

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(Autonomous) Reaccredited by NAAC with 'A' Grade

(Affiliated to Mahatma Gandhi University)

(www.ngcnalgonda.org)

2018

DEPARTMENT OF ZOOLOGY



DEPARTMENT OF ZOOLOGY PROFILE 2018

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NAGARJUNA GOVT.DEGREE COLLEGE NALGONDA

History of the Department of Zoology

The college was established in the year 1956 as a first Govt.Degree college in Nalgonda with Science and Arts departments. Sri B.Madhava Reddy was the first head of the department of zoology. Since establishment of the college the department of Zoology has been developed gradually and brought to the present status. M.Sc Zoology is started from 2006-07 academic year and running successfully.

Building area and labs facilities :

The Zoology department's building is set up with 3000 sq.ft.Four labs are there for the purpose of conducting the regular practical classes for B.Sc., (BZC ,BZG ,MZC,BZCA,MtZC) I , II and III Year classes for both the media i.e., Telugu and English and to P.G Zoology students.

Four laboratories are there having with all equipped materials i.e, Sufficient microscopes and scientific instruments for conducting the practical classes.

Museum :

A well established animal museum is arranged for keeping specimen's and models for different animals which are most useful to the students. A permanent museum keeper is also appointed to look after the museum properly and to maintain the registers and records of the dissection material (consumed and non- consumed material).

1. Name of the Department	Zoology			
2. Year of Establishment	1956			
3. Courses/ Programmes and subjects combinations offered	<u>UG</u> 1. Botany, Zoology, Chemistry (EM/TM) 2. Botany, Zoology, Geology(TM) 3. Microbiology, Zoology ,Chemistry(EM) 4. Botany ,Zoolozy, Computer Applications (EM) 5. Biotechnology , Botany ,Zoology (EM) <u>PG</u> . M.Sc Zoology			
4. Number of Teaching posts sanctioned and filled	Sanctioned - 04 Filled - 02 Contract -01 Guest faculty - 01 PG Guest Faculty - 03			
5. Number of administrative Staff	Museum Keeper-01			
6. Number of Technical Staff	Lab attender- 01			
7. Number of Students (Men/Women) Give details course-wise	Group	Men	Women	Total
	I			350
	II	77	112	189
	III	66	106	172
	Total	363	348	711
	PG	16	12	28
8. Ratio of Teacher to students	UG 1 : 237, PG-1:20			
9. Ratio of Teachers to Research Scholars	1:20			
10. Number of research scholars who have obtained master's degree from other institutions	Nil			
11. Number of teachers in academic bodies of other Autonomous Colleges and Universities	Nil			
12. Latest revision of curriculum (year)	2016 I year , 2017 II year, 2018 III year			
13. Number of students passed in	NET-01			

14. Overall pass percentage I,II&III YEAR	90%
15. Extension Lectures	09-02-2018 on molecular techniques
16. Awards and recognition received by faculty (last 5 years)	01 Bharatha Nari shiromani K.Neeraja by Health care Trust International
17. Faculty who have Attended National/ International Seminars (last 5 years)	01
18. Number of National/ Inter National Seminars organized (Last 5 years)	March 9 th 2018 Biodiversity for sustainable development
19. Number of teachers engaged in consultancy and the revenue generated	-
20. Number of Ongoing projects and their total outlay	nil
21. Research projects completed during last five years& their Outlay	NIL
22. Number of inventions and patents	Nil
23. Number of PhD Theses guided during the last five years	-
24. Publications by faculty (Last 5 years)	Nil
25. Average citation index and impact factor of publication	Nil
26. Number of Books in the Departmental Library, if any	110
27. Number of Journals/ Periodicals in the departmental library	03
28. Number of Computers	01

29. Annual Budget (excluding salary) | Rs. 20,000/-

1. Faculty profile, adequacy and competency of faculty

B.Sc.

S No	Name of the faculty	Educational Qualification	Designation	Teaching Experience	Specialization
01	V.Nanda Kumar	MSc, B.Ed	H.O.D Lecturer	14Years	Entomology
02	S.Srinath Patel	M.Sc,	Lecturer	16 Year	Endocrinology
03	V.Saritha	M.Sc, B.Ed	Contract Lecturer	5	Entomology
04	CH.Samatha	M.Sc, Ph.d	Contract Lecturer	6	Environmental Science

M.Sc.

S No	Name of the faculty	Educational Qualification	Designation	Teaching Experience	Specialization
1	T.Venkatesham	MSc, B.Ed	Academic Consultant	10 Years	Physiology
2	SK.Giri Babu	MSc (Ph.D)	Academic Consultant	9 years	Physiology
3	M.Anitha	MSc, B.Ed	Academic Consultant	5 years	Physiology
4	G.Sharada	MSc B.Ed	Academic Consultant	2 Year	Physiology

Four faculty positions at the degree level are vacant. The faculty is carrying out the academic and the other related activities competently with the

NAGARJUNA GOVERNMENT COLLEGE (A) NALGONDA

STAFF PROFILE

Name of the incumbent : S. SRINATH PATEL

Designation : LECTURER IN ZOOLOGY

Academic qualifications : M.sc

Area of Research :

Native Place : YADADRI

Date of first appointment : 16-01-2002

Date of joining in the present cadre: 04-06-2013

Date of joining in the present college: 12-05-2017

No of orientation courses attended: 01 (UOH HYD)

No of refresher courses attended: 01 (JNTUH)

No of seminars / workshops attended : 10 SEMINARS, 01 WORKSHOP

No of seminars organized : 01

No of extension lectures organized 01

Co& extra –curricular activities : 01

Award & recognitions : nil

Research activities : nil

Publications : Google

NAGARJUNA GOVERNMENT COLLEGE (A) NALGONDA

STAFF PROFILE

Name of the incumbent : V.NANDA KUMAR

Designation : LECTURER IN ZOOLOGY

Academic qualifications : M.sc B.Ed.

Area of Research :

Native Place : NALGONDA

Date of first appointment : 18-12-1996

Date of joining in the present cadre: 31-07-2016

Date of joining in the present college: 31-062018

No of orientation courses attended: NIL

No of refresher courses attended: NIL

No of seminars / workshops attended : 5

No of extension lectures given under DRC: nil

Co& extra –curricular activities : 02

Award & recognitions : nil

Research activities : nil

Publications : nil

NAGARJUNA GOVERNMENT COLLEGE (A) NALGONDA

STAFF PROFILE

Name of the incumbent : V.SARITHA

Designation : LECTURER IN ZOOLOGY (CF)

Academic qualifications : M.sc , B.Ed

Area of Research :

Native Place : NALGONDA

Date of first appointment : 04-09-2013

Date of joining in the present cadre: 04-09-2013

Date of joining in the present college: 04-09-2013

No of orientation courses attended: NIL

No of refresher courses attended: NIL

No of seminars / workshops attended : 1SEMINARS, 02 WORKSHOP

No of seminars organized : NIL

No of extension lectures organized : NIL

Co& extra –curricular activities : NIL

Award & recognitions : nil

Research activities : nil

Publications

NAGARJUNA GOVERNMENT COLLEGE (A) NALGONDA

STAFF PROFILE

Name of the incumbent : Dr.CH. SAMATHA

Designation : Contract LECTURER IN ZOOLOGY

Academic qualifications : M.sc Ph.D

Area of Research : WARANGAL

Native Place : WARANGAL

Date of first appointment : 12-10-2012

Date of joining in the present cadre: 12-10-2012

Date of joining in the present college: 23-07-2018

No of orientation courses attended: NIL

No of refresher courses attended: NIL

No of seminars / workshops attended : 4/ 1

No of extension lectures given under DRC: nil

Co& extra -curricular activities : 02

Award & recognitions : nil

Research activities : BIODIVERSITY OF BUTTERFLYS

Publications : 10

STUDENT PROFILE ACCORDING TO PROGRAMME OF STUDY, GENDER

- The intake for BSc is 60 students and for MSc it is 30 every year. But Bsc in 120

The department is following the CBCS syllabus. The college got autonomous status in 2006. The syllabus is same with CBCS syllabus as semester system is introduced. The members of the faculty have contributed significantly in the introduction and development of the curricula including laboratory practical. The three year degree course consists of eight papers in all covering a wide range of subjects like Taxonomy, Embryology, Ecology, Genetics, Physiology, Evolution, Zoo Geography, Molecular Biology, Animal Behavior and Applied Zoology.

The Post-Graduation course in Zoology was begun in 2006 with affiliation to Osmania University. The intake of students into MSc Zoology was initially 24 and it was increased to 30 in 2009. It has four semesters in its two year duration with 16 papers in all. The subjects range from Taxonomy to Molecular biology, genetics to evolution, Endocrinology to Etiology, and Environmental Biology to Bio-Technology. In addition to a paper on Computer Applications, Methods in Biology is introduced in the second semester to enable students acquaint themselves with ICT and other recent methods. At the graduation level also a paper on Computer Application is introduced.

4. Trend in the success rate and dropout rate of students during the last five years.

➤ The success rate is 95% and the dropout rate is two percent and a half. And this dropout rate is primarily due to the vacation of a certain number of students on getting selected to courses like Pharmacy, T.T.C and Medicine.

5. Learning resources of the Department like library, computers, laboratories and other such resources.

➤ The Department has well established laboratories, museum, computers with internet facility and a projector. In addition, the Graduation wing possesses almost all equipments necessary for research work like Focusing microscope, Howarth Bath microtonee machine, thin layer chromatography, calorie meters and centrifuges. A sufficient number of books are available in the library for both U.G. and P.G courses. Latest journals are also made available to the students in the college library.

6. Enhancement of the learning resources during the past five years.

➤ Computer with internet facility is made available to the faculty and the students. Latest journals are subscribed to and kept in the library. Projector and computer aided teaching is in practice.

7. Modern teaching methods in practice other than the lecture method.

➤ We use audio-visual aids including power point(PPT) slides for the classroom teaching. OHP and ICT computer aided teaching is in practice. Internet facility is being utilized for downloading latest information. Other teaching methods like group discussions and MANA T.V classes are being followed.

8. Participation of teachers in academic and personal counseling of students.

- The teachers actively participate in academic and personal counseling of the students to help them overcome problems if any and improve their overall personality development.

9. Details of faculty development programs and teachers who benefited during the past five years.

- The faculty members are well qualified and have completed their mandatory requirement of undergoing orientation programmes and U.G.C. sponsored refresher courses. The PG faculty members are also attending workshops being conducted by the departments of Zoology of the nearby Universities. The faculty arranged one day national seminars.

10. Participation of teachers in academic activities other than teaching and research.

- All faculties are involved in co-curricular and extra-curricular activities. Every year gold medals are given away to top rankers in BSc Zoology.

Yearly field trips and project works are taken up with an emphatic focus on local problems like malaria and bio-diversity, and fluorination particularly in our own district of Nalgonda. Every year awareness programmes are being held on immediately relevant issues like dengue fever, chicken guinea, florosis and swine flue, so on. Eminent Faculty from departments of colleges and universities professors in and around and eminent scholars are invited to deliver lectures.

11. Collaborations with other departments and institutions at the national and international level and their outcome during the past five years.

- The Department is closely collaborated with Telangana State Biodiversity Board to organize seminars and to work with the TSBD our students staff are supporting and identifying the species of local area and providing the list to TSBD FOR FURTHER PUBLICATIONS. Our students staff identify the near by hill which is harbouring a diverse species with spices richness and brought to the notice of TSBD to declare it as Biodiversity protected area under the law. The Department is also maintaining an intimacy with the universities in the region as well as with the Zoology branches of other colleges in the district.

12. Research is a significant activity, what are the thrust areas of the department

- The primary thrust area of the department is research on the fluorine prone zones in the district and the adverse impact of the dreadful disease on the already poverty stricken unfortunate lot. The essential motto of the department is to enlighten both the state and the central governments of the day to day escalating gravity of this diabolic infliction through an in-depth study and research and make a plea to give a solution deservedly human to the problem.

13. Details of the ongoing projects and projects completed during the last five years

13. *Details of the ongoing projects and projects completed during the last five years*

➤ Every year the III year Degree students are given a project on a problem of local importance, the details of which are given below.

1. Hb%level in women students
2. Flourosis in Nalgonda District
3. Blood group identification
4. Dengue fever and Chicken Guinea in Nalgonda District.
5. Bio-diversity of the Local Area

14. *Participating of the department in the extension activities of the college.*

Participating of the department in the extension activities of the university.

➤ All the deparment faculty talked on varies topics in seminars conducted by other Colleges.Department incharge K.Neeraja working as N.S.S. P.O. and R.R.C
Co- ordinator Dr. B.Chittaranjan Rao , and Dr.K.Ganesh given guest lectures in various colleges.

15. *Method of continuous student assessment, and evaluations in earlier years*

- The department has semester scheme of examination with 30% internal assessment. Students are continuously assessed through tests in theory,semonars, subjects and laboratory practicals and assignments. Students are also encouraged to participate in seminors & study project workproject work and give presentations on the topics of their choice.

Placements through JKC and students Achievements

Significant achievements of students during the past five years appointed in various software companies and departments.

- The department has gold medal awarding schemes to toppers in UG and PG every year.

16. Involvement of students in academic/co-curricular and other activities of the department

- Students are involved in NSS, NCC, Seminars, Study projects, Community development programs.
- 17. Innovations and best practices initiated/adopted by the departments during the last five years.
- Field visits, study projects, seminars by students, career guidance and counseling the students for improvement of academic growth.

18. Development and expansion plans of the department for the next five years.

- The main aim of the Department is to play a determinant role in the next five years in the eradication of fluorosis and encouraging vermiculture . As our Department also runs a PG course, this task will become more viable, more consequential and more prospective both to the teacher and the taught.

DEPARTMENT HIGHLIGHTS

1. Water quality assessment of the Panagal tank, wells and bore wells in the district of Nalgonda.
2. Counseling to people on the measures of preventing dengue and chicken guinea fever awareness on fluorosis ,AIDS awareness and seasonal diseases.
3. Creating awareness on the swine flue.
4. Rupees 500/- money prize for toppers in every semester.

**DEPARTMENT OF ZOOLOGY
BOARD OF STUDIES (BOS)**

S No	Name	Educational Qualification	Designation
01	V.NANDA KUMAR	HOD, N.G COLLEGE	CHAIRPERSON
02	Prof.V.VANITHA DAS	CHAIRMAN, BOS MGU , NALGONDA	UNIVERSITY NOMINEE
03	SRINADH PATEL	Asst.Prof. of zoology , N.G. College	Subject Expert
04	J.Swamy	Asst.Prof. of zoology , GDC women's Nalgonda	Subject Expert
05	J.Narender Reddy	Asst.Prof. of zoology ,K.N.M.College, Miryalaguda.	Subject Expert
06	V.SARITHA	CJL N.G College	Faculty Member

VISION 2018-19

DEPARTMENT OF ZOOLOGY N.G COLLEGE , NALGONDA

- Organization of national seminar on recent trends in tropical diseases.
- Strengthening of the department by procuring modern scientific lab equipment.
- Getting of recognition to N.G. college as a scientific Centre. Getting more minor and major research projects to develop research aptitude in the U.G and P.G students.
- Organizing more number of useful seminars for the extending knowledge to the U.G,P.G staff and students.
- Giving coaching to Msc,NET,SET, ICAR ,ICMAR fellowship and other competitive examinations.
- Providing more number of computers with internet facility to make available to all the U.G and P.G students.
- Arranging more number of study tours and field trips for inculcate research activity.
- Agreement of M .O.U with TSBD and with medical health institutions and Agriculture department.
- Preparing the students for the JIGNASA study projects.
- Preparing for students as a teacher competitions.
- Encouraging the students for innovative practices

ACTION PALN FOR 2017-18

DEPARTMENT OF ZOOLOGY N.G COLLEGE , NALGONDA

- Organization of national seminar on recent trends in tropical diseases.
- Strengthening of the department by procuring modern scientific lab equipment.
- Getting of recognition to N.G. college as a scientific Centre. Getting more minor and major research projects to develop research aptitude in the U.G and P.G students.
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- Encouraging the students for innovative practices

DEPARTMENT OF ZOOLOGY N.G COLLEGE,NALGONDA

ACTION PLAN 2018-19

September -5th Teachers day

September -1-7th Nutrition week

September - 19 Elocution competition

August - 17 Quiz competition

August - 20 Group discussion

August - 24 Student seminar for II year

October -4 world Animal Day

November -2 Extension Lecture

November -14 World diabetic day

November -27 Student seminar for I year

December 1 AIDS Day

January 1 week Group discussion

Extension lecture in the month of October 7

January 2019

Seminar to be conducted in the month of Feb 2019

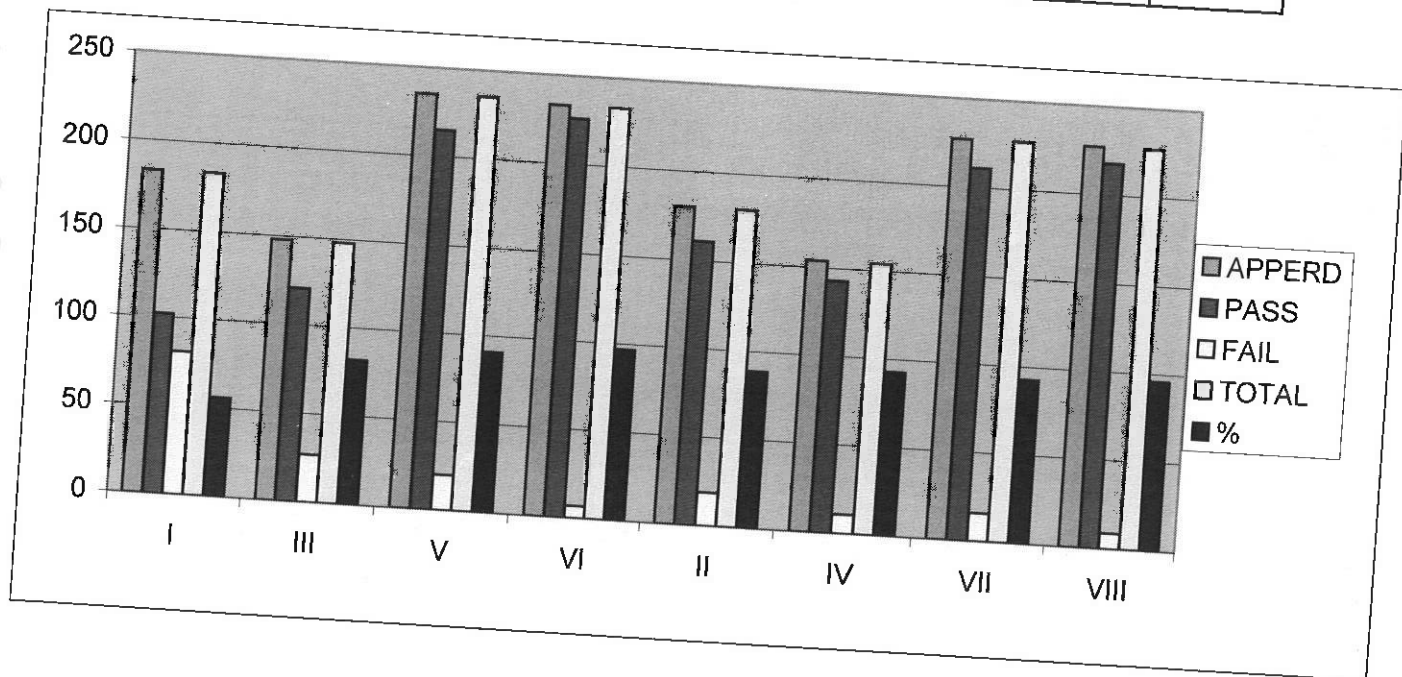
Field trip in the month of September -2018 (2nd week)

DEPARTMENT OF ZOOLOGY RESULT ANALYSIS FROM 2015 TO 2018

ACADEMIC YEAR	SEMISTER	PAPER	APPEARD	PASS	FAIL	TOTAL
	I,II&V	I	183	102	81	183
		III	148	121	27	148
		V	235	215	20	235
		VI	233	226	7	233
2015-16	II,IV&VI	II	180	161	19	180
IV		154	143	11	154	
VII		227	211	16	227	
VIII		227	218	9	227	
	I,II&V	I	182	130	52	182
		III	168	153	15	168
		V	147	100	47	147
		VI	145	138	7	145
2016-17	II,IV&VI	II	174	162	12	174
IV		158	144	14	158	
VII		150	122	28	150	
VIII		148	125	23	148	
	I,II&V	I	185	141	44	185
		III	161	128	33	161
		V	155	145	10	155
		VI	156	148	8	156
2017-18	II,IV&VI	II	177	158	19	177
IV		162	146	16	162	
VII		159	146	13	159	
VIII		159	141	18	159	

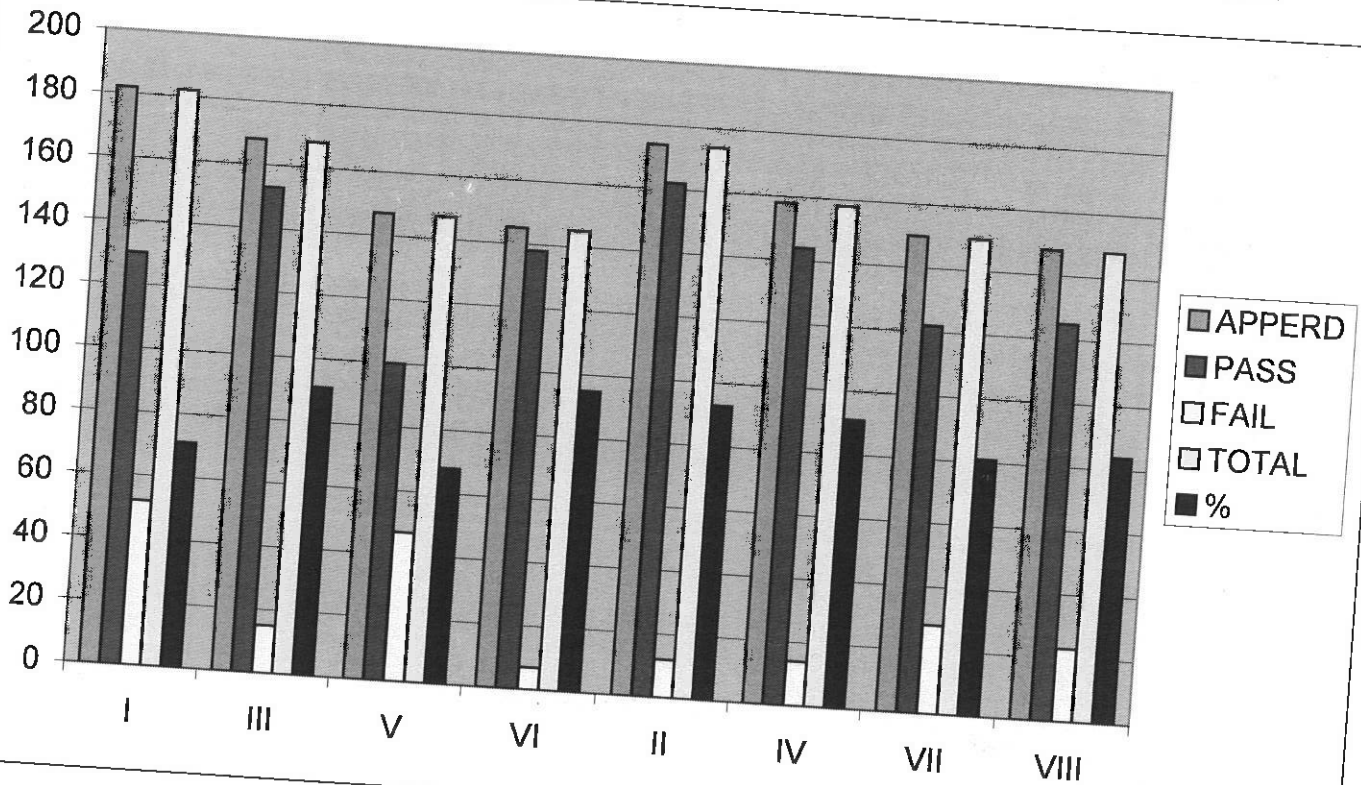
DEPARTMENT OF ZOOLOGY RESULT ANALYSIS 2015-16

ACADEMIC YEAR	SEMISTER	PAPER	APPERD	PASS	FAIL	TOTAL	%
	I,II&V	I	183	102	81	183	56
		III	148	121	27	148	82
		V	235	215	20	235	91
		VI	233	226	7	233	97
		2015-16	II,IV&VI	II	180	161	19
		IV	154	143	11	154	93
		VII	227	211	16	227	93
		VIII	227	218	9	227	96



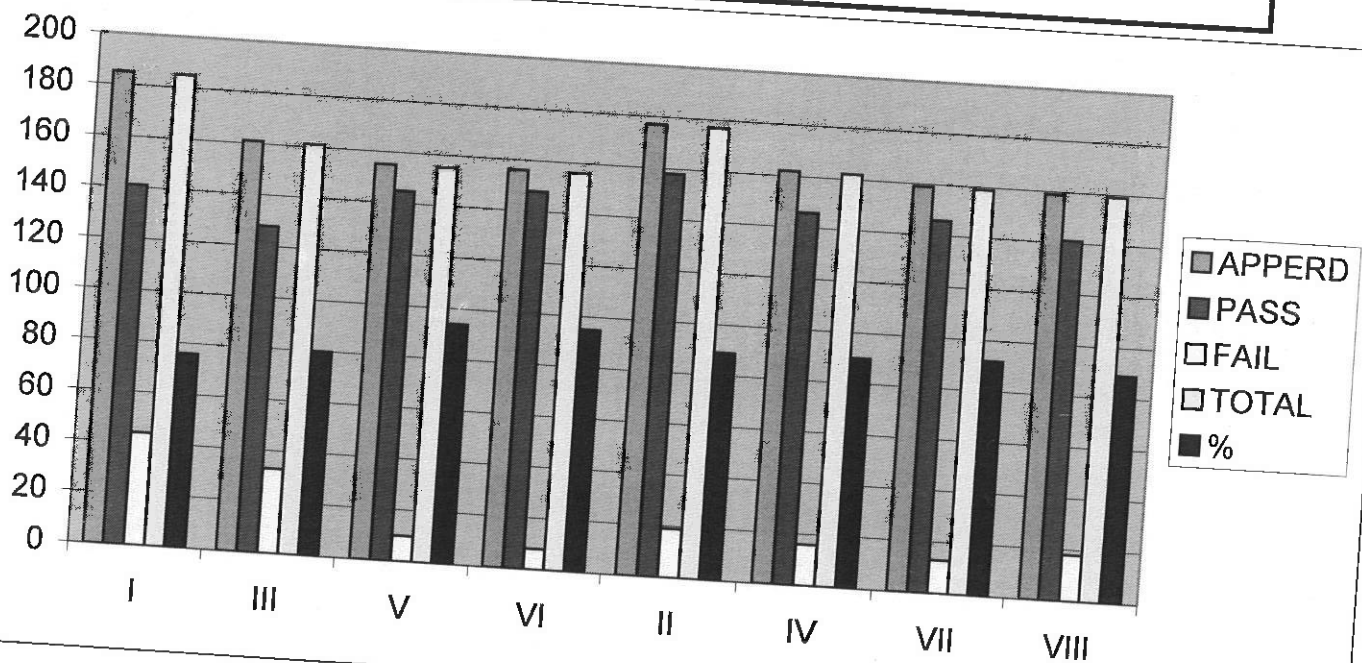
DEPARTMENT OF ZOOLOGY RESULT ANALYSIS 2016-17

ACADEMIC YEAR	SEMISTER	PAPER	APPERD	PASS	FAIL	TOTAL	%
2016-17	I,II&V	I	182	130	52	182	71
		III	168	153	15	168	91
		V	147	100	47	147	68
		VI	145	138	7	145	95
	II,IV&VI	II	174	162	12	174	93
		IV	158	144	14	158	91
		VII	150	122	28	150	81
		VIII	148	125	23	148	84



DEPARTMENT OF ZOOLOGY RESULT ANALYSIS 2017-18

ACADEMIC YEAR	SEMISTER	PAPER	APPERD	PASS	FAIL	TOTAL	%
2017-18	I,II&V	I	185	141	44	185	76
		III	161	128	33	161	80
		V	155	145	10	155	94
		VI	156	148	8	156	95
	II,IV&VI	II	177	158	19	177	89
		IV	162	146	16	162	90
		VII	159	146	13	159	92
		VIII	159	141	18	159	89



B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**CURRICULUM FOR ZOOLOGY
IN UNDER GRADUATE DEGREE PROGRAMME CBCS SYLLABUS SCHEDULE 2016 – 2017
MAHATMA GANDHI UNIVERSITY**

Year	Semester	Paper	Code	Course Type*	Title of the Paper	No. of Credits	No. of hours per week	Exam Hrs.	Max. Marks			
									I.A	End Exam	Total	
I	I	I	BS105	DSC-2A Theory	Animal Diversity-Invertebrates	4	4	2	20	40	60	
				DSC-2A Practical	Animal Diversity-Invertebrates	1	2	2	-	40	40	
	II	II	BS205	DSC-2B Theory	Ecology, Zoogeography and Animal Behavior	4	4	2	20	40	60	
				DSC-2B Practical	Ecology, Zoogeography and Animal Behavior	1	2	2	-	40	40	
			BS301	SEC-1	SEC	2	2	2	10	40	50	
II	III	III	BS305	DSC-2C Theory	Animal Diversity-Vertebrates and Developmental Biology	4	4	2	20	40	60	
				DSC-2C Practical	Animal Diversity-Vertebrates and Developmental Biology	1	2	2	-	40	40	
			BS401	SEC-2	SEC	2	2	2	10	40	50	
	IV	IV	BS405	DSC-2D Theory	Cell Biology, Genetics and Evolution	4	4	2	20	40	60	
DSC-2D Practical				Cell Biology, Genetics and Evolution	1	2	2	-	40	40		
III	V	V	BS504	DSC-2E Theory	Physiology and Biochemistry	3	3	2	20	40	60	
				DSC-2E Practical	Physiology and Biochemistry	1	2	2	-	40	40	
	VI	VI	BS507	DSE-2E (A, B, C) Theory	Applied Zoology / Entomology/Sericulture	3	3	2	20	40	60	
				DSE-2E (A, B, C) Practical	Applied Zoology / Entomology/Sericulture	1	2	2	-	40	40	
			BS601	SEC-4	SEC	2	2	2	10	40	50	
			BS602	GE-2 Theory	Clinical Science	2	2	2	20	40	60	
	VII	VII	BS604	DSC-2F Theory	Immunology and Animal Biotechnology	3	3	2	20	40	60	
				DSC-2F Practical	Immunology and Animal Biotechnology	1	2	2	-	40	40	
		VIII	VIII	BS607	DSE-2F (A, B, C) Theory	Aquatic Biology/Public Health and Hygiene / Poultry Science	3	3	2	20	40	60
					DSE-2F (A, B, C) Practical	Aquatic Biology/ Public Health and Hygiene / Poultry Science	1	2	2	-	40	40
						48	48				920	

*DSC – Discipline Specific Course, DSE – Discipline Specific Elective, GE – Generic Elective, SEC – Skill Enhancement Course

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. ZOOLOGY MODEL PAPER
ZOOLOGY – CORE / ELECTIVE PAPER**

Time: 3 hrs

Max. Marks: 40

**Section- I (Marks: 8x2=16 Marks)
Answer any TWO of the following
Draw labeled diagrams wherever necessary**

1.
or

.....

2.
or

.....

**Section- II (Marks: 4x4=16)
Answer any FOUR of the following
(Minimum One from each Unit)**

3.

4.

5.

6.

7.

8.

**Section- III (Marks: 8x1=8)
Answer EIGHT from the following
(TWO from each Unit)**

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.

19.

20.

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: 40

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 Nematelminthes

- 2.3.1 General characters
- 2.3.2 Classification of Nematelminthes 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. Dhama and J.K. Dhama. *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. 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

Periods: 30

Max. Marks: 40

1. Study of museum slides / specimens / models (Classification of animals up to orders)
 - i. Protozoa: Amoeba, Paramecium, Paramecium 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. Nematelminthes: Ascaris(Male & Female), Dracunculus, Ancylostoma, Wuchereria
 - x. Annelida: Nereis, Aphrodite, Chaetopterus, 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

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: 40

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

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: 40

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 MGrav 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"

Aloccock, "Animal Behaviour- an Evolutionary Approach

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

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: 40

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

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

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: 40

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'

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. II Year

III - SEMESTER

Discipline Specific Course, Paper – III

[Code: BS305; Course Type DSC 2C]

Animal Diversity- Vertebrates and Developmental Biology

Periods: 60

Max. Marks: 40

UNIT – I

(15 Periods)

1.1. Urochordata, Cephalochordata, Cyclostomata

- 1.1.1. Salient features of Urochordata
- 1.1.2. Retrogressive metamorphosis and its significance in Urochordata
- 1.1.3. Salient features and affinities of Cephalochordata
- 1.1.4. General characters of Cyclostomata
- 1.1.5. Comparison of the *Petromyzon* and *Myxine*
- 1.1.6. General characters and classification of Chordata upto orders with examples.

1.2. Pisces

- 1.2.1. General characters of Fishes
- 1.2.2. Classification of fishes up to order level with examples
- 1.2.3. *Scoliodon* – Respiratory, Circulatory and Nervous system.
- 1.2.4. Types of Scales and types of Fins

UNIT – II

(15 Periods)

2.1. Amphibia

- 2.1.1. General characters of Amphibians
- 2.1.2. Classification of Amphibians up to orders with examples.
- 2.1.3. *Rana tigrina* - Respiratory, Circulatory and Nervous system.
- 2.1.4. Parental care in amphibian; neoteny and paedogenesis.

2.2 Reptilia

- 2.2.1. General characters of Reptilia
- 2.2.2. Classification of Reptilia up to orders with examples
- 2.2.3. *Calotes* – Respiratory system, Circulatory and Nervous system.
- 2.2.4. Temporal fosse in reptiles and its evolutionary importance
- 2.2.5. Distinguished characters of Poisonous and Non poisonous snakes.
- 2.2.6. Rhynchocephalia.

UNIT – III

(15 Periods)

3.1. Aves

- 3.1.1. General characters of Aves
- 3.1.2. Classification of Aves up to orders with examples.
- 3.1.3. *Columba livia* -, Digestive system, Circulatory systems, Respiratory system and

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

Nervous system.

3.1.4. Migration in Birds

3.1.5. Flight adaptation in Birds

3.2. Mammalia

3.2.1. General characters of Mammalia

3.2.2. Classification of Mammalia up to orders with examples

3.2.3. Rabbit –Digestive, Respiratory, Circulatory and Nervous system.

3.2.4. Dentition in mammals.

3.2.5. Aquatic adaptations in Mammals.

UNIT – IV

(15 Periods)

4.1 Developmental Biology and Embryology

4.1.1 Gametogenesis (Spermatogenesis and Oogenesis)

4.1.2 Fertilization

4.1.3 Types of eggs

4.1.4 Types of cleavages

4.1.5 Development of Frog up to formation of primary germ layers

4.1.6 Formation of Foetal membrane in chick embryo and their functions

4.1.7 Types and functions of Placenta in mammals

4.1.8 Regeneration in Turbellaria and Lizards

Suggested Readings:

1. E.L.Jordan and P.S. Verma '*Chordate Zoology*' -. S. Chand Publications.
2. Mohan P.Arora. '*Chordata – I*, Himalaya Publishing House Pvt.Ltd.
3. Marshal, Parker and Haswell '*Text book of Vertebrates*'. ELBS and McMillan, England.
4. Alfred Sherwood Romer. Thomas S. Pearson '*The Vertebrate Body*, Sixth edition, CBS college Publishing, Saunders College Publishing
5. George C. Kent, Robert K. Carr. '*Comparative Anatomy of the Vertebrates*, 9th ed. McGraw Hill.
6. Kenneth Kardong '*Vertebrates: Comparative Anatomy, Function and Evolution*, 4th ed, 'McGraw Hill.
7. J.W. Young, '*The Life of Vertebrates*, 3rd ed, Oxford University press.
8. Harvey Pough F, Christine M. Janis, B. Heiser, '*Vertebrate Life*, Pearson, 6th ed, Pearson Education Inc.2002.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. II Year

ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER

Discipline Specific Course, Paper – III

[Code: BS305; Course Type DSC 2C]

Animal Diversity- Vertebrates and Developmental Biology

Periods: 30

Max. Marks: 40

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

1. **Protochordata:** *Amphioxus, Amphioxus* T.S. through pharynx
2. **Cyclostomata:** *Petromyzon, Myxine, Ammocoetus larva*
3. **Pisces:** *Sphyrna Pristis, Torpedo, Channa, Pleuronectes, Hippocampus, Exocoetus, Echieneis, Labeo, Catla, Clarius, Auguilla, Protopterus*, Scales: Placoid, Cycloid, Ctenoid
4. **Amphibia:** *Ichthyophis, Amblystoma, Siren, Hyla, Rachophous, Bufo, Rana*, Axolotal larva
5. **Reptilia :** *Draco, Chamaeleon, Gecko, Uromastix, Vipera russelli, Naja, Bungarus, Enhydrina, Typhlops, Testudo, Trionyx, Crocodilus, Ptyas.*
6. **Aves:** *Archaeopteryx, Passer, Psittacula, Bubo, Alcedo, Columba, Corvus, Pavo*; Collection and study of different types of feathers: Quill, Contour, Filoplume, Down
7. **Mammalia:** *Ornithorhynchus, Tachyglossus, Pteropus, Funambulus, Manis, Loris*, Hedgehog

Histology: T.S. of Liver, Pancreas, Kidney, Stomach, Intestine, Lungs Artery, Vein, Bone T.S., Spinal cord.

Osteology :

1. Rabbit – Axial skeleton system (bones of Skull and Vertebral Column)
2. Varanus, Pigeon and Rabbit – Appendicular skeleton system (bones of limbs and girdles)

Dissections of *Labeo/Tilapia*:

1. Digestive system.
2. Brain, Weberian ossicles
3. V, VII, IX, X cranial nerves

Embryology

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

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

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.

Computer aided virtual dissections.

Suggested manuals

1. S.S.Lal, Practical Zoology – Vertebrata
2. P.S.Verma, A manual of Practical Zoology – Chordata
3. Freeman & Bracegirdle, An atlas of embryology

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. II Year

ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER

Discipline Specific Course, Paper – III

[Code: BS305; Course Type DSC 2C]

Animal Diversity- Vertebrates and Developmental Biology

Max. Marks: 40

Time: 2 Hrs.

1. Identification, labeled diagram and salient features of spots: (6 Museum specimens + 2 slides)	16
2. Osteology (02 Spots)	04
3. Dissection (one) (Diagram -02 + Dissection & Display-05)	07
4. Embryology (02 Spots)	04
5. Certified practical record	04
6. Animal Album	03
7. Viva voce	02

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. II Year
IV - SEMESTER**

**Discipline Specific Course, Paper – IV
[Code: BS405; Course Type DSC 2D]
Cell Biology, Genetics & Evolution**

Max. Marks: 40

Periods: 60

(15 Periods)

UNIT – I

1. Cell Biology

- 1.1. Cell theory, Differences of Prokaryotic and Eukaryotic cells
- 1.2. Ultrastructure of animal cell
- 1.3. Structure and functions of plasma membrane proteins.
- 1.4. Structure and functions of cell organelles –
Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes, centrosomes, Mitochondria and Nucleus
- 1.1.5 Chromosomes – Structure, types, giant chromosomes
- 1.1.6 Cell Division - Mitosis, Meiosis.
- 1.1.7. Cell cycle and its regulation.

(15 Periods)

UNIT – II

2. Molecular Biology

- 2.1 DNA (Deoxyribo Nucleic Acid) - Structure
- 2.2 RNA (Ribo Nucleic Acid) - Structure, types
- 2.3 DNA Replication
- 2.4 Protein Synthesis – Transcription and Translation
- 2.5 Gene Expression – Genetic Code; operon concept
- 2.6 Molecular Biology Techniques- Polymerase Chain Reaction, Electrophoresis

(15 Periods)

UNIT – III

3. Genetics

- 3.1 Mendals laws of Inheritance and Non-Medelian Inheritance
- 3.2 Linkage and Crossing over
- 3.3. Sex determination and sex-linked inheritance
- 3.4 Chromosomal Mutations- Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy.
- 3.5. Gene mutations- Induced versus Spontaneous mutations.
- 3.6. Inborn errors of metabolism.
- 3.7. One gene one enzyme, one gene one polypeptide theory.

UNIT – IV

(15 Periods)

4. Evolution

- 4.1. Theories of evolution – Lamarckism and Neo-Lamarckism, Darwinism and Neo-Darwinism, Modern synthetic theory.
- 4.2. Evidences of Evolution and Hardy Weinberg Law.
- 4.3. Forces of Evolution – mutation, gene flow, genetic drift, and natural selection.
- 4.4. Isolation – Pre-mating and post mating isolating mechanisms
- 4.5. Speciation: Methods of speciation - Allopatric and sympatric
- 4.6. Causes and Role of Extinction in Evolution.

Suggested readings

1. **Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnell** '*Molecular Cell Biology*' W.H. Free man and company New York.
2. **Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008).** *Principles of Genetics*. VIII Edition. Wiley India.
3. **Snustad, D.P., Simmons, M.J. (2009).** *Principles of Genetics*. V Edition. John Wiley and Sons Inc.
4. **Klug, W.S., Cummings, M.R., Spencer, C.A. (2012).** *Concepts of Genetics*. X Edition. Benjamin Cummings.
5. **Russell, P. J. (2009).** *Genetics- A Molecular Approach*. III Edition. Benjamin Cummings.
6. **Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B.** *Introduction to Genetic Analysis*. IX Edition. W. H. Freeman and Co.
7. **Ridley, M. (2004).** *Evolution*. III Edition. Blackwell Publishing
8. **Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007).** *Evolution*. Cold Spring, Harbour Laboratory Press.
9. **Hall, B. K. and Hallgrimsson, B. (2008).** *Evolution*. IV Edition. Jones and Bartlett Publishers
10. **Campbell, N. A. and Reece J. B. (2011).** *Biology*. IX Edition, Pearson, Benjamin, Cummings.
11. **Douglas, J. Futuyma (1997).** *Evolutionary Biology*. Sinauer Associates.
12. **Minkoff, E. (1983).** *Evolutionary Biology*. Addison-Wesley.
13. **James D. Watson, Nancy H. Hopkins** '*Molecular Biology of the Gene*'
14. **Jan M. Savage.** *Evolution*, 2nd ed, Oxford and IBH Publishing Co., New Delhi.
15. **Gupta P.K.,** '*Genetics*'

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. II Year

ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER

Discipline Specific Course, Paper – IV

[Code: BS405; Course Type DSC 2D]

Cell Biology, Genetics and Evolution

Periods: 30

Max. Marks: 40

I. Cytology

1. Preparation and Identification of slides of Mitotic divisions with onion root tips
2. Preparation and Identification of different stages of Meiosis in Grasshopper Testes
3. Identification and study of the following slides
 - i). Different stages of Mitosis and Meiosis
 - ii) Lamp brush and Polytene chromosomes

II. Genetics

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

III. Evolution

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

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

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

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

Suggested manuals

Manual of laboratory experiments in cell biology Edward, G.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. II Year

B.Sc. PRACTICAL MODEL PAPER FOR IV SEMESTER

Discipline Specific Course, Paper – IV

[Code: BS405; Course Type DSC 2D]

Cell Biology, Genetics and Evolution

Time:2 Hrs.

Max. Marks: 40

- | | |
|---|----|
| 1. Identification, labeled diagram and salient features of spots:
(06 spots) | 12 |
| 2. Prepare and Identify Mitotic divisions with onion root tips: | 08 |
| 3. One Problem from Genetics | 05 |
| 4. One Problem from Evolution | 05 |
| 5. Certified practical record | 05 |
| 6. Album | 03 |
| 7. Viva voce | 02 |

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. III Year

V - SEMESTER

General Elective

[Code: BS502; Course Type GE-1]

Medical Transcription

Periods: 30

Max. Marks: 40

UNIT – I

(15 Periods)

Medical terminology Pharmacology and Anatomy of humans

- 1.1. General medical terms, surgical terms, diseases
- 1.2. Human body parts, systems and functions
- 1.3. Medication terminology, treatments, drug reactions, pharmacology legalities, medication handling and doctor's orders.

Medical Theories and Techniques Ethical and Legal Responsibilities Medical Transcription Equipment and Technology

- 1.3 Diagnostic and therapeutic procedure terms and practices
- 1.4 Surgical procedure terms and practices
- 1.5 Lab procedures: patient preparation and blood drawing techniques.

UNIT – II

(15 Periods)

Basic Transcription, Medical Grammar and Style, Medical Reports Formatting

- 2.1 Transcribing audio files into typed format.
- 2.2 Healthcare Documentation formats
- 2.3 American Medical Association stylistic standards.

Computer Information Systems, Speech Recognition Editing

- 2.4 Basics of Microsoft Office software, including Word, PowerPoint, Excel
- 2.5. Basic formatting practices and e-mail and Internet usage and file organization.
- 2.6 Speech recognition software to transcribe dictation and taking dictation with background noise.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. III Year
V - SEMESTER**

**Discipline Specific Course, Paper – V
[Code: BS504; Course Type DSC 2E]
Physiology and Biochemistry**

Periods: 45

Max. Marks: 40

UNIT – I Physiology

(15 Periods)

1.1 Digestion

- 1.1.1 Digestion definition and extra and intracellular digestion.
- 1.1.2 Digestion of Carbohydrates, Proteins, Lipids and Cellulose.
- 1.1.3 Absorption and Assimilation of digested food; role of Gastrointestinal hormones in digestion

1.2 Respiration

- 1.2.1 Definition of Respiration and Respiratory mechanisms – External, Internal and cellular.
- 1.2.2 Respiratory Pigments; Transport of oxygen, Oxygen dissociation curves. Bohr's effect.
- 1.2.3 Transport of CO₂ – Chloride shift; Regulation of respiration – nervous and chemical

1.5.1 Circulation

- 1.3.1 Types of circulation - Open and Closed circulation
- 1.3.2 Structure of Mammalian Heart, Types of hearts – Neurogenic and Myogenic; Heart function – Conduction and regulation of heart beat.
- 1.3.3 Regulation of Heart rate – Tachycardia and Bradycardia; Blood Clotting mechanism

1.4. Excretion

- 1.4.1 Classification of Animals on the basis of excretory products- Ammonotelic, Uricotelic, Ureotelic
- 1.4.2 Structure and function of Nephron.
- 1.4.3 Urine formation, Counter current mechanism.

UNIT – II Physiology

(15 periods)

2.1. Muscle Contraction

- 2.1.1 Types of Muscles
- 2.1.2 Ultra structure of skeletal muscle fibre
- 2.1.3 Sliding Filament theory, muscle contraction mechanism and energetics.

2.2. Nerve Impulse

- 2.2.1 Structure of Neuron
- 2.2.2 Nerve impulse - Resting potential and Action potential and Conduction of Nerve impulse
- 2.2.3 Synapse, types of synapses and Synaptic transmission.

2.3. Endocrine System

- 3.3.1 Endocrine glands - Structure, secretions and functions of Pituitary, Thyroid, Parathyroid, Adrenal glands and Pancreas
- 3.3.2 Hormone action and concept of Secondary messengers
- 3.3.3 Male and Female Hormones, Hormonal control of Menstrual cycle in humans.

UNIT – III Physiology and Biochemistry

(15 periods)

3.1. Homeostasis and Enzymes

- 3.1.1 Concept of Homeostasis.
- 3.1.2 Mechanism of Homeostasis.
- 3.1.3 Osmoregulation - Water and ionic regulation by freshwater, brackish water and marine animals
- 3.1.4 Enzymes: Definition, Classification, Inhibition and Regulation

3.2. Biomolecules and Metabolism

- 3.2.1. Carbohydrates: Classification and function of Carbohydrates
- 3.2.2. Carbohydrate metabolism - Glycolysis, Krebs cycle, , Electron transport and oxidative phosphorylation.
- 3.2.3 Proteins: Classification of proteins based on functions and Chemical nature
- 3.2.4 Protein Metabolism - Transamination, Deamination and Urea Cycle
- 3.2.5 Lipids: Classification of Lipids
- 3.2.6. Lipid Metabolism - Fatty acid synthesis and Fatty acid oxidation.

Suggested readings

Gerard J. Tortora and Sandra Reynolds Garbowski *Principles of Anatomy and Physiology*, Tenth Ed., John Wiley & Sons

Arthur C. Guyton MD, *A Text Book of Medical Physiology*, Eleventh ed., John E. Hall, Harcourt Asia Ltd.

William F. Ganong, *A Review of Medical Physiology*, 22 ed, McGraw Hill, 2005

Sherwood, Klandrof, Yanc, *Animal Physiology*, Thompson Brooks/Coole, 2005.

Sherwood, Klandrof, Yanc, *Human Physiology*, Thompson Brooks/Coole, 2005.

Knut Schmidt-Nielson, *Animal Physiology*, 5th ed, Cambridge Low Price Edition.

Roger Eckert and Randal, *Animal Physiology*, 4th ed, Freeman Co, New York.

Singh. H.R, *Text Book of Animal Physiology and Biochemistry*

Nagabhusanam , *Comparative Animal Physiology*

Veer Bal Rastogi, *Text Book of Animal Physiology*

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. III Year PRACTICAL MODEL PAPER
V - SEMESTER**

**Discipline Specific Course, Paper – V
[Code: BS504; Course Type DSC 2E]
Physiology and Biochemistry**

Time:2 Hrs.

Max. Marks: 40

1. Identification, labeled diagram and salient features of spots: (05 spots)	10
2. Estimation offrom Biochemistry	06
3. Identification/Study of.....from Physiology	06
4. Qualitative Test	06
5. Project Work	05
6. Certified practical record	05
7. Viva voce	02

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. III Year PRACTICAL SYLLABUS
V - SEMESTER**

**Discipline Specific Course, Paper – V
[Code: BS504; Course Type DSC 2E]
Physiology and Biochemistry**

Periods: 30

Max. Marks: 40

1. Qualitative tests for identification of carbohydrates, proteins and lipids.
2. Qualitative tests for identification of ammonia, urea and uric acid (Nitrogenous excretory products)
3. Effect of pH and Temperature on salivary amylase activity.
4. Study of permanent histological sections of Mammalian Endocrine glands - pituitary, thyroid, pancreas, adrenal gland.
5. Estimation of Haemoglobin by Sahlis method.
6. Estimation of total protein by Lowry's method.
7. Estimation of unit Oxygen consumption of fish with reference to body weight.

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

Suggested manuals

Tortora, G.J. and Derrickson, B.H. (2009). *Principles of Anatomy and Physiology*, XII Edition, John Wiley & Sons, Inc.

Widmaier, E.P., Raff, H. and Strang, K.T. (2008) *Vander's Human Physiology*, XI Edition., McGraw Hill

Guyton, A.C. and Hall, J.E. (2011). *Textbook of Medical Physiology*, XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company

Berg, J. M., Tymoczko, J. L. and Stryer, L. (2006). *Biochemistry*. VI Edition. W.H Freeman and Co.

Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009). *Principles of Biochemistry*. IV Edition. W.H. Freeman and Co.

Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009).

Harper's Illustrated Biochemistry. XXVIII Edition. Lange Medical Books/Mc Graw3Hill.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. III Year
VI – SEMESTER**

**Discipline Specific Elective, Paper – VI
[Code: BS507; Course Type DSE 2E]
Applied Zoology**

Periods: 45

Max. Marks: 40

UNIT – I

(15 Periods)

1. Aquaculture and Sericulture

- 1.1 Types of Fisheries; Fresh Water Fish and Prawn culture
- 1.2 Fresh water fishing gears and crafts; Induced Breeding.
- 1.3 Hatchery design and Management of fish and prawn; Transportation of fish and prawn seed.
- 1.4 Preservation, Processing and By-products of fishes.
- 1.5 Fish Diseases and control measures
- 1.6 Life cycle of *Bombyx mori*
- 1.7 Structure of silk gland and secretion of silk
- 1.8 Silkworm rearing technology.
- 1.9 Spinning, harvesting and storage of cocoons.
- 1.10 Silk worm Pests and Diseases: Uzi fly; Protozoan, Viral, Fungal and Bacterial; Control and prevention.
- 1.11 Prospects of Sericulture in India

UNIT – II

(15 Periods)

2. Apiculture and Vermiculture

- 2.1 Selection of Bee Species for Apiculture.
- 2.2 Bee Keeping Equipment.
- 2.3 Methods of Extraction of Honey (Indigenous and Modern).
- 2.4 Bee Diseases and Enemies.
- 2.5 Products of Apiculture Industry and its Uses (Honey, Bees Wax).
- 2.6 Introduction of Vermiculture and Vermicomposting.
- 2.7 Vermiculture techniques.
- 2.8 Bedding, Essential parameters for Vermiculture and Management
- 2.9 Methods of Harvesting (Manual & Mechanical).
- 2.10 Economic Importance of Vermiculture.

UNIT – III

(15 Periods)

3. Poultry Farming & Animal Husbandry

- 3.1 Classification of Fowls based on their use – Broilers and Commercial layers.
- 3.2 Principles of poultry breeding, Management of breeding stock and broilers, Processing and preservation of eggs.
- 3.3 Poultry diseases - Viral, Bacterial, Fungal, Protozoan

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- 3.4 Management of a modern Poultry Farm, progressive plans to promote Poultry as a Self-Employment venture
- 3.5 Dairy farm and its management
- 3.6 Animal Husbandry – Introduction, Preservation of semen, artificial insemination of cattle, Induction of early puberty and synchronization of estrus in cattle

Suggested Readings

1. Prost, P. J. (1962). *Apiculture*. Oxford and IBH, New Delhi.
2. Bisht. D.S., *Apiculture*, ICAR Publication.
3. Singh S., *Beekeeping in India*, Indian council of Agricultural Research, New Delhi.
4. Ullal S.R. and Narasimhanna, M.N. Handbook of Practical Sericulture: CSB, Bangalore
5. Jolly. M. S. Appropriate Sericultural Techniques; Ed., Director, CSR & TI, Mysore.
6. Handbook of Silkworm Rearing: Agriculture and Technical Manual-1, Fuzi Pub. Co.
7. Narasimhanna, M. N. Manual of Silkworm Egg Production,, CSB, Bangalore 1988.
8. Wupang—Chun and Chen Da-Chung, Silkworm Rearing,, Pub. By FAO, Rome 1988.
9. Sengupta, K. A Guide for Bivoltine Sericulture; Director, CSR & TI, Mysore 1989.
10. Krishnaswamy, S. Improved Method of Rearing Young age silkworm; CSB, Bangalore, 1986.
11. Jhingran. V.G. Fish and fisheries in India.,
12. Khanna. S.S, An introduction to fishes
13. Santanam, B. *et al*, A manual of freshwater aquaculture,
14. Boyd. C.E. & Tucker.C.S, Pond aquaculture water quality management,
15. Biswas.K.P, Fish and prawn diseases,
16. Hafez, E. S. E. (1962). *Reproduction in Farm Animals*. Lea & Fabiger Publisher
17. Dunham R.A. (2004). *Aquaculture and Fisheries Biotechnology Genetic Approaches*. CABI
18. Pedigo, L.P. (2002). *Entomology and Pest Management*, Prentice Hall.
19. Lee, Earthworm Ecology
20. Stevenson, Biology of Earthworms
21. Ranganathan L.S, Vermicomposting technology- soil health to human health

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**B.Sc. III Year PRACTICAL SYLLABUS
VI – SEMESTER**

Discipline Specific Elective, Paper – VI

[Code: BS507; Course Type DSE 2E]

Applied Zoology

Periods: 30

Max. Marks: 40

1. Identification and study of important cultivable and edible fishes - Any five
2. Identification and study of important cultivable and edible crustaceans - Any five
3. Identification different larvae of silk worm- Using specimens / pictures
4. Identification of mulberry and non mulberry silkworms
5. Mounting of mouth parts of adult silk worm and silk gland of larva ✓
6. Estimation of quality of milk from different dairy farm units – specific gravity, fat content, pH viscosity.
7. Identification of purity of Honey in different samples
8. Field visits to a Vermiculture / Sericulture / fisheries / apiculture / poultry / dairy farm-submission of any 3 Reports

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

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B.Sc. III Year

VI - SEMESTER

Discipline Specific Elective, Paper – VI

[Code: BS507; Course Type DSE 2E]

Entomology

Periods: 45

Max. Marks: 40

UNIT – I: Basics of Entomology

(15 Periods)

- 1.1. Definition, scope and importance of Entomology.
- 1.2. Insect classification and their distinctive characters.
- 1.3. Insect External morphology- Head, Thorax, and Abdomen.
- 1.4. Insect Internal Morphology – Digestive, Respiratory, Circulatory, Excretory, Nervous, and Reproductive systems.
- 1.5. Insect growth and development.

UNIT – II: Insect vectors and pests.

(15 Periods)

- 2.1. Introduction and history of medical entomology
- 2.2. Vectors of public health importance – Mosquitoes, Housefly, Sand fly, Lice & Bedbugs
- 2.3. Vector-borne diseases- (Malaria, Dengue, Filaria) and their control measures.
- 2.4. Role of pests in Agriculture.
- 2.5. Crop Pests and their control measures

UNIT – III: Beneficial Insects and Harmful Insects

(15 Periods)

- 3.1. Apiculture.
- 3.2. Lac culture.
- 3.3. Sericulture.
- 3.4. Social life of Insects.
- 3.5. Venomous Insects.

Practicals:

1. Identification and study of house hold Insects - Cockroach, Silver fish, Crickets
2. Identification and study of important Insect vectors – Mosquitoes, House fly, Head lice.
3. Mounting of mouth parts of mosquitoes.
4. Identification different larvae of silk worm- Using specimens / pictures.
5. Field visits to a Sericulture/ apiculture farm and submission of report.

References

1. Text Book of Applied Entomology Vol. I & II by K. P. Srivastava
2. General Applied Entomology by B V David and T N Anathakrishnan
3. Destructive and Useful Insects by C. L. Metcalf
4. A text book of Entomology by Mathur and Upadhyay

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. III Year

V – SEMESTER

Discipline Specific Elective, Paper – VI

[Code: BS507; Course Type DSE 2E]

SERICULTURE

Periods: 45

Max. Marks: 40

UNIT – I – Introduction of Sericulture

(15 Periods)

- 1.1 History of Sericulture and Present status of sericulture industry in India.
- 1.2 Sericulture as Agro-industry - Perspectives and prospects of Sericulture in India.
- 1.3 Geographical distribution of various species and economic races of silkworms - mulberry, tasar, eri and muga silkworm.
- 1.4 Types of silkworm host plants and their systematic position.
- 1.5 Morphology and anatomy of Silk glands

UNIT – II – Biology and diseases of Silkworms

(15 Periods)

- 2.1 Life cycle, External morphology and biology of mulberry silkworm.
- 2.2 Internal morphology of Silkworm – Digestive, Respiratory, Nervous, Excretory, and Reproductive systems.
- 2.3 Influence of biotic and a biotic factor on the incidence of diseases.
- 2.4 Diseases of *Bombyx mori* and *Philosamia ricini* –Viral, bacterial protozoan and fungal. Preventive and control measures.
- 2.5 Insect and vertebrate Pests of silkworm and their management.

UNIT – III – Silkworm Rearing

(15 Periods)

- 3.1. Silkworm rearing house and rearing appliances.
- 3.2. Feeding and Rearing methods of mulberry silk worms.
- 3.3. Mounting and harvesting of mulberry silk cocoons.
- 3.4. Properties and composition of silk.
- 3.5. Commercial characters of cocoons and price fixation.

Practicals:

1. Identification of different types of silkworms.
2. Morphology of egg larva, pupa and adult of different silkworm types.
3. Life history of different silkworm types.
4. Dissection of digestive system and salivary gland of silkworm larva.
6. Dissection of the nervous system of larva silkworm.
7. Rearing appliances
8. Sex differentiation of Larva, Pupa and Adult silkworms
9. Calculation of Shell Ratio.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

References:

1. Handbook of Practical Sericulture : Ullal, S.R. and Narasimhanna, M.N. (1987), Central Silk Board Publication, Bangalore.
2. FAO Manuals on Sericulture : Anonymous (1972), Vol. I-IV
3. Sericulture for Rural Development : Hanumappa (1978), Himalaya Publication,
4. The Silkworm, an Important Laboratory Tool : Tazima, Y. (1978), Kodansha Publications, Tokyo.
5. Control of Silkworm Reproduction, Development and Sex : Strunnikov, V.A. (1983), MIR Publications, Moscow.
6. Sericulture in India Sarkar, D.C. (1988), CSB, Bangalore.
7. Silkworm Rearing : Wupang—Chun and Chen Da-Chung (1988), Pub. By FAO.
8. Handbook of Silkworm Rearing : Anonymous (1972), Agriculture and Technical Manual-1, Fuzi Pub. Co. Ltd., Tokyo, Japan.
9. Improved Method of Rearing Young age silkworm : Krishnaswamy (1986), CSB Publication, Bangalore.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. III Year

VI - SEMESTER

Generic Elective – 2

[Code: BS602; Course Type GE-2]

CLINICAL SCIENCE

Periods: 30

Max. Marks: 40

UNIT – I HAEMATOLOGY and IMMUNOLOGY

(15 Periods)

- 1.1 Introduction of Haematology; Structure, Composition and functions of blood; Origin of blood cells (RBC, WBC, PLATELETS)
- 1.2 Blood coagulation and theories of blood coagulation, anticoagulants
- 1.3 Blood groups and Rh factor; Blood Transfusion and Blood Banking
- 1.4 Blood associated disorders – Anaemia, Leucopaenia, Leucocytosis, Leukaemia and Haemophilia
- 1.5 Types of Immunity – Innate and Acquired; Antigens and Antibodies
- 1.6 Immunoglobulins – Classifications and significance; Complement system.
- 1.7 Lymphatic system and Lymphoid organs – Spleen, Thymus, Lymph nodes.
- 1.8 T-cells, B-cells and Macrophages.
- 1.9 Immune response – Humoral and cell mediated; Hypersensitivity – Different types.

UNIT – II TECHNIQUES, PATHOLOGY AND DISEASES

(15 Periods)

- 2.1 Microscopy – Light, phase contrast and Electron Microscopy
- 2.2 Microtomy- Fixation, Section cutting and Staining procedures
- 2.3 Biopsy and Autopsy of normal and affected tissues
- 2.4 Histopathological manifestations in tissues.
- 2.5 Principles of Sterilization, Autoclave, Microbial plating and Antibiotic Sensitivity Tests.
- 2.6 Immunological techniques – Agglutinations, precipitation, complement fixation test and ELISA
- 2.7 Introduction to pathology – Definition, Scope and branches; Health and disease, Types of diseases
- 2.8 Bacterial diseases (Leprosy, Tuberculosis, Syphilis, Rickettsia and Spirochaete diseases); Viral diseases (Dengue, Hepatitis, Swine flu, Chikun gunya, AIDS).
- 2.9 Protozoan diseases (Trypanosomiasis, Amoebiasis, Giardiasis, Toxoplasmosis); Helminth diseases (Schistosomiasis, Echinococcosis, Dracunculosis, Ancylostomiasis); Fungal diseases.

REFERENCES:

1. Textbook of Microbiology – R.Anantharayan and CKJ. Paniker
2. A hand book of Medical laboratory technology – V.H. Talib
3. Medical Laboratory technology – (vol-I & vol-II) – Kanai.L. Mukherjee
4. Medical Zoology-Sobti
5. Medical Laboratory Technology-Ramnik Sood
6. Parasitology – Chatterjee
7. Parasitology – Chakraborty.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. III Year
V- SEMESTER**

**Discipline Specific Course, Paper – VII
[Code: BS604; Course Type DSC 2F]
Immunology and Animal Biotechnology**

Periods: 45

Max. Marks: 40

UNIT – I Immunology – Basic concepts; antigens and antibodies

(15 Periods)

- 1.1 Basic concepts of immunology.
- 1.2 Cells of immune system
- 1.3 Primary and secondary Organs of immune system
- 1.4 Types of Immunity – Innate and acquired
- 1.5 Basic properties of antigens
- 1.6 Structure, function and types of an antibody.
- 1.7 B and T cell epitopes, haptens, adjuvants.
- 1.8 Antigen-antibody reactions,
- 1.9 T-Cell and B-Cell activation
- 1.10 Monoclonal antibodies and their production

UNIT – II Working of an Immune system; Immune system in health and disease

(15 Periods)

- 2.1 Structure and functions of major histocompatibility complex.
- 2.2 Basic properties and functions of Cytokines, Interferons and complement proteins
- 2.3 Humoral and Cell mediated immunity.
- 2.4 Types of hyper sensitivity.
- 2.5 Concepts of autoimmunity and immunodeficiency.
- 2.6 Introduction to Vaccines and types of Vaccines

UNIT – III Animal Biotechnology and Genetically modified organisms

(15 Periods)

- 3.1 Concept and Scope of Animal Biotechnology.
- 3.2 Cloning vectors - Plasmids, Cosmids, Lambda bacteriophage, YAC
- 3.3 Cloning- Cloning methods (Cell, Animal and Gene cloning)
- 3.4 Animal Cell culture - Equipment and materials for animal cell culture; applications of cell culture techniques
- 3.5 Recombinant DNA technology and its applications
- 3.6 Transgenesis – Methods of Transgenesis.
- 3.7 Production of Transgenic animals and Application of Transgenic animals in Biotechnology.
- 3.8 Stem cells –types and their applications

Suggested Readings

Arthur C. Guyton MD, *A Text Book of Medical Physiology*, Eleventh ed., John E. Hall, Harcourt Asia Ltd.

William F. Ganong, *A Review of Medical Physiology*, 22 ed, McGraw Hill, 2005

Sherwood, Klandrof, Yanc, *Human Physiology*, Thompson Brooks/Coole, 2005.

Knut Schmidt-Nielson, *Animal Physiology*, 5th ed, Cambridge Low Price Edition.

Richard A. Glodsby, Thomas J Kind, Barbara A. Osborne, Janis Kuby, *Immunology*, 5th ed, Freeman and Co. New York

Ivan Roitt, *Immunology*, 4th ed, Johanthan Brostoff, Moshy, London.

Thomas C. Chung, *General Parasitology*, Hardcourt Brace and Co Ltd. Asia. New Delhi.

Gerard D. Schmidt and Larry S Roberts, *Foundations of Parasitology*, McGraw Hill

Kindt, T. J., Goldsby, R. A., Osborne, B. A., Kuby, J. (2006). VI Edition. *Immunology*. W.H. Freeman and Company.

Delves, P. J., Martin, S. J., Burton, D. R., Roitt, I.M. (2006). XI Edition. *Roitt's Essential Immunology*, Blackwell Publishing.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. III Year PRACTICAL SYLLABUS
V- SEMESTER**

**Discipline Specific Course, Paper – VII
[Code: BS604; Course Type DSC 2F]
Immunology and Animal Biotechnology**

Periods: 30

Max. Marks: 40

I. Immunology

1. Identification of Blood groups
2. Histological study of spleen, thymus and lymph nodes (through prepared slides)
3. Enumeration of RBC & WBC from a given blood sample
4. Enumeration of Differential count of WBC from a given blood sample
5. Demonstration of
 - a. ELISA
 - b. Immuno-electrophoresis
6. Identification of Autoimmune disease through charts.

II. Animal Biotechnology

1. Study the following techniques through photographs / virtual lab
 - a. Southern blotting
 - b. Western blotting
 - c. DNA sequencing (Sanger's method)
 - d. DNA finger printing
 - e. Identification of Vectors
 - f. Identification of Transgenic animals
2. PCR demonstration /virtual lab

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

Suggested manuals

Kindt, T. J., Goldsby, R.A., Osborne, B. A. and Kuby, J (2006). Immunology, VI Edition. W.H. Freeman and Company.

David, M., Jonathan, B., David, R. B. and Ivan R. (2006). Immunology, VII Edition, Mosby, Elsevier Publication.

Abbas, K. Abul and Lichtman H. Andrew (2003.) Cellular and Molecular Immunology. V Edition. Saunders Publication.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. III Year PRACTICAL MODEL PAPER
V- SEMESTER**

**Discipline Specific Course, Paper – VII
[Code: BS604; Course Type DSC 2F]
Immunology and Animal Biotechnology**

Time: 2 Hrs.

Max. Marks: 40

1. Identification, labeled diagram and salient features of spots: (05 spots)	10
2. Identification/Determination from Immunology	06
3. Identification/Study the technique from Anima Biotechnology	06
4. Demonstration of a technique	06
5. Project Work	05
6. Certified practical record	05
7. Viva voce	02

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. III Year

VI - SEMESTER

Discipline Specific Elective, Paper – VIII

[Code: BS607; Course Type DSE 2F]

AQUATIC BIOLOGY

Periods: 45

Max. Marks: 40

UNIT – I Aquatic Biomes

(15 periods)

- 1.1 Brief introduction of the aquatic biomes
- 1.2 Freshwater ecosystem (lakes, wetlands, streams and rivers),
- 1.3 Estuaries, intertidal zones,
- 1.4 Oceanic pelagic zone, marine benthic zone.
- 1.5 Coral reefs

UNIT – II Fresh Water Biology and Marine Biology

(15 periods)

- 2.1 Lakes: Origin and classification of lakes
- 2.2 Lake as an Ecosystem, Lake morphometry
- 2.3 Physico-chemical Characteristics of fresh water bodies: Light, Temperature, Thermal stratification, Dissolved Solids, Carbonate, Bicarbonates, Phosphates and Nitrates, Turbidity: dissolved gases (Oxygen, Carbon dioxide).
- 2.4 Nutrient Cycles and Lakes- Nitrogen, Sulphur and Phosphorous.
- 2.5 Streams: Different stages of stream development, Physico-chemical environment, adaptation of hill-stream fishes.
- 2.6 Salinity and density of sea water; Continental shelf; Adaptation of deep sea organisms; Sea weeds.

UNIT – III Management of Aquatic Resources

(15 periods)

- 3.1 Aquatic pollution - Causes of pollution: Agricultural, Industrial, Sewage, Thermal and Oil spills,
- 3.2 Eutrophication
- 3.3 Management and conservation
- 3.4 Water pollution acts of India
- 3.5 Sewage treatment and water quality assessment - BOD and COD.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. III Year PRACTICAL SYLLABUS

VI - SEMESTER

Discipline Specific Elective, Paper – VIII

[Code: BS607; Course Type DSE 2F]

AQUATIC BIOLOGY

Periods: 30

Max. Marks: 40

PRACTICAL

1. Study of the topography of a lake
2. Physico-Chemical and biological analysis of a lake
Physico-Chemical analysis of water - O₂, CO₂, BOD, COD
Biological– Zooplanktons – Identification and population density of Zooplanktons of a lake
3. Determination of - Turbidity / transparency, Dissolved Oxygen, Free Carbon dioxide, Alkalinity (carbonates & bicarbonates) in water collected from a nearby lake / water body.
4. Instruments used in limnology (secchi disc, van dorn bottle, conductivity meter, Turbidity meter, PONAR grab sampler) and their significance.
5. A Project Report on a visit to a Sewage treatment plant / Marine bio-reserve/Fisheries Institutes.

Suggested Readings

1. Ananthakrishnan : Bioresources Ecology 3rd Edition
2. Goldman – Limnology, 2nd Edition
3. Odum and Barrett – Fundamentals of Ecology, 5th Edition\
4. Pawlowski: Physicochemical Methods for water and Wastewater Treatment, 1st Edition
5. Wetzel: Limnology, 3rd edition
6. Trivedi and Goyal: Chemical and biological methods for water pollution studies
Welch: Limnology Vols.I-II

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. III Year
VI - SEMESTER**

**Discipline Specific Elective, Paper – VIII
[Code: BS607; Course Type DSE 2F]
Public Health and Hygiene**

Periods: 45

Max. Marks: 40

UNIT – I Nutrition, Environment and Health

(15 Periods)

- 1.1 Classification of foods - Carbohydrates, proteins, lipids, vitamins and minerals
- 1.2 Balanced diet and malnutrition.
- 1.3 Nutritional deficiencies and disorders- Carbohydrates, proteins, lipids, vitamins and minerals.
- 1.4 Environment and health Impact assessment: concept, steps and applications.
- 1.5 Occupational, Industrial, agricultural and urban Health-Exposure at work place, urban areas, industrial workers, farmers and agricultural labourers, Health workers and health disorders and diseases.
- 1.6 Environmental pollution and associated Health hazards
- 1.7 Water borne diseases; Air borne diseases

UNIT-II Communicable and Non-Communicable diseases

(15 Periods)

- 2.1 Causes, Symptoms, Diagnosis, Treatment and Prevention of Communicable diseases - Malaria, Filariasis, Measles, Polio, Chicken pox, Rabies, Plague, Leprosy, Tuberculosis and AIDS.
- 2.2 Causes, Symptoms, Diagnosis, Treatment and Prevention of Non-Communicable diseases - Hypertension, Coronary Heart diseases, Stroke, Diabetes, Obesity and Mental ill-health.

UNIT-III Health Education in India

(15 periods)

- 3.1 Health care legislation in India – termination of pregnancy act, Maternity benefit act, Transplantation of human organs act, Child Labour act, Biomedical waste act, ESI act.
- 3.2 WHO Programmes – Government and Voluntary Organizations and their health services
- 3.3 First Aid and Health awareness, personal health care record maintenance.

Suggested Readings

1. Park and Park, 1995: Text Book of Preventive and Social Medicine – Banarsidas Bhanot Publ. Jodhpur – India.
2. Public Health at the Crossroads Achievements and Prospects. Robert Beaglehole and Ruth
3. Bonita 2nd Edition Cambridge University Press 3. Maxcy Rosenau Last Public Health &
4. Preventive Medicine, Fourteenth Edition Ed RobertWallace, MD, et al. 4.
5. Epidemiology and Management for Health Care: Sathe, P.V. Sathe, A.P., PopularPrakashan, Mumbai, 1991. 5.
7. International Public Health: Diseases, Programs, Systems, and Policies by
8. MichaelMerson, Robert E Black, Anne J Mills Jones and Bartlett Publishers. 6.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. III Year PRACTICAL SYLLABUS
VI - SEMESTER**

**Discipline Specific Elective, Paper – VIII
[Code: BS607; Course Type DSE 2F]
Public Health and Hygiene**

Periods: 30

Max. Marks: 40

1. Medical fitness– Determine the following:
BMI, Blood Pressure, Cholesterol (LDL, HDL) Hemoglobin
Complete Blood Picture; Complete urine examination
 2. Qualitative identification of carbohydrates, Lipids, vitamins, lipids and minerals,
 3. Estimation of fat content and tests milk adulteration.
 4. Qualitative and quantitative survey methods in public health sciences.
 5. Identification of parasitic stages of malaria and filaria through permanent slides
 6. Estimation of blood glucose level in a normal and diabetic persons.
 7. Project report on Epidemiological survey, different diseases such as
Malaria; Chicken gunya; AIDS, Diarrhoea
 8. Epidemiological survey of a slum area to identify the diseases due to poor sanitation and
contaminated drinking water.
 9. Visit to a community water purification and treatment plant.
 10. Visit to an industry to study occupational health hazard and safety of industrial workers
(sugar/milk dairy/textile/cement).
 11. Visit to agricultural fields to study occupational health of farmers and agricultural laborers.
- **Laboratory Record work shall be submitted at the time of practical examination**
 - **Computer aided techniques should be adopted as per UGC guide lines.**

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

**B.Sc. III Year PRACTICAL MODEL PAPER
VI - SEMESTER**

**Discipline Specific Elective, Paper – VIII
[Code: BS607; Course Type DSE 2F]
Public Health and Hygiene**

Time: 2 Hrs.

Max. Marks: 40

1	Epidemiological survey report of a slum area health status	10
2	Estimation of ---- from food or water or milk	10
3	Project work	10
4	Certified practical record	05
5	Viva voce	05

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. III Year

VI - SEMESTER

Discipline Specific Elective, Paper – VIII

[Code: BS607; Course Type DSE 2F]

Poultry Science

Periods: 45

Max. Marks: 40

Unit -I: Poultry Nutrition and Physiology

15 hours

- 1.1 Essential amino acids, proteins, fatty acids, vitamins and minerals their inter-relationships.
- 1.2 Functional regulation of digestion, absorption and metabolism of nutrients.
- 1.3 Feed formulation for different species and groups
- 1.4 Different systems of feeding wet mash, dry mash, crumble and pellet feeding. Feed Passage rate in G.I. tract in relation to digestion and absorption efficiency;
- 1.5 Characteristics features of endocrine glands. Endocrine control and variable factors influencing growth process

Unit II: Poultry Products technology

15 hours

- 2.1 Structure, chemical composition and nutritive value of egg.
- 2.2 Various measures of egg quality. Shell, albumen and yolk quality assessment.
- 2.3 Factors influencing egg quality traits. Mechanism of deterioration of egg quality.
- 2.4 Different methods of preservation of table eggs and their relative merits and demerits.
- 2.5 Physical, chemicals, microbial and organoleptic evaluation of meat quality

Unit III: Poultry Health Management

15 hours

- 3.1 Common diseases of poultry – bacterial, viral, fungal, protozoan, parasitic and other emerging diseases of poultry, their prevention, control and treatment.
- 3.2 Metabolic and nutrient deficiency diseases and disorders.
- 3.3 Vaccination programmes and Deworming programmes.
- 3.4 Control of coccidiosis, worms, ectoparasites and flies. Medication procedures.
- 3.5 Cleaning and disinfection of poultry houses. Drinking water sanitation

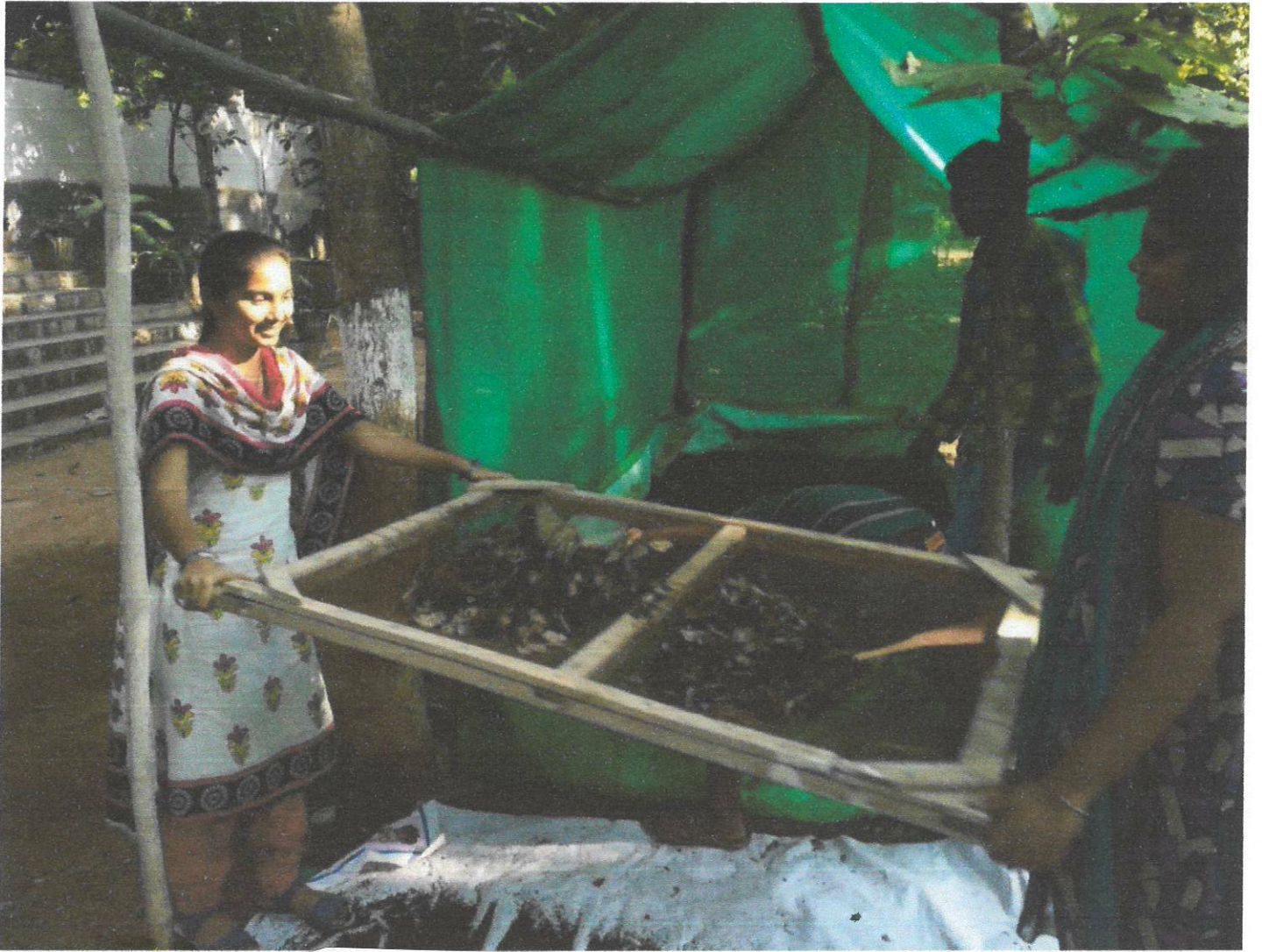
Practical

1. Estimation of amino acids, proteins and fatty acids in feed
2. Virtual demonstration of endocrine glands and their influence on growth of poultry
3. Estimation of albumen and yolk quantity in eggs
4. Estimation of calcium in egg shell.
5. Estimation of carotenes, cholesterol and peroxides in meat of chicken.

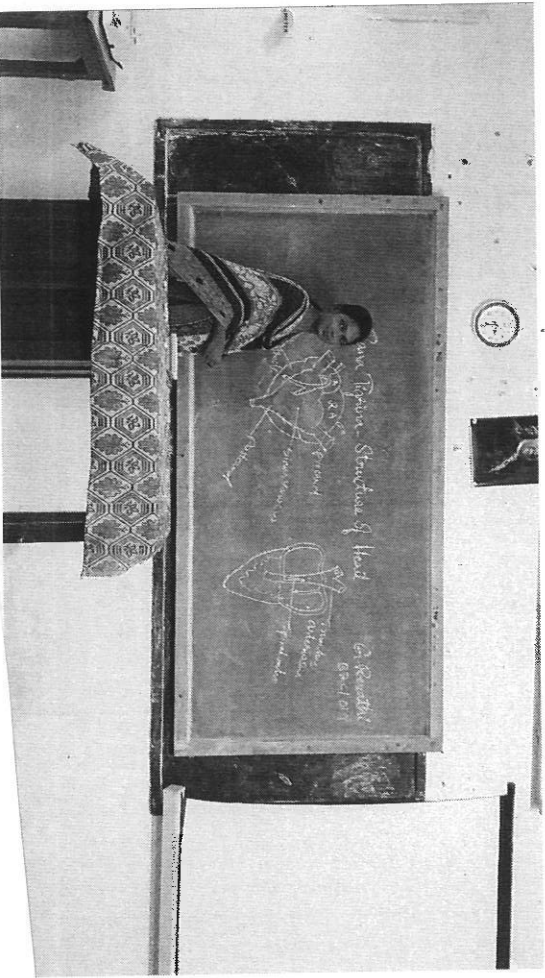


NATIONAL SCIENCE DAY 2018 Resource person Dr. Venkata Krishna.

Dr. Venkata Krishna



STUDENTS PREPARING VERMI COMPOST



STUDENT STUDY PROJECT



NAGARJUNA GOVERNMENT COLLEGE (A) - NALGONDA
 (Re-Accredited by NAAC With 'A' Grade)

ONE DAY NATIONAL SEMINAR ON

BIODIVERSITY FOR SUSTAINABLE DEVELOPMENT

(With the collaboration of Telangana State Biodiversity Board)

ORGANIZED BY: DEPARTMENT OF ZOOLOGY

(Sponsored by UGC - Autonomous Funds)

Chair Person: Dr. R. Nagender Reddy, Principal

Chief Guest: Prof. K. Althaf Hussain, Vice Chancellor, M.G.U

Special Guests & Resource Persons:

Dr. G. Narahari Sastri, Molecular Modelling Group Head IICT, Hyd

Dr. V.V.N. Hanuma Kumar, Associate Prof. of Zoology, Principal, G.D.C Mulugu

Dr. J. Venkateshwar Rao, H.O.D. Dept. of Zoology & C.O.E., Nizam College, Hyd.

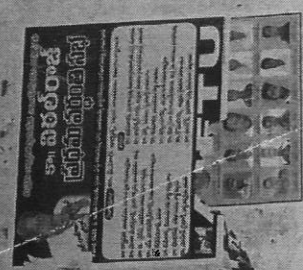
St/G. Sailu, State Project Co-ordinator, Telangana State Biodiversity Board

Date: 03-03-2018 Time: 9.30 AM, Venue Seminar Hall, N.G. College

K. Neeraja, Dept. of Zoology
 Convener

S. Srinath Patel, Asst. Prof. of Zoology
 organizing Secretary

Dr. R. Nagender Reddy
 Principal

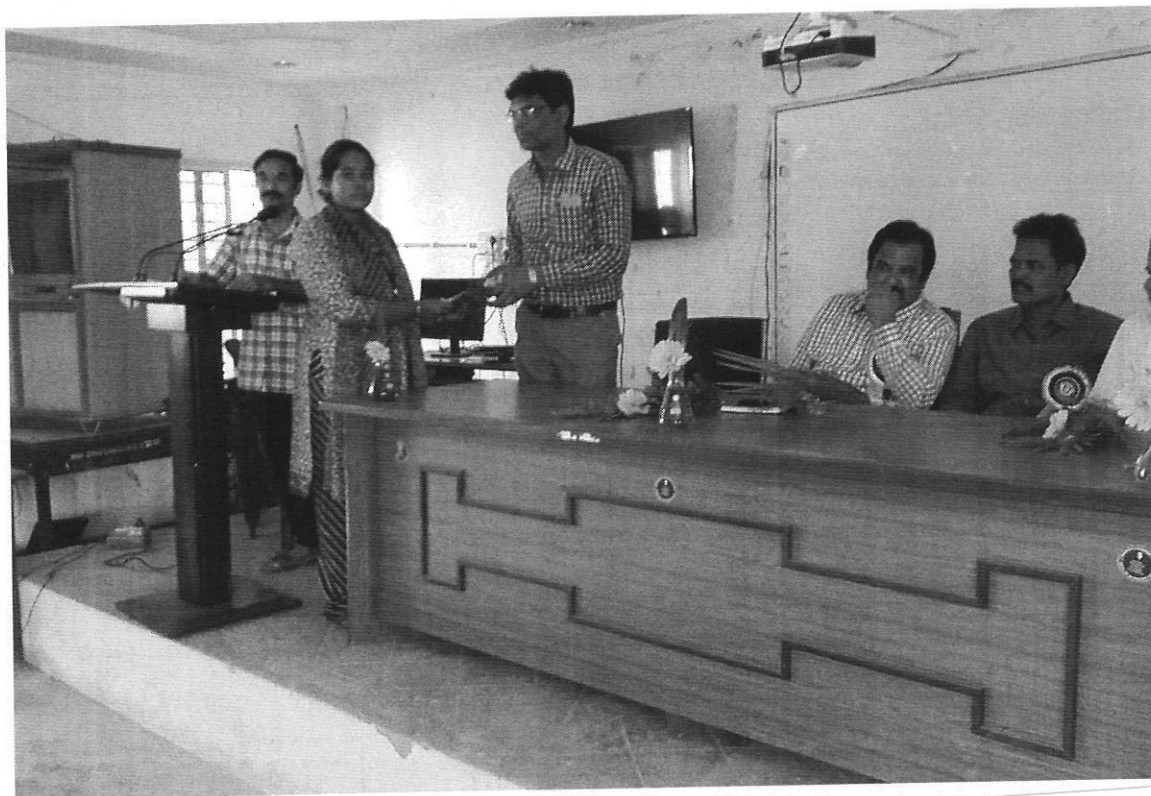




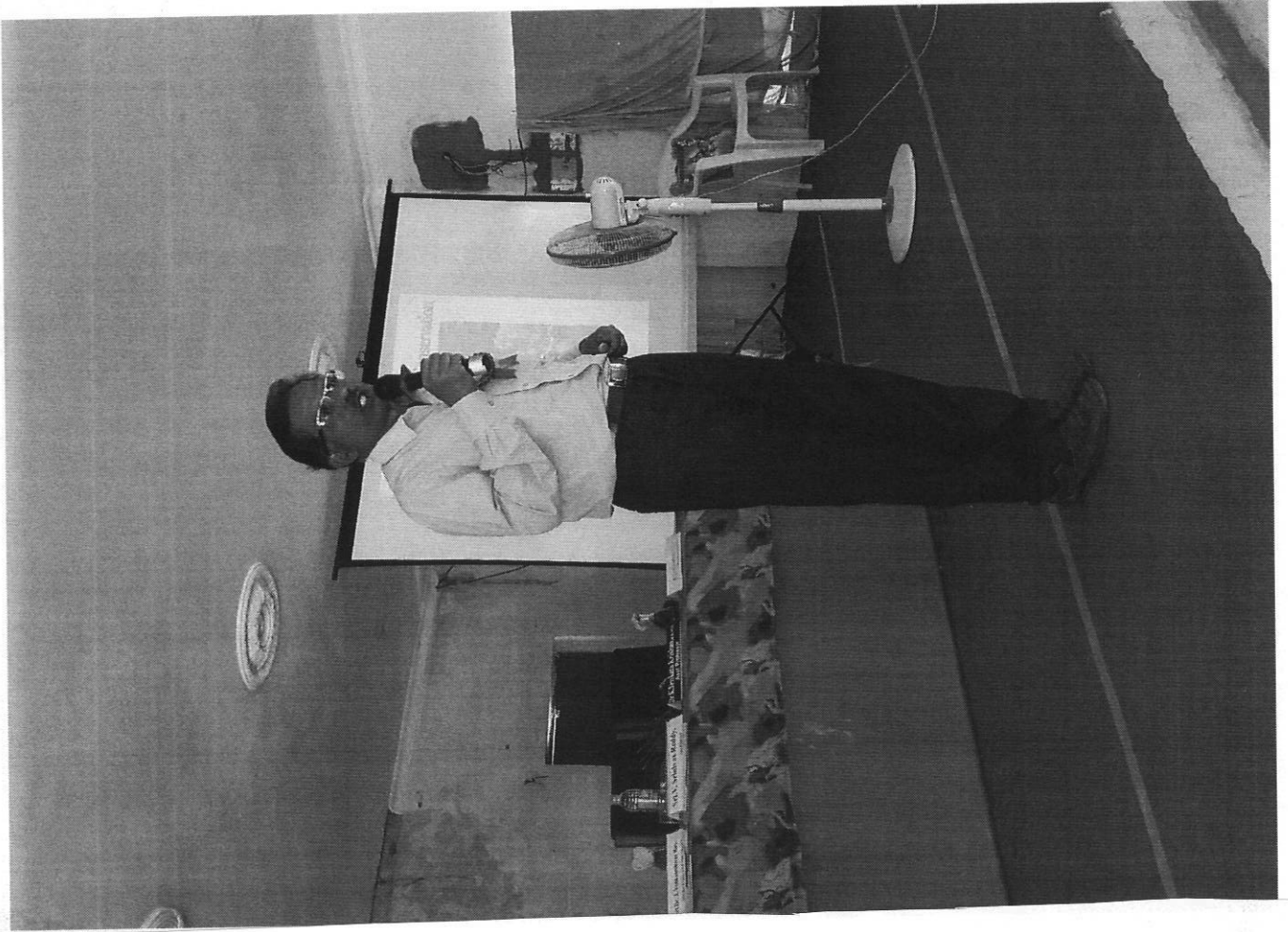
Dr.Narahari Shastri Molicular Modeling Head IICT Hyderabad key note speech on One Day National seminar 09-03-2018.



Extension Lecture on Protean Synthesis By Naresh

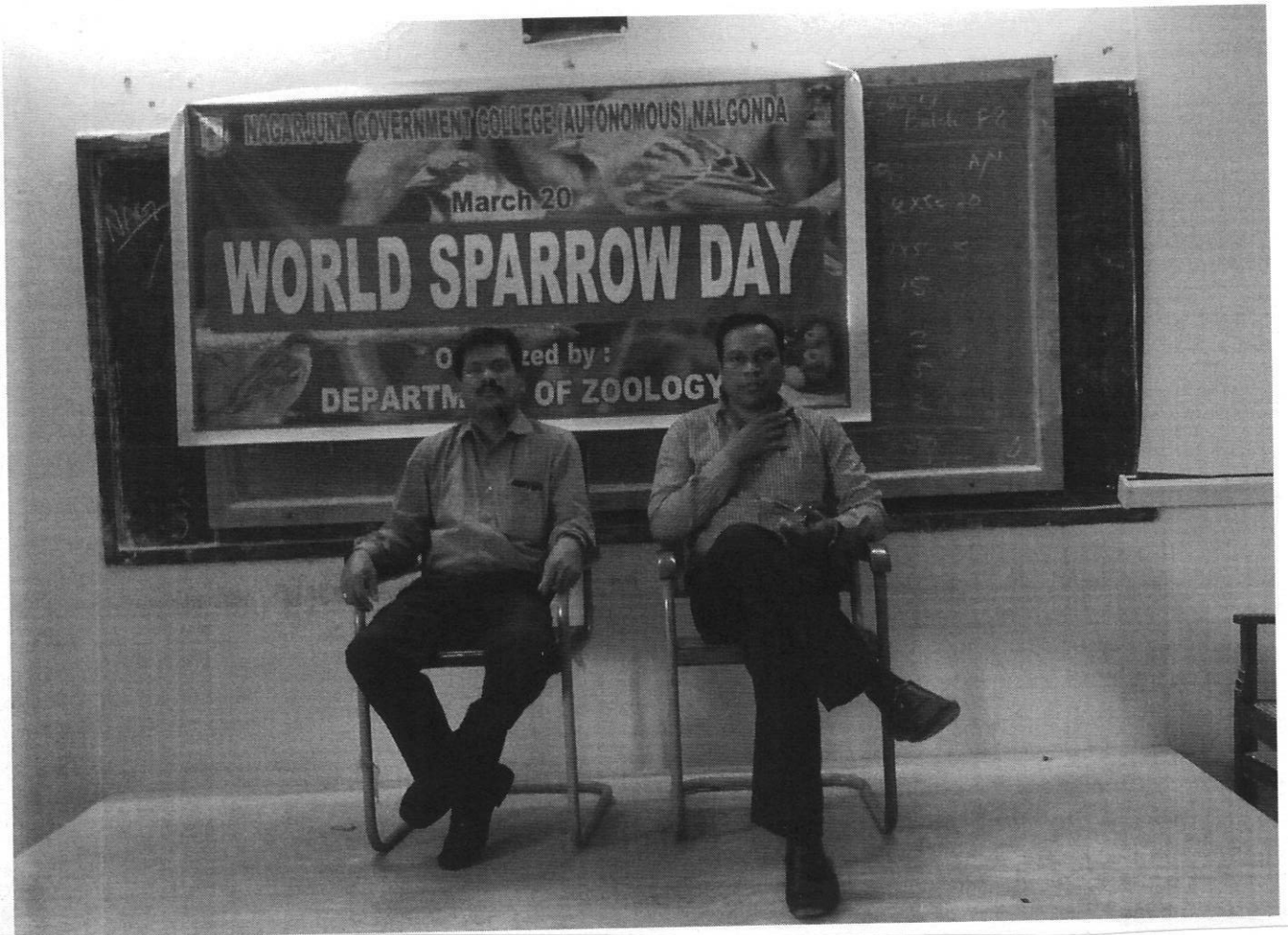


**Extention lecture on Molecular Techniques held on 09-02-2018
Resource person R.Venkar Ram chander.**



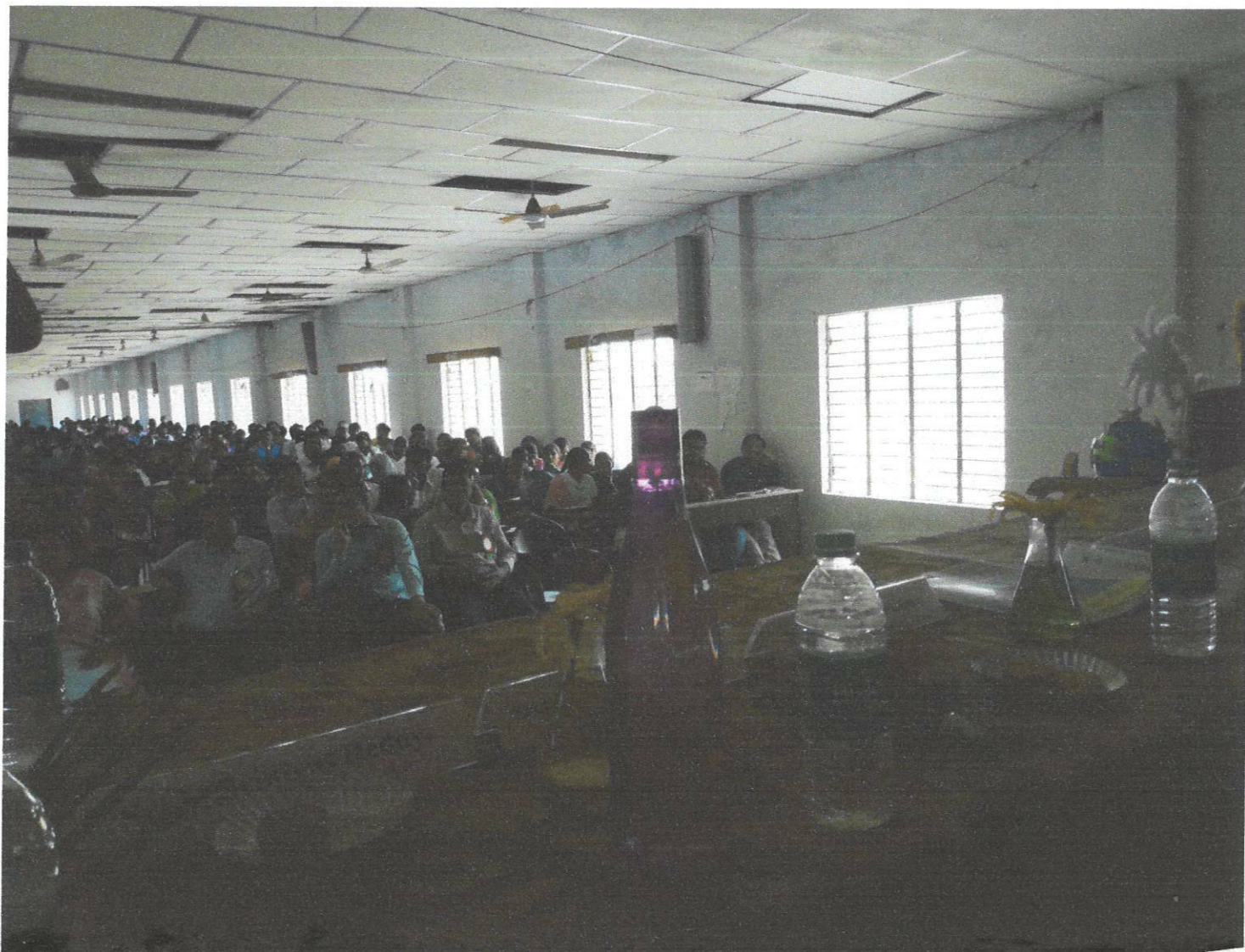
**Dr. VVN Hanuma Kumar presentation on Biodiversity and As
Importance in the seminar held on 09-03-2018**

18/03/2018
Seminar held on 09/03/2018



World Sparrow day celebrated on March 20th 2017

Celebrated in Dept. of Zoology



**ONE DAY NATIONAL SEMINAR BIODIVERSITY FOR
SUSTAINABLE DEVELOPMENT** sponsored by UGC with the
collaboration TSBD DT; 09-03-2018



నాగార్జునా
నలగూడ
WE WILL EXCEL
UGC

ONE DAY

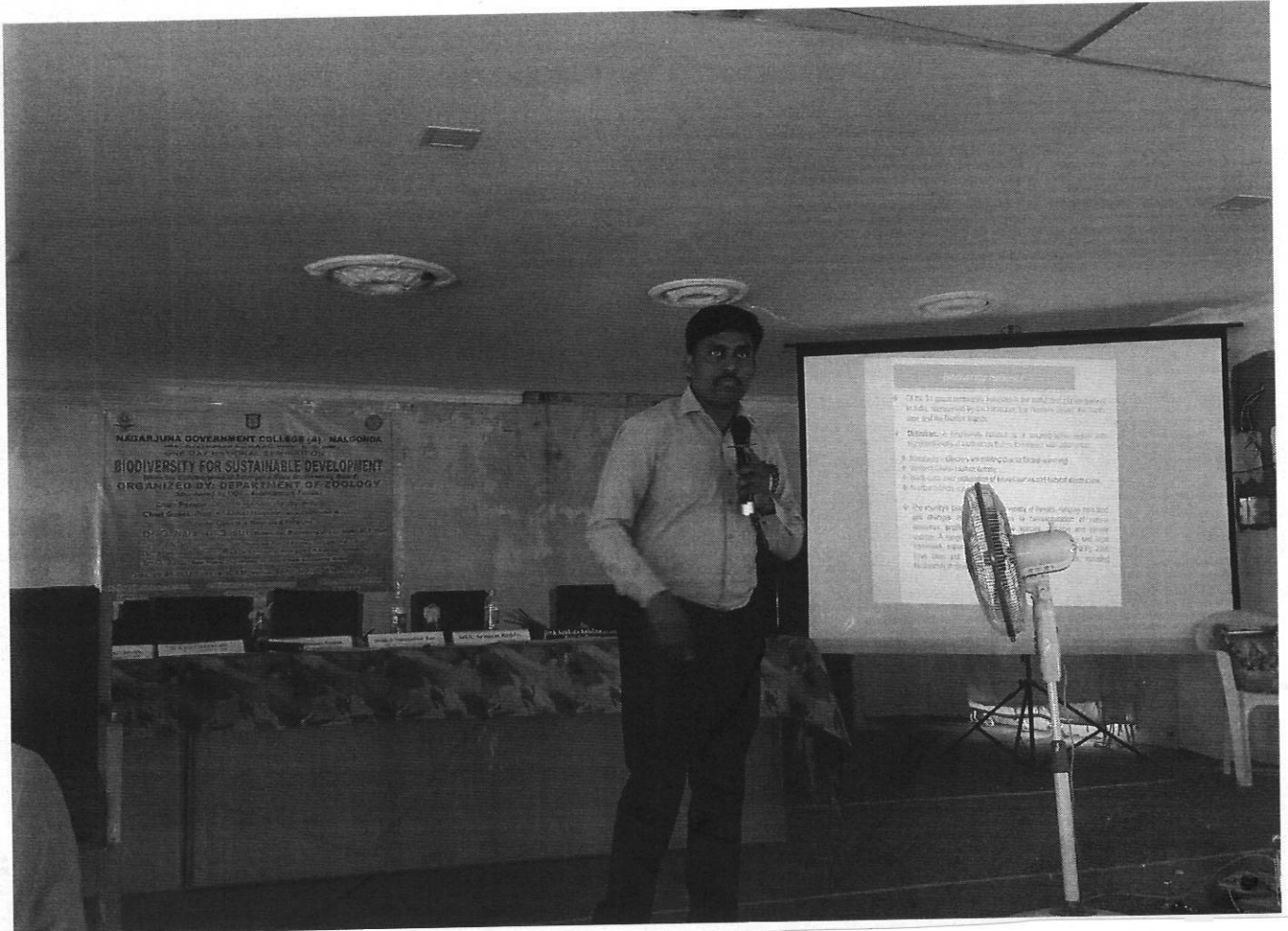
ONE DAY NATIONAL SEMINAR BIODIVERSITY FOR
SUSTAINABLE DEVELOPMENT sponsored by UGC with the
collaboration of TSBD RT, 09-03-2018

NAGARJUNA GOVERNMENT COLLEGE (A) - MALOON
ONE DAY NATIONAL SEMINAR ON BIODIVERSITY
BIODIVERSITY FOR SUSTAINABLE DEVELOPMENT
WITH THE COLLABORATION OF THE INDIAN STATE BOARD OF BIODIVERSITY
ORGANIZED BY UGC (ADMINISTRATIVE UNIT)
BIOLOGICAL SCIENCES
Chair Person: Dr. K. Anand Kumar, Vice-Chancellor, NAGU
Chief Guest: Dr. K. Anand Kumar, Vice-Chancellor, NAGU
Special Guest: Dr. K. Anand Kumar, Vice-Chancellor, NAGU
Dr. G. NARAYANA SASTRI, Member, Planning Group, Hyderabad
Dr. V. Venkateswara Rao, Member, Planning Group, Hyderabad
Date: 09-03-2018
Time: 10:00 AM
Venue: Seminar Hall, NAGU
All are invited
Sri K. Srinivasulu Reddy
Secretary, NAGU



**STUDENT STUDY PROJECT STATE LEVEL JIGNASA
2018**

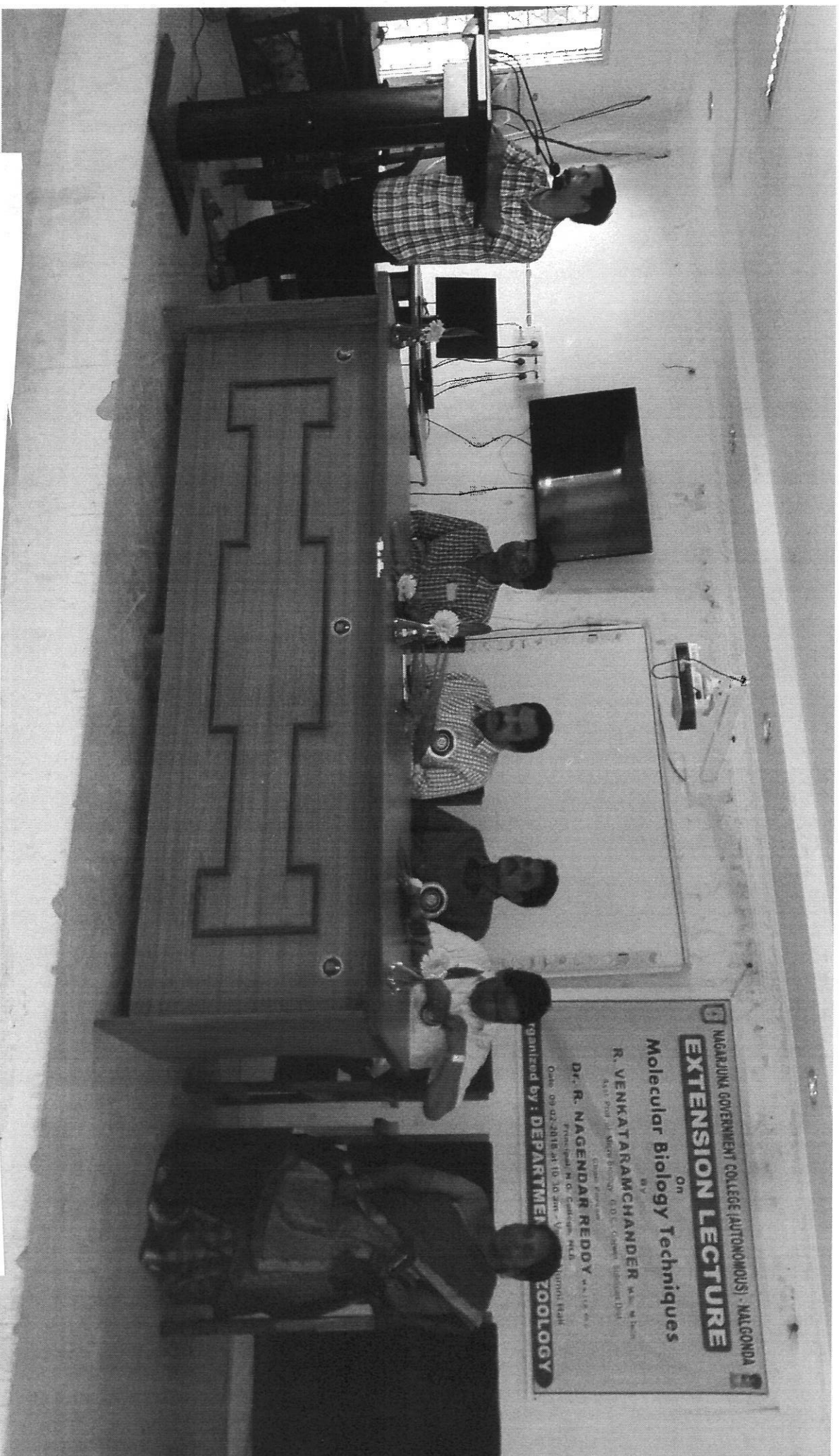
**Evaluating the self fertility on the basis of soil
competences and soil organisms. 2018**



**G.SAILI STATE PROJECT CO ORDINATOR TSBD
PRESENTING ON BIODIVESITY ACTS 09-03-2018**



ONE DAY NATIONAL SEMINAR BIODIVERSITY FOR SUSTAINABLE DEVELOPMENT sponsored by UGC with the collaboration TSBD DT; 09-03-2018



EXTENSION LECTURE
On
Molecular Biology Techniques
BY
R. VENKATARAMCHANDER M.Sc. M.Phil.
Asst. Prof. of Micro Biology, G.O.S. College, Srinagarpet
Organized by : **DEPARTMENT OF ZOOLOGY**
Dr. R. NAGENDAR REDDY
Principal, M.G. College, H.E.L.
Date: 09-02-2018 at 10.30 am - 12.30 pm

Extension lecture on Molecular Techniques held on 09-02-2018
Resource person R. Venkar Ram chander.





STUDENT SEMINAR 2018



STUDENT STUDY PROJECT



DISTRICT LEVEL COMPETITION JIGNASA 2018

NAGARJUNA GOVT. COLLEGE NALGONDA

DEPARTMENT OF ZOOLOGY

LIST OF VBOOKS FOR UG(ZOOLOGY)

1. INVERTEBRATE ZOOLOGY –P.S DHAMI & JK DHAMI (S.CHAND AND CO PUB)
2. INVERTEBRATE ZOOLOGY – KOTHPAL R.L , RASTHOGI PUB
3. PARACTICAL ZOOLOGY –INVERTEBRATES – P.S VERMA
4. PARACTICAL ZOOLOGY –INVERTEBRATES – S.S LAL
5. ENVIRONMENTAL BIOLOGY –P.D SHARMA
6. ECOLOGY AND ANIMAL DISTRIBUTION –VEERBAL RASTHOGI
7. ECOLOGY –M.P. ARORA (HIMALAYA PUB)
8. ECOLOGY –LAB MANUAL DARELL S. VODOPICH
9. CHORDATE ZOOLOGY – E.L JORDAN AND P.S VERMA (S.CHAND PUB)
10. PRACTICAL ZOOLOGY VERTEBRATES –SS LAL
11. A MANUAL OF PRACTICAL ZOOLOGY CHORDATA – P.S VERMA
12. GENETICS – P.K. GUPTHA
13. TEXT BOOK OF ANIMAL PHYSIOLOGY AND BIOCHEMISTRY SINGH H.R
14. COMPARATIVE ANIAML PHYSIOLOGY- NAGABHUSHANAM
15. TEXT BOOK OF ANIMAL PHYSIOLOGY –VEERBAL RASTHOGI
16. TEXT BOOK OOOOF MEDICAL PHYSIOGY –GUYTON A.C. AND HALL
17. BIOCHEMISTRY –BERG J.M
18. BEEKEEPING IN INDIA- SINGH.S
19. FISH AND FISHERIES IN INDIA –JINGRAM
20. VERMICOMPOSTING TECH. SOIL.HEALTH TO HUMAN HEALTH-RANGANATHAN
21. TEXT BOOK OF APPILIED ENTOMOLOGY –K.P. SRIVASTHAVA
22. GENERAL APPLIED ENTOMOLOGY –B.V DAVID AND T.N ANATHAKRISHNAN
23. HAND BOOK OG PRACTICAL SERICULTURE –ULLAL .SR. AND NARSIMHA
24. A HAND BOOK OF MEDICAL LABORATORY TECHNOLOGY – KAMI MUKHERJEE
25. PARASITOLOGY –CHATARJEE
26. IMMUNOLOGY TEXT BOOK
27. AQUATIC BIOLOGY TEXT BOOK
28. BIORESOURCESS ECOLOGY –ANANTHAKRISHNAN
29. EPIDOMOLOGY AND MANGEMENT FOR HALTH CARE –SATHE P.V
30. POULTY SCIENCE
31. A DICTIONARY OF ZOOLOGY- OXFORD
32. COMMON BIRDS –ANANDA BENERJEE
33. GENERAL& APPLIED ICHTHYOLOGY-GUPTHA S.K
34. MOLICULAR BIOLOGY –VERMA P.S
35. ZOOLOGY FOR DEGREE I,II,III, YEAR –DR. V.K AGARWAL (

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