NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(AUTONOMOUS)

Re-accredited by NAAC with 'A' Grade

BOARD OF STUDIES - 2016-17

DEPARTMENT OF ZOOLOGY

DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES : 2016-2017

	CATEGORY	NAME & DESIGNATION	SIGNATURE
1	Chairman Board of studies	K.Neeraja In charge Department of zoology	
2	University Nominee	Professor P.Nagaraja Rao Chairman BOS O.U, Department of zoology , Osania University,Hyderabd.	Prof. P. Nagaraja Ro M.Sc., Ph.D., FPPAI, FSLiSC, FAEB, F Department of Zoology, Osmania Univ Hyderabad 500007
3	(1) Subject expert from outside the college	J. Venkateshwar Rao Asst.Professor Department of zoology , Nizam College, Osania University,Hyderabd	ASSISTANT PROFESSOR Department of Zoology Nizam College (Osmania University) HYDERABAD-500 001.
4	(2) Subject expert from outside the college	Swamy Asst.Professor KRR Degree College, Kodad Nalgonda Dist	Assistant Professor Department of Zoology K.R.R. Govt. Arts & Science College KODAD, Nalgonda- 508 206 (T.S.)
5	Members: All The Faculty members of the Dept.	Dr.B.Chittaranjan Rao	
		Dr.K. Ganesh	
		V.Nanda Kumar	
		V.Saritha	
6	Meritorious P.G. Alumni	M. Anitha	

Submitted by

In-Charge /Chairman BOS

Head Dept. of Zoology
NAGARJUNA GOVT. COLLEGE
NALGONDA.

Proposals approved

Principal/ Chairman Academic council

Principal
Nagarjuna Govt. College
(Autonomous)
Nalgonda

NAGARJUNA GOVT.COLLEGE, NALGONDA
(AUTONOMOUS)
DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES MEETING

The members of Board of studies in Zoology Department, N.G.College(A) Nalgonda met under the chairmanship of Sri K.Neeraja on _____and passed the following resolutions

AGENDA

1. To consider and approve the syllabus for B.Sc I, II, III years (I, II, III, IV, V & VI semesters) for the academic year 2016-17.
2. To consider and approve the choice based credit system (CBCS) and cumulative grade
   Point average (CGPA) system for the III year (V,VI semesters) students for the Academic year2016-17
3. To consider and approve the General Elective for the IV &VI Semester Students the Elective is **APPLIED ZOOLOGY**
4. To Consider and approve the continuation of Internal Assessment for the Students admitted in to I, II& III year degree course during 2016-17.
5. To consider and approve the CBCS and cumulative grade Point average (CGPA) System for the Ist Year Students as per the Mahatma Gandhi University new Syllabus .
6. To consider and approve to conduct year wise practical Examination for II & III year students and semester wise practical Examinations for the I Year student for the Year 2016-17
7. To consider and approve the list of examiners for paper setting and evaluation for B.Sc I,II,III years(I,II,III,IV,V & VI semesters) for the academic year 2016-17.
8. To consider and approve the model Question papers for B.Sc I, II and III Years for the academic year 2016-17.
9. Any other related academic matter.

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Resolutions .

1. Unitization of syllabus in to 4 units for each paper.
2. CBCS and CGPA system are approved.
3. APPLIED ZOOLOGY are approved as general elective in semester-IV.
4. To conduct 2 Internal Assessments for 20 marks, one student seminar for 5 marks and one assignment for 5 marks (total 30 marks) for I , II & III year students .
5. As per MGU I year syllabus is approved.
6. Year wise practical examinations are approved for II and III year and semester wise Practical exams are approved for I year students.
7. List of the examiners are approved.
8. Model question papers are approved.
9. Internal examinations are conducted for 30 marks. Semester end exams are conducted for 70 marks, it is mandatory to get a minimum of 28 marks for one to get through it. On the Whole for 100 marks one must get 40 marks to get through the paper.
10. To design question pattern in the following lines for I, II and III year students.

Section –A **5 X 2=10 Marks**

- To give five very short questions and ask them to answer all questions

Section-B **4 X 5=20 Marks**

- To give Six Short questions and ask them to answer any four questions

Section-C **4 X 10 = 40 Marks**

- To give 4 Long Questions with internal choice and ask them to answer all question

1. To Prepare and supply of question banks and model papers to the students
2. Continuous Internal Assessment methods adopted to evaluate the progression of the Student.

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APPROVED THE PANEL OF EXAMINERS FOR PAPER SETTING AND EVALUATION FOR THE YEAR 2016-17

SNO	PAPER		NAME	DESIGNATION	CELL NO
1		1	J.NARENDER REDDY	Asst.Prof. K.N.M Degree college MLG	8374939833
2	I	2	SRINIVAS SHAREEN	Asst.Prof. G.D.C NAKREKAL	9949496795
3		3	Dr.S. NARSAIAH	Asst.Prof. G.D.C RAMANNAPET	9490524157
4		1	J.SWAMY	Asst.Prof. G.D.C KODAD	9848480243
5	II	2	Dr.B.VENKATAIAH	Asst.Prof. Retd.	9948661204
6		3	SRINIVAS SHAREEN	Asst.Prof. G.D.C NAKREKAL	9949496795
7		1	Dr.K. MADHU	Retd. PRINCIPAL	9247804932
8	III	2	SRINIVAS SHAREEN	Asst.Prof. G.D.C NAKREKAL	9949496795
9		3	K.BALARAJ	Asst.Prof. G.D.C RAMANNAPET	8985415436
10		1	RAMESH	Asst.Prof. SLNS YADAGIRI	9440926180
11	IV	2	CH.PRAKASH	Asst.Prof. Retd.	9440657471
12		3	Dr.B.VENKATAIAH	Asst.Prof. Retd.	9948661204
13		1	Dr.K MADHU	Retd. PRINCIPAL	9247804932
14	V	2	Dr.B.VENKATAIAH	Asst.Prof. Retd.	9948661204
15		3	Dr.J.VENKATESHWAR RAO	Asst.Prof. NIZAM COLLEGE O.U. HYD	7723555472

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16	VI	1	J.SWAMY	Asst.Prof. G.D.C KODAD	9848480243
17		2	Dr.K.MADHU	Retd. PRINCIPAL	9247804932
18		3	Dr.B.VENKATAIAH	Asst.Prof. Retd.	9948661204
19		1	Dr.K.MADHU	Retd. PRINCIPAL	9247804932
20	VII	2	Dr.B.VENKATAIAH	Asst.Prof. Retd.	9948661204
21		3	Dr.RAMESH BABU	Asst.Prof. G.D.C SIDDIPET	9440026956
22	VIII	1	Dr.K MADHU	Retd. PRINCIPAL	9247804932
23		2	J.SWAMY	Asst.Prof. G.D.C KODAD	9848480243
24		3	CH.PRAKASH	Asst.Prof. Retd.	9440657471

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NAGARAJUNA GOVERNMENT COLLEGE,NALGONDA (AUTONOMOUS)

ALLOCATION OF CREDITS AT SUBJECT LEVEL

SUBJECT:ZOOLOGY

SNO	SEMESTER	MODULE(PAPER)	HOURS PER WEEK	MAX. MARKS	CREDITS
1	I (CORE)	Animal diversity -Invertebrates	04	100	3
2	II (CORE)	Ecology Zoo geography and Animal Behaviour	04	100	3
3	PRACTICALS	Animal diversity -Invertebrates Ecology Zoo geography and Animal Behaviour	03	50+50	2
4	III (CORE)	Animal diversity Vertebrates	04	100	3
5	IV (CORE)	Embryology Ecology Zoo geography	04	100	3
6	PRACTICALS	Vertebrates and Developmental Biology and Ecology	03	50	2
8	V-CORE	Animal Physiology	03	100	3
9	V-(ADVANCE) ELACTIVE-I	Applied Zoology Aquaculture Hematology	03	100	2
	V(ADVANCED ELECTIVE-II)	Genetic Engineering	03	100	3
11	PRACTICALS	Animal Physiology and Genetics	03	50	2
12	VI-(CORE)	Endocrinology Genetics and Evolution	03	100	3
13	VI-((ADVANCE) ELACTIVE-I	Immunology Parasitology	03	100	2
14	VI-(ADVANCED ELECTIVE-II)	Environmental Biology	03	100	2
15	PRACTICALS	Aquaculture and Hematology Parasitology	3	50	2
	TOTAL				30

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. I Year
I - SEMESTER
Discipline Specific Course, Paper – I
[Code: BS105; Course Type DSC 2A]
Animal Diversity – Invertebrates

Periods: 60 **Max. Marks: 70**

UNIT – I **(15 Periods)**

1.1 Brief history of Invertebrates
- 1.1.1 Kingdom Animalia
- 1.1.2 Brief history of Invertebrates

1.2 Protozoa
- 1.2.1 General characters
- 1.2.2 Classification up to classes with examples
- 1.2.3 Type study - *Elphidium*
- 1.2.4 Life cycle of *Plasmodium.*
- 1.2.5 Locomotion, Reproduction and Diseases

1.3 Porifera
- 1.3.1 General characters
- 1.3.2 Classification of Porifera up to classes with examples
- 1.3.3 Type study - *Sycon*
- 1.3.4 Canal system in sponges and Spicules.

UNIT – II **(15 Periods)**

2.1. Cnidaria
- 2.1.1 General characters
- 2.1.2 Classification of Cnidaria up to classes with examples
- 2.1.3 Type study - *Obelia*
- 2.1.4 Polymorphism in hydrozoa
- 2.1.5 Corals and coral reef formation

2.2 Platyhelminthes
- 2.1.1 General characters
- 2.1.2 Classification of Platyhelminthes up to classes with examples
- 2.1.3 Type study- *Schistosoma*

2.3 Nemathelminthes
- 2.3.1 General characters
- 2.3.2 Classification of Nemathelminthes up to classes with examples
- 2.3.3 Type study - *Dracunculus*
- 2.3.4 Parasitic Adaptations in Helminthes

UNIT – III **(15 Periods)**

3.1 Annelida

3.1.1 General characters
3.1.2 Classification of Annelida up to classes with examples
3.1.3 Type study - *Hirudinaria granulosa.*
3.1.4 Evolutionary significance of Coelome and Coelomoducts and metamerism

3.2 Arthropoda

3.2.1 General characters
3.2.2 Classification of Arthropoda up to classes with examples
3.2.3 Type study - Prawn
3.2.4 Mouth parts of Insects
3.2.5 Insect metamorphosis
3.2.6 *Peripatus* - Structure and affinities

UNIT – IV **(15 Periods)**

4.1 Mollusca

4.1.1 General characters
4.1.2 Classification of Mollusca up to classes with examples
4.1.3 Type study - *Pila*
4.1.4 Pearl formation
4.1.5 Torsion and detorsion in gastropods

4.2 Echinodermata

4.2.1 General characters
4.2.2 Classification of Echinodermata up to classes with examples
4.2.3 Water vascular system in star fish
4.2.4 Echinoderm larvae and their significance

4.3 Hemichordata

4.3.1 General characters
4.3.2 Classification of Hemichordata up to classes with examples
4.3.3 *Balanoglossus* - Structure and affinities

Suggested Readings

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

B.Sc. I Year
ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
Discipline Specific Course, Paper – I
[Code: BS105; Course Type DSC 2A]
ANIMAL DIVERSITY - INVERTEBRATES

Periods: 30 **Max. Marks: 50**

1. **Study of museum slides / specimens / models (Classification of animals up to orders)**
   - i. **Protozoa:** Amoeba, *Paramoecium, Paramoecium Binary fission and Conjugation, Vorticella, Entamoeba histolytica, Plasmodium vivax*
   - ii. **Porifera:** *Sycon, Spongilla, Euspongia, Sycon* - T.S & L.S, Spicules, Gemmule
   - iv. **Coelenterata:** *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula*
   - vi. **Platyhelminthes:** *Planaria, Fasciola hepatica, Fasciola* larval forms – Miracidium, Redia, Cercaria, *Echinococcus granulosus, Taenia solium, Schistosoma haematobium*
   - viii. **Nemathelminthes:** *Ascaris(Male & Female), Drancunculus, Ancylostoma, Wuchereria*
   - x. **Annelida:** *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva
   - xii. **Arthropoda:** Cancer, Palaemon, Scorpion, *Scolopendra, Sacculina, Limulus, Peripatus,* Larvae - Nauplius, Mysis, Zoea, Mouth parts of male & female *Anopheles* and *Culex,* Mouthparts of Housefly and Butterfly.
   - xiv. **Mollusca:** *Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva
   - xvi. **Echinodermata:** *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon,* Bipinnaria larva
   - xviii. **Hemichordata:** *Balanoglossus,* Tornaria larva
2. **Dissections:**

   Prawn: Appendages, Digestive system, Nervous system, Mounting of Statocyst

   Insect Mouth Parts
3. **Laboratory Record work shall be submitted at the time of practical examination**
4. An **"Animal album"** containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.
5. **Computer aided techniques should be adopted – show virtual dissections**

Suggested manuals:

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

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. I Year
ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
Discipline Specific Course, Paper – I
[Code: BS105; Course Type DSC 2A]
ANIMAL DIVERSITY - INVERTEBRATES

Time: 2 Hrs. **Max. Marks: 50**

1. Identification, labeled diagram and salient features of spots: (7 Museum specimens + 2 slides)	18
2. Dissection (one) (Diagram -02 + Dissection & Display-05)	07
3. Field Visit & Note Book	04
4. Project Work	03
5. Certified practical record	03
6. Animal Album	03
7. Viva voce	02

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. I Year
II - SEMESTER
Discipline Specific Course, Paper – II
[Code: BS205; Course Type DSC 2B]
Ecology, Zoogeography and Animal Behavior

Periods: 60 **Max. Marks: 70**

UNIT – I **(15Periods)**

1.1 Ecology - I

1.1.1 Ecosystem structure and functions.
1.1.2 Types of Ecosystems –Aquatic and Terrestrial.
1.1.3 Biogeochemical cycles - Nitrogen, Carbon, Phosphorus and Water.
1.1.4 Energy flow in ecosystem.
1.1.5 Food chain, food web and ecological pyramids.
1.1.6 Animal Associations - Mutualism, commensalism, parasitism, competition, predation.

UNIT – II **(15 Periods)**

2.1 Ecology – II

2.1.1 Concept of Species, Population dynamics and Growth curves.
2.1.2 Community Structure and dynamics and Ecological Succession.
2.1.3 Ecological Adaptations.
2.1.4 Environmental Pollution – Sources, Effect and Control measures of Air, Water, Soil and Noise pollution,
2.1.5 Wildlife conservation - National parks and Sanctuaries of India, Endangered species.
2.1.6. Biodiversity and hotspots of Biodiversity in India.

UNIT – III **(15 Periods)**

3.1 Zoogeography

3.1.1 Zoogeographical regions – Palaearctic, Nearctic, Neotropical, Oriental, Australian and Ethiopian regions - their Climatic and faunal peculiarities
3.1.2 Wallace line, Discontinuous distribution
3.1.3. Continental Drift

UNIT – IV **(15 Periods)**

4.1 Animal Behaviour

4.1.1 Types of Behaviour- Innate and Acquired, Instinctive and Motivated behaviour
4.1.2 Taxes, Reflexes, Tropisms
4.1.3 Physiology and phylogeny of learning, trial and error learning, Imprinting, habituation, Classical conditioning, Instrumental conditioning
4.1.5 Social behavior, Communication, Pheromones

4.1.6 Biological rhythms, Biological clocks, Circadian rhythms

Suggested Readings

M.P.Arora, '*Ecology*' Himalaya Publishing company.
P.D.Sharma, *Environmental Biology'*.
P.R.Trivedi and Gurdeep Raj. '*Environmental Ecology*'
Buddhadev Sarma and Tej Kumar, *Indian Wildlife Threats and Preservation*
Chapman J.L. and Reiss M.J, *Ecology Principles and Applications*, Second Ed., Cambridge University Press, London.
Benny Joseph, *Environmental Studies*, TATA MGraw Hill Com., New Delhi.
Eugene P. Odum, *Fundamentals of Ecology*.Third Ed., NataraJ Publishers, Dehradun.
Veer Bala Rastogi, "Ecology and Animal Distribution"
P.K. Gupta, "Text Book of Ecology and Environment"
Bhatnagar and Bansal, "Ecology and Wildlife biology
Dasmann, "Wild life Biology"
Reena Mathur, "Animal Behaviour"
Alocock, "Animal Behaviour- an Evolutionary Approach

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B.Sc. I Year
B.Sc. PRACTICAL SYLLABUS FOR II SEMESTER
Discipline Specific Course, Paper – II
[Code: BS205; Course Type DSC 2B]
Ecology, Zoogeography and Animal Behavior

Periods: 30 **Max. Marks: 50**

1. Determination of pH of Soil and Water
2. Estimation of salinity (chlorides) of water in given samples.
3. Estimation of Carbonates and bicarbonates in the given water samples.
4. Estimation of dissolved oxygen of pond water, sewage water and effluents.
5. Identification of Zooplankton from a nearby water body.
6. Study of Pond Ecosystem / local polluted site - Report submission
7. Study of at least 3 endangered or threatened wild animals of India through photographs / specimens / models
8. Field visit to Zoo Park to study the management, behavior and enumeration of wild animals.
9. Identification of Zoogeographical realms from the Map and identify specific fauna of respective regions.
10. Observe the response of invertebrates in different lightening conditions

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

Suggested manuals

1. **Robert Desharnais,Jeffrey Bell,** 'Ecology Student Lab Manual, Biology Labs'
2. **Darrell S Vodopich,** 'Ecology Lab Manual'

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B.Sc. I Year
PRACTICAL MODEL PAPER FOR II SEMESTER
Discipline Specific Course, Paper – II
[Code: BS205; Course Type DSC 2B]
Ecology, Zoogeography and Animal Behavior

Time: 2 Hrs. **Max. Marks: 50**

1. Identification, labeled diagram and salient features of Spots: (06 spots)	12
2. Estimation of dissolved oxygen of a pond,	09
3. Identify any **Five** Zooplankton in a given water samples	05
4. Field Visit & Note Book	04
5. Project Report	04
6. Certified practical record	04
7. Viva voce	02

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NAGARJUNA GOVT. COLLEGE, NALGONDA
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Syllabus for B.Sc Course
Subject: ZOOLOGY Theory
SEMESTER-III
Module: BIOLOGY OF CHORDATES

60 Hours (4 hrs/week)

Topics I: Protochordates and Fishes

1.1. Proto chordates : Sailent features of Uro chordata and Cephalo chordata Structure and life history of *Herdmania*, Significance of retrogressive Metamorphosis. **6 hours**
1.2. General organization of Chordates **1hour**
1.3. General characters of Cyclostomes **1 hour**
1.4. General characters of fishes, classification up to sub-class level with examples **2 hours**
1.5. Type study – *Scoliodon*: Morphology, respiratory system, circulatory system, Excretory system, nervous system and sense organs. **7 hours**
1.6. Migration in fishes and types of scales **2 hours**

Topics II: Amphibia

2.1. General characters and classification of Amphibia up to order level **1hour**
2.2 Type study – *Rana*: Morphology, digestive system, respiratory system, circulatory System, excretory system, nervous system and reproductive system **9 hours**
2.3.Parental care in amphibians. **1 hour**

Topics III:Reptilia

3.1. General characters and classification of Reptilia up to order level. **3 hours**
3.2. Type study – *Calotes:* Morphology, digestive system, respiratory system, circulatory system, urinogenital system and nervous system. **9 hours**

Topics IV:Aves and Mammals

4.1. General characters and classification of Aves up to order level with examples. **3 hours**
4.2. Type study – Pigeon (*Columbia livia*) : Exoskeleton, respiratory system, circulating system and excretory system. **6 hours**
4.3. Significance of migration in birds **2 hour**
4.4. Flight adaptation in birds **2 hours**
4.5. General characters and classification of mammalian up to order level with examples **3 hours**
4.6 Dentition in mammals **2 hours**

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NAGARJUNA GOVT. COLLEGE, NALGONDA
(AUTONOMOUS)
Syllabus for B.Sc Course
Subject: ZOOLOGY Theory
SEMESTER-IV
Module: EMBRYOLOGY,ECOLOGY,AND ZOOGEOGRAPHY

60 Hours (4 hrs/week)

Topics I: Embryology

1.1.Spermatogenesis,Oogenesis,and Fertilization.**3hour**
1.2. Types of eggs **3 hours**
1.3. Types of cleavages **4 hours**
1.4. Development of frog up to gastrulation and formation of primary germ layers **9 hours**
1.5. Foetal membranes and their significance **3 hours**
1.6Placenta : types and functions **4 hours**
1.7. Regeneration with reference to Turbellarians and lizards **4 hours**

Topics II: Ecology

2.1.Scope of ecology **1 hour**
2.2. Structure of ecosystem-Biotic and abiotic factor,foodchain,foodweb,energy flow and ecological pyramids. **2 hours**
2.3. Biogeochemical cycles or nutrient cycles – Gaseous cycles of Nitrogen and Carbon,Sedimentary cycle- phosphorus. **2 hours**
2.4. Definition of Community – Habitat and ecological niche **1 hours**
2.5.Community interactions : Brief account on Competition, predation, mutualism, commensalisms and parasitism. **3 hours**
2.6. Ecological succession: Primary and Secondary, seral stages, climax community with examples **3 hours**

Topics III: Population Ecology

3.1. Population ecology :Natality,Mortality,Density and Dispersions of animal populations **4 hours**
3.2. Growth curves and growth of animal populations –r-selected and k-selected Species **2 hours**
3.3. Population regulation mechanisms – both biotic and abiotic **2 hours**
3.4. Growth of human population its control. Future of human population **4 hours**

Topics IV;Zoogeography.

4.1. Zoogeographical realms and their characteristic fauna **7 hours**
a) Oriental realms
b) Australian realms
c) Neotropical realms
d) Ethiopian realms
e) Nearctic realms
f) Palaearctic realms

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PRACTICAL PAPER –II

(CHORDATE, EMBRYOLOGY AND ECOLOGY)

90 hrs
(3hrs/week)

Observation of the following slides / specimens / models:

1. **Protochordata :-** *Herdmania, Amphioxus, Amphioxus T.S through pharynx.*
2. **Cyclostomes:-***Petromyzon and Myxin.*
3. **Pisces:** *Pristis, Torpedo, Channa, Pleuronectes, Hippocampus, Exocoetus, Echeneis, Labeo, Catla, Clarius, Anguilla,* Scales of fishes.
4. **Amphibians:** *Ichthyophis, Amblystoma, Siren, Axolotl larva, Rana; Hyla. Alytes.*
5. **Reptilians:** - *Draco, Chamaeleon, Uromastix, Russel's viper, Naja, Krait, Enhydrina, Testudo Trionyx, Crocodile.*
6. **Aves:** - *Picus, Psittacula, Eudynamus, Bubo, Alcedo.*
7. **Mammalians:** - *Ornithorhynchus, Tachyglossus, Hedgehog, pteropus, Funambulus, Manis.*

DISSECTIONS:

1. V, VII, IX and X cranial nerves of *Scoliodon* or locally available fish.
2. Arterial system of *Scoliodon* or *Calotes*.

OSTEOLOGY:

1. Appendicular skeletons of *Varanus*, Pigeon and Rabbit.

EMBRYOLOGY:

1. Mounting of sperms (Grasshopper/Rat)
2. Observations of following slides / models
2.1. T.S. of testis and ovary (Rat / Rabbit / Human)
3. Different stages of cleavage (2-cell, 4-cell and 8-cell), Morula.
4. Blastula and gastrula of frog.

ECOLOGY:

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

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ELECTIVE I

HEALTH AND HYGIENE

Objectives:-

To impart: awareness on public health and Hygiene
To create knowledge on Health Education.

UNIT – I

Scope of Public Health and Hygiene – nutrition and health – classification of foods – Nutritional deficiencies – Vitamin deficiencies.

UNIT – II

Environment and Health Hazards – Environmental degradation – pollution and associated health Hazards.

UNIT – III

Communicable diseases and their control measures such as Malaria, Dengue, Dysentery, Influenza, Polio, Chikungunya, Rabies, and AIDS.
Food borne diseases, water borne diseases, Air borne diseases, Vector borne diseases.

UNIT – IV

Non – communicable diseases and their preventive measures such as Hypertension, Coronary Heart Diseases, Stroke, Diabetes, Obesity and Mental ill – Health.

UNIT – V

Health Education in India – WHO programs – government and voluntary Organizations and their health service – Precautions first Aid and awareness on sporadic diseases (Cancer)

Reference Books:

Park and Park, 1995: Text book of preventive and social medicine – Banarsidas Bhanot Publ. jodhpur- India.
Verma, S. 1998: Medical zoology, Rastogi Publ.- Meerut- India
Singh, H.s. and Rastogi, P. 2009: Parasitology, Rastogi Publ. India.
Dubey, R.C and Maheswari, D.K. 2007: Text Book of Microbiology – S. Chand & co. Publ. New Delhi, India.

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VERMICULTURE

Objective:

To impart training on Earthworm culture technology

To create knowledge on Self - Employment opportunity

UNIT – I

Eathworm classification – Morphological and Anatomical characteristics. Biology of Lampito maruitti.

UNIT – II

Vermicomposting materials and their classification. Feeding habits and food for composting worms.

UNIT – III

Vermicomposting methods such as – Small scale and large scale pit method, heap method, window method etc., factors affecting vermicomposting such as pH, Moisture, temperature etc.

UNIT – IV

Vermicomposting: General procedure in Homes. Maintenance of vermicomposting beds.

Harvesting the worms. Earthworm Predators, parasites and pathogens.

UNIT – V

Application of Vermicomposting in Agriculture and Horticultural practices. Advantage of Vermicomposting.

Reference Books:

Edwards, C.A., and Bother, B. 1996: Biology of Earthworms – Chapman Hall Publ. Co., London.

Ismail, S.A. 1997: Vermitechnology – the Biology of Earthworms – Orient Longman Publ. – India.

Ranganathan, L.S. 2006: Vermibiotechnology from soil health to Human health – Agrobios – India.

Talashikar, S.C. 2008: Earthworms in Agriculture – Agrobios - India

Gupta, P.K. 2008: Vermicomposting for sustainable agriculture [2nd edition] – Agrobios – India.

NSS SYLLABUS FOR HONOURS/PASS/GENERAL COURSES
(Four Common Semesters)

SEMESTER–I

PAPER–01

Theory Weight – 60
Practical/Project work – 40

No. of Lectures (35)

Unit – 01: Introduction and Basic Concepts of NSS (4)

a) History, philosophy, aims & objectives of NSS (1)
b) Emblem, flag, motto, song, badge etc. (1)
c) Organizational structure, roles and responsibilities of various NSS functionaries (2)

Unit – 02: NSS Programmes and Activities (10)

a) Concept of regular activities, special camping, Day Camps (3)
b) Basis of adoption of village/slums, Methodology of conducting Survey (2)
c) Financial pattern of the scheme (1)
d) Other youth prog./schemes of GOI (2)
e) Coordination with different agencies (1)
f) Maintenance of the Diary (1)

Unit – 03: Understanding Youth (5)

a) Definition, profile of youth, categories of youth (2)
b) Issues, challenges and opportunities for youth (2)
c) Youth as an agent of social change (1)

Unit – 04: Community Mobilisation (9)

a) Mapping of community stakeholders (3)
b) Designing the message in the context of the problem and the culture of the community (1)
c) Identifying methods of mobilisation (3)
d) Youth-adult partnership (2)

Unit – 05: Volunteerism and Shramdan (7)

a) Indian Tradition of volunteerism (1)
b) Needs & importance of volunteerism (2)
c) Motivation and Constraints of Volunteerism (2)
d) Shramdan as a part of volunteerism (2)

Project work/Practical 40 Marks

NSS SYLLABUS FOR HONOURS/PASS/GENERAL COURSES
(Four Common Semesters)

SEMESTER–II

PAPER–02

Theory Weight – 60
Practical/Project work – 40

No. of Lectures (35)

Unit – 01: Importance and Role of Youth Leadership (6)

a) Meaning and types of leadership (2)
b) Qualities of good leaders; traits of leadership (2)
c) Importance and role of youth leadership (2)

Unit – 02: Life Competencies (11)

a) Definition and importance of life competencies (2)
b) Communication (3)
c) Inter Personal (3)
d) Problem-solving and decision-making (3)

Unit – 03: Social Harmony and National Integration (9)

a) Indian history and culture (2)
b) Role of youth in peace-building and conflict resolution (5)
c) Role of youth in Nation building (2)

Unit – 04: Youth Development Programmes in India (9)

a) National Youth Policy (3)
b) Youth development programmes at the National Level, State Level and voluntary sector (4)
c) Youth-focused and Youth-led organisations (2)

Project work/Practical **40 Marks**

Conducting surveys on special theme and preparing a report thereof.

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NSS SYLLABUS FOR HONOURS/PASS/GENERAL COURSES
(Four Common Semesters)

SEMESTER–III

PAPER–03

Theory Weight – 60
Practical/Project work – 40

No. of Lectures (35)

Unit – 01: Citizenship (7)

a) Basic Features of Constitution of India (2)
b) Fundamental Rights and Duties (2)
c) Human Rights (1)
d) Consumer awareness and the legal rights of the consumer (1)
e) RTI (1)

Unit – 02: Family and Society (6)

a) Concept of family, community, (PRIs and other community-based organisations) and society (2)
b) Growing up in the family – dynamics and impact (1)
c) Human values (1)
d) IV) Gender justice (2)

Unit – 03: Health, Hygiene & Sanitation (7)

a) Definition, needs and scope of health education (1)
b) Food and Nutrition (1)
c) Safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan) (2)
d) National Health Programme (2)
e) Reproductive health (1)

Unit – 04: Youth Health (6)

a) Healthy Lifestyles (1)
b) HIV AIDS, Drugs and Substance abuse (2)
c) Home Nursing (1)
d) First Aid (2)

Unit – 05: Youth and Yoga (9)

a) History, philosophy and concept of Yoga (2)
b) Myths and misconceptions about yoga (1)
c) Different Yoga traditions and their Impacts (2)
d) Yoga as a preventive, promotive ,and curative method (2)
e) Yoga as a tool for healthy lifestyle (2)

40 Marks

Project work/Practical

Preparation of research project report.

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NSS SYLLABUS FOR HONOURS/PASS/GENERAL COURSES
(Four Common Semesters)

SEMESTER–IV

PAPER–04

Theory Weight – 60
Practical/Project work – 40

No. of Lectures (35)

Unit – 01: Environment Issues (11)

a) Environment conservation, enrichment and Sustainability (2)
b) Climate change (2)
c) Waste management (2)
d) Natural resource management (5)
(Rain water harvesting, energy conservation, waste land development, soil conservations and afforestation)

Unit – 02: Disaster Management (7)

a) Introduction to Disaster Management, classification of disasters (4)
b) Role of youth in Disaster Management (3)

Unit-03: Project Cycle Management (10)

a) Project planning (2)
b) Project implementation (3)
c) Project monitoring (2)
d) Project evaluation: impact assessment (3)

Unit – 04: Documentation and Reporting (7)

a) Collection and analysis of data (3)
b) Preparation of documentation/reports (2)
c) Dissemination of documents/reports (2)

Project work/Practical **40 Marks**

Workshops/seminars on personality development and improvement of communication skills

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NSS SYLLABUS FOR PASS/GENERAL COURSES

SEMESTER-V

PAPER-05

Theory Weight – 60
Practical/Project work – 40

No. of Lectures (35)

Unit – 1: Vocational Skill Development (20)

This Unit will aim to enhance the employment potential of the NSS volunteers or, alternately, to help them to set up small business enterprises. For this purpose, a list of 12 to 15 vocational skills will be drawn up, based on the local conditions and opportunities. Each volunteer will have the option to select two skill-areas out of this list – one such skill in each semester. The education institution (or the university) will make arrangements for developing these skills in collaboration with established agencies that possess the necessary expertise in the related vocational skills.

Unit – 02: Entrepreneurship Development (8)

a) Definition & Meaning (1)
b) Qualities of good entrepreneur (2)
c) Steps/ways in opening an enterprise (3)
d) Role of financial and support service Institutions (2)

Unit – 03: Youth and Crime (7)

a) Sociological and Psychological Factors influencing Youth Crime (2)
b) Peer Mentoring in preventing crimes (1)
c) Awareness about Anti-Ragging (1)
d) Cyber Crime and its Prevention (2)
e) Juvenile Justice (1)

Project work/Practical 40 Marks

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NSS SYLLABUS FOR PASS/GENERAL COURSES

SEMESTER–VI

PAPER–06

Theory Weight – 60
Practical/Project work – 40

No. of Lectures (35)

Unit – 1: Vocational Skill Development (20)

This Unit will aim to enhance the employment potential of the NSS volunteers or, alternately, to help them to set up small business enterprises. For this purpose, a list of 12 to 15 vocational skills will be drawn up, based on the local conditions and opportunities. Each volunteer will have the option to select two skill-areas out of this list – one such skill in each semester. The education institution (or the university) will make arrangements for developing these skills in collaboration with established agencies that possess the necessary expertise in the related vocational skills.

Unit – 02: Civil/Self Defense (5)

a) Civil defense services, aims and Objectives of civil defense (2)
b) Needs for Self defense training (3)

Unit-03: Resource Mobilisation (3)

a) Writing a Project Proposal (2)
b) Establishment of SFUs (1)

Unit-04: Additional Life Skills (7)

a) Positive Thinking (1)
b) Self Confidence and Self Esteem (2)
c) Setting Life Goals and working to achieve them (2)
d) Management of Stress including Time Management (2)

Project work/Practical 40 Marks

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B.SC III YEAR SYLLABUS THEORY 2016-17

SEMESTER- V CORE ANIMAL PHYSIOLOGY

THEORY PAPER –V

UNIT I

Physiology of Digestion

1.1 Definition of digestion and types of digestion – extra and intracellular.

1.2 Digestion of Carbohydrates, proteins, lipids and cellulose digestion.

1.3 Absorption and assimilation of digested food materials.

1.4 Gastrointestinal hormones – control of digestion.

1.5 Types of respiration – external and internal respiration

Physiology of respiration

.1.6 Structure of mammalian lungs and gaseous exchange.

1.7 Transport of oxygen – formation of oxyhaemoglobin and affinity of haemoglobin for Oxygen, Oxygen dissociation curves.

1.8 Transport of CO_2 – Chloride shift, Bohr effect.

1.9 Cellular respiration – Main steps of glycolysis, Kreb's cycle, electron transport, Oxidative phosporylationa and ATP production (Chemosmotic theory).

UNIT II

2.0. Physiology of Circulation

2.1 Open and closed circulation.

2.2 Structure of mammalian heart and its working mechanism – Heartbeat and cardiac cycle. Myogenic and neurogenic hearts.

2.3 Regulation of heart rate – Tacchycardia and Bradycardia.

Physiology of Excretion

2.4 Definition of excretion.

2.5 Forms of nitrogenous waste material and their formation: classification of animals on the basis of excretory products.

2.6 Gross organization of mammalian excretory system and structure of kidney.

2.7 Structure and function of Nephron – Counter current mechanism.

UNIT III

3.0. Physiology of muscle contraction

3.1 Gneral structure and types of muscles.

3.2 Ultra structure of skeletal muscle.

3.3 Sliding filament mechanism of muscle contraction.

3.4 Chemical changes during muscle contraction – role of calcium,ATP utilization and its replenishment.

UNIT IV

Physiology of nerve impulse

3.5 Structure of nerve cell.

3.6 Nature of nerve impulse – resting potential and action potential. Properties of nerve impulse – threshold value, refractory period, all or none response.

3.7 Conduction of nerve impulse along an axon – local circuit theory and salutatory conduction theory.

3.8 Structure of synapse, mechanism of synaptic transmission – electrical and chemical

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B.SC III YEAR SYLLABUS THEORY 2016-17

SEMESTER- VI ADVANCE ELECTIVE I APPLIED ZOOLOGY AQUACULTURE AND HEMATOLOGY

THEORY PAPER –VI

UNIT I

1.0. Fisheries

1.1. Capture fisheries – Introduction
1.2. Types of fisheries, Fishery resources from Freshwater, Brackish water and Marine habitats.
1.3. Finfish and shell fisheries. 1.4. Fishing gears and fishing crafts.

UNIT II

Aqaculture

2.1. Freshwater, Brackish water and Mariculture.
2.2 Site selection criteria.
2.3 Aquaculture systems
2.4. Induced breeding.
2.5 Hatchery design and Management seed transportation

2.6 Larval rearing – Nursery ponds, rearing and grow out ponds
2..7 Shrimp and Prawn culture
2.8Hatchery systems, Seed transport, common diseases and control

UNIT III

Harvesting Technology
3.1 Hatchery systems
3.2. Post-harvest technology
3.3 Preservation and processing – Freezing, solar drying, Canning, salting smoking, By product of fish cool miner

UNIT IV

Hematology 8 hours
4.1. Blood composition and functions
4.2. Blood groups and transfusion problems
4.3. Blood diseases – Anemia, Leukemia, Leucocytosis, Leucopenia
4.4. Biopsy and – Clinical importance.
4.5. autopsy – Clinical importance.

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B.Sc III-ZoologyPAPER- V

GENETIC ENGINEERING(CBCS)(Advanced Elective-II)

60 hrs
(3 hrs/ week)

1 Recombinant DNA Technology

1.1 Enzymes used in gene cloning : Restriction endonucleases, Ligases, Phosphatases, Methylases, Kinases

1.2 Cloning vehicles – Plasmids, Cosmids, Phage vectors, Shuttle vectors, Baculovirus vector system.

1.3 Construction of genomic and cDNA libraries

2Applications in rDNA Technology

2.1 Identification of cloned genes

2.2 Application in genetic engineering –HUMILLIN, SOMTOSTATATIN,GOLDEN RICE with Vitamin A

2.3 Recombinant vaccines productions

3Virology

3.1 Structure and composition of viruses.

3.2 One-step growth and determination of plaque forming units (PFU).

3.3 Isolation and cultivation of bacterial plaques.

3.4 Lytic and lysogenic life cycle of λ-phage.

3.5 TMV, Retro viruses- HIV.

3.6 Prions and Mycoplasma

Practicals

1. Immuno-diffusion test
2. ELISA Test
3. Microagglutination using microtiter plates (eg. ABO and Rh Blood grouping)
4. Viability tests of cells/bacteria (Evans blue test or Trypan blue test)
5. Coomb's test

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Recommended Books

1. Genetic Engineering - By R. Williamson, Publ: Academic Press
2. Test Book of Molecular Biology - By K.S. Sastry, G. Padmanabhan& C. Subramanyan, Publ: Macmillan India
3. Microbial Genetics - By S.R. Maloy, J.E. Cronan& D. Freifelder, Publ: Jones &Barlett
4. Principles of Gene Manipulation - By R.W. Old & S.B. Primrose, Publ: Blackwell
5. Genes - By B. Lewin - Oxford Univ. Press
6. Molecular Biology &Biotechnol. - By H.D. Kumar, Publ: Vikas
7. Immunology - By G. Reever& I. Todd, Publ: Blackwell
8. From Genes to Clones - By E.L. Winnacker, Publ: Panima, New Delhi
9. Methods for General & Molecular Bacteriology - By P. Gerhardf et al., Publ: ASM
10. Molecular Biotechnology - By G.R. Click and J.J. Pasternak, Publ: Panima
11. Recombinant DNA - By J.D. Watson et al., Publ: Scikentific American Books
12. Immuno diagnostics - By S.C. Rastogi, Publ: New Age
13. Molecular Biology - By D. Freifelder, Publ: Narosa
14. Genes and Genomes – By Maxine Singer and Paul Berg
15. Cell and Molecular Biology - By S.C. Rastogi
16. Genetic Engineering and Biotechnology - By V. Kumar Gera
17. Essentials of Biotechnology – By P.K. Gupta
18. Immunology - By Kubey
19. Gene Biotechnology - By Jogdand
20. Genome - T.A. Brown
21. Gene Cloning - T.A. Brown

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B.SC IIIYEAR SYLLABUS THEORY 2016-17

SEMESTER- VII CORE ANIMAL PHYSIOLOGY,GENETICS &EVOLUTION

THEORY PAPER –VII

UNIT I

1.0. Physiology of Endocrine system

1.1 Relationship between hypothalamus and pituitary gland.

1.2 Hormones of hypothalamus.

1.3 Hormones of Adenohypophysis and Neuro hypophsis.

1.4 Hormones of pineal gland, thyroid gland, parathyroid, thymus, adrenal and pancreas.

1.5 Endocrine control of mammalian reproduction – Male and female hormones – Hormonal control of menstrual cycle in humans

UNIT II.

Physiology of Homeostatis

2.1 Concept of homeostasis and its basic working mechanism.

2.2 Mechanism of Homeostasis – giving three illustration viz., Hormonal control of glucose levels, Water and ionic regulation by freshwater and marine animals and temperature regulation in man.

UNIT III

3.0. Genetics

3.1. Mendel's laws – Law of segregation and independent assortment;

3.2. Genetic interactions –Incomplete dominance, co dominance and epitasis.

3.3. Identification of DNA as the genetic material – Griffith's experiment and Hershey – Chase

experiment. 2.4. Central dogma of molecular biology – Brief account of DNA replication (Semiconservative

method), Replication fork (Continuous and discontinuous synthesis);

3.4. Transcription – Brief account initiation, elongation and termination in eukaryotes;

3.5. Translation; Genetic code; gene regulation as exemplified by lac operon.

UNIT IV

4.0. Organic Evolution:

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

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

4.3. Speciation – Allopatry and sympatry.

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SEMESTER- VIII ADVANCE ELECTIVE
(IMMUNOLOGY,PARASITOLOGY&ANIMAL BIOTECHNOLOGY)
THEORY PAPER –VIII

UNIT –I

1.0 Immunology
1.1. Types of immunity – Innate and acquired
1.2:. Antigens – Haptenes and epitopes and their properties
1.3. Structure and biological properties of human immunoglobulin G (IgG)
1..4. Hypersensitivity – immediate and delayed

UNIT –II

2.1. Blood parasites (structure and Clinical significance of *Plasmodium*).
2.2 Intestinal parasites – Structure and clinical significance *Entamoeba, Giardia, Taenia solim, Ancylostoma, Enterobius*

UNIT –III

.Animal Biotechnology:
3.1. Animal Biotechnology: Scope of Biotechnology, Cloning vectors – Characteristics of vectors, Plasmids.
3.2 Gene Cloning – Enzymatic cleavage of DNA, Restriction enzymes (Endonucleases) and
Ligation

UNIT –IV
Aimal biotechnology

4.1 Transgenic Animal
4.2. Transgenesis and Production of transgenic animals (Fish and Goat).
4.3 Application of Stem Cell technology in cell based therapy (Diabetes and Parkinson's diseases)

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PRACTICAL PAPER – III

ANIMAL PHYSIOLOGY, GENETICS & EVOLUTION

90 hrs
(3 hrs/ week)

ANIMAL PHYSIOLOGY

1. Identification of carbohydrates, proteins and lipids.
2. Unit Oxygen Consumption in an aquatic animal [fish or crab]
3. Quantitative analysis of excretory products.
4. Demonstration of salivary amylase

GENETICS:

5. A, B, O blood group identification.
6. Problems based on Blood grouping.
7. Karyotyping of human chromosomes [Human karyotype figure on paper should be cut in to different sets of chromosomes and students are asked to arrange them in an order and comment on the ideogram]
8. Identification of genetic syndromes given on charts.
9. Problems based on Mendelian inheritance [at least one problem for each for the laws of segregation and law of independent assortment].

REFERENCE BOOKS

1 'Essentials of Animal Physiology' by S.C.Rastogi'

2 'Animal Physiology' by H.C. Nigam.

3'Biology' by Campbell & Reece.

4'Animal Physiology' – Agarwal, R.A. Srivastava, Kaushal, Anil and Kumar.

5'Animal Physiology and Biochemistry' by Dr. B.Annadurai.

6'Principles of Animal Physiology' by Christopher D.Moyes, Patricia M Schulte.

7'Biology: The Science of Life' by R.A. Wallace, G.P. Sanders & R.J. Ferl.

8'Biology: Concepts and Applications' by Starr

9'Genetics' Vol-I. by C.B.Powar., Himalaya Publishing House Pvt.Ltd.

10'Genetics' by Strickberger.

11'Genetics' by P.K. Gupta.

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10. 'Genetics' by Strickberger.
11. 'Genetics' by P.K. Gupta.
12. ' Cell Biology, Genetics, Evolution and Ecology' by P.S.Varma and V.K. Agrawal; S. Chand and Company.
13. 'Principles of Genetics' by S.B.Basu and M.Hossain.
14. 'Principles of Genetics' by Gardner, Simmons & Smustard.
15. 'Principles of Genetics' by H. Robert & Tamasin.
16. 'Genetics' by P.S.Verma & V.K.Agarwal.
17. 'Organic Evolution' by M.P.Arora & Chandrakanta.
18. 'Organic Evolution' by N.Arumugam.
19. ' Animal nutrition' by P.Mc Donald, R.A. Edwards, J.F.D. Greenhalgh, C.A. Morgan.

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NAGARJUNA GOVT. COLLEGE, NALGONDA.
(Autonomous)
B.SC III YEAR SYLLABUS THEORY 2016-17
SEMESTER- VI ADVANCE ELECTIVE AQUACULTUREAND PARASITOLOGY

PRACTICAL PAPER –VI

FISHERIES AND AQUACULTURE

1.0. Identification of important Freshwater and Marine edible fishes (Minimum 10)
2.0. Identification of important edible prawns (Minimum 5)

FIELD WORK:

Field work is compulsory. Field trip to local fisheries / aquaculture unit is to be conducted and
certified field note book should be submitted at the time of practical examination.

CLINCIAL SCIENCE:

1.0. Identification of the following protozoan parasites.
a) Entamoeba histolytica
b) Giardia intestinalis
c) Balantidium coli
d) Trypanosoma gambiense
e) Plasmodium – Any two stages

2.0. Identification of the following helminth parasites.
a) Taenia solium
b) Ascaris (Male and female)
c) Enterobius vermicularis
d) Dracanculus medinenesis
e) Ancylostoma duodenale

CLINICAL SCIENNCE

1. Blood cell counting – RBC and WBC
2. Estimation of Haemoglobin (Sahi's Method)

ANIMAL BIOTECHNOLOGY:

1. Identification of vectors (charts or photographs)
2. Identification of Genetic disorders (charts or photographs)
Identification of transgenic animals (charts or photographs)

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NAGARJUNA GOVERNMENT COLLEGE,NALGONDA
(AUTONOMOUS)
B.Sc III-Zoology PAPER- VI
ENVIRONMENTAL BIOTECHNOLOGY:(ADVANCED ELECTIVE-II)

60hr
(3hrs/ week)

Unit I:Biological Treatment of Wastewater – Aerobic System

Biological processes for domestic and industrial waste water treatments; Aerobic systems - activated sludge process, trickling filters, biological filters, rotating biological contractors (RBC), Fluidized bed reactor (FBR), expanded bed reactor, Inverse fluidized bed biofilm reactor (IFBBR) packed bed reactors air- sparged reactors, Biological Treatment of Wastewater – Anaerobic System

Unit II: Bioremediation

Introduction, constraints and priorities of Bioremediation, Biostimulation of Naturally occurring microbial activities, Bioaugmentation, in situ, ex situ, intrinsic & engineered bioremediation,Solid phase bioremediation - land farming, prepared beds, soil piles, Phytoremediation

Unit III: Metal Biotechnology

Mining and Metal biotechnology – with special reference to Copper & Iron. Microbial transformation, accumulation and concentration of metals, metal leaching, extraction and future prospects.

Bio Fuels

Microorganisms and energy requirements of mankind; Production of nonconventional fuels - Methane (Biogas), Hydrogen, Alcohols and algal hydrocarbons,

Use of microorganisms in augmentation of petroleum recovery.

Unit IV: Hazardous Waste Management- I

Introduction - Xenobiotic compounds, recalcitrance. hazardous wastes - biodegradation of Xenobiotics . Biological detoxification - market for hazardous waste management –

Hazardous Waste Management- II

biotechnology application to hazardous waste management - examples of biotechnological applications to hazardous waste management - cyanide detoxification - detoxification of oxalate, urea etc. - toxic organics - phenols.

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TEXT BOOKS:

1. Environmental Biotechnology by S. K. Agarwal
2. Biodegradation & Bioremediation (1999), Martin Alexander, Academic press.

REFERENCES:

1. Stanier R. Y., Ingram J.L., Wheelis M.L., Painter R.R., General Microbiology, McMillan Publications, 1989.
2. Foster C.F., John Ware D.A., Environmental Biotechnology, Ellis Horwood Ltd., 1987.
3. Karrely D., Chakrabarty K., Omen G.S., Biotechnology and Biodegradation, Advances in Applied Biotechnology Series, Vol.4, Gulf Publications Co. London, 1989.
4. Bioremediation engineering; design and application 1995 John. T. cookson, Jr. Mc Graw Hill, Inc.
5. Environmental Biotechnology by A.K. Chatterjee
6. Environmental Biotechnology by S.N.Jogdand Himalaya Publishing

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B.Sc., Zoology

Semester-I,

Model Question Paper

Time:2 ½ hour Marks:70

Section-I

Answer all the questions

5x2=10

1. Name different cells of Porifera
2. What is Polymorphism? Give two examples.
3. What are the controlling measures for dracunculosis?
4. How many types of true coelom exists? Name them with examples.
5. Hemichordata divided into how many classes and what are they and give examples

Section-II

Answer any four of the following questions

4x5=20

6. Classify kindom animalia.
7. Explain life cycle of Elphidium
8. Draw a neat labled diagram of Nematocyst.
9. Give prophylaxis for controlling schistosoma
10. What are the affinities of peripatus.
11. Explain pearl formation.

Section-III

Answer all the questions

Draw diagrams where ever neccessaary

4x10=40

12. Write about locomotion in Protozoa

    Or

    Explain canal system in sponges
13. Give a note on the life cycle of Schistosoma haemotobium

    Or

    Explain corla reef formation

14. Explain different types of Mouth parts in class Insecta

    Or

    What is metamerism? Explain its evolutionary significance.

15. Write about Water vascular system in sea star

    Or

    What are the characters of Balanoglossus and explain its affinities.

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B.Sc., Zoology

Semester-II,

Model Question Paper

Time:2 ½ hour Marks:70

Section-I

Answer all the questions

1. What is ecology. 5x2=10
2. What is ecosystem? Give few examples for ecosystem.
3. What is population growth curve? How many types are there draw them
4. What is discontinuous distribution?
5. What is pheromone? Give two examples for it.

Section-II

Answer any four of the following questions

6. What is food web? Explain with an example. 4x5=20
7. Explain ecological succession.
8. What is green house effect? Explain
9. Name national parks and sanctuaries in India.
10. What is Wallace line? Explain
11. How do you explain social behaviour in animals?

Section-III

Answer all the questions

Draw diagrams where ever neccessaary

12. Give an account on aquatic ecosystem. 4x10=40

    Or

    What is biogeochemical cycles? Explain Nitrogen cycle.
13. What is environmental pollution? What are the sources, effect and control measures of air pollution?

    Or

    List the endangered species in india. Give the reasons for this condition.
14. Explain different zoogeographical regions.

    Or

    Explain continenetal drift.

15. What are the different types of behaviour in animals?

    Or

    Write about physiology and phylogony of learning in animals.

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NAGARJUNA GOVT. COLLEGE, NALGONDA
(AUTONOMOUS)
CBCS MODEL QUESTION PAPER
B.Sc ZOOLOGY
SEMESTER-III
BIOLOGY OF CHORDATES

Time: 21/2 Hours **Max.Marks:70**

I. Answer the following questions **2x5=10**

1. Ascidians' tadpole larva
2. Dipnoi
3. Air sacs
4. Sexual dimorphism in frog
5. Placoid scale

II. Answer any four of the following questions **5x4=20**

6. Describe the salient futures of Urochordata
7. Write an essay on migration of fishes
8. Describe the pulmonary respiration in frog
9. Enumerate the general characters of Reptilians
10. Write about the flight adaptations in birds
11. Write essay on dentition in mammals

III. Answer the following questions **10x4=40**

12. a) Write about retrogressive metamorphosis in herdmania and its significance

Or

b) Give a comparative account of lamprey and hog fish

13. a) Describe the different types of scales in fishes

Or

b) Explain the arterial system of scoliodon

14. a) write an essay on parental care in amphibians

Or

b) Describe the arterial system of calotes

15. a) Write about general characters of mammals

Or

b) Describe the structure of heart of a bird

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NAGARJUNA GOVT. COLLEGE, NALGONDA
(AUTONOMOUS)
CBCS MODEL QUESTION PAPER
B.Sc ZOOLOGY
SEMESTER-IV
EMBRYOLOGY, ECOLOGY, AND ZOOGEOGRAPHY

Time: 21/2 Hours **Max.Marks:70**

I. Answer the following questions **2x5=10**

1. Fertilization significance
2. Cleidoic eggs
3. Cleavage
4. Age pyramid
5. nitrification

II. Answer any four of the following questions **5x4=20**

6. Describe the process of spermatogenesis
7. Write an essay on egg membranes
8. Discuss gastrulation in frog
9. Describe functions of placenta
10. Give a brief account on community interaction
11. Explain the population dispersal

III. Answer the following questions **10x4=40**

12. a) What are foetal membranes? How are they developed?

Or

b) Write an essay on placentaion in mammals.

13. a) Differentiate between spermatogenesis and oogenesis

Or

b) Give classification of eggs based on the amount of yolk

14. a) Describe the carbon bio geo chemical cycle

Or

b) Explain the ecological succession by giving an example

15. a) Explain the oriental geo graphical region

Or

b) Describe the future of human population

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Faculty of Science

B.A./B.Com./B.Sc. **II Yr. IV** Semester-End Examination, Mar/Apr 2016

VERMI COMPOST

(INTER DISCIPLINARY/ GENERAL ELECTIVE)

Time: 2 ½ Hrs. Max.Marks: 50

SECTION - A (3 x 10 = 30)

Answer any three of the following questions.

1. Explain the reproductive system of Earthwarm with neat labelled diagram.
పటము సహాయంతో వానపాము యొక్క ప్రత్యుత్పత్తి వ్యవస్థను వివరింపుము.

2. Write about the scope and importance of Vermi Technology.
వెర్మి టెక్నాలజి యొక్క పరిధిని, ప్రాముఖ్యతను గూర్చి వ్రాయుము.

3. Describe the various methods of Vermicomposting.
వెర్మి కంపోస్ట్ ఎరువుల తయారీలో గల వివిధ పద్ధతులను వివరింపుము.

4. What are the factors influencing the culture of earthwarms.
వానపాముల ప్రజననము పై ప్రభావము చూపే కారకాలను తెలుపుము.

5. Write about shapes and importance of warm casts.
వానపాము విసర్జనాల యొక్క ఆకారాలను మరియు ప్రాముఖ్యతను గూర్చి వ్రాయుము.

SECTION - B (4 x 5 = 20)

Answer any four of the following questions.

6. Write about the external characters of Earthwarm.
వానపాము యొక్క బాహ్య లక్షణాలను గూర్చి వ్రాయుము.

7. What are stpes involved in Vermi culture.
వానపాము ప్రజననముతో గల వివిధ దశలను గూర్చి తెలుపుము.

8. Need of Vermi Culture.
వానపాము ప్రజననము యొక్క ఆవశ్యకత.

9. Good qualities of vermibed material.
వెర్మిబెడ్ తయారీకి కావలసిన వస్తువుల మంచి లక్షణాలు.

10. Write about Pit method in Vermi composting.
వెర్మి కంపోస్ట్‌లో గల పిట్ పద్ధతిని గూర్చి వ్రాయుము.

11. Composition of Warm casts.
వానపాము విసర్జనములో గల వివిధ రకాల సమ్మేళనాలు.

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FACUTLY OF SCIENCE

BS c III YEAR V SEMISTER –END EAMINATIONS

ANIMALPHYSIOLOGY PAPER V

TIME :2.30MIN **MAX MARKS 70**

I Answere the following questions 5x2=10

1) Bhoreffect, chloride shift
2) What are chylomicrons
3) Iso tonic, Isometric muscle contractions
4) Columns of Bethini and Belliniducts
5) What are neurtransmiteers

II Answerer any four of the following questions 4x5=20

6) How many types of digestion explain with examples
7) Write in detailed about transport of CO2
8) What are the chemical reaction in muscle contraction
9) How many types of circulation are thare explain ir
10) Draw a well labelled diagram of heart
11) Draw a diagram of Nephron

III Answer the following questions 4x10=40

9) Cellulose digestion

OR

Write about carbohydrates and protein digestion

10) Glycolysis

OR

Krebs cycle

11) Write about working mechanism of heart

OR

Counter current mechanism

15) Write about sliding filament theory

OR

Synoptic transmissin

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NAGARJUNA GOVERNMENT COLLEGE(AUTONOMOUS)

GENETIC ENGINEERING (CBCS)(Advanced Elective-II)
MODEL QUESTION PAPER -PAPER- V

III YEAR (ADVANCED ELECTIVE-I)

TIME 2.30 hrs **MARKS: 70**

SECTION-A

I.ANSWER THE FOLLOWING QUESTIONS **5X2=10**

1.Methylase
2.PBR322
3.Southern blotting
4.Golden rice
5.Thymus

SECTION-B

II.ANSWER ANY FOUR OF THE FOLLOWING QUESTIONS **4X5=20**

1.Palindromic sequences
2.Somatostatin
3.Hapten
4.MHC Complexes
5.Rheumatoid Arthritis
6.Prions & Mycoplasma

SECTION –C

III.ANSWER THE FOLLOWING QUESTIONS **4X10=40**

1 a.)Write the role of restriction endonuclease enzyme in gene cloning.?

Or

b.)Write the brief an account on construction of recombinant DNA.?

2. a.) Explain about the Recombinant vaccines and its production?

Or

b.) Applications of rDNA technology in Genetic engineering?

3.a.)Write the physico-chemical properties of Antigens?

Or

b.)What is Hypersensitivity-Explain its type with examples ?

4.a.)Explain Isolation and cultivation of plaques?

Or

b.)what is Retro virus?Explain HIV replication with neat diagram?

FACUTLY OF SCIENCE

BSc III YEAR V SEMISTER –END EAMINATIONS

APPLIED ZOOLOGY PAPER VI

TIME :2.30MIN **MAX MARKS 70**

I Answer the following questions 5x2=10

1) Marine pelagic fish
2) Katamarans
3) Mari culture
4) Write the composition of blood
5) Biopsy

II Answer any four of the following questions 4x5=20

6) Describe the fin fisheries
7) Aquaculture systems
8) Write an easy on carp jar hatchery
9) Viral diseases in culture ponds
10) List out the by products of fishes
11) Explain the functions of different WBC

III Answer the following questions 4x10=40

12) Write about fishing crafts

OR

Write about fishing gears

13) Write in detail the culture of shrimps

OR

Write an easy on preserving methods of fishes

14) Give an account on carp induced breeding in carps

OR

Write an easy on site selection for finger links and adult fishes

15) Write an easy on anaemia

OR

Describe the blood composition and functions

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FACUTLY OF SCIENCE

BS c III YEAR V SEMISTER –END EAMINATIONS

ANIMALPHYSIOLOGY PAPER VI

TIME :2.30MIN **MAX MARKS 70**

I Answere the following questions 5x2=10

1) Neuro hypophysis
2) Melatonin
3) Alleles
4) Barrbodies
5) Eurihaline and stenohaline animals

II Answerer any four of the following questions 4x5=20

6)Adrenal gland

7)Thyroxin hormonal disorders

8)Write about hormonal regulations in marine fishes

9) Mendelein principles
10) Banding Techniques
11) Transformation theory

III Answer the following questions 4x10=40

12) Adenohypophysial hormones

OR

Write about hormonal control in reproduction

13) Write an essay on thermo regulation in humans

OR

Define homeostasis and explain the same in different organisms

14) Gene regulation in prokaryotes

OR

D.N.A Replication

15) Write about autosomal disorders

OR

Write about Allosomal disorders

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NAGARJUNA GOVERNMENT COLLEGE(AUTONOMOUS)

MODEL QUESTION PAPER

B.Sc III-BiotechnologyPAPER- VI

ENVIRONMENTAL BIOTECHNOLOGY(ADVANCED ELECTIVE-II)

TIME 2.30 hrs

SECTION-A

MARKS: 70

I.ANSWER THE FOLLOWING QUESTIONS **5X2=10**

1. Waste water Treatment.
2. Fluidised bed reactor
3. Palindromic repeats
4. Bioaugmentation
5. Metal leaching

SECTION-B

II.ANSWER ANY FOUR OF THE FOLLOWING QUESTIONS **4X5=20**

6. Write in detail about the waste water treatment in aerobic system.
7. Write about Bioremediation.
8. Describe the process of mining and extraction of iron
9. write the petroleum recovery methods.
10. what are biofuels and their importance.
11. write the anerobic system of waste water treatment.

SECTION –C

III.ANSWER THE FOLLOWING QUESTIONS

4X10=40

12.a.).Describe the process of domestic and waste water treatment?

Or

b.)Write the Biological Treatment of Wastewater – Anaerobic System?

13.a.)Write in detail about constraints and priorities of Bioremediation?

Or

b.)Define Solid phase bioremediation and its procedures?

14.a.)Describe the Mining of copper?

Or

b.)write in detail about Microorganisms and energy requirements of mankind fuels – Methane (Biogas)?

Or

15.a.)Define Biological detoxification and its methods?

b.)Write in detail about detoxification of oxalate, urea

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FACUTLY OF SCIENCE

BSc III YEAR V SEMISTER –END EAMINATIONS

IMMUNOLOGY AND ANIMALBIOTECHNOLOGY PAPER VIII

TIME :2.30MIN **MAX MARKS 70**

I Answer the following questions 5x2=10

1) Antigens
2) Pagocytosis
3) LDL HDL
4) Parkinsons disease
5) What is diabetic keto acidosis

II Answer any four of the following questions 4x5=20

6) Haptons
7) Antibody dependent cytotoxic hypersensitivity
8) Erithoblastosis foetalis
9) What are the essential factors for antigeniciti
10) Entomoeaba histolitica
11) Functions of cholesterol
12) Classified the plasmids and write pBR 322

III Answer the following questions 4x10=40

13) What is immunity ? Describe the innate and acquired immunity

OR

Describe the structure of immunoglobulin Ig G and write properties.

14) Explain the structure and clinical significance of plasmodium

OR

Write about two intestinal parasites.

15) Describe briefly the scope of Biotechnology .

OR

What is gene cloning ? briefly describe

16)What is transgenesis ? Briefly write about it in fishes

OR

Explain briefly about the application of stem cells in diabetes

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