formulation
4	To understand the role of feed additives for health and growth.
5	To know the nutritional pathology and remedial methods of cultivable fish andshrimp.

COURSE OUTCOMES

Course Outcomes: At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Understand Nutritional requirements of cultivable fishes and its impact on their energy allocation and feeding behaviour.	**K2**	**PO1**	**PSO1**
CO2	To Understand the concepts of Feed Conversion Efficiency (FCE), Feed Conversion Ratio (FCR), and Protein Efficiency Ratio (PER) in aquaculture.	**K2**	**PO1**	**PSO1**
CO3	To recognize the importance of feed quality attributes, such as water stability, and different feed types like micro-encapsulated feeds.	**K3**	**PO1**	**PSO1**
CO4	Understand the value of Feed additives and Non-Nutrient ingredients	**K2**	**PO2**	**PSO2**
CO5	To create awareness of different types of nutritional deficiency and importance of natural and supplementary feeds and balanced diet.	**K3**	**PO2**	**PSO2**

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyse; K5: Evaluate; K6: Create

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	M						
CO2	M						
CO3		H					
CO4		M					
CO5	H						

SYLLABUS

Course Details

Unit	Learning Units	Lecture Hours
I	**Nutritionalrequirementsofcultivablefish** 1.1Requirements for energy, proteins, carbohydrates, lipids, fiber, micronutrients for different stages of cultivable fish and prawns 12Essentialaminoacidsandfattyacids,proteintoenergyratio,nutrientinteractionsandprotein sparingeffect 1.3 Dietary sources of energy, effect of ration on growth, determination of feeding rate, checktray **Activity:** Create a worksheet or flashcards with various cultivable fish and prawn species listed alongside their specific nutritional requirements	9
II	**Formsoffeeds &Feedingmethods** 2.1Feed conversion efficiency,feedconversionratioandproteinefficiencyratio 2.2Wet feeds, moist feeds, dry feeds, mashes, pelleted feeds, floating and sinking pellets,advantagesof pelletization 2.3Manual feeding, demand feeders, automatic feeders, surface spraying, bag feeding and tray feeding **Activity:** Provide students with real-life or simulated data on feed intake, weight gain, and protein content for different fish or prawn species. Ask students to calculate and compare Feed Conversion Efficiency (FCE), Feed Conversion Ratio (FCR), and Protein Efficiency Ratio (PER) for each scenario	**9**
III	**Feedmanufacture&Storage** 3.1Feedingredientsand theirselection,nutrientcompositionandnutrientavailabilityoffeed ingredients 3.2 Feed formulation – extrusion processing and steam pelleting, grinding, mixing anddrying, pelletization,andpacking 3.3Water stability of feeds, farm made aqua feeds, micro-coated feeds, micro-encapsulatedfeedsand micro-bound diets 3.4 Microbial,insectandrodentdamageoffeed, chemicalspoilageduringstorageperiod andproper storagemethods. **Activity:** Provide students with a list of common feed ingredients (e.g., fish meal, soybean meal, corn, wheat, vitamins, minerals) and their nutrient composition. Students will select appropriate ingredients for a specific fish or prawn species based on their nutritional needs (e.g., protein, lipids, carbohydrates). Then, they will formulate a simple feed recipe using these ingredients and calculate the nutrient content of the final mixture.	**9**
IV	**Feedadditives&Non-nutrientingredients** 4.1 Binders,anti-oxidants,probiotics 4.2 Feedattractantsandfeedstimulants	**9**

	4.3 Enzymes, hormones, growth promoters and pigments 4-4Anti-metabolites, aflatoxins andfiber. **Assignment:** Feedattractantsandfeedstimulants	
V	**NutritionalDeficiencyinCultivablefish** 5-1 Protein deficiency, vitamin and mineral deficiency symptoms 5-2Nutritional pathology and ant-nutrients 5-3 Importanceofnaturalandsupplementaryfeeds,balanceddiet **Assignment:** Importanceofnaturalandsupplementaryfeeds	**9**

PRESCRIBED BOOK(S):

1. HalverJ.E 1989.Fish Nutrition. Academic press, San Diego.
2. NRC. Nutritional Requirements of Warm Water FishesNational Academy of Sciences, Washington.

REFERENCES:

1. LovellR.T. 1998. Nutritionand Feedingof Fishes, Chapman & Hall, NewYork
2. SenaDeSilvaTrevoraAnderson1995.FishNutritioninAquacultureChapman&Hall, AquacultureSeries,London.

A.G & S.G.S.DEGREE COLLEGE OF ARTS & SCIENC VUYYURU(AUTONOMOUS)
SEMESTER-IV
(Model Question paper) w.e.f. 2024 – 2025

Paper Title**: Fish Nutrition & Feed Technology**

Paper Code: **24AQMAL243**

Time: 3 hrs Max.Marks:70

Note: Draw neat labelled Diagrams wherever necessary.

SECTION-A

Answer any Five of the following Questions. 5X4= 20M

1. a) Write a short note on protein sparingeffect K1
Or
b) Explain aboutchecktray K2
2.a) Explain the pelleted feeds K2
Or
b) Write a short note on bag feeding and trayfeeding K1
3. a) Describe the pelletization K2
Or
b) Explain farm made aqua feeds K2
4. a) Explainprobiotics K2
Or
b)Explain the aflatoxins andfiber K2
5. a) Write a short note on ant-nutrients K1
Or
b) Explain the supplementaryfeeds K2

SECTION-B

Answer all the Questions. **5X10=50M**

6a. Explain the nutritional requirements of cultured fish. K2
OR
b.Analyse the effect of ration on growth and determination of feeding rate. K3

7a. Give an account of the Manual feeding K2
OR
b.Compare the floating and sinking pellets and advantages of pelletization K3

8a. Mention the Microbial,insectandrodentdamageoffeed K2
OR
b. Describe the various feed ingredients and their selection. K3

9a. Explain the Binders,anti-oxidants K2
OR
b. List out the various feed attractants and feed stimulants used in aqua feeds. K3

10.a. List out the various diseases caused due to nutritional deficiency. K3
OR
b. Explain the importance of natural feed in aquaculture. K2

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

ZOOLOGY PRACTICAL SYLLABUS

PAPERS – IX w.e.f. 2024 – 2025.

Credits: 01 **Paper Code: 24AQMAP243**

Max.Marks:50

Paper Title: Fish Nutrition & Feed Technology

PRACTICALS: (Any 8 as per the local Industry needs and Requirement)

1. Estimation of protein content in aquaculture feeds
2. Estimation of carbohydrate content in aquaculture feeds
3 Estimation of lipid content in aquaculture feeds
4. Estimation of ash in aquaculture feed
5. Study of water stability of pellet feeds
6. Feed formulation and preparation in the lab
7. Study of binders used in aquaculture feeds
8. Study of feed packing materials
9. Study of physical and chemical change during storage
10. Study on physical characteristics of floating and sinking feeds
11. Visitto aqua-feed production unit

PRESCRIBEDBOOK(S):

1. HALVER JE 1989. Fish nutrition. Academic press, San diego

REFERENCES:

- Lovellrt1998.Nutrition andfeedingof fishes,Chapmann& Hall,New York
- Senadesilva,trevoraanderson1995.Fishnutritioninaquaculture.Chapmann& Hall,NewYork.

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

PRACTICAL- IX
w.e.f. 2024-2025.
MODEL QUESTION PAPER
SEMESTER-IV **Code: 24AQMAP243**

2hrs/week)
Time: 3 hrs. **Max.marks: 50m.**

A. Semester End Lab Exam

I Answer the following **Max Marks: 25**

Q1:

Q2:

Q3:

Q4:

Q5:

II. Viva **2M**

III.Record **8M**

Total **35M**

B. Continuous Internal Assessment **15M**

Total (A+ B**)** **50M**

VALUE ADDED COURSE

OFFERED BY

THE DEPARTMENT OF ZOOLOGY

DURING -2024-2025

POULTRY FARMING

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS).

NAAC reaccredited at 'A 'level
Autonomous –ISO 9001-2015 Certified

VALUE ADDED COURSE

Title of the Paper: **POULTRY FARMING**
Semester: - IV

Course Code	**VACZOO07**	Course Delivery Method	Class Room/Blended Mode - Both
Credits	2		
No. of Lecture Hours/ Week	2	Semester End Exam Marks	50
Total Number of Lecture Hours	08	Total Marks	50
Year of Introduction: 2024-2025	Year of Offering 2024-2025	Year of Revision –	Percentage of Revision:

OBJECTIVES:

S.NO	COURSE OBJECTIVES
1.	To identify and understand various types of poultry houses and farming and Management of Chicks, Growers, Layers, and Broilers
2.	To develop the ability to prepare project reports for financial support and risk coverage.
3.	To understand and implement various methods of feeding for optimal poultry performance.
4.	To identify and understand the common viral, bacterial, fungal, and parasitic diseases affecting poultry.
5	To acquire skills in egg testing and candling techniques. To learn methods for recycling poultry waste into useful by-products like manure and energy.

COURSE OUTCOMES

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Understand the basic concepts of poultry farming and apply the same in the management practices of poultry farming.	**K2**	**PO1**	**PSO1**
CO2	Analyse and able to prepare project report for banking and insurance	**K4**	**PO1**	**PSO1**
CO3	Acquaint with the poultry feed management practices. Acquire knowledge in the preparation of feed formulation methods and Diseases of poultry.	**K3**	**PO1**	**PSO1**
CO4	Understand the nutrient requirements for different stages of layers and broilers	**K2**	**PO2**	**PSO2**
CO5	Gain knowledge in harvesting of eggs and recycling of poultry waste.	**K2**	**PO2**	**PSO2**

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyse; K5: Evaluate; K6: Create

SYLLABUS

Course Details**POULTRY FARMING**

Unit	Learning Units	Lecture Hours
I	**Section I (Introduction to Poultry Farming):** 1.1General introduction to poultry farming -Definition of Poultry; past and present scenario of poultry industry in India. 1.2Principles of poultry housing; Poultry houses, Systems of poultry farming. 1.3Management of chicks, growers and layers, Management of Broilers. 1.4 Preparation of project report for banking and insurance	**10**
II	**Section II (Feed and Livestock Health Management):** 2.1Poultry feed management – Principles of feeding, Nutrient requirements for different stages of layers and broilers. 2.2 Feed formulation and Methods of feeding. 2.3 Poultry diseases – viral, bacterial, fungal and parasitic (two each); symptoms, control and management; 2.4Vaccination programme.	**10**
III	**Section III (Harvesting of Eggs and Sanitation):** 3.1Selection, care and handling of hatching eggs. 3.2 Egg testing Methods of hatching. 3.3Brooding and rearing. Sexing of chicks. 3.4Farm and Water Hygiene, Recycling of poultry waste	**10**

Co- Curricular Activities suggested: (4 Hrs)

1. Group discussion& SWOT analysis
2. Visit to a poultry farm
3. Invited Lectures by Concerned officers of government or private farms
4. Cheap and Healthy Feed preparation by students based on government standards
5. Market study and Survey (Monitoring of daily price hike in poultry market and analysis)
6. Online Swayam MOOCS course on poultry farming (see reference 9 below)

Reference books:

1. Sreenivasaiah., P. V., 2015. Textbook of Poultry Science. 1st Edition. Write & Print Publications, New Delhi

2. 2. Jull A. Morley, 2007. Successful Poultry Management. 2nd Edition. Biotech Books, New Delhi"

A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru (Autonomous)

Semester –IV

w.e.f. 2024-2025

Time: 90 mins (Model question paper)

Title of the paper: POULTRY FARMING. **Code – VAC ZOO 07**

Max.marks: 50

Section – A

Answer any **Four** questions. Each question carries **five** marks. **4 x 5= 20m.**

1. Poultry house
2. Broilers
3. Methods of feeding
4. Any two bacterial diseases of poultry
5. Egg testing

Section – B

Answer any **THREE** questions. Each question carries **Ten** marks. **3 x 10 =30m.**

6.. Explain principles of poultry housing in detail, with examples.?

7.. Write an essay on viral diseases of poultry.?

8. Give an account of fungal and bacterial diseases (any two each) of poultry?

9.. Write an essay on selection, handling and hatching of eggs.?

10. Write an essay on Brooding and rearing?

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(AUTONOMOUS)

SEMESTER-IV
VALUE ADDED COURSE

Guide lines to the paper setter

Time: $1^{1}/_{2}$ hrs **Max.Marks:50**

Paper Title: - Poultry Farming. **Paper Code: VAC ZOO 07**

Note: 1. Answer any **Four** questions out of five in Part-A.
Each question carries five marks. 4X 5 = 20M.

2. Answer any **THREE** questions out of four in Part-B.
Each question carries 10 marks. 3 X 10 = 30M.

	PART	Unit –I	Unit – II	Unit-III
5 Marks Questions	**A**	**2**	**2**	**1**
10 Marks Questions	**B**	**1**	**2**	**1**
Weightage		**20**	**30**	**15**

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

2. Question paper should be in English medium.

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Siddhartha Degree College of Arts & Science
Vuyyuru
(An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam)

Accredited by NAAC with "A" Grade
2024-25

MINUTES OF BOARD OF STUDIES

B.SC. ZOOLOGY MAJOR(HONOURS)

2024-2025

II, IV SEMESTERS

15th February2025

DEPARTMENT OF ZOOLOGY

EVEN SEMESTER

ADUSUMILLIGOPALAKRISHNAIAH& SUGARCANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU

(An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam)
Accredited by NAAC with "A" Grade ISO 9001-2015 Certified Institution

DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES MEETING: 15th February 2025

Minutes of Meeting of Board of Studies of Department of Zoology for B.Sc. Zoology Major was convened at 11.00AM on**15/02/2025**under the chairmanship of Smt. D.A.Kiranmayee,Head of the Department of Zoology and Aquaculture. The members present have discussed various aspects such as changes to be made in the Syllabi, Scheme of Evaluation and Blue print both for theory and practical papers, departmental activities for II, & IV semesters for the academic year 2024-2025 through off line.

Members Present:

1) ……. **(Smt. D.A.Kiranmayee.)**	Chair person	Head, Department of Zoology, A.G&S.G.S Degree College of Arts & Science, Vuyyuru-521165.
2)…… **(Smt. Dr.L.Suseela.)**	University Nominee	Bio Sciences & Bio technology Krishna University Machilipatnam.
3)…… **(Sri Dr.K.Daniel.)**	Academic Council Nominee	Head, Department of Zoology, JKC College, Guntur.
4)…… **(Sri G.Ravi Teja.)**	Academic Council Nomine	Lecturer, Department of Zoology, Govt. College Autonomous Rajamundry.
5)…… **(Smt. K. Padmaja.)**	Member	Lecturer in Zoology, A.G&S.G.S Degree College Vuyyuru-521165.
6)…… **(Smt. Dr.V.Subhashini.)**	Member	Lecturer in Zoology, A.G&S.G.S Degree College Vuyyuru-521165.
7)…… **(Ch.Chiranjeevi.)**	Student Represent	P.hd –Research Scholar, Dept.of Botany &Microbiology, Acharya Nagarjuna University, Guntur**.**

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Members Present:

1) D.A.K. **(Smt. D.A.Kiranmayee.)**	Chair person	Head, Department of Zoology, A.G&S.G.S Degree College of Arts & Science, Vuyyuru-521165.
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5)..... **(Smt. K. Padmaja.)**	Member	Lecturer in Zoology, A.G&S.G.S Degree College Vuyyuru-521165.
6)..... **(Smt. Dr.V.Subhashini.)**	Member	Lecturer in Zoology, A.G&S.G.S Degree College Vuyyuru-521165.
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 frame and recommend the syllabi (Theory & Practical) for **Fourth Semester** of **II B.Sc. Zoology Major, Honours** for the academic year 2024 -2025.

2.To recommend the Model question paper, Blue Print and Guidelines for Question paper setters for IV Semester of II B.Sc. **Zoology Major, Honours** for the academic year 2024 - 2025.

3. To frame and recommend the syllabi for Health and Hygiene (MDC) for IV Semester of II B.A, II B.C.A, II B.Com. (G), II B.Com.(C. A) for the academic year 2024 - 2025.

4. To implement Semester End Internship for III B.Sc. BZC in VI Semester.

5. To conduct Value Added Course on Poultry Farming for IV Semester Students.

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

7. Any other matter.

D. A. Kiranmayee

Chairman.

RESOLUTIONS:

1.It is resolved to implement the same syllabi for IV semester of II B.Sc. Zoology Major(Honours) as prescribed by APSCHE and recommended by BOS members for the academic year 2024 -2025.

2.It has been resolved to follow the Model Question paper, Blue Print and Guidelines for Question paper setters for IV Semester of **II B.Sc. Zoology Major** as recommended by BOS members for the academic year 2024 – 2025.

3.It is resolved to recommend the syllabi for Health and Hygiene (MDC) for IV Semester of II B.A, II B.C.A, II B.Com. (G), II B.Com.(C. A) as per APSCHE and recommended by BOS members for the academic year 2024 -2025.

6.It is resolved to implement Semester End Internship for III B.Sc. BZC in VI Semester.

7.ItisresolvedtoconductValueAddedCourse(Non-Credits)onPoultry FarmingforIVSemesterofIIB.Sc.ZoologyHonours studentsfor theacademicyear 2024-2025.

Evaluation procedure:

8.It is resolved to implement the following Teaching and Evaluation methods to be followed under Autonomousstatus.

Internal Assessment Examination:

- Out of maximum 100 marks in each paper for I B.Sc. Zoology Minorof B. Sc. Honours 30 marks are allocated for internal assessment.
- Out of these 30 marks, 20 marks are allocated for Announced tests (IA-1& IA-2). Twoannounced 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/activity.
- Out of maximum 100 marks in each paper for IV Semester of II B.Sc. Zoology Major, 30 marks shall be allocated for internal assessment.
- Out of these 30 marks, 20 marks are allocated for announced tests (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, 5marks allocated for attendance and reaming 5 marks forassignment /seminar for IV semester students.There is no pass minimum for internal assessment for IV Semester.

Semester – End Examination:

- 70marks are allocated for **II Semester ofFirst B.Sc. Zoology Minor** (Honours) in Semester end Examination. Even though 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"
- 70 marks are allocated for **IV Semester of II B.Sc. Zoology Major** in Semester End Examination. 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"

D. A. Kiranmayee

Chairman

ADUSUMILLI GOPALAKRISHNAIAH& SUGARCANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS)

Department of Zoology

COURSE STRUCTURE

ALLOCATION OF CREDITS

B.SC. ZOOLOGY MAJOR HONOURS

Year : - 2024-2025

Semester	Course Code	Course Title	Hours / Week	CIA	SEE	No.of Credits	Core/LSC/ SDC/MDC Elective/ Cluster
IV	23ZOMAL241	Embryology	3	30	70	4	Core
	23ZOMAP241	Embryology **Practical Course**	2	15	35	1	Lab
	23ZOMAL242	Animal Physiology	3	30	70	4	Core
	23ZOMAP242	Animal Physiology **Practical Course**	2	15	35	1	Lab
	23ZOMAP243	Immunology	3	30	70	4	Core
	23ZOMAP243	Immunology **Practical Course**	2	15	35	1	Lab
IV		Health and Hygiene **MDC**	2	15	35	2	Core
VI		**SEM END INTERNSHIP**					

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Title of the Paper: EMBRYOLOGY
Semester: - IV

Course Code:	**23ZOMAL241**	Course Delivery Method	Class Room/Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours/ Week	3	Semester End Exam Marks	70
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction: 2024-25	Year of Offering2024-25	Year of Revision: Percentage of Revision:	Type of the course: Skill Development

Course Description:

Embryology is the branch of biology and medicine that studies the formation, growth, and development of embryos from fertilization to birth. This course provides a comprehensive understanding of the structural and functional development of organisms, with a focus on human embryology. This course integrates theoretical knowledge with practical applications, including clinical case studies and discussions on advances in embryological research.

Course Aims and Objectives:

S. No	COURSE OBJECTIVES
1	To understand the fundamentals of Developmental Biology
2	To understand and illustrate the process of fertilization, cleavage, blastulation and gastrulation.
3	To understand about Organogenesis and System Development
4	To understand and explore Molecular and Genetic Mechanisms
5	To understand and recognize Developmental Abnormalities and Teratology

LEARNINGOUTCOMES:
At the end of the course, the student will / will be…

S. No	COURSE OUTCOMES	BTL	PO	PSO
CO1	Understand the stages and processes of embryonic development.	K2	PO1	PSO1
CO2	Describe and remember the formation of major organ systems and their clinical relevance.	K1	PO1	PSO1
CO3	Analyze the molecular mechanisms driving cell differentiation and tissue development.	K4	PO2	PSO2
CO4	Recognize the causes and implications of congenital abnormalities	K2	PO2	PSO2
CO5	Apply embryological concepts to medical and clinical scenarios.	K3	PO2	PSO2

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyse; K5: Evaluate; K6: Create

CO-PO-PSO MATRIX									
CO. NO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1	**2**							**2**	
CO2	**3**							**3**	
CO3		**3**							**3**
CO4		**2**							**2**
CO5		**3**							**3**

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

EMBRYOLOGYSYLLABUS

Course Details

Unit	Learning Topics	Lecture Hours
I	**Embryology** 1.1 Historical perspective and basic concepts: Phases of development 1.2 Cell-Cell interaction, Pattern formation, Differentiation and growth 1.3 Differential gene expression 1.4Cytoplasmic determinants and asymmetric cell division **Activity1:**Developmental Stages Chart**:** Provide images or videos of embryonic stages (e.g., cleavage, gastrulation, organogenesis). **Assignment1:Topic:**Trace the historical development of embryology and its impact on modern medicine. (outlining key discoveries in embryology, focusing on at least three major scientists (e.g., Aristotle, Hans Spemann, Conrad Waddington) and their contributions to developmental biology)	9
II	2.1Gametogenesis, Spermatogenesis, Oogenesis; 2.2 Types of eggs, Egg membranes; Fertilization (External and Internal) 2.3 Planes and patterns of cleavage; Types of Blastulae; Fate maps. 2.4 Early development of frog and chick up to gastrulation. **Activity 1:Egg Identification Activity: Task:** Provide images or samples of different types of eggs (e.g: Isolecithal, telolecithal, centrolecithal).Ask students to classify the eggs based on yolk distribution and membrane structure. **Assignment 1:** Diagrammatic Comparison ofspermatogenesis and oogenesis, labeling all stages (e.g., primary spermatocytes, secondary oocytes). Include descriptions of key differences, such as timeline, number of gametes, and meiotic divisions.	9
III	3.1 Fate of Germ Layers 3.2 Extra-embryonic membranes 3.3 Placenta (Structure, types and functions of placenta) 3.4 Amniocentesis **Activity 1:Placenta Cross-Section Model; Task:** Students should draw a labeled cross-section of the human placenta, showing structures like villi, maternal and fetal blood supply. **Assignment 1:Task:** Write step-by-step description of the amniocentesis procedure, including its purpose, risks, and benefits. Include diagrams	9
IV	4.1 Metamorphosis: Changes, hormonal regulations in amphibians 4.2 Regeneration: Modes of regeneration, epimorphosis, morphallaxis and compensatory regeneration (in Turbellarians) 4.3 Ageing: Concepts and Theories 4.4 Teratogenic agents and their effects on embryonic development **Activity 1: Comparative Analysis of Larval and Adult Stages** **Task:** Compare larval and adult stages of an amphibian (e.g., frog) in terms of morphology, habitat, and physiology. Present findings in a table or infographic. **Activity 2: Teratogen Effects Diagram** Task: Illustrate the effects of common teratogenic agents (e.g., alcohol, thalidomide) on embryonic development using diagrams.	9

V	5.1 Organogenesis of Central Nervous system 5.2 Organogenesis of Eye, Ear 5.3 Organogenesis of Skin 5.4 Organogenesis of Circulatory system (*Organogenesis in Human need to be explained) **Activity 1: Effects of Environmental Factors on Skin Development** **Task:** Write a report on how environmental factors (e.g., UV radiation, chemical exposure) affect skin development and the risk of skin disorders (e.g., birthmarks, melanoma). **Assignment 1: Eye and Ear Development Report** **Task:** Write a report on the organogenesis of the eye and ear. Include the developmental stages, key structures formed, and the role of different embryonic tissues in the development of these organs.	9

Co-curricularactivities (Suggested)

1. Preparationofmodelsofdifferenttypesofeggsinanimals
2. Chartonfrogembryonicdevelopment,fatemapof frogblastula,cleavageetc.
3. Charton the organogenesis
4. RBPTonthe Placenta
5. Modelof extraembryonicmembrane
6. Laboratoryobservation ofchick embryonicdevelopment

REFERENCESBOOKS:

- Developmental Biology by Balinksy
- Developmental Biology by Gerard Karp
- Chordate embryology by Varma and Agarwal
- Embryology by V.B.Rastogi
- AustenC.RandShortRV.1980.*Reproduction in Mammals*. Cambridge UniversityPress.
- Gilbert SF. 2006. *Developmental Biology*, 8th Edition. Sinauer AssociatesInc.Publishers, Sunderland, USA.
- RastogiVBandJayarajMS.1989.DevelopmentalBiology.KedaraNathRamNathPublishers, Meerut, Uttar Pradesh.

D.A.Kiranmayee

Signature of the Program In-charge Signature of the HOD

A. G& S.G.S.DEGREECOLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS)
SEMESTER-IV (Model Question paper)

Paper Title: Embryology **Credits :03**

Paper Code:**23ZOMAL241**

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

Note: Draw neat labeled Diagrams wherever necessary.

SECTION-A

Answer all questions. 5X4= 20M

Each question carries 4 marks

1. a) Describe thedifferential gene expression K2

Or

b)Write a short note on Cell-Cell interactionK2

2. a) Explain the Types ofFertilization K1

Or

b) Write a short note on Fate maps. K1

3.a) Give an account ofAmniocentesis K2

Or

b) Explain thefunctions of placenta K2

4. a) Analyse the process of epimorphosis K4

Or

b) Explain theConcepts and Theories of Ageing: K2

5. a) Discuss the development of middle ear in man K2

Or

b) Explain theOrganogenesis of Skin K2

SECTION-B

Answer all the Questions.5X10=50M

6.a) Describe thePhases of development in Embryology K1

(Or)

b) Write an essay on cytoplasmic determinants and asymmetric cell division K2

7.a) Explain early development of frog up to gastrulation.K2

(Or)

b) Write an essay on Oogenesis K1

8.a) Describe thestructure and types of placenta K2

(Or)

b) Explain the formation of Extra embryonic membranes. K3

9.a) Explain the process of hormonal regulations on Metamorphosis in amphibians K3

(Or)

b) Analyze the Teratogenic agents and their effects on embryonic development K4

10. a) Write an essay on Organogenesis of Central Nervous system in man K2

(Or)

b) Describe the Organogenesis of Circulatory system in man K2

MODEL PAPER -2

Section A: Short Answer Questions (20 Marks)

Answer All questions. Each question carries 4 Marks.

Q1 (a) Explain about Cell interaction. K1/K2

OR

(b) Write a short note on asymmetric cell division. K1/K2

Q2 (a) Write a short note on Egg membranes. K1/K2

OR

(b) Write about patterns of cleavage.K1/K2

Q3 (a) Explain about Structure of Placenta. K2/K3

OR

(b) What is Amniocentesis? Explain its procedure. K2/K3

Q4 (a) Write a short note on Metamorphosis. K2/K3

OR

(b) Write a short note on Compensatory Regeneration in Turbellarians. K2/K3

Q5 (a) Write a short note on Organogenesis of Eye. K3/K4

OR

(b) Write a short note on Organogenesis of Ear. K3/K4

Section B: Long Answer Questions (50 Marks)

Answer All questions. Each question carries 10 Marks

Q6 (a) Explain about Differential Gene Expression K2/K3

OR

(b) Write an essay on Cytoplasmic determinants K2/K3

Q7 (a) Explain in detail about Gametogenesis. K2/K3

OR

(b) Explain in detail about early development in Frog upto gastrulation K2/K3

Q8 (a) Explain about Extra embryonic membranes K3/K4

OR

(b) What is Placenta? Write an essay on types and functions of Placenta. K3/K4

Q9 (a) Explain about Concepts and Theories of Ageing. K3/K4

OR

(b) Write an essay on Teratogenic agents and their effects on embryonic development K3/K4

Q10 (a) Write an essay on Organogenesis of Central Nervous System in Humans. K4/K5

OR

(b) Write an essay on Organogenesis of Circulatory system in Humans. K4/K5

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(AUTONOMOUS)

PRACTICAL VII

Paper Title: EMBRYOLOGY

. **PRACTICAL SYLLABUS**

Course Code:23ZOMAP241
MAX.MARKS: 35.

(2hrs/week) Credits: 01
(30 hrs)

Course Description:

This course provides hands-on experience in the study of embryological development across various species. Students will explore the formation, structure, and development of embryos, applying theoretical knowledge in a laboratory setting. Key activities include microscopic analysis of fertilized eggs, observation of developmental stages, preparation of slides, and study of model organisms. The practical course emphasizes understanding developmental processes such as fertilization, cleavage, gastrulation, and organogenesis. By the end of the course, students will acquire the skills to identify embryonic stages, use laboratory equipment effectively, and analyze experimental data related to embryology.

S. No	COURSE OBJECTIVES
1	To gain practical experience in identifying and analyzing embryonic stages in different species
2	To develop proficiency in microscopy, slide preparation, and staining techniques.
3	To develop proficiency in microscopy, slide preparation, and staining techniques.
4	To apply critical thinking to interpret developmental processes and patterns.
5	To integrate embryology with clinical relevance

NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Recognize developmental stages.	K1	5	1
CO2	Demonstrate technical laboratory skills	K2	5	1
CO3	Analyze embryological specimens	K2	2	1
CO4	Understand experimental approaches in embryology	K1	5	1
CO5	Demonstrate ethical laboratory practices	K2	2	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO-PSO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1					1			1	
CO2						2			2
CO3						2		1	
CO4							3	1	
CO5					1	2		1	

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

SYLLABUS

1.Study of whole mounts and sections of developmental stages of frog through permanent slides: Cleavage stages, blastula, gastrula, neurula, tail-bud stage, tadpole (external and internal gill stages)

2. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages)

3. Study of different sections of placenta (photomicrograph/ slides)

4.Study on Human embryo 21 weeks.

5.Study on Human embryo 24 weeks.

6.Study on Human embryo 31 weeks.

7.Study on Human embryo 34 weeks.

8.Project report on chick embryo development

RFERENCEWEB LINKS:

- https://praxilabs.com/en/3d-simulations/cultivation-and-preparation-of-the-virus-in-chick-embryo-virtual-lab
- https://vlab.amrita.edu/
- https://www.vlab.co.in/
- https://www.youtube.com/watch?v=p_tx88He8Pk
- https://core.ac.uk/download/143957972.pdf
- https://egyankosh.ac.in/bitstream/123456789/57549/1/Exercise%207%20Chick%20Embryo.pdf
- http://www.macollege.in/app/webroot/uploads/department_materials/doc_501.pdf
- http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf

A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru (Autonomous)
Zoology Practical
w.e.f. 2024-2025.

Title: EMBRYOLOGY **Code: 23ZOMAP241**

Model PracticalPaper

Time : 3 Hrs **Max Marks: 50 (CIA+ SEE)**

A. Semester End Lab Exam

I Answer the following **Max Marks: 25**

Q1:Q1. Identify and draw a neat labelled diagram of the cleavage stages of frog in the slides and comment upon them. 2x2.5=5M

A. 4-celled stage B.8-celled stage

Q2: Identify and draw a neat labelled diagram of the developmental stage of the chick embryo in the slides and comment upon them. 2x2.5=5M

C.18hrs of incubation D.33hrs of incubation

Q3: Identify the developmental week of the Human embryo and comment upon them. 2x2.5=5M

E. 21 weeks F. 34 weeks

Q4: Identify the given picture G and comment upon it. 1x5=5M

G.

Q5: Identify the given picture F and comment upon it. 1x5=5M

F.

II. Viva **2M**

III.Record **8M**

Total **35M**

B. Continuous Internal Assessment **15M**

Total (A+ B**)** **50M**

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

NACC reaccredited at 'A 'level

Autonomous –ISO 9001-2015 Certified

Title of the Paper: **ANIMAL PHYSIOLOGY**

Semester: - IV Zoology (Major)

Course Code	**23ZOMAL242**	Course Delivery Method	Class Room/Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours/ Week	3	Semester End Exam Marks	70
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction: 2024-2025	Year of offering 2024-2025	Year of Revision – Percentage of Revision:	TypeoftheCourse**:** Skill Development

Course Description:

The basic physiological principles common to animals, relating structure to function. Compare physiological systems across the animal kingdom, including through in-depth topic presentations. The discipline of animal physiology is underpinned by the concept of homeostasis of the intra- and extracellular environments, neural and endocrine systems for homeostatic regulation, and the various physiological systems including ionic and osmotic balance, excretion, respiration, circulation, metabolism, digestion,

S.No	COURSEOBJECTIVES
1	Compare physiological systems across the animal kingdom, including through in- depth topic presentations.
2	To acquire knowledge of organ systems function.
3	To develop the ability to integrate physiology from the cellular and molecular level to the organ system and organismic level of organization.
4	To Effectively read, evaluate and communicate scientific information related to physiological processes in the body.
5	To gain a deep knowledge of current topics in physiology.

COURSE OUTCOMES:

NO	COURSEOUTCOME	BTL	PO	PSO
CO1	Understand the physiology of digestion and hormonal control of digestion	**K1**	**2**	**1**
CO2	Understand the physiology of digestion and hormonal control of digestion	**K2**	**5**	**1**
CO3	Develop a comprehensive picture of respiratory physiology	**K2**	**5**	**1**
CO4	Acquire knowledge on the Renal physiology	**K1**	**5**	**1**
CO5	Understand the physiology of Nerve and muscle	**K2**	**2**	**1**

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyse; K5: Evaluate; K6: Create

CO-PO-PSOMATRIX									
CONO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1						**2**		**1**	
CO2						**2**		**1**	
CO3					**1**			**1**	
CO4						**2**			**2**
CO5					**1**			**1**	

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

SYLLABUS **CC:23ZOMAL242**

Unit	Learning Units	Lecture Hours
I	**Physiology of Digestion in Human beings** 1.1 Structural organization and functions of gastrointestinal tract and associated glands 1.2 Vitamins & Mineral composition of food & Mechanical and Chemical digestion of food 1.3 Absorptions of carbohydrates, lipids, proteins, water, minerals and vitamins; 1.4 Hormonal control of secretion of enzymes in Gastrointestinal tract. **Activity: 1.** To demonstrate the length of the digestive tract **Materials Needed:**Measuring tape or string; Labels for different parts of the digestive system **Assignment 1:**Flow chart ofsecretion of enzymes in Gastrointestinal tract and their Hormonal control	9
II	**Physiology of Respiration in human beings** 2.1 Structural organization of Respiratory system, Mechanism of respiration, Control of respiration 2.2 Pulmonary ventilation; Respiratory volumes and capacities; 2.3 Transport of oxygen in blood and dissociation curves and the factors influencing it 2.4 Transport of Carbon dioxide in blood; dissociation curves and the factors influencing it, Carbon monoxide poisoning **Assignment:**Transport of oxygen in blood and dissociation curves and the factors influencing it.	9
III	**Renal Physiology of human beings `** 3.1 Structure of kidney and its functional unit 3.2 Mechanism of urine formation 3.3 Regulation of water balance 3.4 Regulation of acid-base balance **Activity: Pathway of Urine Formation:** To trace the journey of urine through the urinary system. **Instructions:** Provide students with diagrams of the kidney, ureters, bladder, and urethra. Ask students to label each part and describe its role in urine formation and excretion. Use arrows to show the path from blood filtration in the kidney to urine excretion.	9
IV	**Physiology of exciting tissues** 4.1 Neuron structure and types 4.2 Nerve impulse transmission-(Myelinated, Non-myelinated, synaptic) 4.3 Ultra structure of muscle 4.4 Molecular and chemical basis of muscle contraction **Assignment:Nerve impulse transmission through Myelinated nerve fiber**	9

V	**Physiology of Human Heart** 5.1 Structure of mammalian heart, Coronary circulation; 5.2 Structure and working of conducting myocardial fibers. Origin and conduction of cardiac impulses 5.3 Cardiac Cycle-Cardiac output and its regulation 5.4 Nervous and chemical regulation of heart rate. Blood pressure and its regulation **Activity: Heartbeat Measurement** **Purpose:** To observe how the heart beat rate changes during rest and activity. **Materials Needed:**Stopwatch or timer; Notebook for recording data **Instructions:** • Measure the resting pulse rate of students by checking their radial or carotid pulse for 1 minute. • Ask students to perform light physical activity (e.g., jumping jacks) for 2 minutes • Measure the pulse rate again immediately after exercise. • Compare the resting and post-exercise pulse rates.	9

Co-curricular activities (Suggested)

- Chart on cardiac cycle, human lung, kidney/nephron structure etc.
- Working model of human / any mammalian heart.
- Working model of human / any mammalian urine formation
- Chart/model of sarcomere

Web-Links:

- https://funaab.edu.ng/section/animal-physiology/
- https://my.clevelandclinic.org/health/body/7041-digestive-system
- https://www.nhlbi.nih.gov/health/lungs/respiratory-system
- https://courses.lumenlearning.com/suny-dutchess-ap1/chapter/nephrons-structure/
- https://www.khanacademy.org/science/biology/human-biology/neuron-nervous-system/a/overview-of-neuron-structure-and-function
- https://training.seer.cancer.gov/anatomy/cardiovascular/heart/structure.html
- https://www.physio-pedia.com/Anatomy_of_the_Human_Heart

REFERENCES BOOKS:

1. Eckert H. Animal Physiology: Mechanisms and Adaptation. W.H. Freeman & Company.
2. Floray E. An Introduction to General and Comparative Animal Physiology. W.B. Saunders Co., Philadelphia.
3. Goel KA and Satish KV. 1989. A Text Book of Animal Physiology, Rastogi Publications, Meerut, U.P.

D.A.Kiranmayee
Signature of the Course In-charge

Signature of the HOD

A. G & S.G.S. DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS)
SEMESTER-IV (Model Question paper)

Paper Title: Physiology

Paper Code:**23ZOMAL242**

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

Note: Draw neat labeled Diagrams wherever necessary.

SECTION-A

Answer all questions. **5X4= 20M**

Each question carries 4 marks

1. a) Describe the structural organization of gastrointestinal tract K2

Or

b) Write a short note on absorptions of carbohydrates K2

2. a) Explain the types of Respiratory volumes K1

Or

b) Write a short note on Carbon monoxide poisoning. K1

3.a) Describe the structure of Nephron K2

Or

b) Explain the role of kidney in acid-base balanceK2

4. a) Describe the structureof NeuronK4

Or

b) Explain the ultra-structure of striated muscleK2

5. a) Structure of mammalian heartK2

Or

b) Describe the Cardiac output and its regulationK2

SECTION-B

Answer all the Questions. **5X10=50M**

6.a) Describe the Mechanical and chemical digestion of foodK1

(Or)

b) Give an account of Hormonal control of digestion K2

7.a) Explain the process of transport of oxygen in blood and dissociation curves and the factors influencing it. K2

(Or)

b) Describe the CO2dissociation curveand the factors influencing it.K1

8.a) Explain themechanism of urine formation K2

(Or)

b) Explain the role of kidney inregulation of water balance K3

9.a) Explain the process of nerve impulse transmission in Myelinated nerve fiber K3

(Or)

b) Describe the molecular and chemical basis of muscle contraction K4

10. a) Write an essay on origin and conduction of cardiac impulses K2

(Or)

b) Give an account of nervous and chemical regulation of heart rate K2

MODEL PAPER -2

Section A: Short Answer Questions (20 Marks)

Answer All questions. Each question carries 4 Marks.

Q1 (a). Explain the Absorptions of carbohydrates. CO1 K2

OR

(b). Illustrate the role of enzymes in digestion. CO1 K2

Q2 (a). Describe the mechanism of Respiration.CO2 K1

OR

(b). Explain the process of transportation of oxygen in blood CO2.K2

Q3. (a) Describe the structure of Kidney. CO3, K2.

OR

(b) Explain the regulation of water balance.CO3,K1

Q4. (a) Illustrate the ultra-structure of muscle. CO4, K2.

OR

(b) Describe the structure of Neuron CO4,K1.

Q5. (a) Illustrate the structure of Human heart. CO5, K2.

OR

(b) Explain the blood pressure and its regulationCO5, K2.

SECTION – B

Answer the following questions 5X10=50 Marks

Q6. (a). Explain detailed in human digestive system.CO1,K2

Or

(b). Describe Hormonal control of secretion of enzymes in Gastrointestinal tract. .CO1,K1

Q.7 (a). Describe the respiratory system in detail .CO2,K2

Or

(b).Give detailed account of gaseous exchange in humans.CO2,K2

Q.8 (a). Explain the structure and function of Kidney in humans.CO3, K2

Or

(b).Explain in detail about Mechanism of Urine formation.CO3,K2

Q.9.(a).Illustrate the Muscle contraction in detailed.CO4,K2

Or

(b). Describe the Nerve impulse transmission.CO4,K1

Q.10.(a). Give a detailed account on Cardiac Cycle-Cardiac output and its regulation.CO5, K2

Or

(b). Explain in detailed about Structure and working of conducting myocardial fibers. CO5 L4

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU,
(AUTONOMOUS)
PRACTICAL

w.e.f. 2024-2025.

Paper Title: PHYSIOLOGY

. **Course Code:23ZOMAP242**

MAX.MARKS: 35.

(2hrs/week)Credits: 01

(30 hrs) PRACTICAL SYLLABUS

Course Description:

Compare physiological systems across the animal kingdom, including through in-depth topic presentations. The discipline of animal physiology is underpinned by the concept of homeostasis of the intra- and extracellular environments, neural and endocrine systems for homeostatic regulation, and the various physiological systems including ionic and osmotic balance, excretion, respiration, circulation, metabolism, digestion

S. No	COURSE OBJECTIVES
1	To acquire knowledge of anatomy of certain important organs.
2	To develop the ability to test the biological sample like saliva and urine
3	To effectively estimate the blood haemoglobin.
4	To acquire skill to use the sphygmomanometer in recording blood pressure
5	. To observe the ECG

NO	COURSE OUTCOME	BTL	PO	PSO
CO1	To analyse the life sustaining, controlling and coordinating systems.	**K1**	**5**	**1**
CO2	Understand the physiology of digestion and hormonal control of digestion	**K2**	**5**	**1**
CO3	Develop a comprehensive picture of respiratory physiology	**K2**	**2**	**1**
CO4	Acquire knowledge on the Renal physiology	**K1**	**5**	**1**
CO5	Understand the physiology of Nerve and muscle	**K2**	**2**	**1**

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO-PSO MATRIX									
CONO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1					**1**			**1**	
CO2						**2**			**2**
CO3						**2**		**1**	
CO4							**3**	**1**	
CO5					**1**	**2**		**1**	

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

SYLLABUS

UNIT-1	1.Examination of sections of mammalian esophagus, stomach, duodenum, ileum, rectum .liver, trachea, lung, kidney 2. Study of activity of Salivary amylase under optimum condition 3. Qualitative tests for identification of Carbohydrates 4. Qualitative tests for identification of Proteins 1.https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham 2.https://library.csi.cuny.edu/oer/virtuallabs-simulations#anatomy
UNIT-2	5.Qualitative tests for identification of Fats 6. Urine test for sugar, albumin 7. Estimation of hemoglobin using Sahli's haemoglobinometer 1.https://www.labster.com/simulations?course-packages=animal-physiology 2.http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf
UNIT-3	8.Recording of blood pressure using a sphygmomanometer 9. Recording of frog's heart beat under in situ and perfused conditions 10. ECG observation- Spotting/identification of curves from the given ECG https://physiology.elte.hu/gyakorlat/jegyzet/Physiology_Pactical_(2013).pdf

Co-curricular activities (Suggested)

- Chart on cardiac cycle, human lung, kidney/nephron structure etc.
- Working model of human / any mammalian heart.
- Working model of human / any mammalian urine formation
- Chart/model of sarcomere

REFERENCES BOOKS:

4. Eckert H. *Animal Physiology: Mechanisms and Adaptation.* W.H. Freeman & Company.

5. Floray E. *An Introduction to General and Comparative Animal Physiology.* W.B. Saunders Co., Philadelphia.
6. Goel KA and Satish KV. 1989. *A Text Book of Animal Physiology,* Rastogi Publications, Meerut, U.P.

A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru (Autonomous)
Zoology Practical

w.e.f. 2024-2025.

Title: PHYSIOLOGY **Code: 23ZOMAP242**

Model PracticalPaper

Time : 3 HrsMax Marks: 50 (CIA+ SEE) **Credits:01**

A. Semester End Lab Exam

I Answer the following **Max Marks: 25**

Q1: Identify the image, draw a neat labelled diagram and describe its role in the human body. K1
A Stomach B. Liver 2X2.5=5M

Q2: Estimate the presence of Carbohydrates in the given sample and write its procedure. K2 =5M

Q3:. Estimate the presence of Proteins in the given sample and write its procedure K2 =5M

Q4: Estimate the activity of Salivary amylase under optimum conditions. K2 =5M

Q5: Determine the albumin content in the given Urine sample.K1 =5M

II. Viva **2M**

III.Record **8M**

Total **35M**

B. Continuous Internal Assessment **15M**

Total (A+ B**)** **50M**

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: - IV

Course Code	**23ZOMAL243**	Course Delivery Method	Class Room/Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours/ Week	3	Semester End Exam Marks	70
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction: 2024-25	Year of Offering 2024-25	Year of Revision Percentage of Revision:	TypeoftheCourse: SkillDevelopment

Course Description:

Immunology is the study of the immune system and is a very important branch of the medical and biological sciences. The immune system protects us from infection through various lines of defences. If the immune system is not functioning as it should, it can result in disease, such as autoimmunity, allergy and cancer.

S.No	**COURSEOBJECTIVES**
1	To promote critical thinking among students
2	To promote critical thinking among students.
3	To provide students with a foundation in immunological processes
4	To provide students with knowledge on how the immune system works building on their previous knowledge
5	To clearly state the role of the immune system.

Learning Outcomes:

NO	**COURSEOUTCOMES**	**BTL**	**PO**	**PSO**
CO1	Articulate the roles of innate recognition receptors in immune responses	**K1**	**5**	**1**
CO2	Articulate the roles of innate recognition receptors in immune responses	**K2**	**5**	**1**
CO3	Compare and contrast humoral versus cell-mediated immune responses	**K2**	**2**	**1**
CO4	Distinguish various cell types involved in immune responses and associated functions;	**K1**	**5**	**1**
CO5	Distinguish and characterize antibody isotypes, development, and functions	**K2**	**2**	**1**

CO-PO-PSOMATRIX									
CONO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1						**2**		**1**	
CO2					**1**				**2**
CO3						**2**		**1**	
CO4					**1**			**1**	
CO5					**1**	**2**		**1**	

Use the codes 3,2,1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

SYLLABUS

Unit	Learning Units	Lecture Hours
I	Overview of Immune system 1.1 Introduction to basic concepts in Immunology 1.2 Innate and adaptive immunity 1.3 Cells of immune system 1.4 Organs of immune system **Assignment1:Types of Immunity**	9
II	**Antigens** 2.1 Basic properties of antigens 2.2 B and T cell epitopes, paratopes 2.3 Hap tens and adjuvants 2.4 Factors influencing immunogenicity **Assignment: Factors influencing immunogenicity**	9
III	**Antibodies** 3.1 Structure of antibody, Classes of antibodies based on heavy chain 3.2 Functions of antibodies 3.3 Complement system 3.4 Production and Application of Monoclonal antibodies **Assignment:Monoclonal antibodies and their applications**	9
IV	**Working of Immune system** 4.1 Structure and functions of major histocompatibility complexes 4.2 Exogenous pathway of antigen presentation and processing 4.3 Endogenous pathway of antigen presentation and processing 4.4. Basic properties and functions of cytokines **Activity:Model chart preparation of MHC**	9
V	**Immune system in health and disease** 5.1 Gell and Coombs' classification and brief description of various types of hypersensitivities 5.2 Introduction to concepts of autoimmunity and immunodeficiency 5.3 General introduction to vaccines Types of vaccines, Immunization programme 5.4 Organ transplantation- Graft rejection, immune suppressors **Activity: Model chart preparation of classification of Hypersensitivity**	9

Co-curricular activities (suggested)

- Organizing awareness on immunization importance in local village in association with NCC and NSS teams
- Charts on types of cells and organs of immune system
- Student study projects on aspects such as – identification of allergies among students (hypersensitivity), blood groups in the class (antigens and antibodies duly reported) etc., as per the creativity and vision of the lecturer and students

REFERENCES BOOKS:

- Judy Owen, Jenni Punt, Sharon Stranford 2013 Kuby Immunology: International Edition W. H. Freeman
- Abbas AK, 2011, Cellular and Molecular Immunology 7th Ed. Elsevier Health Sciences – India.
- Delves P, Martin S, Burton D, Roitt IM 2011 Roitt's Essential Immunology. 12th Ed. Wiley-Blackwell Scientific Publication, Oxford.
- Murphy K, 2011 Janeway's Immunobiology. 8th Ed. Garland Science Publishers, New York.

Weblinks:

1.https://medlineplus.gov/ency/article/000821.htm#:~:text=Innate%2C%20or%20nonspecific%2C%20immunity%20is,materials%20from%20entering%20your%20body.

2.. ht.tps://www.ncbi.nlm.nih.gov/books/NBK279396/

3.https://my.clevelandclinic.org/health/diseases/24067-antigen

4.https://my.clevelandclinic.org/health/body/22971antibodies#:~:text=Antibodies%20are%20proteins%20that%20protect,word%20for%20antibody%20is%20immunoglobulin.

5.https://www.genome.gov/genetics-glossary/Antibody

6.https://www.britannica.com/science/major-histocompatibility-complex

https://www.ncbi.nlm.nih.gov/books/NBK27156/

D.A.Kiranmayee

Signature of the Program In-charge

Signature of the HOD

A. G & S.G.S. DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU (AUTONOMOUS)

SEMESTER-IV

(Model Question paper)

Paper Title:IMMUNOLOGY

Paper Code:23ZOMAL243

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

Note: Draw neat labeled Diagrams wherever necessary.

SECTION-A

Answer all questions. **5X4= 20M**

Each question carries 4 marks

1. a)Write short notes on LymphocytesK1

Or

b) Discuss on primary Lymphoid organsK2

2. a) Explain the differences between B and T cell epitopesK2

Or

b) Write a short note on Adjuvants.K1

3.a) Describe the general structure of ImmunoglobinK2

Or

b) ExplainOpsonization K2

4. a) Describe the structure of Major Histocompatibility ComplexesK2

Or

b) Explain theEndogenous pathway of antigen presentationK2

5. a) Write a short note onautoimmunityK2

Or

b) Describe various types of vaccines K2

SECTION-B

Answer all the Questions. **5X10=50M**

6.a) Explain the differences between Innate and adaptive ImmunityK1

(Or)

b) Give an account of Secondary Lymphoid OrgansK2

7.a) What are the basic properties of antigens? Explain K2

(Or)

b) Analyze the factors influencing immunogenicity K3

8.a) Classify Immunoglobulins and describe them brieflyK3

(Or)

b) Explain the production and applications of Monoclonal AntibodiesK3

9.a) Explain the Exogenous pathway of antigen presentation and processing K2

(Or)

b) Describe the basic properties and functions of cytokines K2

10. a) classify and briefly describe various types of hypersensitivities K2

(Or)

b) Give an account of Organ transplantation K2

MODEL QUESTION PAPER -2

Section A: Short Answer Questions (20 Marks)

Answer All questions. Each question carries 4 Marks.

Q1 (a). Explain the primary lymphoid organs.CO1 K2

OR

(b). Illustrate the cells of Immune system. CO1K2

Q2 (a). Describe the Haptanes.CO2K1

OR

(b). Explain the basic properties of Antigens. CO2 K2

Q3. (a) Explain classification of antibody. CO3, K2.

OR

(b) Describe the structure of Antibody. CO3,K1

Q4. (a) Illustrate the MHC. CO4, K2.

OR

(b) Describe the cytokines.CO4,K1.

Q5. (a) Explain Autoimmunity. CO5, K2.

OR

(b) Illustrate about hypersensitive. CO5, K2.

SECTION – B

Answer the following questions 5X10=50 Marks

Q6. (a). Explain the different factors contributing for innate immunity.CO1,K2

Or

(b). Describe Adaptive Immunity.CO1,K1

Q.7 (a). Describe the structure and function of different types of immunoglobulin's.CO2,K2

Or

(b).Give an account of the factors influencing immunogencity.CO2,K2

Q.8 (a). Explain the Production of Monoclonal antibodies.CO3, K2

Or

(b). Explain in detail about structure and classes of antibodies.CO3, K2

Q.9.(a).Illustrate the Endogenous pathway of antigen presentation and processing.CO4,K2

Or

(b). Describe Exogenous pathway of antigen presentation and processing. CO4,K1

Q.10. (a). Give a detailed account on types of various types of hypersensitivities. CO5, K2

Or

(b). Explain in detailed about organ transplantation. CO5 L4

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

PRACTICAL

w.e.f. 2024-2025. **Code:23ZOMAP243**

IMMUNOLOGY

MAX.MARKS: 35.

(2hrs/week)Credits: 01

PRACTICAL SYLLABUS

Course Description:

Immunology is the study of the immune system and is a very important branch of the medical and biological sciences. The immune system protects us from infection through various lines of defences. If the immune system is not functioning as it should, it can result in disease, such as autoimmunity, allergy and cancer.

S.No	COURSEOBJECTIVES
1	To acquire knowledge on the distribution of lymphoid organs
2	To study the histology of lymphoid organs
3	To acquaint with the process of blood grouping with kit
4	To acquaint with the ELISA test
5	To acquaint with the Widal test

NO	COURSEOUTCOME	BTL	PO	PSO
CO1	Articulate the roles of innate recognition receptors in immune responses	K1	5	1
CO2	Articulate the roles of innate recognition receptors in immune responses	K2	2	1
CO3	Compare and contrast humoral versus cell-mediated immune responses	K2	5	1
CO4	Distinguish various cell types involved in immune responses and associated functions;	K1	5	1
CO5	Distinguish and characterize antibody isotypes, development, and functions	K2	2	1

ForBTL:K1:Remember;K2:Understand;K3:Apply;K4:Analyze;K5:Evaluate;K6:Create

CO-PO-PSOMATRIX									
CONO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1						**2**		**1**	
CO2					**1**			**1**	
CO3					**1**				**2**
CO4						**2**		**1**	
CO5						**2**	**3**	**1**	

Usethecodes3,2,1forHigh,ModerateandLowcorrelation betweenCO-PO-PSOrespectively

SYLLABUS

UNIT-1	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 https://vlab.amrita.edu/?sub=3&brch=69 https://ivl1-au.vlabs.ac.in/List%20of%20experiments.html https://ivl2-au.vlabs.ac.in/List%20of%20experiments.html
UNIT-2	4.Demonstration of ELISA 5. Demonstration of Immuno-electrophoresis 6. Testing for Typhoid antigens by Widal test. https://www.medicine.mcgill.ca/physio/vlab/immun/vlabmenuimmun.htm http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf
UNIT-3	7. Differential Leukocyte Count 8. Isolation of monocytes from blood. 9. Rapid Plasma Reagin (RPR) Test https://www.urmc.rochester.edu/MediaLibraries/URMCMedia/labs/frelinger-lab/documents/Immunology-Lab-Manual.pdf https://webstor.srmist.edu.in/web_assets/downloads/2021/18BTC106J-lab-manual.pdf

Co-curricular activities (suggested)

- Organizing awareness on immunization importance in local village in association with NCC and NSS teams
- Charts on types of cells and organs of immune system
- Student study projects on aspects such as – identification of allergies among students (hypersensitivity), blood groups in the class (antigens and antibodies duly reported) etc., as per the creativity and vision of the lecturer and students

D.A. Kiranmayee

Signature of the Program In-charge

Signature of the HOD

A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru (Autonomous)
Zoology Practical

w.e.f. 2024-2025.

Title: IMMUNOLOGY **Code: 23ZOMAP243**

Model PracticalPaper

Time : 3 Hrs **Max Marks: 50 (CIA+ SEE)** **Credits:01**

A. Semester End Lab Exam

I Answer the following **Max Marks: 25**

Q1: Describe the procedure of blood groping and do the experiment and tabulate the results K2=5M

Q2: Identify and write a procedure of "working mechanism of given equipment".k2 =5M

Q3: Isolate and Identify the leucocytes from given blood sample. K1. =5M

Q4: Identify and write comment upon 'A' (thymus). K3 =5M

Q5: Identify and write comment upon 'A' (Spleen). K3 =5M

II. Viva **2M**

III.Record **8M**

Total **35M**

B. Continuous Internal Assessment **15M**

Total (A+ B**)** **50M**

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Autonomous –ISO 9001-2015 Certified

Title of the Paper: **Health and Hygiene (MDC)** **Code:24MDCZOOT01**
Semester: - IV

Course Code		Course Delivery Method	Class Room/Blended Mode - Both
Credits	2	CIA Marks	15
No. of Lecture Hours/ Week	2	Semester End Exam Marks	35
Total Number of Lecture Hours	30	Total Marks	50
Year of Introduction: 2024-2025	Year of Offering 2024-2025	Year of Revision –	Percentage of Revision:
MULTI- DISCIPLINARY COURSE (MDC)	Course code:	**2024-2025**	**BA, B. Com (G), B.Com-Computers, B.C.A**

Learning Outcomes:

- To provide knowledge on different health indicators and types of hygienemethods
- To impart knowledge on different health care programmes taken up byIndia
- To make student understand the latest concepts of health such as HIA, EIA, SIAand SEA
- To enable student with disaster mitigationstrategies
- To create awareness on community health andhygiene
- To enrich knowledge on communicable and non-communicable diseases and their control
- To aware the student on the importance of food, social strategies, mental status and physical activities onhealth
- To introduce different community-based mobile apps on health to student and thereby to thecommunity

Course Outcomes: On completion of this course, the students will be able to

- Understand about healthydiet
- Use available information to optimize ourdiet
- Use nutrition for a healthylife
- Individualize our dietarygoals
- Assess the impact of policies on health and hygiene
- Take health measures whiletravelling
- Create awareness in public through digital media viz., mobileapps

Syllabus **HEALTH AND HYGIENE**

Course Details

Unit	Learning Units	Lecture Hours
I	**BasicsofNutrition** 1.1Nutrition – definition, importance, Good nutrition and mal nutrition; BalancedDiet: Basics of MealPlanning 1.2 Carbohydrates, –functions, dietary sources, effects ofdeficiency; Lipids – functions, dietary sources, effects ofdeficiency; Proteins –functions, dietary sources, effects ofdeficiency. 1.3 Brief account of Vitamins- functions, food sources, effects ofdeficiency, 1.4Macro and micro minerals –functions, effects of deficiency; food sources of Calcium, Potassium and Sodium; food sources of Iron, Iodine andZinc 1.5Importance of water– functions, sources, requirement and effects ofdeficiency.	10
II	**Health** 2.1Health - Determinants of health, Key Health Indicators, Environment health & Public health; Health-Education: Principles andStrategies 2.2Health Policy & Health Organizations: Health Indicators and National Health Policy of Govt. of India-2017; Functioning of various nutrition and health organizations in India viz., NIN (National Institution of Nutrition), FNB (Food and Nutrition Board), ICMR (Indian Council of Medical Research), IDA (Indian Dietetics Association),WHO-India, UNICEF-India 2.3National Health Mission: National Rural Health Mission (NRHM) Framework, National Urban Health Mission (NUHM)Framework 2.4Women & Child Health Care Schemes: Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+); Janani Shishu Suraksha Karyakaram (JSSK); Rashtriya Bal SwasthyaKaryakram(RBSK); India Newborn Action Plan (INAP); AdolecentHeatlh- Rashtriya Kishor SwasthyaKaryakram(RKSK) 2.5Disaster Management – Containment, Control and Prevention of Epidemics and Pandemics – Acts, Guidelines and Role of Government andPublic.	**10**
III	**Hygiene** 3.1Hygiene – Definition; Personal, Community, Medical and Culinary hygiene; WASH (**WA**ter, **S**anitation and **H**ygiene)programme 3.2Rural Community Health: Village health sanitation & Nutritional committee (Roles & Responsibilities); About Accredited Social Health Activist (ASHA); Village Health Nutrition Day, Rogi KalyanSamitis 3.3Community & Personal Hygiene: Environmental Sanitation and Sanitation in Public places 3.4Public Awareness through Digital Media - An Introduction to Mobile Apps of Government of India: NHP, Swasth Bharat, No More Tension, Pradhan Mantri SurakshitMantritva Abhiyan (PM Suman Yojana), My Hospital (Meraaspataal), India fights Dengue, JSK Helpline, Ayushman Bhava, Arogya Setu, Covid19AP	**10**

A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru, (Autonomous)

Semester –IV

w.e.f. 2024-2025

Time: 90 mins (Model question paper)

Title of the paper: Health and Hygiene **Code – 24MDCZOOT01**

Max.marks: 35

Section – A

Answer any **three** questions. Each question carries **five** marks. **3 x 5= 15**

1. Balanced Diet
2. Vitamins
3. ICMR
4. Village Health Nutrition Day
5. Pradhan Mantri SurakshitMantritva Abhiyan (PM Suman Yojana)
6. Disaster management

Section – B

Answer any**two** questions. Each question carries **Ten** marks. **2 x 10 =20**

7. Define Nutrition and write its importance?

8. What are Carbohydrates, write its functions, dietary sources, effects ofdeficiency.

9. Write an essay on National Institution of Nutrition (NIN)?

10. Write an essay on Community & Personal Hygiene?

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VALUE ADDED COURSE

Title of the Paper: **POULTRY FARMING**
Semester: - IV

Course Code	**VACZOO07**	Course Delivery Method	Class Room/Blended Mode - Both
Credits	2		
No. of Lecture Hours/ Week	2	Semester End Exam Marks	50
Total Number of Lecture Hours	08	Total Marks	50
Year of Introduction: 2024-2025	Year of Offering 2024-2025	Year of Revision –	Percentage of Revision:

OBJECTIVES:

S.NO	COURSE OBJECTIVES
1.	To identify and understand various types of poultry houses and farming and Management of Chicks, Growers, Layers, and Broilers
2.	To develop the ability to prepare project reports for financial support and risk coverage.
3.	To understand and implement various methods of feeding for optimal poultry performance.
4.	To identify and understand the common viral, bacterial, fungal, and parasitic diseases affecting poultry.
5	To acquire skills in egg testing and candling techniques. To learn methods for recycling poultry waste into useful by-products like manure and energy.

COURSE OUTCOMES

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Understand the basic concepts of poultry farming and apply the same in the management practices of poultry farming.	**K2**	**PO1**	**PSO1**
CO2	Analyse and able to prepare project report for banking and insurance	**K4**	**PO1**	**PSO1**
CO3	Acquaint with the poultry feed management practices. Acquire knowledge in the preparation of feed formulation methods and Diseases of poultry.	**K3**	**PO1**	**PSO1**
CO4	Understand the nutrient requirements for different stages of layers and broilers	**K2**	**PO2**	**PSO2**
CO5	Gain knowledge in harvesting of eggs and recycling of poultry waste.	**K2**	**PO2**	**PSO2**

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyse; K5: Evaluate; K6: Create

SYLLABUS

Course Details**POULTRY FARMING**

Unit	Learning Units	Lecture Hours
I	**Section I (Introduction to Poultry Farming):** 1.1General introduction to poultry farming -Definition of Poultry; past and present scenario of poultry industry in India. 1.2Principles of poultry housing. Poultry houses, Systems of poultry farming. 1.3Management of chicks, growers and layers, Management of Broilers. 1.4 Preparation of project report for banking and insurance	**10**
II	**Section II (Feed and Livestock Health Management):** 2.1Poultry feed management – Principles of feeding, Nutrient requirements for different stages of layers and broilers. 2.2 Feed formulation and Methods of feeding. 2.3 Poultry diseases – viral, bacterial, fungal and parasitic (two each); symptoms, control and management; 2.4Vaccination programme.	**10**
III	**Section III (Harvesting of Eggs and Sanitation):** 3.1Selection, care and handling of hatching eggs. 3.2 Egg testing Methods of hatching. 3.3Brooding and rearing. Sexing of chicks. 3.4Farm and Water Hygiene, Recycling of poultry waste	**10**

Co- Curricular Activities suggested: **(4 Hrs)**

1. Group discussion& SWOT analysis
2. Visit to a poultry farm
3. Invited Lectures by Concerned officers of government or private farms
4. Cheap and Healthy Feed preparation by students based on government standards
5. Market study and Survey (Monitoring of daily price hike in poultry market and analysis)
6. Online Swayam Moocs course on poultry farming (see reference 9 below)

Reference books:

1. Sreenivasaiah., P. V., 2015. Textbook of Poultry Science. 1st Edition. Write & Print Publications, New Delhi

2. 2. Jull A. Morley, 2007. Successful Poultry Management. 2nd Edition. Biotech Books, New Delhi"

A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru (Autonomous)

Semester –IV
Model Question Paperw.e.f. 2024-2025
Title of the paper: POULTRY FARMING **Code – VAC ZOO07**
Max. marks: 50

Section – A

Answer any **Four** questions. Each question carries **five** marks. **4 x 5= 20m.**

1. Poultry house
2. Broilers
3. Methods of feeding
4. Any two bacterial diseases of poultry
5. Egg testing

Section – B

Answer any **THREE** questions.

Each question carries **Ten** marks. **3 x 10 =30 m**

6.. Explain principles of poultry housing in detail, with examples.?

7.. Write an essay on viral diseases of poultry. ?

8. Give an account of fungal and bacterial diseases (any two each) of poultry?

9.. Write an essay on selection, handling and hatching of eggs. ?

10. Write an essay on Brooding and rearing?

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(AUTONOMOUS)

SEMESTER-IV
VALUE ADDED COURSE

Guide lines to the Paper Setter

Time: $1^{1}/_{2}$ hrs **Max.Marks:50**

Paper Title: - Poultry Farming. **Paper Code: VAC ZOO07**

Note: 1. Answer any **Four** questions out of five in Part-A.
Each question carries five marks. 4X 5 = 20M.

2. Answer any **THREE** questions out of four in Part-B.
Each question carries 10 marks. 3 X 10 = 30M.

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

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

2. Question paper should be in English medium.