

UNIVERSITY OF CALICUT



B.Sc. ZOOLOGY PROGRAMME

[CBCSS UG 2019]

SYLLABUS

Core Courses

Open Courses

Complementary Courses

&

Model Question Papers

EFFECTIVE FROM 2019 ADMISSION

Members of Board of Studies in Zoology (UG)

(U.O.No.10961/2016/Admn. dated, Calicut University, P.O., 07.09.2016)

1. **Dr. T.M. Benny (Chairman)**
Associate Professor, Dept. of Zoology
St. Joseph's College, Devagiri, Kozhikode
email: bennydevagiri@gmail.com
Mob: 9495184280
2. Dr. P. Haridasan
Principal, Govt. Arts and Science College,
Thrithala, Palakkad.
email: dr.p.haridasan@gmail.com
Mob: 9496294026
3. Dr. Francy K. Kakkassery
Associate Professor, Dept. of Zoology,
St. Thomas College, Thrissur.
4. Dr. I. P. Abdul Razak
Associate Professor, Dept. of Zoology,
Unity College, Manjeri.
5. Dr. Tomy Francis
Associate Professor, Dept. of Zoology,
St. Aloysius College, Elthuruth, Thrissur.
6. Dr. Jeeja Tharakan
Associate Professor, Dept. of Zoology,
St. Aloysius College, Elthuruth, Thrissur.
7. Dr. P. Shylaja Kumari
Assistant Professor, Dept. of Zoology,
Govt. Arts and Science College,
Meenchanda, Kozhikode.
8. Mr. Abdul Riyas, K.
Assistant Professor, Dept. of Zoology,
Govt. Arts and Science College,
Meenchanda, Kozhikode.
9. Dr. Santhosh Shreevihar
Assistant Professor, Dept. of Zoology,
Malabar Christian College, Calicut.
10. Dr. Anoop Das
Assistant Professor, Dept. of Zoology,
M.E.S.Mampad College, Malappuram.
11. Dr. M. Nasser [Chairman, Board of Studies Zoology (PG)]
Professor, Dept. of Zoology,
University of Calicut.

INDEX

| Sl. No. | Content | Page No. |
|---------|---|----------|
| 1 | B.Sc. Zoology programme: Introduction | 1 |
| 2 | Aims and objectives | 2 |
| 3 | An Overview | 3 |
| 4 | Credits and marks distribution of B.Sc. Zoology programme (<i>Course Structure</i>).[Table 2] | 7 |
| 5 | Course wise mark distribution of B.Sc. Zoology programme [Table 3] | 8 |
| 6 | Semester wise distribution of credits and marks [Table 4] | 9 |
| 7 | B.Sc. Zoology (Core) programme <i>Structure of core, open and elective courses</i> [Table 5] | 11 |
| 8 | B.Sc. Zoology Open course [<i>for students of other streams</i>] <i>Structure of open course</i> [Table 6] | 13 |
| 9 | Outcomes and Outcome Based Education (OBE) | 14 |
| 10 | Programme Outcomes (POs) for general undergraduate programme | 15 |
| 11 | Program Specific Outcomes (PSOs): B.Sc. Zoology program, course outcomes | 15 |
| 12 | Core course: Scheme of instructions | 16 |
| 13 | Examinations | 17 |
| 14 | Evaluation and Grading | 18 |
| 15 | Ten point indirect grading system [Table 7] | 19 |
| 16 | Core course: Scheme of evaluation | 19 |
| 17 | A. Theory [core course]: Evaluation scheme | 19 |
| 18 | I. Internal evaluation | 19 |
| 19 | II. External evaluation | 21 |
| 20 | Pattern of question paper (theory) type 1 & 2 [Table 9 & 10] | 22 |
| 21 | B. Practical [core course]: Evaluation scheme | 22 |
| 22 | I. Internal evaluation | 22 |
| 23 | II. External evaluation | 23 |
| 24 | Scheme of question papers for practical I, II & III [Table 12 & 13] | 24 |
| 25 | Project work & Field study (core course): Evaluation scheme | 25 |
| 26 | I. Internal evaluation | 26 |
| 27 | II. External evaluation | 26 |
| 28 | Open Course [Zoology] | 27 |
| 29 | Open Course : Scheme of Evaluation | 27 |
| 30 | I. Internal evaluation | 27 |
| 31 | II. External evaluation: Pattern of question paper [Table 20] | 28 |
| 32 | Internal Assessment : Precautions | 28 |

| Sl. No. | Content | Page No. |
|----------------|---|-----------------|
| 33 | S1. Core course I [Theory]: Animal diversity: Non-chordata Part- I | 31 |
| 34 | S2. Core course II [Theory]: Animal diversity: Non-chordata Part- II | 35 |
| 35 | S3. Core course III [Theory]: Animal diversity: Chordata Part- I | 39 |
| 36 | S4. Core course IV [Theory]: Animal diversity: Chordata Part- II | 43 |
| 37 | S4. Core course Practical - I : [S1 I*A + S2 I*B + S3 I*C + S4 I*D] | 47 |
| 38 | S5. Core course V [Theory]: Cell Biology and Genetics | 53 |
| 39 | S5. Core course VI [Theory]: Biotechnology, Microbiology and Immunology | 58 |
| 40 | S5. Core course VII [Theory]: Biochemistry and Molecular Biology | 63 |
| 41 | S5. Core course VIII [Theory]: Methodology in Science, Biostatistics and Bioinformatics | 68 |
| 42 | S5. Core course Practical - II : [S5 II*A + S5 II*B] | 72 |
| 43 | S5. Open course: Zoology - 01[Theory]: Reproductive Health and Sex Education | 77 |
| 44 | S5. Open course: Zoology - 02[Theory]: Nutrition, Health and Hygiene | 80 |
| 45 | S5. Open course: Zoology - 03[Theory]: Applied Zoology | 83 |
| 46 | S6. Core course IX [Theory]: Physiology and Endocrinology | 86 |
| 47 | S6. Core course X [Theory]: Reproductive and Developmental Biology | 89 |
| 48 | S6. Core course XI [Theory]: Environmental and Conservation Biology | 93 |
| 49 | S6. Core course XII [Theory]: Ethology, Evolution and Zoogeography | 97 |
| 50 | S6. Core Elective course XIII [Theory]: 01: Human Genetics | 101 |
| 51 | S6. Core Elective course XIII [Theory]: 02: Aquaculture, Animal Husbandry and Poultry Science | 104 |
| 52 | S6. Core Elective course XIII [Theory]: 03: Applied Entomology | 107 |
| 53 | S6. Core course Practical - III : [S6 III*A + S6 III*B] | 111 |
| 54 | B.Sc. Zoology Complementary Programme | 117 |
| 55 | Complementary Course: Introduction | 117 |
| 56 | Complementary Course: Scheme of instruction | 117 |
| 57 | Complementary Course: Structure of complementary course | 118 |
| 58 | Complementary Course: Scheme of evaluation | 119 |
| 59 | A. Theory [Complementary course]: Evaluation scheme | 119 |
| 60 | i. Internal evaluation | 119 |
| 61 | ii. External evaluation | 120 |

| Sl. No. | Content | Page No. |
|----------------|--|-----------------|
| 62 | B. Practical [Complementary course]: Evaluation scheme | 121 |
| 63 | i. Internal Evaluation | 121 |
| 64 | ii. External Evaluation | 122 |
| 65 | Scheme of question paper for Complementary Practical | 122 |
| 66 | S1. Compl. course I [Theory]: Animal Diversity and Wildlife Conservation | 123 |
| 67 | S2. Compl. course II [Theory]: Economic Zoology | 126 |
| 68 | S3. Compl. course III [Theory]: Physiology and Ethology | 128 |
| 69 | S4. Compl. course IV [Theory]: Genetics and Immunology | 131 |
| 70 | S4. Complementary course Practical-I:[S1 I*A+S2 I*B+S3 I*C+S4 I*D] | 134 |
| 71 | Model question papers [Core courses] (S1-S5) | 139 |
| 72 | Model question papers [Open courses] | 147 |
| 73 | Model question papers [Core courses] (S6) | 150 |
| 74 | Model question papers [Core Elective courses] | 154 |
| 75 | Model question papers [Complementary courses] | 157 |
| 76 | Model question paper [Core Practical I] | 161 |
| 77 | Model question paper [Core Practical II & III] | 162 |
| 78 | Model question paper [Complementary Practical] | 166 |

**INTRODUCTION,
GUIDELINES
AND
GENERAL INFORMATION**

B.Sc. ZOOLOGY PROGRAMME

INTRODUCTION

The Higher Education Programme in Kerala has been witnessing a drastic change from 2009 admission onwards with the introduction of Semesterisation and Grading at the undergraduate level. As a continuation of this trend, UGC has recognized the importance of Outcome Based Education (OBE) to be incorporated in the Choice Based Credit and Semester System (CBCSS) for UG curriculum. A course in General Higher Education Programme in India needs to be designed and conducted to facilitate the students to meet the identified Course Outcomes (COs). The course outcomes address a subset of Programme Outcomes (POs) identified by the university or the autonomous institutions that offer the programme. Also, the course outcomes address the Programme Specific Outcomes (PSOs) identified by the Branch/Department. Keeping in view of the implementation of OBE-CBCSS of UGC, Kerala State Higher Education Council conducted three days workshop during 12 -14 February 2019 with the title “*Redesigning of Courses for Outcome Based Education (OBE)*” for the Board of Studies in UG Programme under Faculty of Science at Tagore Nikethan, University of Calicut.

Vide U.O No. GA I/J2/3601/08 (Vol. II) dated 19.06.2009, regulations for CBCSS for UG curriculum was implemented from 2009 admission onwards under the University of Calicut, as per the directions of Kerala State Higher Education Council. The regulations of CBCSS for UG curriculum was also modified [U.O. No. 3797/2013/CU dated 07.09.2013] and implemented from 2014 admission onwards under the University of Calicut, as per the recommendations of Hridayakumari Committee appointed by the Govt. of Kerala. The Academic Council in its special meeting held on 28.02.2019 has approved the CBCSS UG regulations 2019 [U.O No. 4368/2019/Admn dated, 23.03.2019] and has, therefore, been accorded to implement the regulations for Choice Based Credit and Semester System for Under Graduate curriculum-2019 (CBCSS UG Regulations 2019) for all UG Programme under CBCSS regular and SDE/Private registration in the university of calicut, w.e.f. 2019 admission.

Board of Studies in Zoology (U.G.) of University of Calicut [constituted as per U.O.No.10961/2016/Admn. Dated 07.09.2016] reviewed and meticulously analyzed the existing and continuing syllabi of B.Sc. Zoology Programme. BoS received many requests and suggestions regarding the course structure, content and credit distribution that are to be incorporated in to the existing syllabus. BoS also discussed the details of the syllabus of B.Sc. Zoology programme in the context of outcome based education and the regulations of CBCSS UG curriculum 2019. Accordingly, BoS has framed the curriculum, course structure, course content, instructional hours, scheme of instruction, scheme of evaluation, credits, mark distribution, duration of examination and model question papers of B.Sc. Zoology Programme [CBCSS UG] with the present requirements of the teaching and learning process.

In addition, the semester-end examinations (total 6 semesters) to be conducted by the university, a system of continuous evaluation through *Internal*

Assessment by the faculty members of the Department of Zoology of the respective institutions must be adopted for Zoology Core, Open and Complementary courses. The distribution of marks is 80% for external evaluation and 20% for internal assessment.

The syllabus for the six semesters of B.Sc. Degree Programme with Zoology as Core course of study which contain provision for both theory and practical components in all six semesters and complementary courses also contain both theory and practical components in four semesters.

Some changes are also made in the combination of core course content in the fifth and sixth semesters in order to complete the teaching process in time especially in the tight schedule of the semesters. Further, some pertinent topics are suggested for *seminar/ assignment* for theory courses with a view to enrich the UG Programme.

The practical courses offered are designed in such a way that they support the theory topics and also impart the basic skills and techniques required of them. In addition to the items for practical, a *Project work* forms an integral part of the curriculum during the sixth semester. *Field study/study tour* to the research institution/museum and places of biological/zoological importance/ecological interest is a compulsory element of the curriculum. Requirement to visit places of importance of elective subject area is also a compulsory element. Attempts have also been made to update the syllabus, considering the needs of the time and conforming to the work load prescribed by the university.

Accordingly, the BoS meeting held on 12.04.2019 at Calicut University took the decision **to implement the revised syllabus w.e.f. 2019 B.Sc. Zoology admission.**

AIMS AND OBJECTIVES

The Board of Studies in Zoology (UG) recognizes that curriculum, course content and assessment of scholastic achievement play complementary roles in shaping education. The revised Outcome Based Education- Choice Based Credit and Semester System for Under Graduate (UG) Curriculum for B.Sc. Zoology Programme envisages undergraduate education as a combination of general and specialized education with outcome based, simultaneously introducing the concepts of breadth and depth in learning. Besides recalling information, the learning process is aimed to acquire the ability for problem solving, and critical and creative thinking in students. The present attempt is to prepare the students for lifelong learning by drawing attention to the vast world of knowledge of animals and introducing them to the methodology of systematic academic enquiry. The crew of the syllabus ensures firm footing in fundamental aspects of Zoology and wide exposure to modern branches of Zoology to the students.

The expected outcome of the syllabus:

- To know the scope and importance of Zoology.
- To develop scientific temper among students.

- To inculcate interest in nature and living forms and their conservation.
- To make the students eco-friendly by creating a sense of environmental awareness in them.
- To give better exposure to the diversity of life forms.
- To give awareness about natural resources and their importance in sustainable development.
- To study different ecological sites for animals in their natural habitats by field study.
- To provide opportunities for the application of the acquired knowledge in day- to - day life.
- To develop skills in doing experiments, familiarizing equipments and biological specimens.
- To undertake scientific projects which help to develop research aptitude in students.
- To expose students to various fields in biological sciences and to develop interest in related disciplines.
- To attain interdisciplinary approach to understand the application of the subject in daily life.
- To familiarize the emerging areas of Zoology and their applications in various spheres of biological sciences and to appraise the students of its relevance in future studies.

AN OVERVIEW

Definitions and Structure

Title shall be called “Regulations for Choice Based Credit and Semester System for Under Graduate Curriculum 2019” (CBCSS UG 2019). **Programme** means the entire course of study and examinations lead to the award of a degree. **Duration of programme** means period of time required for the conduct of undergraduate programme i.e. six semesters distributed in a period of 3 years. The odd semesters (1, 3 and 5) shall be from June to October and the even semesters (2, 4 and 6) shall be from November to March. **Academic week** is a unit of five working days in which distribution of work is organised from Monday to Friday with five contact hours of one hour duration on each day. A sequence of 18 such academic weeks constitutes a semester. **Semester** constitute minimum of 18 weeks (16 instructional weeks and 2 weeks for examination).

Course means a segment of subject matter to be covered in a semester. The graduate programme includes five types of courses, *viz.*, common, core, complementary, open, audit /ability enhancement and improvement courses.

Common course means a course that comes under the category of courses for English and additional language, a selection of both is compulsory for all students undergoing undergraduate programme. Every undergraduate student shall undergo 10 common courses [6 English courses and 4 additional language courses] for completing the programme. **Core courses** are major (core) courses in a subject related to a particular degree programme. Core courses are offered by the parent department. There are 17 core courses including a project work and field study.

Complementary course means a course which is generally related to the core subject. It covers two disciplines in B.Sc. degree programme that are distributed in the first four semesters. There shall be one **Open course** in the 5th semester. This is a course outside the field of specialisation of the student, which can be opted by his/her choice. **Audit course/Ability Enhancement course** is a course which is mandatory. There shall be one Audit course each in the first four semesters. These courses are not meant for class room study. The credits of audited courses are not counted for SGPA or CGPA. [**Improvement course** is a course registered by a student for improving his/her performance.]

Course code of each course shall have a unique alphanumeric code number, which includes abbreviation of the subject in three letters, the semester number (1 to 6) in which the course is offered, the code of the course (A to E) and serial number of the course (01,02.). (A: Common course, B: Core course, BE: Core Elective course, C: Complementary course and D: Open course, E: Audit course) For example: ZOL5B06 represents a core course of serial number 06 offered in 5th semester in B.Sc. Zoology programme.

Each course shall have certain credits. **Credit** is a unit of academic input measured in terms of weekly contact hours/course content assigned to a course. **Extra Credit** is the mandatory additional credit awarded to a student over and above the minimum credits required in a programme, for participating in co-curricular activities and social activities outside the regular class hours, like NCC, NSS and Swatch Bharath. Those students who could not join in any of the above activities have to undergo Calicut University Social Service Programme (CUSSP). Extra credits are not counted for SGPA or CGPA.

Grade in a course is a letter symbol (O, A+, A, B+, B, C, P, F, I and Ab). Grade shall mean the prescribed alphabetical grade awarded to a student based on his/her performance in various examinations. Each letter grade is assigned a '**Grade point** (G) which is an integer indicating the numerical equivalent of the broad level of performance of a student in a course. **Grade Point** means point given to a letter grade on 10 point scale. **Strike off the roll:** A student who is continuously absent for 14 days without sufficient reason and proper intimation to the Principal of the college shall be removed from the roll.

Department means any teaching department in a college offering a course of study approved by the university as per the Statutes and Act of the University. **Department Co-ordinator** is a teacher nominated by a Dept. Council to co-ordinate all the works related to CBCSS UG undertaken in that department including continuous evaluation. **Department Council** means the body of all teachers of a department in a college. **Parent Department** means the Department which offers a particular degree programme. **Course teacher:** A teacher nominated by the Head of the Department shall be in charge of a particular course.

College Co-ordinator is a teacher nominated by the college council to co-ordinate the effective running of the process of CBCSS including internal evaluation undertaken by various departments within the college. She/he shall be the convener for the college level monitoring committee. **College level monitoring committee:** A monitoring Committee is to be constituted for CBCSS UG at the

college level with Principal as Chairperson, college co-ordinator as convener and department co-ordinators as members. The elected college union chairperson shall be a member of this committee. **Faculty Adviser** means a teacher from the parent department nominated by the Department Council, who will advise the student in the academic matters and in the choice of open courses.

Project work & Field study: Every student of a UG programme shall have to work on a project under the supervision of a faculty member. A field study/study tour for 5 days is compulsory during the tenure of the B.Sc. Zoology programme.

Grace Marks: Grace marks may be awarded to a student for meritorious achievements in co-curricular activities (in Sports/Arts/NSS/NCC/Student Entrepreneurship) carried out besides the regular hours. Such a benefit is applicable and limited to a maximum of 8 courses in an academic year spreading over two semesters. In addition, maximum of 6 marks per semester can be awarded to the students of UG Programme, for participating in the College Fitness Education Programme (COFE).

Attendance: A student shall be permitted to appear for the semester examination, only if he/she secures not less than 75% attendance in each semester. Attendance shall be maintained by the Department concerned.

A student is required to acquire a minimum of **140** credits for passing the degree programme, of which 120 credits are to be acquired from class room study and shall only be counted for SGPA and CGPA.

| | |
|-------------------------------|---|
| Common courses: | 38 credits (22 for English courses + 16 for Additional languages). |
| Core courses: | 55 credits (including 3 credits for project work & field study). |
| Open course: | 3 credits |
| Complementary courses: | 24 credits (12 credits each for Chemistry and Botany) |
| Audit courses: | 16 credits (4 credits per course in first 4 semesters) |
| Extra credits: | 4 credits (4 credits in first 4 semesters) |

If more Extra credit activities are done by a student that may be mentioned in the Grade card. *The credits of audited courses or extra credits are not counted for SGPA or CGPA.* The successful completion of all the courses (common, core, complementary and open courses) prescribed for the degree programme with 'P' grade shall be the minimum requirement for the award of degree.

CALICUT UNIVERSITY SOCIAL SERVICE PROGRAMME (CUSSP)

In this programme, a student has to complete 12 days of social service. This has to be completed in the first four semesters; 3 days in each semester. For the regular programme the student has to work in a Panchayath or Local body or in a hospital/ poor home or old age home or in a Pain & palliative centre or any social work assigned by the College authorities. Students who engaged in College Union

activities and participate in sports and cultural activities in Zonal level have to undergo only 6 days of CUSSP during the entire programme. The whole documents regarding the student should be kept in the college and the Principal should give a certificate for the same. The list of students (successfully completed the programme) must be sent to the university before the commencement of the fifth semester examinations. A college level co-ordinator and a department level co-ordinator shall be appointed for the smooth conduct of the programme.

AUDIT COURSES/ABILITY ENHANCEMENT COURSES

These are courses which are mandatory for a programme but not counted for the calculation of SGPA or CGPA. There shall be one Audit course each in the first four semesters. These courses are not meant for class room study. The students can attain only pass (Grade P) for these courses. At the end of each semester, there shall be examination conducted by the college from a pool of questions (Question Bank) set by the University. The Question paper shall be of 100 marks of 3 hour duration. The students can also attain these credits through online courses like SWAYAM, MOOC etc (optional). The list of passed students must be sent to the University from the colleges at least before the fifth semester examination. The lists of courses in each semester with credits are given below.

Table 1. AUDIT COURSES: CREDITS IN FIRST 4 SEMESTERS

| Sl.No. | Semesters | Courses | Credits | Marks | Duration of Exam |
|---------------|------------------|---|----------------|--------------|-------------------------|
| 1 | I | Environmental studies | 4 | 100 | 3 hrs |
| 2 | II | Disaster Management | 4 | 100 | 3 hrs |
| 3 | III | *Human Rights/Intellectual Property Rights/ Consumer Protection | 4 | 100 | 3 hrs |
| 4 | IV | *Gender studies/Gerontology | 4 | 100 | 3 hrs |
| | | Total | 16 | 400 | |

**College can opt any one of the courses.*

Table 2. CREDITS AND MARKS DISTRIBUTION OF B.Sc. ZOOLOGY PROGRAMME

[Course Structure]

| Semesters | Common course: Credits | | Core Course Zoology: Credits | Open Course: Credits | Complementary course: Credits | | Total Credits | Audit course: Credits | Extra Credits |
|-----------|-----------------------------------|---------------------------------|------------------------------------|-------------------------------|---------------------------------|---------------------------------|---|--|---|
| | English | Addl Language | | | Chemistry | Botany | | | |
| I | 3+3 | 4 | 2 | -- | 2 | 2 | 16 | 4 | |
| II | 4+4 | 4 | 2 | -- | 2 | 2 | 18 | 4 | |
| III | 4 | 4 | 3 | -- | 2 | 2 | 15 | 4 | 4 |
| IV | 4 | 4 | 3+4* | -- | 2+4* | 2+4* | 27 | 4 | |
| V | -- | -- | 4+4+4+4 | 3 | -- | -- | 19 | -- | |
| VI | -- | -- | 3+3+3+3 +2+4*+4 *+3** | -- | -- | -- | 25 | -- | |
| Total | 22 Credits (550 Marks) | 16 Credits (400 Marks) | 55 Credits (1450 Marks) | 3 Credits (75 Marks) | 12 Credits (400 Marks) | 12 Credits (400 Marks) | 120 Credits (3275 Marks) | 16 Credits (400 Marks) | 4 Credits (100 Marks) |
| | 38 Credits (950 Marks) | | 82 Credits (2325 Marks) | | | | 120 Credits (3275 Marks) | #16 Credits (400 Marks) | #4 Credits (100 Marks) |

Grand Total: 3775 Marks; 140 Credits (Minimum)

**Practical (12 Credits) **Project work & Field study (3 Credits).*

Credits acquired from class room study and counted for SGPA and CGPA: 120

Total 140 credits [120+16+4] are required for completing UG programme.

#Credits of audit course (16) and extra credits (4) are mandatory and not counted for SGPA or CGPA calculation.

Table 3. COURSEWISE MARK DISTRIBUTION OF B.Sc. ZOOLOGY PROGRAMME

| Courses | | | No. of Courses | Marks per Course | Total Marks | Grand Total Marks |
|-----------------------|-----------------------|------------------------------|----------------|-------------------------------|-------------|-------------------|
| Common Courses | English | Theory | 6 | 75 x 2 = 150 100 x 4 = 400 | 550 | 550 |
| | Additional Language | Theory | 4 | 100 | 400 | 400 |
| Core Courses | Zoology | Theory | 13 | 75 x 9 = 675 100 x 4 = 400 | 1075 | 1450 |
| | | Practical | 3 | 100 | 300 | |
| | | Project work and Field study | 1 | 75 | 75 | |
| Open course | Zoology/Other streams | Theory | 1 | 75 | 75 | 75 |
| Complementary courses | Chemistry | Theory | 4 | 75 x 4 = 300 | 300 | 400 |
| | | Practical | 1 | 100 | 100 | |
| | Botany | Theory | 4 | 75 x 4 = 300 | 300 | 400 |
| | | Practical | 1 | 100 | 100 | |
| Total Marks | | | | | | 3275 |
| Audit courses | | Theory | 4 | 400 | 400 | 400 |
| Extra credits | | | 4 | | 100 | 100 |
| Total Marks | | | | | | 500 |

Grand Total: 3775 Marks (3275+500); 140 Credits (Minimum)

Table 4. SEMESTER WISE DISTRIBUTION OF CREDITS AND MARKS

B.Sc. Zoology Programme
Total Credits: 140; Total Marks: 3775

| Semester | Course | Credits | Marks |
|-----------------|---|----------------|--------------|
| I | Common course: English | 3 | 75 |
| | Common course: English | 3 | 75 |
| | Common course: Additional Language | 4 | 100 |
| | Core Course I: Animal Diversity: Non-chordata Part-I | 2 | 75 |
| | Complementary course: Chemistry | 2 | 75 |
| | Complementary course: Botany | 2 | 75 |
| | Audit Course: Environmental studies | 4 | 100 |
| | Total | 20 | 575 |
| II | Common course: English | 4 | 100 |
| | Common course: English | 4 | 100 |
| | Common course: Additional Language | 4 | 100 |
| | Core Course II: Animal Diversity: Non-chordata Part-II | 2 | 75 |
| | Complementary course: Chemistry | 2 | 75 |
| | Complementary course: Botany | 2 | 75 |
| | Audit Course: Disaster Management | 4 | 100 |
| | Total | 22 | 625 |
| III | Common course: English | 4 | 100 |
| | Common course: Additional Language | 4 | 100 |
| | Core Course III: Animal Diversity: Chordata Part-I | 3 | 75 |
| | Complementary course: Chemistry | 2 | 75 |
| | Complementary course: Botany | 2 | 75 |
| | Audit Course: Human Rights/Intellectual Property Rights/ Consumer Protection | 4 | 100 |
| | Total | 19 | 525 |
| IV | Common course: English | 4 | 100 |
| | Common course: Additional Language | 4 | 100 |
| | Core course IV: Animal Diversity: Chordata Part-II | 3 | 75 |
| | Core course V: Zoology Core Practical – I [Practical I*A +I*B+ I*C+ I*D] | 4 | 100 |
| | Complementary course: Chemistry | 2 | 75 |
| | Complementary course: Chemistry Practical | 4 | 100 |
| | Complementary course: Botany | 2 | 75 |
| | Complementary course: Botany Practical | 4 | 100 |
| | Audit Course: Gender studies/Gerontology | 4 | 100 |
| | Extra credits (Maximum) | 4 | 100 |
| | Total | 35 | 925 |

| Semesters | Course | Credits | Marks |
|------------------|--|----------------|--------------|
| V | Core Course VI: Cell Biology and Genetics | 4 | 100 |
| | Core Course VII: Biotechnology, Microbiology and Immunology | 4 | 100 |
| | Core Course VIII: Biochemistry and Molecular Biology | 4 | 100 |
| | Core Course IX: Methodology in Science, Biostatistics and Bioinformatics | 4 | 100 |
| | Open course: Any other streams | 3 | 75 |
| | Total | 19 | 475 |
| VI | Core Course X: Physiology and Endocrinology | 3 | 75 |
| | Core Course XI: Reproductive and Developmental Biology | 3 | 75 |
| | Core Course XII: Environmental and Conservation Biology | 3 | 75 |
| | Core Course XIII: Ethology, Evolution and Zoogeography | 3 | 75 |
| | Core Course XIV: Elective course (Any one below) [01] Human Genetics [02] Aquaculture, Animal Husbandry & Poultry science [03] Applied Entomology | 2 | 75 |
| | Core Course XV: Zoology Core Practical- II [Practical II*A + II*B] | 4 | 100 |
| | Core Course XVI: Zoology Core Practical- III [Practical III*A+ III*B] | 4 | 100 |
| | Core Course XVII: Project Work and Field study | 3 | 75 |
| | Total | 25 | 650 |
| | Grand Total | 140 | 3775 |

Table 5
B.Sc. ZOOLOGY (CORE) PROGRAMME
STRUCTURE OF CORE, OPEN AND ELECTIVE COURSES
Course code, Title, Instructional hours, Credits, Marks and Examination duration in various semesters

Total Credits: 58
(w.e.f. 2019 Admission)

| Semester | Core/Open/ Elective courses | Code | Course Title | Instructional hours/week | Instructional hrs in a semester | Credits | External Marks | Internal marks | Total marks | Duration of Exam (hrs) |
|----------|---|----------------------------------|--|--------------------------|---------------------------------|---------|----------------|----------------|-------------|------------------------|
| I | Theory I | ZOL1B01T | Animal Diversity : Nonchordata Part-I | 2 | 36 | 2 | 60 | 15 | 75 | 2 |
| | Practical I*A | -- | Practical related to ZOL1B01T | 2 | 36 | * | -- | -- | -- | |
| II | Theory II | ZOL2B02T | Animal Diversity : Nonchordata Part-II | 2 | 36 | 2 | 60 | 15 | 75 | 2 |
| | Practical I*B | -- | Practical related to ZOL2B02T | 2 | 36 | * | -- | -- | -- | |
| III | Theory III | ZOL3B03T | Animal Diversity: Chordata Part-I | 3 | 54 | 3 | 60 | 15 | 75 | 2 |
| | Practical I*C | -- | Practical related to ZOL3B03T | 2 | 36 | * | -- | -- | -- | |
| IV | Theory IV | ZOL4B04T | Animal Diversity: Chordata Part-II | 3 | 54 | 3 | 60 | 15 | 75 | 2 |
| | Practical I*D | -- | Practical related to ZOL4B04T | 2 | 36 | * | -- | -- | -- | |
| | Practical-I {I*A +I*B+ I*C+ I*D} | ZOL4B05P | Zoology Core Practical I (Practical related to ZOL1B01T,02T,03T and 04T) | 8 | 144 | 4 | 80 | 20 | 100 | 4 |
| V | Theory V | ZOL5B06T | Cell Biology and Genetics | 3 | 54 | 4 | 80 | 20 | 100 | 2.5 |
| | Theory VI | ZOL5B07T | Biotechnology, Microbiology and Immunology | 4 | 72 | 4 | 80 | 20 | 100 | 2.5 |
| | Practical II*A | -- | Practical related to ZOL5B06T & 07T | 4 | 72 | ** | -- | -- | -- | |
| | Theory VII | ZOL5B08T | Biochemistry and Molecular Biology | 4 | 72 | 4 | 80 | 20 | 100 | 2.5 |
| | Theory VIII | ZOL5B09T | Methodology in Science, Biostatistics and Bioinformatics | 3 | 54 | 4 | 80 | 20 | 100 | 2.5 |
| | Practical II*B | -- | Practical related to ZOL5B08T, & 09T | 4 | 72 | ** | -- | -- | -- | |
| | #Open Course +++ (for other streams) | ZOL5D01T ZOL5D02T ZOL5D03T | • Reproductive Health and Sex Education • Nutrition, Health & Hygiene • Applied Zoology (Any one) # | 3 | 54 | 3 | 60 | 15 | 75 | 2 |
| VI | Theory IX | ZOL6B10T | Physiology and Endocrinology | 3 | 54 | 3 | 60 | 15 | 75 | 2 |
| | Theory X | ZOL6B11T | Reproductive and Developmental Biology | 3 | 54 | 3 | 60 | 15 | 75 | 2 |
| | Practical III*A | -- | Practical related to ZOL6B10T & 11T | 4 | 72 | ** | -- | -- | -- | |
| | Theory XI | ZOL6B12T | Environmental and Conservation Biology | 3 | 54 | 3 | 60 | 15 | 75 | 2 |
| | Theory XII | ZOL6B13T | Ethology, Evolution and Zoogeography | 3 | 54 | 3 | 60 | 15 | 75 | 2 |

| Semester | Core/Open/ Elective courses | Code | Course Title | Instructional hours/week | Instructional hrs in a semester | Credits | External Marks | Internal marks | Total marks | Duration of Exam (hrs) |
|----------|-------------------------------------|--|--|--------------------------|---------------------------------|-----------|----------------|----------------|-------------|------------------------|
| | Theory XIII Elective Course## | ZOL6B14BE01T ZOL6B14BE02T ZOL6B14BE03T | <ul style="list-style-type: none"> Human Genetics Aquaculture, Animal Husbandry & Poultry science Applied Entomology (Any one) ## | 3 | 54 | 2 | 60 | 15 | 75 | 2 |
| | Practical III*B | -- | Practical related to theory core course ZOL6B12T, 13T & ZOL6B14 BE01T/ BE02T/ BE03T | 4 | 72 | ** | -- | -- | -- | |
| | | | Project work / Field study | 2 | 32 | *** | -- | -- | -- | |
| | Practical II (II*A +II*B) | ZOL6B15P | Zoology Core Practical II (Practical related to ZOL5B06T, 07T, 08T, 09T) | 8 | 144 | 4** | 80 | 20 | 100 | 4 |
| | Practical III (III*A +III*B) | ZOL6B16P | Zoology Core Practical III (Practical related to ZOL6B10T, 11T, 12T, 13T & 14T E01/E02/E03) | 8 | 144 | 4** | 80 | 20 | 100 | 4 |
| | | ZOL6B17PF | Project work & Field study | -- | -- | 3*** | 60 | 15 | 75 | |
| | | | Total | | | 58 | 1220 | 305 | 1525 | |

Core courses 1450 + Open course 75 = 1525 Marks

Scheme of evaluation: External 80 % +Internal 20 %

* Practical examination for 1st, 2nd, 3rd and 4th semesters will be held at the end of IV semester.

** Practical examination for 5th and 6th semesters will be held at the end of VI semester.

*** Evaluation of Project work and Field study will be held at the end of VI semester.

External evaluation of Project work (60 Marks) and Field study report (15 Marks) will be conducted at the end semester VI after Practical III (External:80% Marks + Internal:20 % marks; **Total: 75 Marks**). (It includes a Viva-voce based on report of Project work and field study).

Project: External 48 marks + Internal 12 marks = **60** marks

Field study report: External 12 marks +Internal 3 marks = **15** marks

Open course of any one course (ZOL5D01T/ ZOL5D02T/ ZOL5D03T) opted by the dept. is for other streams.

Open course Theory: 80% marks for external and 20% marks for internal evaluation.

+++ See Appendix of Open course

Elective course of any one course (ZOL6B14T BE01/ ZOL6B14T BE02/ ZOL6B14TBE03) opted by the dept. is for Core course.