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G20 भारत 2023 INDIA
वसुधैव कुटुम्बकम्
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નં.એકે/વિજ્ઞાન/ ૮૪૭૭૮ /૨૦૨૩

તા.૨૪/૦૮/૨૦૨૩

ઝુલોજી

પરિપત્ર:-

સૌરાષ્ટ્ર યુનિવર્સિટીની વિજ્ઞાન વિદ્યાશાખા હેઠળની સ્નાતક કક્ષાના B.Sc.(ઝુલોજી)ના અભ્યાસક્રમ ચલાવતી સર્વે સંલગ્ન કોલેજોના આચાર્યશ્રીઓને આથી જાણ કરવામાં આવે છે કે, NEP-2020 અંતર્ગતના રાજય સરકારશ્રીના તા.૧૧/૦૭/૨૦૨૩ના ઠરાવ ત્યારબાદ તા.૨૭/૦૭/૨૦૨૩ના રોજ પ્રકાશિત થયેલ સ્ટાન્ડર્ડ ઓપરેટિંગ પ્રોસિજર(SOP) તેમજ ત્યારબાદ તેને આનુસંગિક તા.૨૮/૦૭/૨૦૨૩ના રોજ આવેલ સુધારા મુજબના અભ્યાસક્રમો ચેરમેનશ્રી, ઝુલોજી વિષયની અભ્યાસ સમિતિ દ્વારા રજુ કરાયેલ B.Sc.(ઝુલોજી) સેમેસ્ટર-૦૧ના અભ્યાસક્રમો આગામી શૈક્ષણિક સત્ર જુન-૨૦૨૩થી અમલમાં આવે તે રીતે ઝુલોજી વિષયની અભ્યાસ સમિતિ, વિજ્ઞાન વિદ્યાશાખા, એકેડેમિક કાઉન્સિલ તથા સિન્ડિકેટની બહાલીની અપેક્ષાએ મંજુર કરવા માન.કુલપતિશ્રીને ભલામણ કરેલ, જે માન.કુલપતિશ્રીએ મંજુર કરેલ છે. જેથી સંબંધિત તમામે તે મુજબ તેની ચુસ્તપણે અમલવારી કરવી.

(મુસદ્દો કુલસચિવશ્રીએ મંજુર કરેલ છે.)

સહી/-
(ડૉ. એચ.પી.રૂપારેલીઆ)
કુલસચિવ

બિડાણ:- ઉક્ત અભ્યાસક્રમ (સોફ્ટ કોપી)

રવાના કર્યું
24/8/23
એકેડેમિક ઓફીસર

પ્રતિ,
(૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની ઝુલોજી વિષય ચલાવતી સ્નાતક કક્ષાની સર્વે સંલગ્ન કોલેજોના આચાર્યશ્રીઓ તરફ
(૨) વિજ્ઞાન વિદ્યાશાખા હેઠળની ઝુલોજી વિષયની અભ્યાસ સમિતિના સર્વે સભ્યશ્રીઓ

નકલ જાણ અર્થે રવાના:-
૧. માન.કુલપતિશ્રી/કુલસચિવશ્રીના અંગત સચિવ

નકલ રવાના (યોગ્ય કાર્યવાહી અર્થે):-
૧. ડીનશ્રી, વિજ્ઞાન વિદ્યાશાખા ૨. પરીક્ષા વિભાગ ૩. પી.જી.ટી.આર.વિભાગ ૪. જોડાણ વિભાગ

SAURASHTRA UNIVERSITY

FACULTY OF SCIENCE

Course Structure and Syllabus for Science FYUGP

B.Sc. Honours/ Honours with Research in Zoology

Based on

UGC's guidelines NEP-2020 "Curriculum and Credit Framework for Undergraduate Programmes- CCFUP" and

Education Department, Government of Gujarat's
Uniform Credit Structure for all HEIs of Gujarat State and
Implementation of the Common Curriculum and Credit Framework under the National Education Policy-2020
(No: KCG/admin/2023-24/0607/kh.1 Sachivalaya, Gandhinagar dated 11/07/2023) and

Standard Operating Procedure for Implementation of NEP-2020 for the State of Gujarat- HEIs of Gujarat
(No: KCG/admin/2023-24/865/ dated 26/07/2023) and

Additional content to be added to SOP published by KCG
(No: KCG/NEP-2020/2023-24/893/ dated 28/07/2023)

EffectiveFromJune–2023& onwards

Graduate Attributes:

Graduates should be able to demonstrate the acquisition of the following:

Academic excellence: Comprehensive knowledge and coherent understanding of Microbiology and other interdisciplinary areas of study.

Practical, professional, and procedural knowledge required for carrying out professional or highly skilled work/tasks related to Microbiology, including knowledge required for undertaking self-employment initiatives and knowledge and mind-set required for entrepreneurship, improved product development, or a new mode of organization.

Critical and Analytical reasoning/thinking and Effective communications: Analysis and evaluation of information to form a judgment about a subject or idea and ability to communicate the same in a structured form.

Research-related skills: the ability to understand basic research ethics and skills in practicing/doing ethics in the field/ in personal research work, regardless of the funding authority or field of study.

Leadership qualities and Teamwork abilities: The graduates should be able to demonstrate the capability for mapping out the tasks of a team and setting direction and inspiring vision, and building a team that can help achieve the goals.

Global Citizenship: Mutual understanding with others from diverse cultures, perspectives, and backgrounds by embracing and practicing constitutional, humanistic, ethical, and moral values in life, including universal human values of truth, righteous conduct, peace, love, nonviolence, and scientific temper.

Life Long Learning: Ready to imbibe new knowledge, values, and skills with an open mind and willing to adopt change for constructive development.

Programme Outcomes (PO):

By the end of the program the students will be able to:

PO 1	Broad Scientific Knowledge: Graduates will demonstrate a comprehensive understanding of fundamental principles across multiple scientific disciplines, including but not limited to biology, chemistry, physics, mathematics, and earth sciences.
PO 2	Critical Thinking: Graduates will exhibit the ability to analyze and evaluate scientific information, synthesize complex concepts, and apply critical thinking skills to solve scientific problems and make informed decisions.
PO 3	Quantitative and Analytical Skills: Graduates will be proficient in utilizing quantitative techniques, mathematical tools, and data analysis methods to interpret and draw conclusions from scientific data.
PO 4	Effective Communication: Graduates will possess strong written and verbal communication skills, enabling them to convey scientific concepts clearly and concisely to both technical and non-technical audiences.
PO 5	Laboratory Proficiency: Graduates will be adept at designing, conducting, and interpreting experiments, utilizing laboratory equipment and techniques effectively, and maintaining a strong emphasis on safety and ethical considerations.
PO 6	Problem Solving and Research Skills: Graduates will demonstrate the ability to identify research questions, design research methodologies, collect and analyze data, and draw meaningful conclusions to contribute to the advancement of scientific knowledge.
PO 7	Ethical and Social Responsibility: Graduates will exhibit an awareness of ethical considerations in scientific research and its applications, and understand the societal implications of scientific discoveries and technological advancements.
PO 8	Adaptability and Lifelong Learning: Graduates will be prepared to adapt to evolving scientific paradigms and new technologies, and demonstrate a commitment to continuous learning and professional development.
PO 9	Information Literacy: Graduates will be proficient in accessing, evaluating, and utilizing scientific literature and resources, demonstrating an ability to stay informed about the latest developments in various scientific fields.
PO 10	Career Readiness: Graduates will possess a strong foundation to pursue a variety of career paths, including entry-level positions in scientific research, education, industry, government, healthcare, and more, or to pursue further education at the graduate level in specialized scientific disciplines.

Programme Specific Outcomes (PSO):

By the end of the program the students will be able to:

PSO 1	Animal Diversity and Classification: Graduates will demonstrate a deep understanding of animal taxonomy, evolution, and diversity, including the ability to classify and identify various animal species based on their characteristics.
PSO 2	Anatomy and Physiology: Graduates will have a thorough knowledge of the anatomical structures and physiological functions of different animal systems, enabling them to explain the adaptations and behaviours of animals.
PSO 3	Ecology and Behaviour: Graduates will understand the ecological interactions and behaviours of animals within their natural habitats, including concepts related to population dynamics, community structure, and animal responses to environmental factors.
PSO 4	Genetics and Evolution**: Graduates will be proficient in the principles of genetics and evolution as they relate to animal species, including the mechanisms of inheritance, genetic variation, and the role of natural selection in shaping animal populations.

PSO 5	Cell Biology and Histology: Graduates will have a solid foundation in cellular biology and histological techniques, allowing them to examine and analyze animal tissues at the microscopic level.
PSO 6	Ethics and Animal Welfare: Graduates will be aware of ethical considerations related to the treatment of animals in research, conservation, and other contexts, and will uphold standards of animal welfare.

B.Sc. Honours/ Honours with Research in Zoology

(NCrF Level- 4.5 First Year – Certificate in Zoology)

Semester I

SN	Course Category As per GoG- NEP-SOP - July 2023& additional content 28/7/23	Course Title	Credit		SEE Duration Hrs.	Evaluation - Weightage CCE: SEE = 50:50		
			T	P		CCE Marks	SEE Marks	Total Marks
1	**Major (Core) 1** (Zoology)	Zoology - 1	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
2	**Major(Core) 1 Practical** (Zoology)	Zoology Practical - 1	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
3	**Major (Core) 2** (Zoology)	Zoology - 2	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
4	**Major (Core) 2 Practical** (Zoology)	Zoology Practical - 2	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
5	**Minor(Elective)*-1**	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.2) **Any One from Basket** (As per the expertise and resources available in the college)	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
6	**Minor (Elective) Practical*-1**	**Practical** of the Course selected as **Minor**	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
7	**Multi/Inter - Disciplinary Course -1** (MDC/IDC-1) **(Elective)**** Categories: Natural & Physical Science/ Maths.,Stat.and Comp. Appl./Lib.,Info.and Media Sci./Comm. and Mgt./Huma., and Social Sci./ Sanskrit etc...	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.3) **Any One from Basket** (As per the expertise and resources available in the college)	**3**		**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
8	**Multi/Inter - Disciplinary Course Practical-1**** (MDC/IDC-1)**(Elective)**	**Practical** of the Course selected as **MDC/IDC-1**	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
9	**Ability Enhancement Course -1**(AEC-1)	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.4) **English Language:**	**2**	**-**	**2**	**50**	**50**	**100** To be converted for 50

		Development of Functional English						
10	**Skill Enhancement Course-1** (SEC-1)	**Any One from Basket** (As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.5)	**-**	**2**	**2**	**50**	**50**	**100** To be converted for 50
11	**Common Value Added Course-1** (C-VAC-1)*** NSS/NCC/ Sports & Fitness/ Ethics and Culture/ Culture and Communication/ Ethics and Values in Ancient Indian Traditions/ Human Values and Ethics/IPDC	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.6) VAC based on **IKS:** NSS/NCC/Sports & Fitness/Human Values and Ethics	**-**	**2**	**2**	**50**	**50**	**100** To be converted for 50
Total Credits and Marks (Semester-I)			**14**	**8**	**NA**	**550**	**550**	**1150** To be converted for 550

***** Any one course from the basket is to be selected as a Minor elective course as per the expertise and resources available in the college. The same course will continue as a Minor in the semester-II as well.

****** Any one course from the basket is to be selected as Multi/Inter disciplinary elective courses (MDC/IDC) as per the MDC/IDC in the semester-II as well.

*** Common **Value Added Elective Courses** (C-VAC-1) common to all is to be selected from University Basket for semester 1**,** as per the expertise and resources available in the college.

Courses Offered by BoS in Zoology to other FYUGP- B.Sc. Program in Semester-I

SN	Course Category As per GoG- NEP-SOP - July 2023& additional content 28/7/23	Course Title	Credit		SEE Duration Hrs.	Evaluation - Weightage CCE: SEE = 50:50		
			T	P		CCE Marks	SEE Marks	Total Marks
1	**Minor (Elective)-1** (Zoology) (In addition to courses mentioned in SOP basket)	Introduction to Zoology - 1	**3**	**-**	$2\frac{1}{2}$	**75**	**75**	**150** To be converted for 75
2	**Minor (Elective) Practical-1** (Zoology) (In addition to courses mentioned in SOP basket)	Practical – Introduction to Zoology - 1	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
3	**Multi/Inter - Disciplinary Course -1** (MDC/IDC-1) **(Elective)** (In addition to courses mentioned in SOP basket)	Zoology – Introduction to Biology	**3**	**-**	$2\frac{1}{2}$	**75**	**75**	**150** To be converted for 75
4	**Multi/Inter - Disciplinary Course Practical-1** (MDC/IDC Practical-1) **(Elective)**(In addition to courses mentioned in SOP basket)	Practical - Zoology – Introduction to Biology	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25

Evaluation Scheme: (As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Chapter-7: Evaluation Reforms)

The evaluation process should be formulated to make a systematic evaluation of students' progress based on UGC guidelines. The evaluation must be designed with learner attributes in mind. These attributes have clear linkages to Programme Education Objectives and Outcomes. The evaluation consists of the following two components:

1. Continuous and Comprehensive Evaluation (CCE)- Formative
2. Semester End Evaluation (SEE)- Summative

CCE carries 50% of the total marks allotted to a subject and the other 50% being assigned to the SEE.

In each course, every credit carries 25 marks, of which 50% marks is assigned for CCE and rest 50% marks for SEE. The 50% marks assigned to the CCE is distributed between the continuous classroom evaluation and mid-term evaluation. The pattern may be as follow:

SN	Evaluation	4 credit subjects (Marks)	2 credit subjects (Marks)
1	CCE (50%)		
	Classroom & Mid-Term Evaluation	75	50
2	SEE (50%)	75	50
	Total	150	100

Continuous and Comprehensive Evaluation (CCE)

Subject–wise CCE will be undertaken by the concerned faculty member. The mode of evaluation will be decided by the faculty member concerned with the subject. Normally CCE consists of class participation, case analysis and presentation, assignment, tutorials, slip tests (announced/ surprised), quizzes, attendance etc. or any combination of these. The students are expected to submit their answer scripts/ reports of internal evaluation within the stipulated time. Failure to do so may result in the script not being valued. Another part of CCE consists of mid-term written evaluation, which is compulsory for all students. It can be done in a scheduled manner. The duration of the mid-term evaluation shall be one hour.

Semester End Evaluation (SEE)

The SEE carries 50% of the marks assigned to a course. SEE shall be of 2 ½ hours for 4 credit course and 2 hours in case of 2 credit courses. The controller of the examination will conduct these examinations. Paper setting and evaluation will be done by the external examiners to an extent of 50% of the evaluation process. This examination shall be conducted as per a schedule which shall be notified in advance.

The backlog exam will be conducted twice a year just after the result declared of the semester evaluation. Students shall have a second chance to clear their backlog and avoid the burden to carry forward the backlog with the next semester exam.

Appearance in all the evaluations is mandatory and no exemption can be granted except in the following case:

1. In case of inability to attend the exam due to reasons considered genuine by the controller of examination in consultation with the Director/Board.

2. In case of medical emergency, a certificate from the registered medical practitioner must be produced before the commencement of exams. The evaluation board will then take final decision on the recommendation for exemption.

Eligibility Criteria to appear in SEE

To be able to appear for the SEE, a student must comply with the following conditions:

1. Should have at least 75% of attendance in all the courses put together.

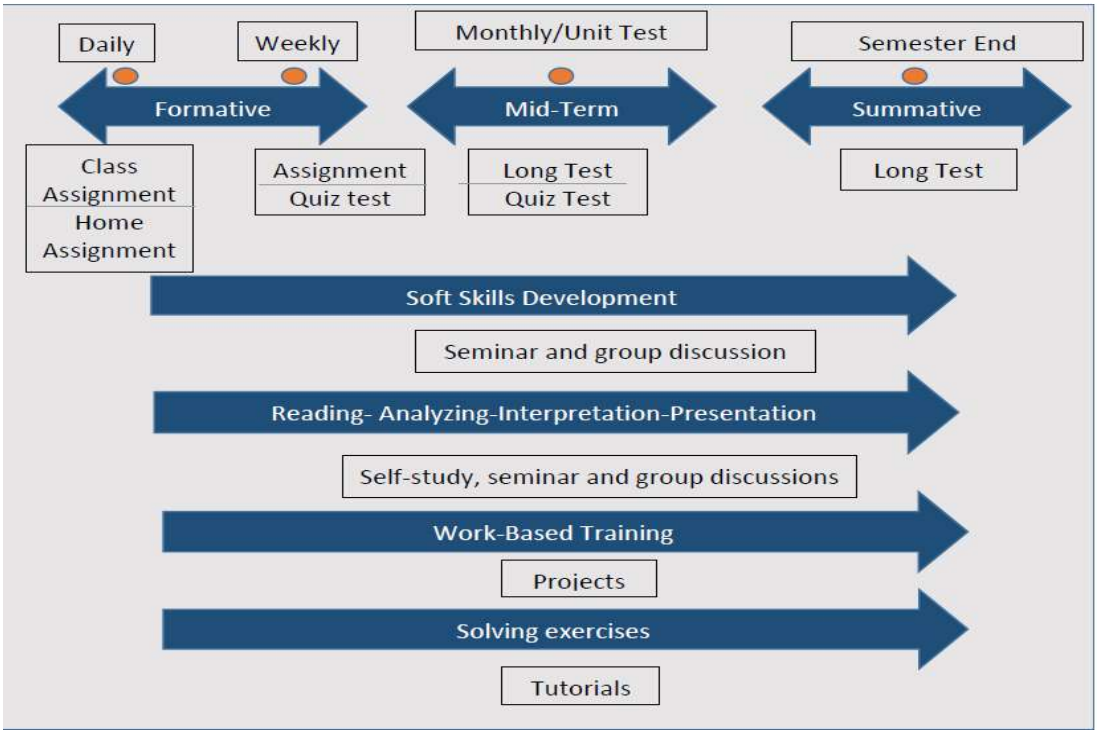
2. Should have at least 70% of attendance in each course/subject.

3. Should not have any disciplinary proceedings pending against him/her.

4. Should have no pending due.

Continuum of Evaluation

Evaluation must be continuous which may include both formative and summative components in a timely manner for continuous feedback as follow:



Mode of Evaluation

A wide range of modes of evaluation for evaluating students is available for the teachers/ institutions to use. A suitable compendium of such a mode needs to be carefully chosen for a particular program depending on its nature, objectives, and available resources. The mode of evaluation can be as below:

Written Mode	Oral Mode	Practical Mode	Integrated Mode
Semester Exam Class Test Open book exam/test Open note exam/test Self-test/Online test Essay/Article writing Quizzes/Objective test Class assignment Home assignment Reports writing Research/Dissertation Class Studies	Viva/Oral exam Group Discussion Role Play Authentic Problem Solving Quiz Interview	Lab work Computer simulation/virtual labs Craft work Co-curricular work	Paper presentation/Seminar Field Assignment Poster Presentation

Written Mode		
Evaluation Type	**Nature**	**Objective**
Semester Exam	Traditionally essay type with objective/short answer questions to evaluate Lower Ordered Thinking (LOT) OBE skills	For depth and planned preparation
Class test	Traditionally essay type	Fixed date forces students to learn
Open book test	Allowed choice of reference book	Measures what students can do with resources, less stress on memory
Open note test	To get used to the system	Encourage good note taking
Self-test	For subjective and objective items	Mastery learning occurs with proper feedback
Article/essay writing	Individual long written assignment	Individual expression and creativity
Quizzes/Objective test	Short duration structured test	Excellent validity as greater syllabus coverage
Class assignment	With defined time	Student's performance to make decision
Home assignment	With undefined time	Reinforce learning and facilitate mastery of specific skills
Reports Writing	On activities performed or event observed	Develop a key transferable skill
Research/Dissertation	Detailed research-based report	To judge creativity and research skills

Case Studies	Analyse a given case (real or fictional)	To assess thinking, value, and attitude
Oral Mode		
Evaluation Type	**Nature**	**Objective**
Viva/Oral exam	Individually or in small group	Practical experience towards job interview situation
Group discussion	Small group of 2-5 members work on a joint task	Encourage teamwork
Role Play	Small group of 2-5 members work on a joint task	Develop personality
Authenticate problem solving	Small group of 2-5 members work on a joint task	Communication of ideas
Quiz	Small group of 2-5 members work on a joint task	Assess memory power
Interview	Individually	Judge the personal confidence level

Practical Mode		
Evaluation Type	**Nature**	**Objective**
Lab work	Component of working with one's hand	Keep the students on the task
Computer simulation/virtual labs	Component of working with one's hand	To understand the practical exposure
Craft work	Component of working with one's hand	Encourage application of concepts learnt
Co-curricular work	Component of working with one's hand	For immediate feedback

Integrated Mode		
Evaluation Type	**Nature**	**Objective**
Paper presentation/Seminar	Group or individual work	Learn from others presentation
Field Assignment	Field visit with report	Develop observation and recording skills
Poster presentation	Group or individual work	Develop research, creativity, and discussion skills
Paper presentation/Seminar	Group or individual work	Learn from others presentation

Models of Evaluation

Based on the types of evaluation, various models of evaluation implementation are suggested for theory, practical, self-study and work-based learning. The focus of these models is to encourage the students to improve on skills and performance.

Model for Theory Courses	
CCE-50% (75)SEE-50% (75)	
Exam Pattern	**Marks**
Class Test (Average of two tests)	15
Quiz (Average of two tests)	15
Home Assignment	15
Active Learning- PBL/CSBL/Seminar/Flipped Class Room etc. OBE tools.	10
Class Assignment	10
Attendance	10
Continuous and Comprehensive Evaluation	**75**
Semester-End Evaluation	**75**

Model for Practical Courses	
CCE-50% (25)SEE-50% (25)	
Exam Pattern	**Marks**
Lab work assessment	10
Viva voce/Lab quiz	10
Attendance	05
Continuous and Comprehensive Evaluation	**25**
Semester-End Evaluation	**25**

Model for Project/Self-study Courses	
CCE-50% (100)SEE-50% (100)	
Exam Pattern	**Marks**
Project Evaluation (Best 4 out of 5)	80
Participation in discussion	10
Attendance	10
Continuous and Comprehensive Evaluation	**100**
Semester-End Evaluation	**100**

***Model for Project/Self-study Courseswill be implemented from semester-6 after discussion and approval.**

Model for Work Experience Courses	
CCE-50% (100)SEE-50% (100)	
Exam Pattern	**Marks**
Project Evaluation (Best 4 out of 5)	80
Participation in discussion	10
Attendance	10
Continuous and Comprehensive Evaluation	**100**
Semester-End Evaluation	**100**

***Model for Work Experience Courses will be implemented from semester-6 after discussion and approval.**

Model for Skill Enhancement Course - Skill based Practical Course **-2 Credit Course**	
CCE-50% (50)&SEE-50% (50)	
Exam Pattern	**Marks**
Lab work assessment or Project based Assessment	20
Viva voce/Lab quiz	20
Attendance & Performance	10
Continuous and Comprehensive Evaluation	**50**
Semester-End Evaluation	**50**

Component	**Marks**	**SEE Duration Hrs.**	**Evaluation - Weightage CCE: SEE = 50:50**			
			CCE Marks	**SEE Marks**	**Total Marks**	**Total Marks To be Converted for**
Theory	**75**	$2\frac{1}{2}$	**75**	**75**	**150**	**75**
Practical	**25**	**2**	**25**	**25**	**50**	**25**
Total	**100**	**NA**	**100**	**100**	**200**	**100**

Theory Question Paper Pattern

Semester End Examination (SEE)

Instructions:

- All Units/ Module carry equal weightage of 15 Marks each
- There must be One Question from each Unit/ Module
- Each Subtopic/ Chapter must be given due weightage in the Question paper
- Time duration: 2½Hours

The Theory Question Paper Skeleton is as follows

Question 1 (Unit/Module 1)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 1	**15**
Question 2 (Unit/Module 2)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 2	**15**
Question 3 (Unit/Module 3)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 3	**15**
Question 4 (Unit/Module 4)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 4	**15**
Question 5 (Unit/Module 5)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 5	**15**

B.Sc. Honours/ Honours with Research in Zoology

(NCrF Level- 4.5 First Year – Certificate in Zoology)

Semester I

Course Category	**Major-1**
Title of the Course	**Zoology - 1**
Course Credit	**03**
Teaching Hours per Semester	**45**
Total Marks	**75**

Course Objectives

Objectives of this course is to teach students

- Range of techniques used in biology research , i.e., microscopy and ph
- Structure and function of eukaryotic cells
- Principals of Mendelian genetics, inheritance pattern and genetic variation
- Various types of environmental pollution and their mitigation
- Different poultry species and their keeping and maintenance

Course Outcomes - COs

Students will be able to

- Learn various fundamental techniques in biology and develop analytical skills.
- Understand the structure and purposes of basic components of prokaryotic and eukaryotic cells and cell organelles.
- Genetics will deal with concept of gene and mandelian laws and examples of multiple alleles which enable them to understand inheritance of characters.
- Environmental education is to increase public awareness about environmental issues, explore possible solutions and to lay the foundation for fully informed and active participation of individual in the protection of the environment and the prudent and rational use of natural resources.
- Get knowledge in poultry management by learning types of poultry birds and their rearing system which will create opportunities for them to venture into poultry business.

1	Employability/Entrepreneurship/Skill Development પરકેન્દ્રિતથયેલછેકેનહિ ?			Yes/No
2	Value added Courses Imparting Transferable and Life Skillsનાગુણોધરાવેછે?			Yes/No
3	Major	Yes/No	Minor	Yes/No
	Skill Enhancement Courses	Yes/No	Ability Enhancement Courses	Yes/No
	Value Added Courses	Yes/No	Exit/ Vocational Courses	Yes/No

4	Holistic Education	Yes/No	Multidisciplinary	Yes/No	Interdisciplinary	Yes/No
5	દિવ્યાંગમાટેવિષયઅંતર્ગતઆનુસાંગિકજોગવાઈકરાયેલછે ?					Yes/No
6	New India Literacy Programme (NILP) મુજબનોવિષયછે ?					Yes/No
7	Swayam પ્લેટફોર્મપરના MOOC વિષયપરઆધારિતઆવિષયછે ?					Yes/No
8	ઈન્ડીયનનોલેજસીસ્ટમ (IKS) પરઆધારિતવિષયછે ?					Yes/No

Unit No.	Topics	Hours	Marks
1	**Techniques in biology** 1. Types of microscopy and their working principles a. Dissecting Microscope b. Compound Microscope 2. pH meter a. Concept of pH, Henderson – Hasselbalch equation, precaution and care of pH meter.	08	15
2	**Cell Biology** 1. Types of cells and cell theory 2. Cell organelles a. Cytoplasm b. Plasma membrane c. Endoplasmic Reticulum d. Nucleus 3. Types of chromosomes based on centromere	09	15
3	**Genetics** 1. Introduction to Gene 2. Introduction to Mendelian laws of hereditary 3. Incomplete Dominance 4. Co-dominance 5. Multiple alleles a. ABO blood group in humans Rh Factor, Erythroblastosis Fetalis	08	15
4	**Environmental Challenges** 1. Causes, effects and controlling measures of various kinds of environmental pollutions; a) Air pollution, b) Water pollution, c) Soil pollution, d) Noise pollution, e) Thermal pollution, f) Light pollution 2. Effects of human population explosion on environment 3. Climate change as result of global warming	12	15
5	**Applied Zoology** 1. Poultry Science a. Introduction to various bird rearing methods	08	15

	b. Deep Litter House, Cage System c. Types of Fowl – Asil, Rhode Island Red, Indian Giant d. Apparatus - feeding and watering, Incubators and Hatchers e. Diseases in poultry – parasitic, protozoan, fungal, bacterial and viral		

Reference Books:

1. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology by P. S. Verma and V. K. Agarwal
2. Applied Zoology by Tarit Kumar Banerjee
3. Ecology and Environment by P. D. Sharma
4. Biological Instrumentation and Methodology by P. K. Bajpai
5. Textbook of Invertebrate by R. L. Kotpal

B.Sc. Honours/ Honours with Research in Zoology

(NCrF Level- 4.5 First Year – Certificate in Zoology)

Semester I

Course Category	**Major Practical -1**
Title of the Course	**Zoology Practical – 1**
Course Credit	**01**
Teaching Hours per Semester	**30**
Total Marks	**25**

Course Objectives
Objectives of this course is to teach students • Practical use of light microscopes and pH meter • Morphology of different cell organelles • Problem solving in genetics • Blood group types and determination • About different poultry apparatus

Course Outcomes - COs
Students will be able to • Use light microscopes in laboratories • Identify plant and animal cells and cell organelles • Solve genetical problems of inheritance • Determine blood group • Comprehend use of various poultry apparatus

1	Employability/Entrepreneurship/Skill Development પરકેન્દ્રિતથયેલછેકેનહિ ?					Yes/No
2	Value added Courses Imparting Transferable and Life Skillsનાગુણોધરાવેછે?					Yes/No
3	Major		Yes/No	Minor		Yes/No
	Skill Enhancement Courses		Yes/No	Ability Enhancement Courses		Yes/No
	Value Added Courses		Yes/No	Exit/ Vocational Courses		Yes/No
4	Holistic Education	Yes/No	Multidisciplinary	Yes/No	Interdisciplinary	Yes/No
5	દિવ્યાંગમાટેવિષયઅંતર્ગતઆનુસાંગિકજોગવાઈકરાયેલછે ?					Yes/No
6	New India Literacy Programme (NILP) મુજબનોવિષયછે ?					Yes/No
7	Swayam પ્લેટફોર્મપરના MOOC વિષયપરઆધારિતઆવિષયછે ?					Yes/No
8	ઈન્ડીયનનોલેજસીસ્ટમ (IKS) પરઆધારિતવિષયછે ?					Yes/No

Pr. No.	List of Practicals
1	Study working principle of dissecting and compound microscope.
2	Study working principle of pH meter.
3	Study plant and animal cells by preparing temporary slide (Ex. Onion cells, cheek cell).
4	Study cell organelles by charts/multi media (as per theory)
5	Solve the given genetic problems • Mono hybrid • Di hybrid • Incomplete dominance • Co-dominance
6	Solve the given genetic problems • Multiple Alleles (ABO Blood group in human)
7	To Determine own blood group and Rh factor
8	Study poultry types and fowls (cage system and deep litter house)
9	Study poultry apparatus (feeders, waterer, incubator and brooder, debeaker)
10	Case study of any polluted site with aim to discuss type of pollution, source of pollution, environmental impact and possible mitigation

Practical Question Paper Pattern

Semester End Examination (SEE)

The Practical Question Paper Skeleton is as follows

Instructions:

- Certified journal is must and minimum requirement to appearing for semester end practical examination.
- Should have at least 75% attendance in practical sessions during the semester.
- Time duration: 2 Hours.

Que. No.	Question	Marks
1	Do as per instruction & show it to examiner. (Practical – 3)	05
2	Do as per instruction and show it to examiner. (Practical – 5, 6 and 7)	05
3	Write as per instruction. (A) Identify and describe. (Practical -1, 2) (B) Identify and describe.(Practical-4) (C) Identify and describe.(Practical-8, 9)	06
4	Submission of report on case study of any polluted site	3
5	Viva–voice	3
6	Certified Journal.	3

SAURASHTRA UNIVERSITY

FACULTY OF SCIENCE

Course Structure and Syllabus for Science FYUGP

B.Sc. Honours/ Honours with Research in Zoology

Based on

UGC's guidelines NEP-2020 "Curriculum and Credit Framework for Undergraduate Programmes- CCFUP" and

Education Department, Government of Gujarat's
Uniform Credit Structure for all HEIs of Gujarat State and
Implementation of the Common Curriculum and Credit Framework under the National Education Policy-2020
(No: KCG/admin/2023-24/0607/kh.1 Sachivalaya, Gandhinagar dated 11/07/2023) and

Standard Operating Procedure for Implementation of NEP-2020 for the State of Gujarat- HEIs of Gujarat
(No: KCG/admin/2023-24/865/ dated 26/07/2023) and

Additional content to be added to SOP published by KCG
(No: KCG/NEP-2020/2023-24/893/ dated 28/07/2023)

EffectiveFromJune–2023& onwards

Graduate Attributes:

Graduates should be able to demonstrate the acquisition of the following:

Academic excellence: Comprehensive knowledge and coherent understanding of Microbiology and other interdisciplinary areas of study.

Practical, professional, and procedural knowledge required for carrying out professional or highly skilled work/tasks related to Microbiology, including knowledge required for undertaking self-employment initiatives and knowledge and mind-set required for entrepreneurship, improved product development, or a new mode of organization.

Critical and Analytical reasoning/thinking and Effective communications: Analysis and evaluation of information to form a judgment about a subject or idea and ability to communicate the same in a structured form.

Research-related skills: the ability to understand basic research ethics and skills in practicing/doing ethics in the field/ in personal research work, regardless of the funding authority or field of study.

Leadership qualities and Teamwork abilities: The graduates should be able to demonstrate the capability for mapping out the tasks of a team and setting direction and inspiring vision, and building a team that can help achieve the goals.

Global Citizenship: Mutual understanding with others from diverse cultures, perspectives, and backgrounds by embracing and practicing constitutional, humanistic, ethical, and moral values in life, including universal human values of truth, righteous conduct, peace, love, nonviolence, and scientific temper.

Life Long Learning: Ready to imbibe new knowledge, values, and skills with an open mind and willing to adopt change for constructive development.

Programme Outcomes (PO):

By the end of the program the students will be able to:

PO 1	Broad Scientific Knowledge: Graduates will demonstrate a comprehensive understanding of fundamental principles across multiple scientific disciplines, including but not limited to biology, chemistry, physics, mathematics, and earth sciences.
PO 2	Critical Thinking: Graduates will exhibit the ability to analyze and evaluate scientific information, synthesize complex concepts, and apply critical thinking skills to solve scientific problems and make informed decisions.
PO 3	Quantitative and Analytical Skills: Graduates will be proficient in utilizing quantitative techniques, mathematical tools, and data analysis methods to interpret and draw conclusions from scientific data.
PO 4	Effective Communication: Graduates will possess strong written and verbal communication skills, enabling them to convey scientific concepts clearly and concisely to both technical and non-technical audiences.
PO 5	Laboratory Proficiency: Graduates will be adept at designing, conducting, and interpreting experiments, utilizing laboratory equipment and techniques effectively, and maintaining a strong emphasis on safety and ethical considerations.
PO 6	Problem Solving and Research Skills: Graduates will demonstrate the ability to identify research questions, design research methodologies, collect and analyze data, and draw meaningful conclusions to contribute to the advancement of scientific knowledge.
PO 7	Ethical and Social Responsibility: Graduates will exhibit an awareness of ethical considerations in scientific research and its applications, and understand the societal implications of scientific discoveries and technological advancements.
PO 8	Adaptability and Lifelong Learning: Graduates will be prepared to adapt to evolving scientific paradigms and new technologies, and demonstrate a commitment to continuous learning and professional development.
PO 9	Information Literacy: Graduates will be proficient in accessing, evaluating, and utilizing scientific literature and resources, demonstrating an ability to stay informed about the latest developments in various scientific fields.
PO 10	Career Readiness: Graduates will possess a strong foundation to pursue a variety of career paths, including entry-level positions in scientific research, education, industry, government, healthcare, and more, or to pursue further education at the graduate level in specialized scientific disciplines.

Programme Specific Outcomes (PSO):

By the end of the program the students will be able to:

PSO 1	Animal Diversity and Classification: Graduates will demonstrate a deep understanding of animal taxonomy, evolution, and diversity, including the ability to classify and identify various animal species based on their characteristics.
PSO 2	Anatomy and Physiology: Graduates will have a thorough knowledge of the anatomical structures and physiological functions of different animal systems, enabling them to explain the adaptations and behaviours of animals.
PSO 3	Ecology and Behaviour: Graduates will understand the ecological interactions and behaviours of animals within their natural habitats, including concepts related to population dynamics, community structure, and animal responses to environmental factors.
PSO 4	Genetics and Evolution**: Graduates will be proficient in the principles of genetics and evolution as they relate to animal species, including the mechanisms of inheritance, genetic variation, and the role of natural selection in shaping animal populations.

PSO 5	Cell Biology and Histology: Graduates will have a solid foundation in cellular biology and histological techniques, allowing them to examine and analyze animal tissues at the microscopic level.
PSO 6	Ethics and Animal Welfare: Graduates will be aware of ethical considerations related to the treatment of animals in research, conservation, and other contexts, and will uphold standards of animal welfare.

B.Sc. Honours/ Honours with Research in Zoology

(NCrF Level- 4.5 First Year – Certificate in Zoology)

Semester I

SN	Course Category As per GoG- NEP-SOP - July 2023& additional content 28/7/23	Course Title	Credit		SEE Duration Hrs.	Evaluation - Weightage CCE: SEE = 50:50		
			T	P		CCE Marks	SEE Marks	Total Marks
1	**Major (Core) 1** (Zoology)	Zoology - 1	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
2	**Major(Core) 1 Practical** (Zoology)	Zoology Practical - 1	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
3	**Major (Core) 2** (Zoology)	Zoology - 2	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
4	**Major (Core) 2 Practical** (Zoology)	Zoology Practical - 2	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
5	**Minor(Elective)*-1**	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.2) **Any One from Basket** (As per the expertise and resources available in the college)	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
6	**Minor (Elective) Practical*-1**	**Practical** of the Course selected as **Minor**	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
7	**Multi/Inter - Disciplinary Course -1** (MDC/IDC-1) **(Elective)**** Categories: Natural & Physical Science/ Maths.,Stat.and Comp. Appl./Lib.,Info.and Media Sci./Comm. and Mgt./Huma., and Social Sci./ Sanskrit etc...	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.3) **Any One from Basket** (As per the expertise and resources available in the college)	**3**		**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
8	**Multi/Inter - Disciplinary Course Practical-1**** (MDC/IDC-1)**(Elective)**	**Practical** of the Course selected as **MDC/IDC-1**	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
9	**Ability Enhancement Course -1**(AEC-1)	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.4) **English Language:**	**2**	**-**	**2**	**50**	**50**	**100** To be converted for 50

		Development of Functional English						
10	**Skill Enhancement Course-1** (SEC-1)	**Any One from Basket** (As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.5)	**-**	**2**	**2**	**50**	**50**	**100** To be converted for 50
11	**Common Value Added Course-1** (C-VAC-1)*** NSS/NCC/ Sports & Fitness/ Ethics and Culture/ Culture and Communication/ Ethics and Values in Ancient Indian Traditions/ Human Values and Ethics/IPDC	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.6) VAC based on **IKS:** NSS/NCC/Sports & Fitness/Human Values and Ethics	**-**	**2**	**2**	**50**	**50**	**100** To be converted for 50
Total Credits and Marks (Semester-I)			**14**	**8**	**NA**	**550**	**550**	**1150** To be converted for 550

***** Any one course from the basket is to be selected as a Minor elective course as per the expertise and resources available in the college. The same course will continue as a Minor in the semester-II as well.

****** Any one course from the basket is to be selected as Multi/Inter disciplinary elective courses (MDC/IDC) as per the MDC/IDC in the semester-II as well.

*** Common **Value Added Elective Courses** (C-VAC-1) common to all is to be selected from University Basket for semester 1**,** as per the expertise and resources available in the college.

Courses Offered by BoS in Zoology to other FYUGP- B.Sc. Program in Semester-I

SN	Course Category As per GoG- NEP-SOP - July 2023& additional content 28/7/23	Course Title	Credit		SEE Duration Hrs.	Evaluation - Weightage CCE: SEE = 50:50		
			T	P		CCE Marks	SEE Marks	Total Marks
1	**Minor (Elective)-1** (Zoology) (In addition to courses mentioned in SOP basket)	Introduction to Zoology - 1	**3**	**-**	$2\frac{1}{2}$	**75**	**75**	**150** To be converted for 75
2	**Minor (Elective) Practical-1** (Zoology) (In addition to courses mentioned in SOP basket)	Practical – Introduction to Zoology - 1	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
3	**Multi/Inter - Disciplinary Course -1** (MDC/IDC-1) **(Elective)** (In addition to courses mentioned in SOP basket)	Zoology – Introduction to Biology	**3**	**-**	$2\frac{1}{2}$	**75**	**75**	**150** To be converted for 75
4	**Multi/Inter - Disciplinary Course Practical-1** (MDC/IDC Practical-1) **(Elective)**(In addition to courses mentioned in SOP basket)	Practical - Zoology – Introduction to Biology	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25

Evaluation Scheme: (As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Chapter-7: Evaluation Reforms)

The evaluation process should be formulated to make a systematic evaluation of students' progress based on UGC guidelines. The evaluation must be designed with learner attributes in mind. These attributes have clear linkages to Programme Education Objectives and Outcomes. The evaluation consists of the following two components:

1. Continuous and Comprehensive Evaluation (CCE)- Formative
2. Semester End Evaluation (SEE)- Summative

CCE carries 50% of the total marks allotted to a subject and the other 50% being assigned to the SEE.

In each course, every credit carries 25 marks, of which 50% marks is assigned for CCE and rest 50% marks for SEE. The 50% marks assigned to the CCE is distributed between the continuous classroom evaluation and mid-term evaluation. The pattern may be as follow:

SN	Evaluation	4 credit subjects (Marks)	2 credit subjects (Marks)
1	CCE (50%)		
	Classroom & Mid-Term Evaluation	75	50
2	SEE (50%)	75	50
	Total	150	100

Continuous and Comprehensive Evaluation (CCE)

Subject–wise CCE will be undertaken by the concerned faculty member. The mode of evaluation will be decided by the faculty member concerned with the subject. Normally CCE consists of class participation, case analysis and presentation, assignment, tutorials, slip tests (announced/ surprised), quizzes, attendance etc. or any combination of these. The students are expected to submit their answer scripts/ reports of internal evaluation within the stipulated time. Failure to do so may result in the script not being valued. Another part of CCE consists of mid-term written evaluation, which is compulsory for all students. It can be done in a scheduled manner. The duration of the mid-term evaluation shall be one hour.

Semester End Evaluation (SEE)

The SEE carries 50% of the marks assigned to a course. SEE shall be of 2 ½ hours for 4 credit course and 2 hours in case of 2 credit courses. The controller of the examination will conduct these examinations. Paper setting and evaluation will be done by the external examiners to an extent of 50% of the evaluation process. This examination shall be conducted as per a schedule which shall be notified in advance.

The backlog exam will be conducted twice a year just after the result declared of the semester evaluation. Students shall have a second chance to clear their backlog and avoid the burden to carry forward the backlog with the next semester exam.

Appearance in all the evaluations is mandatory and no exemption can be granted except in the following case:

1. In case of inability to attend the exam due to reasons considered genuine by the controller of examination in consultation with the Director/Board.

2. In case of medical emergency, a certificate from the registered medical practitioner must be produced before the commencement of exams. The evaluation board will then take final decision on the recommendation for exemption.

Eligibility Criteria to appear in SEE

To be able to appear for the SEE, a student must comply with the following conditions:

1. Should have at least 75% of attendance in all the courses put together.

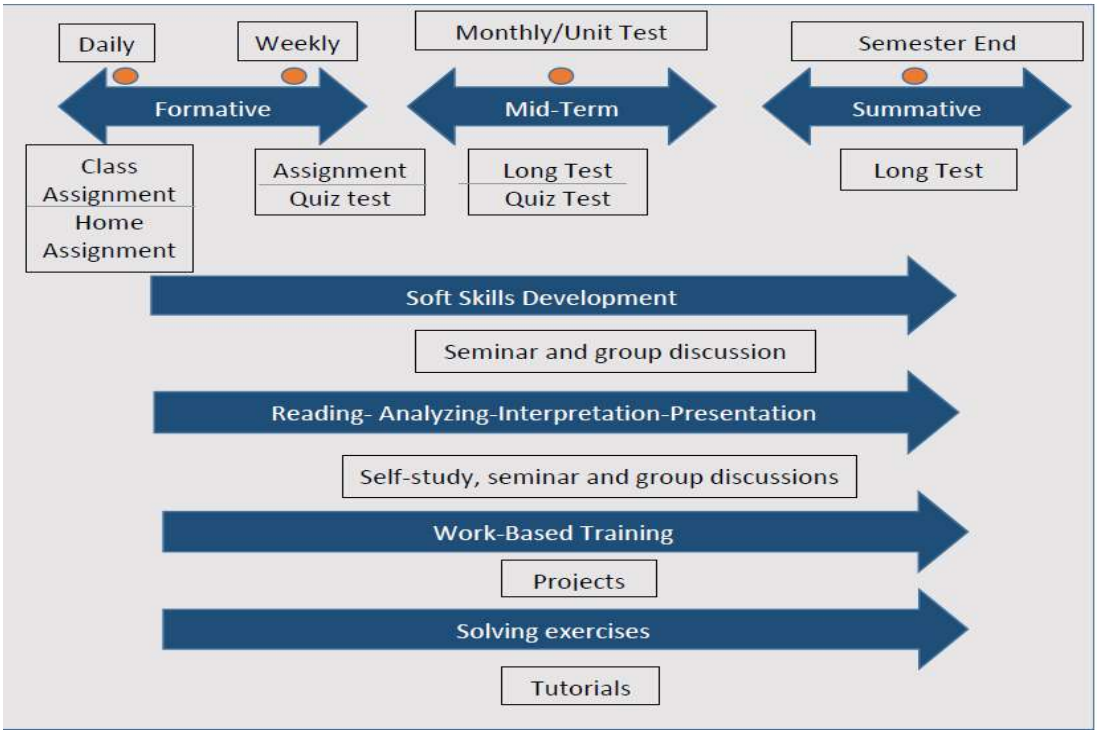
2. Should have at least 70% of attendance in each course/subject.

3. Should not have any disciplinary proceedings pending against him/her.

4. Should have no pending due.

Continuum of Evaluation

Evaluation must be continuous which may include both formative and summative components in a timely manner for continuous feedback as follow:



Mode of Evaluation

A wide range of modes of evaluation for evaluating students is available for the teachers/ institutions to use. A suitable compendium of such a mode needs to be carefully chosen for a particular program depending on its nature, objectives, and available resources. The mode of evaluation can be as below:

Written Mode	Oral Mode	Practical Mode	Integrated Mode
Semester Exam Class Test Open book exam/test Open note exam/test Self-test/Online test Essay/Article writing Quizzes/Objective test Class assignment Home assignment Reports writing Research/Dissertation Class Studies	Viva/Oral exam Group Discussion Role Play Authentic Problem Solving Quiz Interview	Lab work Computer simulation/virtual labs Craft work Co-curricular work	Paper presentation/Seminar Field Assignment Poster Presentation

Written Mode		
Evaluation Type	**Nature**	**Objective**
Semester Exam	Traditionally essay type with objective/short answer questions to evaluate Lower Ordered Thinking (LOT) OBE skills	For depth and planned preparation
Class test	Traditionally essay type	Fixed date forces students to learn
Open book test	Allowed choice of reference book	Measures what students can do with resources, less stress on memory
Open note test	To get used to the system	Encourage good note taking
Self-test	For subjective and objective items	Mastery learning occurs with proper feedback
Article/essay writing	Individual long written assignment	Individual expression and creativity
Quizzes/Objective test	Short duration structured test	Excellent validity as greater syllabus coverage
Class assignment	With defined time	Student's performance to make decision
Home assignment	With undefined time	Reinforce learning and facilitate mastery of specific skills
Reports Writing	On activities performed or event observed	Develop a key transferable skill
Research/Dissertation	Detailed research-based report	To judge creativity and research skills

Case Studies	Analyse a given case (real or fictional)	To assess thinking, value, and attitude
Oral Mode		
Evaluation Type	**Nature**	**Objective**
Viva/Oral exam	Individually or in small group	Practical experience towards job interview situation
Group discussion	Small group of 2-5 members work on a joint task	Encourage teamwork
Role Play	Small group of 2-5 members work on a joint task	Develop personality
Authenticate problem solving	Small group of 2-5 members work on a joint task	Communication of ideas
Quiz	Small group of 2-5 members work on a joint task	Access memory power
Interview	Individually	Judge the personal confidence level

Practical Mode		
Evaluation Type	**Nature**	**Objective**
Lab work	Component of working with one's hand	Keep the students on the task
Computer simulation/virtual labs	Component of working with one's hand	To understand the practical exposure
Craft work	Component of working with one's hand	Encourage application of concepts learnt
Co-curricular work	Component of working with one's hand	For immediate feedback

Integrated Mode		
Evaluation Type	**Nature**	**Objective**
Paper presentation/Seminar	Group or individual work	Learn from others presentation
Field Assignment	Field visit with report	Develop observation and recording skills
Poster presentation	Group or individual work	Develop research, creativity, and discussion skills
Paper presentation/Seminar	Group or individual work	Learn from others presentation

Models of Evaluation

Based on the types of evaluation, various models of evaluation implementation are suggested for theory, practical, self-study and work-based learning. The focus of these models is to encourage the students to improve on skills and performance.

Model for Theory Courses	
CCE-50% (75)SEE-50% (75)	
Exam Pattern	**Marks**
Class Test (Average of two tests)	15
Quiz (Average of two tests)	15
Home Assignment	15
Active Learning- PBL/CSBL/Seminar/Flipped Class Room etc. OBE tools.	10
Class Assignment	10
Attendance	10
Continuous and Comprehensive Evaluation	**75**
Semester-End Evaluation	**75**

Model for Practical Courses	
CCE-50% (25)SEE-50% (25)	
Exam Pattern	**Marks**
Lab work assessment	10
Viva voce/Lab quiz	10
Attendance	05
Continuous and Comprehensive Evaluation	**25**
Semester-End Evaluation	**25**

Model for Project/Self-study Courses	
CCE-50% (100)SEE-50% (100)	
Exam Pattern	**Marks**
Project Evaluation (Best 4 out of 5)	80
Participation in discussion	10
Attendance	10
Continuous and Comprehensive Evaluation	**100**
Semester-End Evaluation	**100**

***Model for Project/Self-study Courseswill be implemented from semester-6 after discussion and approval.**

Model for Work Experience Courses	
CCE-50% (100)SEE-50% (100)	
Exam Pattern	**Marks**
Project Evaluation (Best 4 out of 5)	80
Participation in discussion	10
Attendance	10
Continuous and Comprehensive Evaluation	**100**
Semester-End Evaluation	**100**

***Model for Work Experience Courses will be implemented from semester-6 after discussion and approval.**

Model for Skill Enhancement Course - Skill based Practical Course **-2 Credit Course**	
CCE-50% (50)&SEE-50% (50)	
Exam Pattern	**Marks**
Lab work assessment or Project based Assessment	20
Viva voce/Lab quiz	20
Attendance & Performance	10
Continuous and Comprehensive Evaluation	**50**
Semester-End Evaluation	**50**

Component	**Marks**	**SEE Duration Hrs.**	**Evaluation - Weightage CCE: SEE = 50:50**			
			CCE Marks	**SEE Marks**	**Total Marks**	**Total Marks To be Converted to**
Theory	**75**	$2\frac{1}{2}$	**75**	**75**	**150**	**75**
Practical	**25**	**2**	**25**	**25**	**50**	**25**
Total	**100**	**NA**	**100**	**100**	**200**	**100**

Theory Question Paper Pattern

Semester End Examination (SEE)

Instructions:

- All Units/ Module carry equal weightage of 15 Marks each
- There must be One Question from each Unit/ Module
- Each Subtopic/ Chapter must be given due weightage in the Question paper
- Time duration: 2½Hours

The Theory Question Paper Skeleton is as follows

Question 1 (Unit/Module 1)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 1	**15**
Question 2 (Unit/Module 2)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 2	**15**
Question 3 (Unit/Module 3)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 3	**15**
Question 4 (Unit/Module 4)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 4	**15**
Question 5 (Unit/Module 5)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 5	**15**

B.Sc. Honours/ Honours with Research in Zoology

(NCrF Level- 4.5 First Year – Certificate in Zoology)

Semester I

Course Category	**Major-2**
Title of the Course	**Zoology -2**
Course Credit	**03**
Teaching Hours per Semester	**45**
Total Marks	**75**

Course Objectives

Objectives of this course is to teach students

- Systematic in animals
- Classification and anatomical features in nonchordate animals
- Ecological components and processes
- Importance of wildlife
- Fundamentals of evolution

Course Outcomes - COs

Students will be able to

- Develop understanding of fundamental body organizations, taxonomy and nomenclature of animals.
- Visualize anatomical features of invertebrates by studying type animals.
- Understand the evidence that living species share descent from common ancestry and how this fact explains the traits of living species.
- Conceptualize the fundamental theories of ecology.
- Wildlife conservation is necessary to maintain and protect the population of animals on earth to maintain their role in ecosystem.

1	Employability/Entrepreneurship/Skill Development પરકેન્દ્રિતથયેલછેકેનહિ?					Yes/No
2	Value added Courses Imparting Transferable and Life Skillsનાગુણોધરાવેછે?					Yes/No
3	Major		Yes/No	Minor		Yes/No
	Skill Enhancement Courses		Yes/No	Ability Enhancement Courses		Yes/No
	Value Added Courses		Yes/No	Exit/ Vocational Courses		Yes/No
4	Holistic Education	Yes/No	Multidisciplinary	Yes/No	Interdisciplinary	Yes/No
5	દિવ્યાંગમાટેવિષયઅંતર્ગતઆનુસાંગિકજોગવાઈકરાયેલછે ?					Yes/No
6	New India Literacy Programme (NILP) મુજબનોવિષયછે ?					Yes/No

7	Swayam પ્લેટફોર્મપરના MOOC વિષયપરઆધારિતઆવિષયછે ?	Yes/No
8	ઈન્ડીયનનોલેજસીસ્ટમ (IKS) પરઆધારિતવિષયછે ?	Yes/No

Unit No.	Topics	Hours	Marks
1	**Concept of Systematic** 1. Introduction to animal taxonomy a. Theories of biological classifications b. Hierarchy of categories/taxa 2. Fundamentals of zoological nomenclature a. Binomial and trinomial nomenclature in animals b. Introduction to ICZN and its operative principles 3. Types of coeloms, Symmetry, body organisations and types of circulation.	**10**	**15**
2	**Classification and forms and function in nonchordate animals** 1. Classification of animal phyla from Protozoa to Helminth (upto class) 2. Type Study – Tape Worm (*Taenia solium*) a. External Features, Scolex, Neck, Immature proglottids, Mature proglottids and Gravid; bladder worm.	**13**	**15**
3	**Ecology** 1. Concept of Ecology (Definition, Species to Biome) 2. Biotic and abiotic factors a. Biotic Factor: Producers, Consumers and Decomposers b. Abiotic Factors: Soil, Air, Atmosphere, Temperature, Precipitation, Lat-Long, Altitude, Light, Topography. 3. Energy flow in ecosystem a. food chain and b. food web	**10**	**15**
4	**Wildlife** 1. Concept of wildlife 2. Causes of wildlife depletion and need for conservation 3. Methods of conservation (*In-situ* and *Ex-situ* conservation methods) 4. National Park and Sanctuaries a. Khijadia Bird Sanctuary b. Marine National Park c. GIR National Park d. Hingolgadh Sanctuary	**05**	**15**
5	**Evolution** 1. Concept of Evolution 2. Direct – Indirect evidences of evolution	**07**	**15**

	a. Direct: Fossils records b. Indirect: Homology and Analogy, vestigial organs, recapitulation theory 3. Evolution theories (Lamarckism, Darwinism, Neo Darwinism)		

Reference Books:

1. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology by P. S. Verma and V. K. Agarwal
2. Ecology and Environment by P. D. Sharma
3. Methods and principles of systematic zoology by Mayr E, Linsley E.G. and Usinger, R.L.
4. Textbook of Invertebrate by R. L. Kotpal
5. Wildlife conservation and management by Reena Mathur

B.Sc. Honours/ Honours with Research in Zoology

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Semester I

Course Category	**Major Practical -2**
Title of the Course	**Zoology Practical – 2**
Course Credit	**01**
Teaching Hours per Semester	**30**
Total Marks	**25**

Course Objectives

Objectives of this course is to teach students

- Classification and identification of animals through morphology
- Morphological and anatomical features in type specimen
- Evaluation of various quality parameters in soil
- Explain biological properties/peculiarities of specific Protected Areas

Course Outcomes - COs

Students will be able to

- Identify animals and ascertain their taxonomic positions
- Comprehend anatomy of type specimen
- Perform quality analysis of soil
- Comprehend local peculiarities of Protected Areas

1	Employability/Entrepreneurship/Skill Development પરકેન્દ્રિતથયેલછેકેનહિ ?					Yes/No
2	Value added Courses Imparting Transferable and Life Skillsનાગુણોધરાવેછે?					Yes/No
3	Major		Yes/No	Minor		Yes/No
	Skill Enhancement Courses		Yes/No	Ability Enhancement Courses		Yes/No
	Value Added Courses		Yes/No	Exit/ Vocational Courses		Yes/No
4	Holistic Education	Yes/No	Multidisciplinary	Yes/No	Interdisciplinary	Yes/No
5	દિવ્યાંગમાટેવિષયઅંતર્ગતઆનુસાંગિકજોગવાઈકરાયેલછે ?					Yes/No
6	New India Literacy Programme (NILP) મુજબનોવિષયછે ?					Yes/No
7	Swayam પ્લેટફોર્મપરના MOOC વિષયપરઆધારિતઆવિષયછે ?					Yes/No
8	ઈન્ડીયનનોલેજસીસ્ટમ (IKS) પરઆધારિતવિષયછે ?					Yes/No

Pr. No.	List of Practicals
1	Identification and classification of Invertebrate animals Phylum: Protozoa:-Arcella, Ceratium, Vorticella, Plasmodium, Opalina
2	Identification and Classification of Invertebrate animals. (i) Phylum: Porifera:- Leucosolenia, Euplectella, Euspongia (ii) Phylum: Coelenterata :-Hydra, Rhizostoma, Metridium
3	Identification and Classification of Invertebrate animals (i) Phylum: Platyhelminthes:- Planaria, Liverfluke, Tapeworm (ii) Phylum: Nematoda :- Ascaris, Hook Worm, Filarial worm, Desmoscolex
4	Study of Permanent slide (Tape Worm) - Scolex, Proglottids (Mature and Gravid)
5	Study life cycle of Tape Worm - Lifecycle and WM of Bladder Worm
6	Study texture, colour and temperature in Soil
7	Study water holding capacity of soil (loamy, silt, clay and sand)
8	Study National Park of Gujarat (Marine National Park, Velavadar National Park, Gir National Park, Vasda National Park)
9	Study Sanctuaries of Gujarat (Khijadiya Bird Sanctuary, Hingolgadh Sanctuary, Wild Ass Sanctuary, Ratanmahal Sloth Bear Sanctuary)
10	Study connecting Link: Peripatus and Balanoglosus

Practical Question Paper Pattern

Semester End Examination (SEE)

The Practical Question Paper Skeleton is as follows

Instructions:

- Certified journal is must and minimum requirement to appearing for semester end practical examination.
- Should have at least 75% attendance in practical sessions during the semester.
- Time duration: 2 Hours.

Que. No.	Question	Marks
1	Sketch and label _____ system of Tape worm. (Practical- 4 and 5)	05
2	Do as per instruction and show it to examiner. (Practical–7)	05
3	Write as per instruction. (A) Identify and classify giving reasons. (Practical-1, 2 and 3) (B) Identify and describe. (Practical-8 and 9) (C) Identify and describe. (Practical-10)	06
4	Report of field visit.	03
5	Viva-voice.	03
6	Certified Journal.	03

SAURASHTRA UNIVERSITY

FACULTY OF SCIENCE

Course Structure and Syllabus for Science FYUGP

B.Sc. Honours/ Honours with Research in Zoology

Based on

UGC's guidelines NEP-2020 "Curriculum and Credit Framework for Undergraduate Programmes- CCFUP" and

Education Department, Government of Gujarat's
Uniform Credit Structure for all HEIs of Gujarat State and
Implementation of the Common Curriculum and Credit Framework under the National Education Policy-2020
(No: KCG/admin/2023-24/0607/kh.1 Sachivalaya, Gandhinagar dated 11/07/2023) and

Standard Operating Procedure for Implementation of NEP-2020 for the State of Gujarat- HEIs of Gujarat
(No: KCG/admin/2023-24/865/ dated 26/07/2023) and

Additional content to be added to SOP published by KCG
(No: KCG/NEP-2020/2023-24/893/ dated 28/07/2023)

EffectiveFromJune–2023& onwards

Graduate Attributes:

Graduates should be able to demonstrate the acquisition of the following:

Academic excellence: Comprehensive knowledge and coherent understanding of Microbiology and other interdisciplinary areas of study.

Practical, professional, and procedural knowledge required for carrying out professional or highly skilled work/tasks related to Microbiology, including knowledge required for undertaking self-employment initiatives and knowledge and mind-set required for entrepreneurship, improved product development, or a new mode of organization.

Critical and Analytical reasoning/thinking and Effective communications: Analysis and evaluation of information to form a judgment about a subject or idea and ability to communicate the same in a structured form.

Research-related skills: the ability to understand basic research ethics and skills in practicing/doing ethics in the field/ in personal research work, regardless of the funding authority or field of study.

Leadership qualities and Teamwork abilities: The graduates should be able to demonstrate the capability for mapping out the tasks of a team and setting direction and inspiring vision, and building a team that can help achieve the goals.

Global Citizenship: Mutual understanding with others from diverse cultures, perspectives, and backgrounds by embracing and practicing constitutional, humanistic, ethical, and moral values in life, including universal human values of truth, righteous conduct, peace, love, nonviolence, and scientific temper.

Life Long Learning: Ready to imbibe new knowledge, values, and skills with an open mind and willing to adopt change for constructive development.

Programme Outcomes (PO):

By the end of the program the students will be able to:

PO 1	Broad Scientific Knowledge: Graduates will demonstrate a comprehensive understanding of fundamental principles across multiple scientific disciplines, including but not limited to biology, chemistry, physics, mathematics, and earth sciences.
PO 2	Critical Thinking: Graduates will exhibit the ability to analyze and evaluate scientific information, synthesize complex concepts, and apply critical thinking skills to solve scientific problems and make informed decisions.
PO 3	Quantitative and Analytical Skills: Graduates will be proficient in utilizing quantitative techniques, mathematical tools, and data analysis methods to interpret and draw conclusions from scientific data.
PO 4	Effective Communication: Graduates will possess strong written and verbal communication skills, enabling them to convey scientific concepts clearly and concisely to both technical and non-technical audiences.
PO 5	Laboratory Proficiency: Graduates will be adept at designing, conducting, and interpreting experiments, utilizing laboratory equipment and techniques effectively, and maintaining a strong emphasis on safety and ethical considerations.
PO 6	Problem Solving and Research Skills: Graduates will demonstrate the ability to identify research questions, design research methodologies, collect and analyze data, and draw meaningful conclusions to contribute to the advancement of scientific knowledge.
PO 7	Ethical and Social Responsibility: Graduates will exhibit an awareness of ethical considerations in scientific research and its applications, and understand the societal implications of scientific discoveries and technological advancements.
PO 8	Adaptability and Lifelong Learning: Graduates will be prepared to adapt to evolving scientific paradigms and new technologies, and demonstrate a commitment to continuous learning and professional development.
PO 9	Information Literacy: Graduates will be proficient in accessing, evaluating, and utilizing scientific literature and resources, demonstrating an ability to stay informed about the latest developments in various scientific fields.
PO 10	Career Readiness: Graduates will possess a strong foundation to pursue a variety of career paths, including entry-level positions in scientific research, education, industry, government, healthcare, and more, or to pursue further education at the graduate level in specialized scientific disciplines.

Programme Specific Outcomes (PSO):

By the end of the program the students will be able to:

PSO 1	Animal Diversity and Classification: Graduates will demonstrate a deep understanding of animal taxonomy, evolution, and diversity, including the ability to classify and identify various animal species based on their characteristics.
PSO 2	Anatomy and Physiology: Graduates will have a thorough knowledge of the anatomical structures and physiological functions of different animal systems, enabling them to explain the adaptations and behaviours of animals.
PSO 3	Ecology and Behaviour: Graduates will understand the ecological interactions and behaviours of animals within their natural habitats, including concepts related to population dynamics, community structure, and animal responses to environmental factors.
PSO 4	Genetics and Evolution**: Graduates will be proficient in the principles of genetics and evolution as they relate to animal species, including the mechanisms of inheritance, genetic variation, and the role of natural selection in shaping animal populations.

PSO 5	Cell Biology and Histology: Graduates will have a solid foundation in cellular biology and histological techniques, allowing them to examine and analyze animal tissues at the microscopic level.
PSO 6	Ethics and Animal Welfare: Graduates will be aware of ethical considerations related to the treatment of animals in research, conservation, and other contexts, and will uphold standards of animal welfare.

B.Sc. Honours/ Honours with Research in Zoology

(NCrF Level- 4.5 First Year – Certificate in Zoology)

Semester I

SN	Course Category As per GoG- NEP-SOP - July 2023& additional content 28/7/23	Course Title	Credit		SEE Duration Hrs.	Evaluation - Weightage CCE: SEE = 50:50		
			T	P		CCE Marks	SEE Marks	Total Marks
1	**Major (Core) 1** (Zoology)	Zoology - 1	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
2	**Major(Core) 1 Practical** (Zoology)	Zoology Practical - 1	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
3	**Major (Core) 2** (Zoology)	Zoology - 2	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
4	**Major (Core) 2 Practical** (Zoology)	Zoology Practical - 2	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
5	**Minor(Elective)*-1**	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.2) **Any One from Basket** (As per the expertise and resources available in the college)	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
6	**Minor (Elective) Practical*-1**	**Practical** of the Course selected as **Minor**	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
7	**Multi/Inter - Disciplinary Course -1** (MDC/IDC-1) **(Elective)**** Categories: Natural & Physical Science/ Maths.,Stat.and Comp. Appl./Lib.,Info.and Media Sci./Comm. and Mgt./Huma., and Social Sci./ Sanskrit etc...	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.3) **Any One from Basket** (As per the expertise and resources available in the college)	**3**		**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
8	**Multi/Inter - Disciplinary Course Practical-1**** (MDC/IDC-1)**(Elective)**	**Practical** of the Course selected as **MDC/IDC-1**	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
9	**Ability Enhancement Course -1**(AEC-1)	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.4) **English Language:**	**2**	**-**	**2**	**50**	**50**	**100** To be converted for 50

		Development of Functional English						
10	**Skill Enhancement Course-1** (SEC-1)	**Any One from Basket** (As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.5)	**-**	**2**	**2**	**50**	**50**	**100** To be converted for 50
11	**Common Value Added Course-1** (C-VAC-1)*** NSS/NCC/ Sports & Fitness/ Ethics and Culture/ Culture and Communication/ Ethics and Values in Ancient Indian Traditions/ Human Values and Ethics/IPDC	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.6) VAC based on **IKS:** NSS/NCC/Sports & Fitness/Human Values and Ethics	**-**	**2**	**2**	**50**	**50**	**100** To be converted for 50
Total Credits and Marks (Semester-I)			**14**	**8**	**NA**	**550**	**550**	**1150** To be converted for 550

***** Any one course from the basket is to be selected as a Minor elective course as per the expertise and resources available in the college. The same course will continue as a Minor in the semester-II as well.

****** Any one course from the basket is to be selected as Multi/Inter disciplinary elective courses (MDC/IDC) as per the MDC/IDC in the semester-II as well.

*** Common **Value Added Elective Courses** (C-VAC-1) common to all is to be selected from University Basket for semester 1**,** as per the expertise and resources available in the college.

Courses Offered by BoS in Zoology to other FYUGP- B.Sc. Program in Semester-I

SN	Course Category As per GoG- NEP-SOP - July 2023& additional content 28/7/23	Course Title	Credit		SEE Duration Hrs.	Evaluation - Weightage CCE: SEE = 50:50		
			T	P		CCE Marks	SEE Marks	Total Marks
1	**Minor (Elective)-1** (Zoology) (In addition to courses mentioned in SOP basket)	Introduction to Zoology - 1	**3**	**-**	$2\frac{1}{2}$	**75**	**75**	**150** To be converted for 75
2	**Minor (Elective) Practical-1** (Zoology) (In addition to courses mentioned in SOP basket)	Practical – Introduction to Zoology - 1	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
3	**Multi/Inter - Disciplinary Course -1** (MDC/IDC-1) **(Elective)** (In addition to courses mentioned in SOP basket)	Zoology – Introduction to Biology	**3**	**-**	$2\frac{1}{2}$	**75**	**75**	**150** To be converted for 75
4	**Multi/Inter - Disciplinary Course Practical-1** (MDC/IDC Practical-1) **(Elective)**(In addition to courses mentioned in SOP basket)	Practical - Zoology – Introduction to Biology	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25

Evaluation Scheme: (As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Chapter-7: Evaluation Reforms)

The evaluation process should be formulated to make a systematic evaluation of students' progress based on UGC guidelines. The evaluation must be designed with learner attributes in mind. These attributes have clear linkages to Programme Education Objectives and Outcomes. The evaluation consists of the following two components:

1. Continuous and Comprehensive Evaluation (CCE)- Formative
2. Semester End Evaluation (SEE)- Summative

CCE carries 50% of the total marks allotted to a subject and the other 50% being assigned to the SEE.

In each course, every credit carries 25 marks, of which 50% marks is assigned for CCE and rest 50% marks for SEE. The 50% marks assigned to the CCE is distributed between the continuous classroom evaluation and mid-term evaluation. The pattern may be as follow:

SN	Evaluation	4 credit subjects (Marks)	2 credit subjects (Marks)
1	CCE (50%)		
	Classroom & Mid-Term Evaluation	75	50
2	SEE (50%)	75	50
	Total	150	100

Continuous and Comprehensive Evaluation (CCE)

Subject–wise CCE will be undertaken by the concerned faculty member. The mode of evaluation will be decided by the faculty member concerned with the subject. Normally CCE consists of class participation, case analysis and presentation, assignment, tutorials, slip tests (announced/ surprised), quizzes, attendance etc. or any combination of these. The students are expected to submit their answer scripts/ reports of internal evaluation within the stipulated time. Failure to do so may result in the script not being valued. Another part of CCE consists of mid-term written evaluation, which is compulsory for all students. It can be done in a scheduled manner. The duration of the mid-term evaluation shall be one hour.

Semester End Evaluation (SEE)

The SEE carries 50% of the marks assigned to a course. SEE shall be of 2 ½ hours for 4 credit course and 2 hours in case of 2 credit courses. The controller of the examination will conduct these examinations. Paper setting and evaluation will be done by the external examiners to an extent of 50% of the evaluation process. This examination shall be conducted as per a schedule which shall be notified in advance.

The backlog exam will be conducted twice a year just after the result declared of the semester evaluation. Students shall have a second chance to clear their backlog and avoid the burden to carry forward the backlog with the next semester exam.

Appearance in all the evaluations is mandatory and no exemption can be granted except in the following case:

1. In case of inability to attend the exam due to reasons considered genuine by the controller of examination in consultation with the Director/Board.

2. In case of medical emergency, a certificate from the registered medical practitioner must be produced before the commencement of exams. The evaluation board will then take final decision on the recommendation for exemption.

Eligibility Criteria to appear in SEE

To be able to appear for the SEE, a student must comply with the following conditions:

1. Should have at least 75% of attendance in all the courses put together.

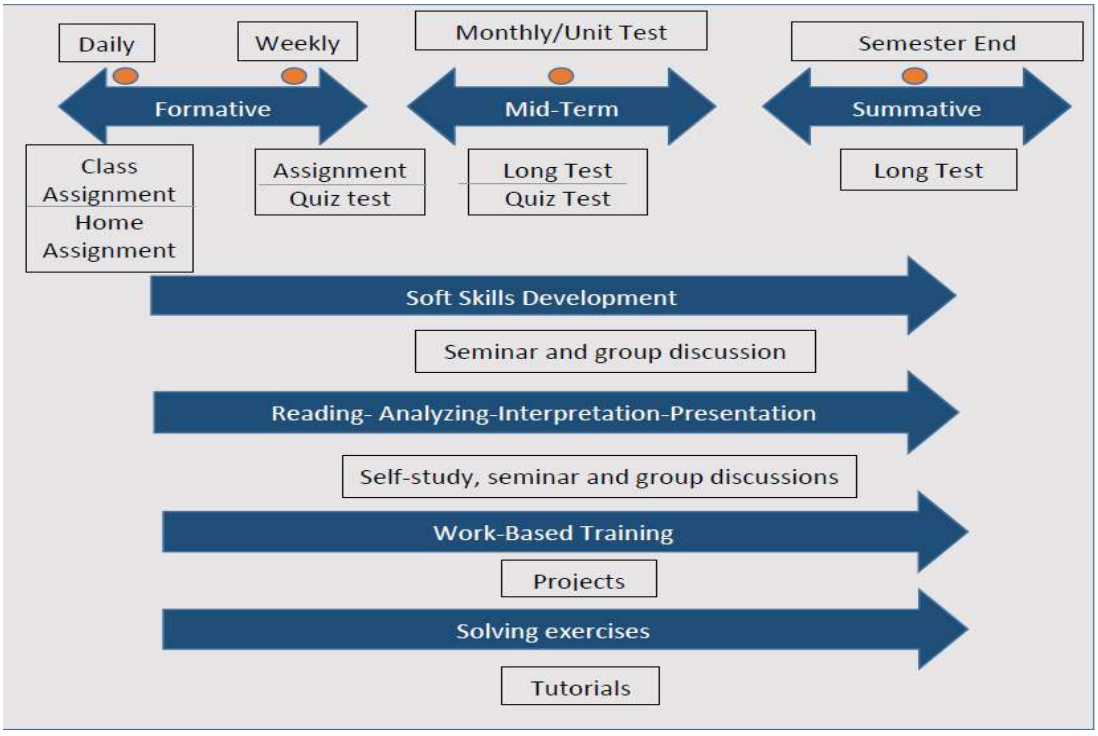
2. Should have at least 70% of attendance in each course/subject.

3. Should not have any disciplinary proceedings pending against him/her.

4. Should have no pending due.

Continuum of Evaluation

Evaluation must be continuous which may include both formative and summative components in a timely manner for continuous feedback as follow:



Mode of Evaluation

A wide range of modes of evaluation for evaluating students is available for the teachers/ institutions to use. A suitable compendium of such a mode needs to be carefully chosen for a particular program depending on its nature, objectives, and available resources. The mode of evaluation can be as below:

Written Mode	Oral Mode	Practical Mode	Integrated Mode
Semester Exam Class Test Open book exam/test Open note exam/test Self-test/Online test Essay/Article writing Quizzes/Objective test Class assignment Home assignment Reports writing Research/Dissertation Class Studies	Viva/Oral exam Group Discussion Role Play Authentic Problem Solving Quiz Interview	Lab work Computer simulation/virtual labs Craft work Co-curricular work	Paper presentation/Seminar Field Assignment Poster Presentation

Written Mode		
Evaluation Type	**Nature**	**Objective**
Semester Exam	Traditionally essay type with objective/short answer questions to evaluate Lower Ordered Thinking (LOT) OBE skills	For depth and planned preparation
Class test	Traditionally essay type	Fixed date forces students to learn
Open book test	Allowed choice of reference book	Measures what students can do with resources, less stress on memory
Open note test	To get used to the system	Encourage good note taking
Self-test	For subjective and objective items	Mastery learning occurs with proper feedback
Article/essay writing	Individual long written assignment	Individual expression and creativity
Quizzes/Objective test	Short duration structured test	Excellent validity as greater syllabus coverage
Class assignment	With defined time	Student's performance to make decision
Home assignment	With undefined time	Reinforce learning and facilitate mastery of specific skills
Reports Writing	On activities performed or event observed	Develop a key transferable skill
Research/Dissertation	Detailed research-based report	To judge creativity and research skills

Case Studies	Analyse a given case (real or fictional)	To assess thinking, value, and attitude
Oral Mode		
Evaluation Type	**Nature**	**Objective**
Viva/Oral exam	Individually or in small group	Practical experience towards job interview situation
Group discussion	Small group of 2-5 members work on a joint task	Encourage teamwork
Role Play	Small group of 2-5 members work on a joint task	Develop personality
Authenticate problem solving	Small group of 2-5 members work on a joint task	Communication of ideas
Quiz	Small group of 2-5 members work on a joint task	Assess memory power
Interview	Individually	Judge the personal confidence level

Practical Mode		
Evaluation Type	**Nature**	**Objective**
Lab work	Component of working with one's hand	Keep the students on the task
Computer simulation/virtual labs	Component of working with one's hand	To understand the practical exposure
Craft work	Component of working with one's hand	Encourage application of concepts learnt
Co-curricular work	Component of working with one's hand	For immediate feedback

Integrated Mode		
Evaluation Type	**Nature**	**Objective**
Paper presentation/Seminar	Group or individual work	Learn from others presentation
Field Assignment	Field visit with report	Develop observation and recording skills
Poster presentation	Group or individual work	Develop research, creativity, and discussion skills
Paper presentation/Seminar	Group or individual work	Learn from others presentation

Models of Evaluation

Based on the types of evaluation, various models of evaluation implementation are suggested for theory, practical, self-study and work-based learning. The focus of these models is to encourage the students to improve on skills and performance.

Model for Theory Courses	
CCE-50% (75)SEE-50% (75)	
Exam Pattern	**Marks**
Class Test (Average of two tests)	15
Quiz (Average of two tests)	15
Home Assignment	15
Active Learning- PBL/CSBL/Seminar/Flipped Class Room etc. OBE tools.	10
Class Assignment	10
Attendance	10
Continuous and Comprehensive Evaluation	**75**
Semester-End Evaluation	**75**

Model for Practical Courses	
CCE-50% (25)SEE-50% (25)	
Exam Pattern	**Marks**
Lab work assessment	10
Viva voce/Lab quiz	10
Attendance	05
Continuous and Comprehensive Evaluation	**25**
Semester-End Evaluation	**25**

Model for Project/Self-study Courses	
CCE-50% (100)SEE-50% (100)	
Exam Pattern	**Marks**
Project Evaluation (Best 4 out of 5)	80
Participation in discussion	10
Attendance	10
Continuous and Comprehensive Evaluation	**100**
Semester-End Evaluation	**100**

***Model for Project/Self-study Courseswill be implemented from semester-6 after discussion and approval.**

Model for Work Experience Courses	
CCE-50% (100)SEE-50% (100)	
Exam Pattern	**Marks**
Project Evaluation (Best 4 out of 5)	80
Participation in discussion	10
Attendance	10
Continuous and Comprehensive Evaluation	**100**
Semester-End Evaluation	**100**

***Model for Work Experience Courses will be implemented from semester-6 after discussion and approval.**

Model for Skill Enhancement Course - Skill based Practical Course **-2 Credit Course**	
CCE-50% (50)&SEE-50% (50)	
Exam Pattern	**Marks**
Lab work assessment or Project based Assessment	20
Viva voce/Lab quiz	20
Attendance & Performance	10
Continuous and Comprehensive Evaluation	**50**
Semester-End Evaluation	**50**

Component	**Marks**	**SEE Duration Hrs.**	**Evaluation - Weightage CCE: SEE = 50:50**			
			CCE Marks	**SEE Marks**	**Total Marks**	**Total Marks To be Converted for**
Theory	**75**	$2\frac{1}{2}$	**75**	**75**	**150**	**75**
Practical	**25**	**2**	**25**	**25**	**50**	**25**
Total	**100**	**NA**	**100**	**100**	**200**	**100**

Theory Question Paper Pattern

Semester End Examination (SEE)

Instructions:

- All Units/ Module carry equal weightage of 15 Marks each
- There must be One Question from each Unit/ Module
- Each Subtopic/ Chapter must be given due weightage in the Question paper
- Time duration: 2½Hours

The Theory Question Paper Skeleton is as follows

Question 1 (Unit/Module 1)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 1	**15**
Question 2 (Unit/Module 2)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 2	**15**
Question 3 (Unit/Module 3)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 3	**15**
Question 4 (Unit/Module 4)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 4	**15**
Question 5 (Unit/Module 5)		Marks
A	Answer All the Three	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 5	**15**

B.Sc. Honours/ Honours with Research in Zoology

(NCrF Level- 4.5 First Year – Certificate in Zoology)

Semester I

Course Category	**Minor**
Title of the Course	**Introduction to Zoology - 1**
Course Credit	**03**
Teaching Hours per Semester	**45**
Total Marks	**75**

Course Objectives

Objectives of this course is to teach students

- Range of techniques used in biology research , i.e., microscopy and ph
- Structure and function of eukaryotic cells
- Principals of Mendelian genetics, inheritance pattern and genetic variation
- Various types of environmental pollution and their mitigation
- Different poultry species and their keeping and maintenance

Course Outcomes - COs

Students will be able to

- Learn various fundamental techniques in biology and develop analytical skills.
- Understand the structure and purposes of basic components of prokaryotic and eukaryotic cells and cell organelles.
- Genetics will deal with concept of gene and mandelian laws and examples of multiple alleles which enable them to understand inheritance of characters.
- Environmental education is to increase public awareness about environmental issues, explore possible solutions and to lay the foundation for fully informed and active participation of individual in the protection of the environment and the prudent and rational use of natural resources.
- Get knowledge in poultry management by learning types of poultry birds and their rearing system which will create opportunities for them to venture into poultry business.

1	Employability/Entrepreneurship/Skill Development પરકેન્દ્રિતથયેલછેકેનહિ ?			Yes/No
2	Value added Courses Imparting Transferable and Life Skillsનાગુણોધરાવેછે?			Yes/No
3	Major	Yes/No	Minor	Yes/No
	Skill Enhancement Courses	Yes/No	Ability Enhancement Courses	Yes/No
	Value Added Courses	Yes/No	Exit/ Vocational Courses	Yes/No

4	Holistic Education	Yes/No	Multidisciplinary	Yes/No	Interdisciplinary	Yes/No
5	દિવ્યાંગમાટેવિષયઅંતર્ગતઆનુસાંગિકજોગવાઈકરાયેલછે ?					Yes/No
6	New India Literacy Programme (NILP) મુજબનોવિષયછે ?					Yes/No
7	Swayam પ્લેટફોર્મપરના MOOC વિષયપરઆધારિતઆવિષયછે ?					Yes/No
8	ઈન્ડીયનનોલેજસીસ્ટમ (IKS) પરઆધારિતવિષયછે ?					Yes/No

Unit No.	Topics	Hours	Marks
1	**Techniques in biology** 1. Types of microscopy and their working principles a. Dissecting Microscope b. Compound Microscope 2. pH meter a. Concept of pH, Henderson – Hasselbalch equation, precaution and care of pH meter.	08	15
2	**Cell Biology** 1. Types of cells and cell theory 2. Cell organelles a. Cytoplasm b. Plasma membrane c. Endoplasmic Reticulum d. Nucleus 3. Types of chromosomes based on centromere	09	15
3	**Genetics** 1. Introduction to Gene 2. Introduction to Mendelian laws of hereditary 3. Incomplete Dominance 4. Co-dominance 5. Multiple alleles a. ABO blood group in humans Rh Factor, Erythroblastosis Fetalis	08	15
4	**Environmental Challenges** 1. Causes, effects and controlling measures of various kinds of environmental pollutions; a) Air pollution, b) Water pollution, c) Soil pollution, d) Noise pollution, e) Thermal pollution, f) Light pollution 2. Effects of human population explosion on environment 3. Climate change as result of global warming	12	15
5	**Applied Zoology** 1. Poultry Science a. Introduction to various bird rearing methods	08	15

	b. Deep Litter House, Cage System c. Types of Fowl – Asil, Rhode Island Red, Indian Giant d. Apparatus - feeding and watering, Incubators and Hatchers e. Diseases in poultry – parasitic, protozoan, fungal, bacterial and viral		

Reference Books:

1. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology by P. S. Verma and V. K. Agarwal
2. Applied Zoology by Tarit Kumar Banerjee
3. Ecology and Environment by P. D. Sharma
4. Biological Instrumentation and Methodology by P. K. Bajpai
5. Textbook of Invertebrate by R. L. Kotpal

B.Sc. Honours/ Honours with Research in Zoology

(NCrF Level- 4.5 First Year – Certificate in Zoology)

Semester I

Course Category	**Minor Practical**
Title of the Course	**Practical Introduction to Zoology - 1**
Course Credit	**01**
Teaching Hours per Semester	**30**
Total Marks	**25**

Course Objectives

Objectives of this course is to teach students

- Practical use of light microscopes and pH meter
- Morphology of different cell organelles
- Problem solving in genetics
- Blood group types and determination
- About different poultry apparatus

Course Outcomes - COs

Students will be able to

- Use light microscopes in laboratories
- Identify plant and animal cells and cell organelles
- Solve genetical problems of inheritance
- Determine blood group
- Comprehend use of various poultry apparatus

1	Employability/Entrepreneurship/Skill Development પરકેન્દ્રિતથયેલછેકેનહિ ?					Yes/No
2	Value added Courses Imparting Transferable and Life Skillsનાગુણોધરાવેછે?					Yes/No
3	Major		Yes/No	Minor		Yes/No
	Skill Enhancement Courses		Yes/No	Ability Enhancement Courses		Yes/No
	Value Added Courses		Yes/No	Exit/ Vocational Courses		Yes/No
4	Holistic Education	Yes/No	Multidisciplinary	Yes/No	Interdisciplinary	Yes/No
5	દિવ્યાંગમાટેવિષયઅંતર્ગતઆનુસાંગિકજોગવાઈકરાયેલછે ?					Yes/No
6	New India Literacy Programme (NILP) મુજબનોવિષયછે ?					Yes/No
7	Swayam પ્લેટફોર્મપરના MOOC વિષયપરઆધારિતઆવિષયછે ?					Yes/No

8	ઈન્ડીયનનોલેજસીસ્ટમ (IKS) પરઆધારિતવિષયછે ?	Yes/No

Pr. No.	List of Practicals
1	Study working principle of dissecting and compound microscope.
2	Study working principle of pH meter.
3	Study plant and animal cells by preparing temporary slide (Ex. Onion cells, cheek cell).
4	Study cell organelles by charts/multi media (as per theory)
5	Solve the given genetic problems • Mono hybrid • Di hybrid • Incomplete dominance • Co-dominance
6	Solve the given genetic problems • Multiple Alleles (ABO Blood group in human)
7	To Determine own blood group and Rh factor
8	Study poultry types and fowls (cage system and deep litter house)
9	Study poultry apparatus (feeders, waterer, incubator and brooder, debeaker)
10	Case study of any polluted site with aim to discuss type of pollution, source of pollution, environmental impact and possible mitigation

Practical Question Paper Pattern

Semester End Examination (SEE)

The Practical Question Paper Skeleton is as follows

Instructions:

- Certified journal is must and minimum requirement to appearing for semester end practical examination.
- Should have at least 75% attendance in practical sessions during the semester.
- Time duration: 2 Hours.

Que. No.	Question	Marks
1	Do as per instruction & show it to examiner. (Practical – 3)	05
2	Do as per instruction and show it to examiner. (Practical – 5, 6 and 7)	05
3	Write as per instruction. (A) Identify and describe. (Practical -1, 2) (B) Identify and describe.(Practical-4) (C) Identify and describe.(Practical-8, 9)	06
4	Submission of report on case study of any polluted site	3
5	Viva–voice	3
6	Certified Journal.	3

SAURASHTRA UNIVERSITY

FACULTY OF SCIENCE

Course Structure and Syllabus for Science FYUGP

B.Sc. Honours/ Honours with Research in Zoology

Based on

UGC's guidelines NEP-2020 "Curriculum and Credit Framework for Undergraduate Programmes- CCFUP" and

Education Department, Government of Gujarat's
Uniform Credit Structure for all HEIs of Gujarat State and
Implementation of the Common Curriculum and Credit Framework under the National Education Policy-2020
(No: KCG/admin/2023-24/0607/kh.1 Sachivalaya, Gandhinagar dated 11/07/2023) and

Standard Operating Procedure for Implementation of NEP-2020 for the State of Gujarat- HEIs of Gujarat
(No: KCG/admin/2023-24/865/ dated 26/07/2023) and

Additional content to be added to SOP published by KCG
(No: KCG/NEP-2020/2023-24/893/ dated 28/07/2023)

EffectiveFromJune–2023& onwards

Graduate Attributes:

Graduates should be able to demonstrate the acquisition of the following:

Academic excellence: Comprehensive knowledge and coherent understanding of Microbiology and other interdisciplinary areas of study.

Practical, professional, and procedural knowledge required for carrying out professional or highly skilled work/tasks related to Microbiology, including knowledge required for undertaking self-employment initiatives and knowledge and mind-set required for entrepreneurship, improved product development, or a new mode of organization.

Critical and Analytical reasoning/thinking and Effective communications: Analysis and evaluation of information to form a judgment about a subject or idea and ability to communicate the same in a structured form.

Research-related skills: the ability to understand basic research ethics and skills in practicing/doing ethics in the field/ in personal research work, regardless of the funding authority or field of study.

Leadership qualities and Teamwork abilities: The graduates should be able to demonstrate the capability for mapping out the tasks of a team and setting direction and inspiring vision, and building a team that can help achieve the goals.

Global Citizenship: Mutual understanding with others from diverse cultures, perspectives, and backgrounds by embracing and practicing constitutional, humanistic, ethical, and moral values in life, including universal human values of truth, righteous conduct, peace, love, nonviolence, and scientific temper.

Life Long Learning: Ready to imbibe new knowledge, values, and skills with an open mind and willing to adopt change for constructive development.

Programme Outcomes (PO):

By the end of the program the students will be able to:

PO 1	Broad Scientific Knowledge: Graduates will demonstrate a comprehensive understanding of fundamental principles across multiple scientific disciplines, including but not limited to biology, chemistry, physics, Zoologymatics, and earth sciences.
PO 2	Critical Thinking: Graduates will exhibit the ability to analyze and evaluate scientific information, synthesize complex concepts, and apply critical thinking skills to solve scientific problems and make informed decisions.
PO 3	Quantitative and Analytical Skills: Graduates will be proficient in utilizing quantitative techniques, Zoologymatical tools, and data analysis methods to interpret and draw conclusions from scientific data.
PO 4	Effective Communication: Graduates will possess strong written and verbal communication skills, enabling them to convey scientific concepts clearly and concisely to both technical and non-technical audiences.
PO 5	Laboratory Proficiency: Graduates will be adept at designing, conducting, and interpreting experiments, utilizing laboratory equipment and techniques effectively, and maintaining a strong emphasis on safety and ethical considerations.
PO 6	Problem Solving and Research Skills: Graduates will demonstrate the ability to identify research questions, design research methodologies, collect and analyze data, and draw meaningful conclusions to contribute to the advancement of scientific knowledge.
PO 7	Ethical and Social Responsibility: Graduates will exhibit an awareness of ethical considerations in scientific research and its applications, and understand the societal implications of scientific discoveries and technological advancements.
PO 8	Adaptability and Lifelong Learning: Graduates will be prepared to adapt to evolving scientific paradigms and new technologies, and demonstrate a commitment to continuous learning and professional development.
PO 9	Information Literacy: Graduates will be proficient in accessing, evaluating, and utilizing scientific literature and resources, demonstrating an ability to stay informed about the latest developments in various scientific fields.
PO 10	Career Readiness: Graduates will possess a strong foundation to pursue a variety of career paths, including entry-level positions in scientific research, education, industry, government, healthcare, and more, or to pursue further education at the graduate level in specialized scientific disciplines.

Programme Specific Outcomes (PSO):

By the end of the program the students will be able to:

PSO 1	Animal Diversity and Classification: Graduates will demonstrate a deep understanding of animal taxonomy, evolution, and diversity, including the ability to classify and identify various animal species based on their characteristics.
PSO 2	Anatomy and Physiology: Graduates will have a thorough knowledge of the anatomical structures and physiological functions of different animal systems, enabling them to explain the adaptations and behaviours of animals.
PSO 3	Ecology and Behaviour: Graduates will understand the ecological interactions and behaviours of animals within their natural habitats, including concepts related to population dynamics, community structure, and animal responses to environmental factors.
PSO 4	Genetics and Evolution**: Graduates will be proficient in the principles of genetics and evolution as they relate to animal species, including the mechanisms of inheritance, genetic variation, and the role of natural selection in shaping animal populations.

PSO 5	Cell Biology and Histology: Graduates will have a solid foundation in cellular biology and histological techniques, allowing them to examine and analyze animal tissues at the microscopic level.
PSO 6	Ethics and Animal Welfare: Graduates will be aware of ethical considerations related to the treatment of animals in research, conservation, and other contexts, and will uphold standards of animal welfare.

B.Sc. Honours/ Honours with Research in Zoology

(NCrF Level- 4.5 First Year – Certificate in Zoology)

Semester I

SN	Course Category As per GoG- NEP-SOP - July 2023& additional content 28/7/23	Course Title	Credit		SEE Duration Hrs.	Evaluation - Weightage CCE: SEE = 50:50		
			T	P		CCE Marks	SEE Marks	Total Marks
1	**Major (Core) 1** (Zoology)	Zoology - 1	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
2	**Major(Core) 1 Practical** (Zoology)	Zoology Practical - 1	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
3	**Major (Core) 2** (Zoology)	Zoology - 2	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
4	**Major (Core) 2 Practical** (Zoology)	Zoology Practical - 2	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
5	**Minor(Elective)*-1**	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.2) **Any One from Basket** (As per the expertise and resources available in the college)	**3**	**-**	**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
6	**Minor (Elective) Practical*-1**	**Practical** of the Course selected as **Minor**	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
7	**Multi/Inter - Disciplinary Course -1** (MDC/IDC-1) **(Elective)**** Categories: Natural & Physical Science/ Maths.,Stat.and Comp. Appl./Lib.,Info.and Media Sci./Comm. and Mgt./Huma., and Social Sci./ Sanskrit etc...	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.3) **Any One from Basket** (As per the expertise and resources available in the college)	**3**		**$2\frac{1}{2}$**	**75**	**75**	**150** To be converted for 75
8	**Multi/Inter - Disciplinary Course Practical-1**** (MDC/IDC-1)**(Elective)**	**Practical** of the Course selected as **MDC/IDC-1**	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
9	**Ability Enhancement Course -1**(AEC-1)	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.4) **English Language:**	**2**	**-**	**2**	**50**	**50**	**100** To be converted for 50

		Development of Functional English						
10	**Skill Enhancement Course-1** (SEC-1)	**Any One from Basket** (As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.5)	**-**	**2**	**2**	**50**	**50**	**100** To be converted for 50
11	**Common Value Added Course-1** (C-VAC-1)*** NSS/NCC/ Sports & Fitness/ Ethics and Culture/ Culture and Communication/ Ethics and Values in Ancient Indian Traditions/ Human Values and Ethics/IPDC	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.6) VAC based on **IKS:** NSS/NCC/Sports & Fitness/Human Values and Ethics	**-**	**2**	**2**	**50**	**50**	**100** To be converted for 50
Total Credits and Marks (Semester-I)			**14**	**8**	**NA**	**550**	**550**	**1150** To be converted for 550

***** Any one course from the basket is to be selected as a Minor elective course as per the expertise and resources available in the college. The same course will continue as a Minor in the semester-II as well.

****** Any one course from the basket is to be selected as Multi/Inter disciplinary elective courses (MDC/IDC) as per the MDC/IDC in the semester-II as well.

*** Common **Value Added Elective Courses** (C-VAC-1) common to all is to be selected from University Basket for semester 1**,** as per the expertise and resources available in the college.

Courses Offered by BoS in Zoology to other FYUGP- B.Sc. Program in Semester-I

SN	Course Category As per GoG- NEP-SOP - July 2023& additional content 28/7/23	Course Title	Credit		SEE Duration Hrs.	Evaluation - Weightage CCE: SEE = 50:50		
			T	P		CCE Marks	SEE Marks	Total Marks
1	**Minor (Elective)-1** (Zoology) (In addition to courses mentioned in SOP basket)	Introduction to Zoology - 1	**3**	**-**	$2\frac{1}{2}$	**75**	**75**	**150** To be converted for 75
2	**Minor (Elective) Practical-1** (Zoology) (In addition to courses mentioned in SOP basket)	Practical – Introduction to Zoology - 1	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25
3	**Multi/Inter - Disciplinary Course -1** (MDC/IDC-1) **(Elective)** (In addition to courses mentioned in SOP basket)	Zoology – Introduction to Biology	**3**	**-**	$2\frac{1}{2}$	**75**	**75**	**150** To be converted for 75
4	**Multi/Inter - Disciplinary Course Practical-1** (MDC/IDC Practical-1) **(Elective)**(In addition to courses mentioned in SOP basket)	Practical - Zoology – Introduction to Biology	**-**	**1**	**2**	**25**	**25**	**50** To be converted for 25

Evaluation Scheme: (As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Chapter-7: Evaluation Reforms)

The evaluation process should be formulated to make a systematic evaluation of students' progress based on UGC guidelines. The evaluation must be designed with learner attributes in mind. These attributes have clear linkages to Programme Education Objectives and Outcomes. The evaluation consists of the following two components:

1. Continuous and Comprehensive Evaluation (CCE)- Formative
2. Semester End Evaluation (SEE)- Summative

CCE carries 50% of the total marks allotted to a subject and the other 50% being assigned to the SEE.

In each course, every credit carries 25 marks, of which 50% marks is assigned for CCE and rest 50% marks for SEE. The 50% marks assigned to the CCE is distributed between the continuous classroom evaluation and mid-term evaluation. The pattern may be as follow:

SN	Evaluation	4 credit subjects (Marks)	2 credit subjects (Marks)
1	CCE (50%)		
	Classroom & Mid-Term Evaluation	75	50
2	SEE (50%)	75	50
	Total	150	100

Continuous and Comprehensive Evaluation (CCE)

Subject–wise CCE will be undertaken by the concerned faculty member. The mode of evaluation will be decided by the faculty member concerned with the subject. Normally CCE consists of class participation, case analysis and presentation, assignment, tutorials, slip tests (announced/ surprised), quizzes, attendance etc. or any combination of these. The students are expected to submit their answer scripts/ reports of internal evaluation within the stipulated time. Failure to do so may result in the script not being valued. Another part of CCE consists of mid-term written evaluation, which is compulsory for all students. It can be done in a scheduled manner. The duration of the mid-term evaluation shall be one hour.

Semester End Evaluation (SEE)

The SEE carries 50% of the marks assigned to a course. SEE shall be of 2 ½ hours for 4 credit course and 2 hours in case of 2 credit courses. The controller of the examination will conduct these examinations. Paper setting and evaluation will be done by the external examiners to an extent of 50% of the evaluation process. This examination shall be conducted as per a schedule which shall be notified in advance.

The backlog exam will be conducted twice a year just after the result declared of the semester evaluation. Students shall have a second chance to clear their backlog and avoid the burden to carry forward the backlog with the next semester exam.

Appearance in all the evaluations is mandatory and no exemption can be granted except in the following case:

1. In case of inability to attend the exam due to reasons considered genuine by the controller of examination in consultation with the Director/Board.

2. In case of medical emergency, a certificate from the registered medical practitioner must be produced before the commencement of exams. The evaluation board will then take final decision on the recommendation for exemption.

Eligibility Criteria to appear in SEE

To be able to appear for the SEE, a student must comply with the following conditions:

1. Should have at least 75% of attendance in all the courses put together.

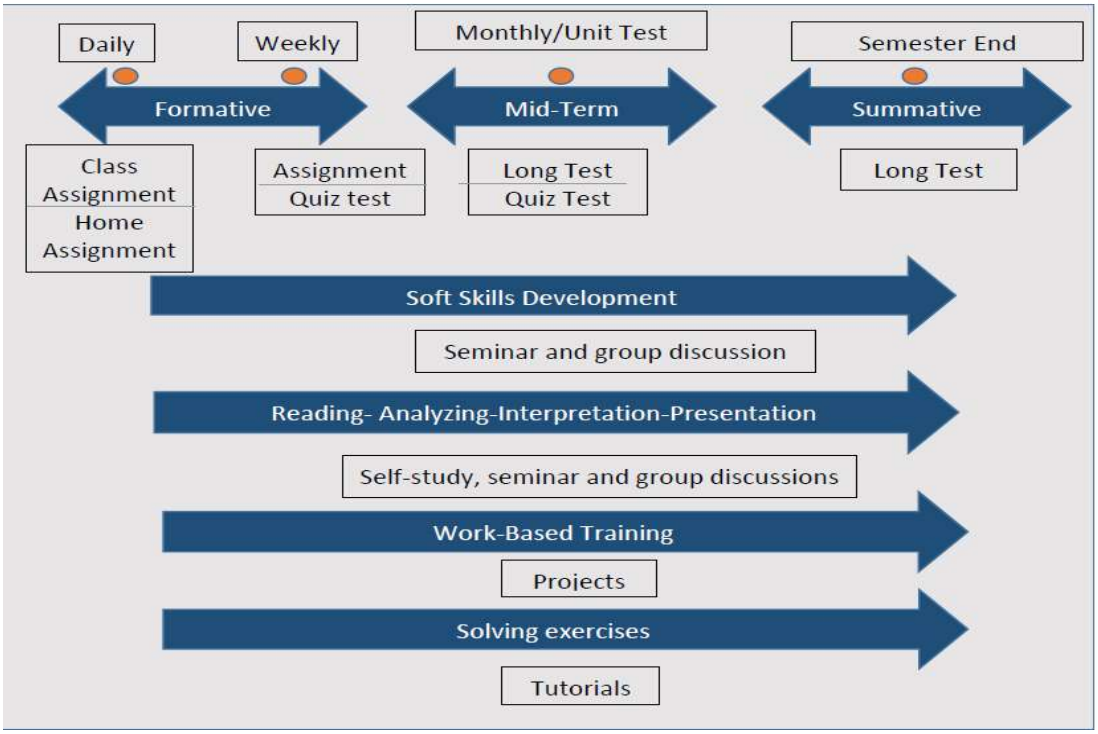
2. Should have at least 70% of attendance in each course/subject.

3. Should not have any disciplinary proceedings pending against him/her.

4. Should have no pending due.

Continuum of Evaluation

Evaluation must be continuous which may include both formative and summative components in a timely manner for continuous feedback as follow:



Mode of Evaluation

A wide range of modes of evaluation for evaluating students is available for the teachers/ institutions to use. A suitable compendium of such a mode needs to be carefully chosen for a particular program depending on its nature, objectives, and available resources. The mode of evaluation can be as below:

Written Mode	Oral Mode	Practical Mode	Integrated Mode
Semester Exam Class Test Open book exam/test Open note exam/test Self-test/Online test Essay/Article writing Quizzes/Objective test Class assignment Home assignment Reports writing Research/Dissertation Class Studies	Viva/Oral exam Group Discussion Role Play Authentic Problem Solving Quiz Interview	Lab work Computer simulation/virtual labs Craft work Co-curricular work	Paper presentation/Seminar Field Assignment Poster Presentation

Written Mode		
Evaluation Type	**Nature**	**Objective**
Semester Exam	Traditionally essay type with objective/short answer questions to evaluate Lower Ordered Thinking (LOT) OBE skills	For depth and planned preparation
Semester Exam	Traditionally essay type	For depth and planned preparation
Class test	Traditionally essay type	Fixed date forces students to learn
Open book test	Allowed choice of reference book	Measures what students can do with resources, less stress on memory
Open note test	To get used to the system	Encourage good note taking
Self-test	For subjective and objective items	Mastery learning occurs with proper feedback
Article/essay writing	Individual long written assignment	Individual expression and creativity
Quizzes/Objective test	Short duration structured test	Excellent validity as greater syllabus coverage
Class assignment	With defined time	Student's performance to make decision
Home assignment	With undefined time	Reinforce learning and facilitate mastery of specific skills
Reports Writing	On activities performed or event observed	Develop a key transferable skill

Research/Dissertation	Detailed research-based report	To judge creativity and research skills
Case Studies	Analyse a given case (real or fictional)	To assess thinking, value, and attitude
Oral Mode		
Evaluation Type	**Nature**	**Objective**
Viva/Oral exam	Individually or in small group	Practical experience towards job interview situation
Group discussion	Small group of 2-5 members work on a joint task	Encourage teamwork
Role Play	Small group of 2-5 members work on a joint task	Develop personality
Authenticate problem solving	Small group of 2-5 members work on a joint task	Communication of ideas
Quiz	Small group of 2-5 members work on a joint task	Assess memory power
Interview	Individually	Judge the personal confidence level

Practical Mode		
Evaluation Type	**Nature**	**Objective**
Lab work	Component of working with one's hand	Keep the students on the task
Computer simulation/virtual labs	Component of working with one's hand	To understand the practical exposure
Craft work	Component of working with one's hand	Encourage application of concepts learnt
Co-curricular work	Component of working with one's hand	For immediate feedback

Integrated Mode		
Evaluation Type	**Nature**	**Objective**
Paper presentation/Seminar	Group or individual work	Learn from others presentation
Field Assignment	Field visit with report	Develop observation and recording skills
Poster presentation	Group or individual work	Develop research, creativity, and discussion skills
Paper presentation/Seminar	Group or individual work	Learn from others presentation

Models of Evaluation

Based on the types of evaluation, various models of evaluation implementation are suggested for theory, practical, self-study and work-based learning. The focus of these models is to encourage the students to improve on skills and performance.

Model for Theory Courses	
CCE-50% (75)SEE-50% (75)	
Exam Pattern	**Marks**
Class Test (Average of two tests)	15
Quiz (Average of two tests)	15
Home Assignment	15
Active Learning- PBL/CSBL/Seminar/Flipped Class Room etc. OBE tools.	10
Class Assignment	10
Attendance	10
Continuous and Comprehensive Evaluation	**75**
Semester-End Evaluation	**75**

Model for Practical Courses	
CCE-50% (25)SEE-50% (25)	
Exam Pattern	**Marks**
Lab work assessment	10
Viva voce/Lab quiz	10
Attendance	05
Continuous and Comprehensive Evaluation	**25**
Semester-End Evaluation	**25**

Model for Project/Self-study Courses	
CCE-50% (100)SEE-50% (100)	
Exam Pattern	**Marks**
Project Evaluation (Best 4 out of 5)	80
Participation in discussion	10
Attendance	10
Continuous and Comprehensive Evaluation	**100**
Semester-End Evaluation	**100**

***Model for Project/Self-study Courseswill be implemented from semester-6 after discussion and approval.**

Model for Work Experience Courses	
CCE-50% (100)SEE-50% (100)	
Exam Pattern	**Marks**
Project Evaluation (Best 4 out of 5)	80
Participation in discussion	10
Attendance	10
Continuous and Comprehensive Evaluation	**100**
Semester-End Evaluation	**100**

***Model for Work Experience Courses will be implemented from semester-6 after discussion and approval.**

Model for Skill Enhancement Course - Skill based Practical Course **-2 Credit Course**	
CCE-50% (50)&SEE-50% (50)	
Exam Pattern	**Marks**
Lab work assessment or Project based Assessment	20
Viva voce/Lab quiz	20
Attendance & Performance	10
Continuous and Comprehensive Evaluation	**50**
Semester-End Evaluation	**50**

Component	**Marks**	**SEE Duration Hrs.**	**Evaluation - Weightage CCE: SEE = 50:50**			
			CCE Marks	**SEE Marks**	**Total Marks**	**Total Marks To be Converted for**
Theory	**75**	$2\frac{1}{2}$	**75**	**75**	**150**	**75**
Practical	**25**	**2**	**25**	**25**	**50**	**25**
Total	**100**	**NA**	**100**	**100**	**200**	**100**

Theory Question Paper Pattern

Semester End Examination (SEE)

Instructions:

- All Units/ Module carry equal weightage of 15 Marks each
- There must be One Question from each Unit/ Module
- Each Subtopic/ Chapter must be given due weightage in the Question paper
- Time duration: 2½Hours

The Theory Question Paper Skeleton is as follows

Question 1 (Unit/Module 1)		Marks
A	Answer Any Three out of Five	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 1	**15**
Question 2 (Unit/Module 2)		Marks
A	Answer Any Three out of Five	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 2	**15**
Question 3 (Unit/Module 3)		Marks
A	Answer Any Three out of Five	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 3	**15**
Question 4 (Unit/Module 4)		Marks
A	Answer Any Three out of Five	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 4	**15**
Question 5 (Unit/Module 5)		Marks
A	Answer Any Three out of Five	03
B	Answer Any Two out of Three	06
C	Answer Any One out of Two	06
	Total Marks Question 5	**15**

B.Sc. Honours/ Honours with Research in Zoology

(NCrF Level- 4.5 First Year – Certificate in Zoology)

Semester I

Course Category	**MDC/IDC**
Title of the Course	**Zoology: Introduction to Biology - 1**
Course Credit	**03**
Teaching Hours per Semester	**45**
Total Marks	**75**

Course Objectives

Objectives of this course is to teach students

- Basics of biology by introducing them to the origin of life, how it evolved, diversified and dispersed in different regions with specialized adaptations.

Course Outcomes - COs

Students will be able to

- Understand how theories of origin of life on this earth.
- How early life evolved from primitive features to the complex ones by different evolutionary theories. This will develop their analytical/comparative skills
- Comprehend present scenario of diversified biological work.
- Comprehend global dispersal of animals according to their adaptive features.

1	Employability/Entrepreneurship/Skill Development પરકેન્દ્રિતથયેલછેકેનહિ ?					Yes/No
2	Value added Courses Imparting Transferable and Life Skillsનાગુણોધરાવેછે?					Yes/No
3	Major		Yes/No	Minor		Yes/No
	Skill Enhancement Courses		Yes/No	Ability Enhancement Courses		Yes/No
	Value Added Courses		Yes/No	Exit/ Vocational Courses		Yes/No
4	Holistic Education	Yes/No	Multidisciplinary	Yes/No	Interdisciplinary	Yes/No
5	દિવ્યાંગમાટેવિષયઅંતર્ગતઆનુસાંગિકજોગવાઈકરાયેલછે ?					Yes/No
6	New India Literacy Programme (NILP) મુજબનોવિષયછે ?					Yes/No
7	Swayam પ્લેટફોર્મપરના MOOC વિષયપરઆધારિતઆવિષયછે ?					Yes/No

8	ઈન્ડીયનનોલેજસીસ્ટમ (IKS) પરઆધારિતવિષયછે ?	Yes/No

Unit No.	Topics	Hours	Marks
1	**Origin of Life** 1. Introduction 2. Historical background a. Special creation theory, b. Theories of spontaneous generation, c. Theory of eternity of life, d. Modern concept of origin of life – theories of chemical evolution of live, conclusion	08	15
2	**Evolutionary theories** 1. Lamarckism a. Introduction b. Lamarckian laws c. Criticism d. Neo-Lamarckism 2. Darwinism a. Introduction b. Main principles of Darwinism c. Criticism d. Neo-Darwinism (Mutation, Variation and heredity, natural selection, isolation and origin of new species, Weismann's germ plasm theory)	08	15
3	**Isolation and speciation** 1. Isolation a. Isolating Mechanism i. Geographic isolation, Spatial isolation, Biotic isolation, Reproductive isolation, Genetic isolation b. Premating isolating mechanisms i. Ecological isolation, Seasonal isolation, Ethological isolation, Mechanical isolation, Physiological isolation c. Post mating isolating mechanisms i. Gametic mortality, Zygotic mortality, Hybrid inviability, Hybrid sterility, Hybrid brackdown 2. Speciation a. Types of speciation (Allopatric, Parapatric, Sympatric)	08	15
4	**Zoogeography** 1. Geographical Distributions and barriers	13	15

	i. Kind of distributions, Geographical distribution, necessity of dispersal, barriers to dispersal 2. Zoogeographical Regions i. Palaearctic, Ethiopian, Oriental, Australian, Neotropical and Nearctic regions.		
5	**Adaptation** 1. Introduction 2. Law of adaptive radiation 3. Kinds of adaptations (Cursorial, Fossorial, Arboreal, Volant, Aquatic, Desert) 4. Mimicry i. Definition ii. kinds of mimicry 1. Protective mimicry (Concealing mimicry, Warning mimicry) 2. Aggressive mimicry (Concealing mimicry, Alluring mimicry) 3. Simulation of death	**08**	**15**

Reference Books:

1. General Biology – Evolution, Distribution and Palaeontology by B. S. Tomar and S. P. Singh by Rastogi publication, Meeruth
2. A textbook of Organic Evolution by M. P. Arora and H. Arora by Himalaya Publishing House

B.Sc. Honours/ Honours with Research in Zoologymatics

(NCrF Level- 4.5 First Year – Certificate in Zoologymatics)

Semester I

Course Category	**MDC/IDC Practical**
Title of the Course	**Zoology: Introduction to Biology - 1**
Course Credit	**01**
Teaching Hours per Semester	**30**
Total Marks	**25**

Course Objectives

Objectives of this course is to teach students

- Theoretical aspects through participatory/practical based methods.

Course Outcomes – Cos

Students will be able to

- Comprehend theoretical aspects of origin of life, evolution, zoogeography and adaptation which will improve their knowledge and understanding of life on this earth.

1	Employability/Entrepreneurship/Skill Development પરકેન્દ્રિતથયેલછેકેનહિ ?					Yes/No
2	Value added Courses Imparting Transferable and Life Skillsનાગુણોધરાવેછે?					Yes/No
3	Major		Yes/No	Minor		Yes/No
	Skill Enhancement Courses		Yes/No	Ability Enhancement Courses		Yes/No
	Value Added Courses		Yes/No	Exit/ Vocational Courses		Yes/No
4	Holistic Education	Yes/No	Multidisciplinary	Yes/No	Interdisciplinary	Yes/No
5	દિવ્યાંગમાટેવિષયઅંતર્ગતઆનુસાંગિકજોગવાઈકરાયેલછે ?					Yes/No
6	New India Literacy Programme (NILP) મુજબનોવિષયછે ?					Yes/No
7	Swayam પ્લેટફોર્મપરના MOOC વિષયપરઆધારિતઆવિષયછે ?					Yes/No
8	ઈન્ડીયનનોલેજસીસ્ટમ (IKS) પરઆધારિતવિષયછે ?					Yes/No

Pr. No.	List of Practicals
1	To study theories of origin of life through charts (as per theory syllabus)
2	To study Miller-Urey Experiment through chart
3	To study evidences supporting Lamarckism by chart (Evolution of Giraffe and Snake)
4	To study evidences supporting Darwinism by chart (Finches and Tortoise)
5	To study suitable examples of isolation through chart.
6	To study suitable examples of speciation through chart.
7	To study different zoogeographical regions through map and their biodiversity
8	To study adaptations in animals (Cursorial, Fossorial, Arboreal, Volant, Aquatic, Desert)
9	To study examples of mimicry by charts (as per theory syllabus)
10	Visit to college campus/Institutional visit/Study tour

Practical Question Paper Pattern

Semester End Examination (SEE)

The Practical Question Paper Skeleton is as follows

Instructions:

- Certified journal is must and minimum requirement to appearing for semester end practical examination.
- Should have at least 75% attendance in practical sessions during the semester.
- Time duration: 2 Hours.

Que. No.	Question	Marks
1	Write as per instruction. (A) Identify and describe.(Practical-1, 2) (B) Identify and describe (Practical-3 and 4) (C) Identify and describe (Practical-3 and 4) (D) Identify and describe (Practical-5 and 6) (E) Identify and describe (Practical-7) (F) Identify and describe (Practical-8) (G) Identify and describe (Practical-8) (H) Identify and describe (Practical- 9)	16
2	Report of field visit.	03
3	Viva-voice	03
4	Certified Journal.	03