Holy Cross College (Autonomous), Nagercoil

Kanyakumari District, Tamil Nadu.

Accredited with A$^+$ by NAAC - IV cycle – CGPA 3.35

Affiliated to

Manonmaniam Sundaranar University, Tirunelveli

Semester I & II

Guidelines & Syllabus

DEPARTMENT OF ZOOLOGY

2023-2026

(With effect from the academic year 2023-2024)

Issued from

THE DEANS' OFFICE

Vision

Empower the students with Academic skills, Research aptitude and social commitment through holistic education.

Mission

1. Foster knowledge and skills through innovative teaching and instill moral and ethical values.
2. Render opportunities for critical thinking, communication, and collaboration.
3. Create research ambience to promote innovations and contemporary skills relevant to local and global needs.
4. Inspire to explore the natural resources and connect with nature.
5. Promote passion to serve the local community by creating empowered women of
6. Commitment and social consciousness through outreach and exposure programmes.
7. Facilitate life-long learning, participatory leadership, and commitment to society.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	**Upon completion of B.A/B.Sc. degree programme, the graduates will be able to**	**Mission addressed**
PEO 1	apply appropriate theory and scientific knowledge to participate in activities that support humanity and economic development nationally and globally, developing as leaders in their fields of expertise.	**M1& M2**
PEO 2	inculcate practical knowledge for developing professional empowerment and entrepreneurship and societal services.	**M2, M3, M4 & M5**
PEO 3	pursue lifelong learning and continuous improvement of the knowledge and skills with the highest professional and ethical standards.	**M3, M4, M5 & M6**

PROGRAMME OUTCOMES (POs)

POs	**Upon completion of B.Sc. Degree Programme, the graduates will be able to:**	**PEOs Addressed**
PO1	obtain comprehensive knowledge and skills to pursue higher studies in the relevant field of science.	PEO 1
PO2	create innovative ideas to enhance entrepreneurial skills for economic independence.	PEO2
PO3	reflect upon green initiatives and take responsible steps to build a sustainable environment.	PEO 2
PO4	enhance leadership qualities, team spirit and communication skills to face challenging competitive examinations for a better developmental career.	PEO 1&PEO 3
PO5	communicate effectively and collaborate successfully with peers to become competent professionals.	PEO 2&PEO 3
PO6	absorb ethical, moral and social values in personal and social life leading to highly cultured and civilized personality	PEO 2& PEO 3
PO7	participate in learning activities throughout life, through self-paced and self-directed learning to develop knowledge and skills.	PEO 1 & PEO 3

PROGRAMME SPECIFIC OUTCOMES (PSOS)

PSO	Upon completion, B.Sc. Zoology graduates will be able to:	PO addressed
PSO - 1	deep understanding of the key concepts of Zoology in the areas of Taxonomy, Physiology, Cell Biology, Genetics, Applied Zoology, Aquaculture Ecology and Toxicology, Biochemistry, Biophysics, Biostatistics, Biotechnology, Immunology, Microbiology and Evolution.	PO1, PO3
PSO - 2	perform laboratories experiments with suitable techniques at cellular, molecular, biochemical, physiological, and systematic levels.	PO2, PO3
PSO - 3	apply biological methods to formulate hypothesis, collect, analyze, and evaluate the data to address the problem effectively.	PO4, PO5
PSO - 4	plan their career goals and pursue higher studies in different Zoological disciplines and develop entrepreneurship skills by applying the knowledge gained from courses like Aquaculture, Sericulture, Apiculture, Poultry, Vermitechnology and Clinical Laboratory Technology.	PO1, PO4, PO 6
PSO - 5	to identify societal and environmental problems and solve them with innovative ideas and technologies, which can be patented.	PO3, PO6, PO7

MAPPING OF PO'S AND PSO'S

POs	PSO1	PSO2	PSO3	PSO4	PSO5
PO 1	3	3	3	3	3
PO 2	3	3	3	3	3
PO 3	3	3	2	3	3
PO4	2	2	3	2	2
PO5	3	2	3	3	2
PO6	3	2	2	2	3
PO7	3	3	2	2	3
Total	20	18	18	18	19
Average	2.8	2.5	2.5	2.5	2.7

Eligibility: 10 + 2 pattern

For Admission: A pass in the Higher Secondary Examination (10+2) (Academic / Vocational Stream) conducted by the Government of Tamil Nadu with Zoology or Biology as one of the subjects or an examination accepted as equivalent by the syndicate of Manonmaniam Sundaranar University, Tirunelveli, is eligible for admission.

Duration of the Programme: 3 years

Medium of Instruction: English

Passing Minimum

A minimum of 40% in the external examination and an aggregate of minimum 40% is required. There is no minimum pass mark for the continuous internal assessment.

Components of the B.Sc. Zoology programme

Part III (Core Courses and Elective Courses)

Core Courses	Core-Theory papers / Project	13 x 100	1300
	Practical (Core Applied)	5 x 100	500
	Discipline Specific Elective-Theory Papers	4 x 100	400
	Total Marks		**2200**
Elective Courses	Theory	4 x 100	400
	Practical	4 x 100	400
	Total Marks		**800**
	Total Marks		**3000**

- **Core and Elective Practical Courses carry 100 marks each.**
- **Practical examination will be conducted at the end of each semester for Core and Elective Courses.**

Course Structure

Distribution of Hours and Credits

Curricular Courses

Course	**S I**	**S II**	**S III**	**S IV**	**S V**	**S VI**	**Total**	
							H	**C**
Part I: Language	6 (3)	6 (3)	6 (3)	6 (3)	-	-	24	12
Part II : English	6 (3)	6 (3)	6 (3)	6 (3)	-	-	24	12
Part III								
Core Course	6 (6)	6 (6)	4 (4) 4 (4)	4 (4) 4 (4)	5 (4) + 5 (4) + 5 (4) +	6 (4) + 6 (4) + 6 (4) +	76	65
Core Lab Course		2 (2)	2 (2)	2 (2)		2 (1)		
Core Project	2 (2)				5 (4)			

Elective /Discipline Specific Elective Courses	4 (3) 2 (2)	4 (3) 2 (2)	2 (2) 2 (1)	2 (2) 2 (1)	4 (3) 4 (3)	4 (3) 4 (3)	36	28
Part IV								
Non-major Elective Course	2 (2)	2 (2)	-	-	-	-	4	4
Skill Enhancement Course	-	2 (2)	1 (1) 2 (2)	1 (1) 2 (2)	-		8	8
Foundation Course	2(2)	-	-	-	-	-	2	2
Value Education	-	-	-	-	2 (2)	-	2	2
Summer Internship /Industrial Training					(2)			2
Environmental Studies	-	-	1	1 (2)	-	-	2	2
Extension activity	-	-	-	-	-	(1)	-	1
Professional Competency Skill						2 (2)	2	2
Total	**30 (23)**	**30 (23)**	**30 (22)**	**30 (24)**	**30 (26)**	**30 (22)**	**180**	**140**

Co-curricular Courses

Course	**S I**	**S II**	**S III**	**S IV**	**S V**	**S VI**	**Total**
LST (Life Skill Training)	-	(1)	-	(1)			2
Skill Development Training (Certificate Course)	(1)						1
Field Project		(1)					1
Specific Value-added Course	(1)		(1)				2
Generic Value-added Course				(1)		(1)	2
MOOC		(1)		(1)		(1)	3
Student Training Activity: Clubs & Committees / NSS				(1)			1
Community Engagement Activity: RUN				(1)			1
Human Rights Education					(1)		1
Gender Equity Studies						(1)	1
Total							**15**

Total number of Compulsory Credits = Academic credits + Non-academic credits: 140 + 15

Courses Offered

Semester I

Course	Course Code	Title of the Course	Credits	Hours/ Week
Part I	TU231TL1 FU231FL1	Language: Tamil French	3	6
Part II	EU231EL1	English	3	6
Part III	ZU231CC1	Core Course I: Invertebrata	6	6
	ZU231CP1	Core Lab Course I: Invertebrata	2	2
	ZU231EC1	Elective Course I: Allied Zoology I	3	4
	ZU231EP1	Elective Lab Course I: Lab on Allied Zoology I	2	2
Part IV	ZU231NM1	Non Major Elective NME I : Ornamental Fish farming and Management	2	2
	ZU231FC1	Foundation Course: Introduction to Zoology	2	2
		Total	**23**	**30**

Semester II

Course	Course Code	Title of the Course	Credits	Hours/ Week
Part I	TU232TL1 FU232FL1	Language: Tamil French	3	6
Part II	EU232EL1	English	3	6
Part III	ZU232CC1	Core Course II: Chordata	6	6
	ZU232CP1	Core Lab Course II: Lab on Chordata	2	2
	ZU232EC1	Elective Course II: Allied Zoology II	3	4
	ZU232EP1	Elective Lab Course II: Lab on Allied Zoology II	2	2
Part IV	ZU232NM1	Non-Major Elective NME II: Bio-composting for Entrepreneurship	2	2
	ZU232SE1	Skill Enhancement Course SEC I Animal Behaviour	2	2
		Total	**23**	**30**

Co-curricular Courses

Specific Value Added Course

Part	Semester	Code	Title of the Course	Credit
Part V	I & II	UG232LC1	Life Skill Training I: Catechism	1
		UG232LM1	Life Skill Training I: Moral	
	I	UG231C01 –UG231C--	Skill Development Training (SDT) - Certificate Course	1
	II	ZU232FP1	Field Project	1
	I & III	ZU231V01-ZU231V--/ ZU233V01 – ZU233V--	Specific Value-added Course	1+1
	II, IV& VI	-	MOOC	1+1+1
	III & IV	UG234LC1	Life Skill Training II: Catechism	1
		UG234LM1	Life Skill Training II: Moral	
	IV & VI	UG234V01-UG234V--/ UG236V01-UG236V--	Generic Value-added Course	1 +1
	I - IV	UG234ST1	Student Training Activity – Clubs & Committees / NSS	1
	IV	UG234CE1	Community Engagement Activity - RUN	1
	V	UG235HR1	Human Rights Education	1
	VI	UG236GS1	Gender Equity Studies	1
			Total	**15**

S. No.	Course code	Title of the course	Total hours
I	ZU231V01	Pet Keeping and Care	30

Examination Pattern

Each paper carries an internal component.
There is a passing minimum for external component.

A minimum of 40% in the external examination and an aggregate of 40% is required.

a. Part I – Tamil, Part II – English, Part III - (Core Course/ Elective Course)
Ratio of Internal and External= 25:75

Continuous Internal Assessment (CIA)

Internal Components and Distribution of Marks

Components	**Marks**
Internal test (2) (40 marks)	10
Quiz (2) (20 marks)	5
Assignment: (Model Making, Exhibition, Role Play, Seminar, Group Discussion, Problem Solving, Class Test, Open Book Test etc. (Minimum three items per course should be included in the syllabus & teaching plan) (30 marks)	10
Total	**25**

Question Pattern

Internal Test	**Marks**	**External Exam**	**Marks**
Part A 4 x 1(No choice)	4	Part A 10 x 1 (No choice)	10
Part B 3 x 4(Internal choice)	12	Part B 5 x 6 (Internal choice)	30
Part C 3 x 8 (Internal choice)	24	Part C 5 x 12(Internal choice)	60
Total	**40**	**Total**	100

Lab Course:
Ratio of Internal and External= 25:75
Total: 100 marks
Internal Components and Distribution of Marks

Internal Components	**Marks**
Performance of the Experiments	10
Regularity in attending practical and submission of records	5
Record	5
Model exam	5
Total	**25**

Question pattern

External Exam	**Marks**
Major Practical	
Minor Practical / Spotters /Record	75
Total	**75**

Core Project
Ratio of Internal and External = 25:75

Components	**Marks**
Internal	25
External	

Report	40
Viva voce	35

Part - IV

i. Non-major Elective, Foundation Course, Skill Enhancement Course, Value Education, Professional Competency Skill

Ratio of Internal and External = 2**5: 75**

Internal Components and Distribution of Marks

Components	**Marks**
Internal test (2)	10
Quiz (2)	5
Assignment: (Model Making, Exhibition, Role Play, Album, Group Activity (Mime, Skit, Song) (Minimum three items per course)	10
Total	**25**

Question Pattern

Internal Test	**Marks**	**External Exam**	**Marks**
Part A 2 x 2 (No Choice)	4	Part A 5 x 2 (No Choice)	10
Part B 3 x 4 (Open choice **Three** out of **Five**)	12	Part B 5 x 5 (Open choice any **Five** out **of Eight**)	25
Part C 1 x 9 (Open choice O**ne** out of **Three**)	9	Part C 5 x 8 (Open choice any **Five** out **of Eight**)	40
Total	**25**	**Total**	**75**

ii. Environmental Studies

Internal Components

Component	**Marks**
Project Report	15
Viva voce	10
Total	**25**

Question Pattern

Internal Test	**Marks**	**External Exam**	**Marks**
Part A 2 x 2 (No Choice)	4	Part A 5 x 2 (No Choice)	10
Part B 3 x 4 (Open choice **Three** out of **Five**)	12	Part B 5 x 5 (Open choice any **Five** out **of Eight**)	25
Part C 1 x 9 (Open choice O**ne** out of **Three**)	9	Part C 5 x 8 (Open choice any **Five** out **of Eight**)	40
Total	**25**	**Total**	**75**

iii. Summer Internship/Industrial Training

Components	**Marks**
Industry Contribution	50
Report & Viva-voce	50

Co-Curricular Courses:

i. Life Skill Training: Catechism & Moral, Human Rights Education & Gender Equity Studies

Internal Components

Component	Marks
Project - Album on current issues	25
Group Song/ Mime/ Skit	25
Total	**50**

External Components

Component	Marks
Quiz	20
Written Test: Open choice – 5 out of 7 questions (5 x 6)	30
Total	**50**

ii. Skill Development Training (SDT) - Certificate Course:

Components	Marks
Attendance & Participation	50
Skill Test	50

iii. Field Project:

Components	Marks
Field Work	50
Report & Viva-voce	50

iv. Specific Value-Added Courses & Generic Value-Added Courses:

Components	Marks
Internal	25
External	75

v. Community Engagement Activity: Reaching the Unreached Neighbourhood (RUN)

Components	Marks
Attendance & Participation	50
Field Project	50

vi. Student Training Activity: Clubs and Committees

Compulsory for all I & II-year students (1 credit).

Component	Marks
Attendance	25
Participation	25
Total	**50**

Outcome Based Education (OBE)

(i) Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S. No	Level	Parameter	Description
1	KI	Knowledge/Remembering	It is the ability to remember the previously learned
2	K2	Comprehension/Understanding	The learner explains ideas or concepts
3	K3	Application/Applying	The learner uses information in a new way
4	K4	Analysis/Analysing	The learner distinguishes among different parts
5	K5	Evaluation/Evaluating	The learner justifies a stand or decision
6	K6	Synthesis /Creating	The learner creates a new product or point of view

(ii) Weightage of K – Levels in Question Paper

Number of questions for each cognitive level:

Programme	Assessment	Lower Order Thinking									Higher order thinking			Total number of questions
		K1			K2			K3			K4, K5, K6			
	Part	A	B	C	A	B	C	A	B	C	A	B	C	
I UG	Internal	2	2		1	1	1	1	-	2	-	-	-	10
	External	5	2	1	3	2	2	2	1	2	-	-	-	20
II UG	Internal	1	-	1	1	2		1	-	1	1	1	1	10
	External	5	1	1	4	1	1	-	3	1	1	-	2	20
III UG	Internal	1	1	-	-	1	-	1	-	1	2	1	2	10

Evaluation

i. The performance of a student in each course is evaluated in terms of percentage of marks with a provision for conversion to grade points.
ii. Evaluation of each course shall be done by Continuous Internal Assessment (CIA) by the course teacher as well as by an end semester examination and will be consolidated at the end of the semester.
iii. There shall be examinations at the end of each semester, for odd semesters in October/November; for even semesters in April/ May.
iv. A candidate who does not pass the examination in any course(s) shall be permitted to reappear in such failed course(s) in the subsequent examinations to be held in October/ November or April/May. However, candidates who have arrears in practical examination shall be permitted to reappear for their areas only along with regular practical examinations in the respective semester.
v. Viva-voce: Each project group shall be required to appear for Viva -voce examination in defence of the project.
vi. The results of all the examinations will be published in the college website.

Conferment of Bachelor's Degree

A candidate shall be eligible for the conferment of the Degree of Bachelor of Arts / Science / Commerce only if the minimum required credits for the programme thereof (140 + 18 credits) is earned.

Grading System

For the Semester Examination:

Calculation of Grade Point Average for End Semester Examination:

GPA = Sum of the multiplication of grade points by the credits of the course / Sum of the credits of the courses (passed) in a semester

For the entire programme:

Cumulative Grade Point Average (CGPA) $\Sigma_n\Sigma_i C_{ni}G_{ni} / \Sigma_{ni}\Sigma_i C_{ni}$

CGPA = Sum of the multiplication of grade points by the credits of the entire programme / Sum of the credits of the courses of the entire programme

Where

C_i - Credits earned for course i in any semester
G_i - Grade point obtained for course i in any semester
n - semester in which such courses were credited

Final Result

Conversion of Marks to Grade Points and Letter Grade

Range of Marks	Grade Points	Letter Grade	Description
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Excellent

75-79	7.5-7.9	D	Distinction
70-74	7.0-7.4	A+	Very Good
60-69	6.0-6.9	A	Good
50-59	5.0-5.9	B	Average
40-49	4.0-4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

Overall Performance

CGPA	**Grade**	**Classification of Final Result**
9.5-10.0	O+	First Class – Exemplary*
9.0 and above but below 9.5	O	
8.5 and above but below 9.0	D++	First Class with Distinction*
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	
4.0 and above but below 5.0	C	Third Class
0.0 and above but below 4.0	U	Re-appear

*The candidates who have passed in the first appearance and within the prescribed semester are eligible for the same.

SEMESTER I
CORE COURSE I: INVERTEBRATA

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
ZU231CC1	4	1	-	1	4	6	90	25	75	100

Pre-requisite

Students need to know the classification of invertebrates based on their morphology and Anatomy.

Learning Objectives:

1. To distinguish the characteristic features and function, evolutionary position, economic importance, and interaction with the environment of invertebrates.
2. To develop the skill of identification of invertebrates and to promote employability in museum, consultancy firms and educational institutions.

Course Outcome

COs	On completion of this course, students will;	CL
CO 1	understand the basic concepts of invertebrate animals and recall its structure and functions.	**K1**
CO 2	illustrate and examine the systemic and functional morphology of various groups of invertebrates.	**K2**
CO 3	differentiate and classify the animal's mode of life in various taxa and estimate the biodiversity.	**K3**

K1 - Remember; **K2** - Understand; **K3** – Apply

UNIT	Contents	No. of Hours
I	**Protozoa:** Introduction to Classification, taxonomy, and nomenclature. General characters and classification of Phylum Protozoa up to classes. Type study: *Paramecium* (Morphology and Reproduction) and *Plasmodium* (Lifecycle) - Parasitic protozoans (*Entamoeba*, *Trypanasoma* & *Leishmania*) - Economic importance Nutrition in protozoa - Host-parasitic interactions in *Entamoeba* and *Plasmodium*- Locomotion in protozoa **Porifera:** General characters and classification up to Classes. Type study: Sycon- Canal system in sponges. Reproduction in sponges. Skeleton in sponges.	18
II	**Coelenterata :** General characters and classification up to classes – Type study: *Obelia* (Morphology and lifecycle)- Corals and coral reefs - Economic importance of corals and coral reefs - Polymorphism in Hydrozoa. **Platyhelminthes:** General characters and classification of up to classes. Type study: *Fasciola hepatica* (Morphology and lifecycle)-. Parasitic adaptations. Host-parasitic interactions of Helminthine parasites	18
III	.**Aschelminthes** : General characters and classification of up to classes - Type study: *Ascaris lumbricoides* (Morphology and lifecycle),	18

	Nematode Parasites and diseases - *Wuchereria bancrofti*, *Enterobius vermicularis*, *Ancylostoma duodenale*. Parasitic adaptations. **Annelida:** General characters and classification up to Classes. Type study: *Nereis* (Morphology) , Metamerism- Modes of life in Annelids. Reproduction in polychaetes.	
IV	**Arthropoda:** General characters and classification of Phylum Arthropoda up to Classes. Type study: *Penaeus indicus* (Morphology and reproduction). Affinities of *Peripatus* – Larval forms in Crustacea. Economic importance of Insects. Insect pests of Agricultural Importance- Pest of rice: Rice stem borer (*Scirpophaga incertulas*) – Pest of Sugarcane: The shoot borer (*Chilo infuscatellus*) – Pest of coconut: The rhinoceros beetle (*Oryctes rhinoceros*). Principles of Integrated Pest Management.	18
V	**Mollusca:** General characters and classification of Phylum Mollusca up to Classes. Type study: *Pila globosa*. Foot and torsion in Mollusca. Economic importance- Cephalopods. **Echinodermata:** General characters and classification of Phylum Echinodermata up to Classes. Type study: *Asterias.* Water Vascular system in Echinodermata – Larval forms of Echinoderms.	18

Self-study	Nutrition in Protozoa; Corals and coral reefs; Nereis; *Penaeus indicus* – Morphology; Economic importance- Cephalopods

Text Books

1. Ekambaranatha Ayyar, and T. N. Ananthakrishnan, 2000. A Manual of Zoology. Vol 1 (Invertebrata). Part II – Viswanathan Pvt. Ltd.
2. Jordan, E.L. and Verma P.S, 1995. Invertebrate Zoology, 12th edn. S. Chand& Co.
3. Kotpal R.L. 2019. Modern Text Book of Zoology, Invertebrtes 9th Ed., Rastogi Publications, Gangotri, Shivaji Road, Meerut.
4. Vasantharaj David, B. 2001. Elements of Economic Entomology, Popular Book Depot, Chennai.
5. Ruppert and Barnes, R.D. 2006. Invertebrate Zoology, VIII Edition. Holt Saunders International Edition, Belmont, CA : Thomson-Brooks/Cole.

References Books

1. Barrington, E.J.W., 2012, Invertebrate structure and function. Boston – Houghton. Miffin and ELBS, London.
2. Bhamrah, H.S. and KavithaJunea, 2002. A text book of Invertebrates. Alilnol Publications Private Limited, 4374/4B.Ansari Road, Dayaganj, New Delhi.
3. Hyman L.H, 1955. The invertebrates – Vol. I to Vol. VII – McGraw Hill Book Co.
4. Kotpal, 1992. Protozoa, Porifera, Coelenterata, Annelida, Arthropoda, Mollusca, Echinodermata, R.L- Rastogi Publication.
5. Parker, J. and Haswell , 1978. A text book of Zoology Vol. I - Williams and Williams.
6. Srivastava, M.D.L and Srivastava, 1969. A text book of Invertebrate Zoology, U.S- Central Book Depot, Allahabad.
7. Verma, A. Invertebrates: Protozoa to Echinodermata. Narosa Publishing House Private Limited.35-36 Greams Road, Thousand Lights, Chennai.

Web Resources

1. https://www.nationalgeographic.com/animals/invertebrates/
2. https://bit.ly/3kABzKa
3. https://www.nio.org/
4. https://bit.ly/3lJdUX0
5. https://greatbarrierreef.org/

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO 1	3	3	1	3	3	1	3
CO 2	3	2	2	2	2	1	3
CO 3	3	3	1	2	3	2	3
TOTAL	9	8	4	7	8	4	9
AVERAGE	3	2.6	1.3	2.3	2.6	1.3	3

3 – Strong, 2 – Medium, 1 - Low

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	3	2
CO2	3	3	2	2	3
CO3	2	2	3	2	2
Total	8	8	7	7	7
Average	2.6	2.6	2.3	2.3	2.3

SEMESTER I

CORE LAB COURSE I: INVERTEBRATA

Course Code	L	T	P	S	Credits	Inst. Hours	Total hours	Marks		
								CIA	External	Total
ZU231CP1	-	-	2	-	-	2	30	25	75	100

Pre- requisite:

Students should be aware of invertebrate animals and their living environments

Learning objectives:

1. To enable students to identify different groups of invertebrate animals by observing their external characteristics and understand their adaptations to various environments and modes of life.
2. To develop students' practical skills in invertebrate anatomy through dissection, internal organ display, and mounting of mouthparts and scales, enhancing their understanding of invertebrate structures and functions.

Course outcome

On completion of this course, students will be able to:		
CO1	identify and label the external features of different groups of invertebrate animals.	**K1**
CO2	illustrate and examine the circulatory system, nervous system, and reproductive system of invertebrate animals.	**K2**
CO3	differentiate and compare the structure, function, and mode of life of various groups of animals.	**K3**
CO4	to compare and distinguish the dissected internal organs of lower animals.	**K4**
CO5	prepare and develop the mounting procedure of economically important invertebrates.	**K5**

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate

UNIT	Details	No. of Hours
I	**Major Dissection:** Cockroach: Nervous system, Reproductive system.	6
II	**Minor Dissection:** Cockroach: Digestive system.	6
III	**Mounting:** Cockroach: Mouth parts - Honey Bee/ House fly/ Mosquito. Prawn: Appendages	6
IV	Record / Observation Note **(Submission Is Mandatory)**	6
V	**Spotters:** (i). Protozoa: *Amoeba, Paramecium, Paramecium* Binary fission and Conjugation, *Entamoeba histolytica*, *Plasmodium vivax* (ii). Porifera: Sycon, Gemmule (iii). Coelenterata: Obelia – Colony & Medusa, Aurelia, Physalia, Gorgonia, (iv). Platyhelminthes: Planaria, *Fasciola hepatica*, Fasciola larval forms – Miracidium, Redia, Cercaria, *Taenia solium*, (v). Nemathelminthes: Ascaris (Male & Female), vi). Annelida: Nereis, Chaetopteurs, Hirudinaria, Trochophore larva (vii). Arthropoda: Cancer, Palaemon, Scorpion, Scolopendra, Sacculina, Limulus, Peripatus, Larvae - Nauplius, Mysis, Zoea, (viii). Mollusca: Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, (ix). Echinodermata: Asterias, Ophiothrix, Cucumaria, Antedon, Bipinnaria larva.	6
	Total	**30**

Text Books

1. Ekambaranatha Ayyar, and T. N. Ananthakrishnan, 2000. A Manual of Zoology. Vol 1 (Invertebrata). Part II – Viswanathan Pvt. Ltd.
2. Jordan, E.L. and Verma P.S, 1995. Invertebrate Zoology, 12th edn. S. Chand& Co.
3. Kotpal R.L. 2019. Modern Text Book of Zoology, Invertebrates 9th Ed., Rastogi Publications, Gangotri, Shivaji Road, Meerut.
4. Vasantharaj David, B. 2001. Elements of Economic Entomology, Popular Book Depot, Chennai. .
5. Ruppert and Barnes, R.D. 2006. Invertebrate Zoology, VIII Edition. Holt Saunders International Edition, Belmont, CA: Thomson-Brooks/Cole.

References Books

1. Barrington, E.J.W., 2012, Invertebrate structure and function. Boston – Houghton. Miffin and ELBS, London.
2. Hyman L.H, 1955. The invertebrates – Vol. I to Vol. VII – McGraw Hill Book Co.
3. Kotpal, 1992. Protozoa, Porifera, Coelenterata, Annelida, Arthropoda, Mollusca, Echinodermata, R.L- Rastogi Publication.
4. Parker, J. and Haswell , 1978. A text book of Zoology Vol. I - Williams and Williams.
5. Srivastava, M.D.L and Srivastava, 1969. A text book of Invertebrate Zoology, U.S-Central Book Depot, Allahabad.

Web Resources

1. https://www.nationalgeographic.com/animals/invertebrates/
2. https://bit.ly/3kABzKa
3. https://www.nio.org/
4. https://bit.ly/3lJdUX0

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO 1	3	3	1	2	3	1	2
CO 2	3	2	2	3	2	1	3
CO 3	3	3	1	2	3	2	3
CO 4	3	3	1	2	3	1	2
CO5	2	1	3	2	3	3	3
TOTAL	14	12	13	11	14	8	13
AVERAGE	2.8	2.4	2.6	2.2	2.8	1.6	2.6

3 – Strong, 2 – Medium, 1 - Low

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2
CO2	3	2	2	2	3
CO3	2	3	3	2	2

CO4	3	3	3	3	3
CO 5	2	3	2	3	2
Total	13	14	13	13	12
Average	2.6	2.8	2.6	2.6	2.4

SEMESTER I
ELECTIVE COURSE I- ALLIED ZOOLOGY I

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
ZU231EC1	3	1	-	-	3	4	60	25	75	100

Pre-requisite:

Students should be common aware of living organisms and their basic morphological differentiations from biological studies.

Learning Objectives

1. To acquire a basic knowledge of diversity and organization of Protozoa, Coelenterata, Helminthes, Annelida, Arthropoda, Mollusca and Echinodermata.
2. To comprehend the taxonomic position and diversity among Protochordata, Pisces, Amphibia, Reptilia, Aves and Mammalia.

Course Outcomes

On the successful completion of the course, student will be able to:		
CO1	relate the characteristic features in invertebrates and chordates.	**K1 & K2**
CO2	classify invertebrates up to class level and chordates up to order level.	**K2 & K4**
CO3	identify the structural and functional organization of few invertebrates and chordates.	**K3 & K4**
CO4	survey the adaptations and habits of animals to their habitat.	**K4 & K5**
CO5	assess the taxonomic position of invertebrate and chordate animals.	**K5 & K6**

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6**– Create

Unit	Contents	Hours
Unit I	Diversity of Invertebrates–I: Principles of taxonomy. Criteria for classification– Symmetry and Coelom–Binomial nomenclature. Classification of Protozoa, Coelenterata, Helminthes and Annelida up to classes with two examples.	**12**
Unit II	Diversity of Invertebrates–II: Classification of Arthropoda, Mollusca and Echinodermata up to class level with examples.	**12**
Unit III	Diversity of Chordates–I: Classification of Prochordata, Pisces and Amphibia up to orders giving two examples.	**12**
Unit IV	Diversity of Chordates–II: Classification of Reptilia, Aves and Mammalia up to orders giving two examples.	**12**
Unit V	Animal organization Structure and organization of (i) Earthworm (ii) Prawn/Fish (iii) Rabbit/Rat	**12**

Textbook

1. Ekamberanatha Ayyar M. (1990). A Manual of Zoology, Volume I. Invertebrate Part I and Part II S. Viswanathan Printers & Publishers Pvt. Ltd.
2. Hickman, C, Keen, S, Larson, A, Eisenhour, D and Roberts, L. 2021. Animal Diversity (9th Edition).

Reference Books

1. Ekambaranatha Iyer M. and Anantakrishnan T. N. (1990): *A manual of Zoology*. Vol. I. Invertebrata (Part 1 &2). S. Vishwanathan Pvt. Ltd.
2. Ekambaranatha Iyer M. and Anantakrishnan T. N. (1990): *A manual of Zoology*. Vol. II. Chordata S. Vishwanathan Pvt. Ltd.
3. Jordan E. L. and Verma P.S. (1976): *Chordate Zoology*. S. Chand & Co. Jordan E. L. and Verma P.S. (1976): Invertebrate Zoology. S. Chand & Co.
4. Kotpal R. L. (1993): *Protozoa- Echinodermata* (all volumes). Rastogi Publ. Pough H (2004): *Vertebrate life*, VIII Edition, Pearson International.
5. Ruppert and Barnes, R.D. (2006): Invertebrate Zoology, VIII Edition. Holt Saunders International Edition

Web Resources

1. https://blogs.ubc.ca/mrpletsch/2019/09/10/unit-1-1-principals-of-taxonomy/
2. https://byjus.com/biology/animal-kingdom-basis-classification/
3. https://www.britannica.com/animal/arthropod/Classification
4. https://www.geeksforgeeks.org/phylum-chordata/
5. https://www.brainkart.com/article/Phylum-Chordata-and-Diversity-and-General-Characters-of-Chordates_587/
6. https://youtu.be/19dPFqd-H_o
7. https://youtu.be/QRYVvRRmJRU
8. https://www.biologydiscussion.com/invertebrate-zoology/phylum-arthropoda/study-notes-on-prawn/33417

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**
CO 1	3	2	3	3	2	3	2
CO 2	3	2	3	3	2	3	2
CO 3	3	2	3	3	2	3	2
CO 4	3	2	3	3	3	3	2
CO 5	3	2	3	3	3	3	2
Total	15	10	15	15	12	15	10
Average	3	2	3	3	2.4	3	2

S- Strong (3) M-Medium (2) L-Low (1)

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2
CO2	3	2	2	2	3
CO3	2	2	3	2	2
CO4	3	3	3	3	3
CO 5	2	2	2	3	3
Total	13	12	13	13	13
Average	2.6	2.8	2.6	2.6	2.6

SEMESTER I
ELECTIVE LAB COURSE - LAB ON ALLIED ZOOLOGY I

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
ZU231EP1	-	-	2	-	2	2	30	25	75	100

Pre-requisite:
Students should be aware of surrounding living invertebrates and vertebrates and their basic structural differentiations and their habitats.

Learning Objectives

1. To understand the structure and label the various parts of the dissected organisms.
2. Enable the students to understand, identify and classify the various fauna surrounding them.

Course Outcomes

On the successful completion of the course, student will be able to:		
CO1	compare and distinguish the dissected internal organs of animals.	**K1**
CO2	prepare and develop the mounting procedure of important invertebrate and chordate anatomical parts.	**K2**
CO3	identify and label the external features of different groups of invertebrates.	**K3**
CO4	analyze the ecological roles and significance of the organisms within their ecosystems.	**K4**
CO5	evaluate evolutionary relationships and broader biological concepts among the spotted organisms.	**K5**

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyse; **K5** - Evaluate

S.No	Details
1.	**DISSECTION:** 1. Cockroach - digestive system 2. Cockroach - nervous system 3. Fish-digestive system
2.	**MOUNTING:** 1. Mouth parts- Cockroach 2.Mouth parts - Mosquito 3.Scales -Placoid, Cycloid and Ctenoid 4.Prawn appendages
3.	**SPOTTERS-** *Paramecium, Plasmodium*, Scypha, *Leucosolenia*, Corals. *Taenia solium* – entire, *Ascaris* male and female. Earthworm, Prawn, Scorpion, Pila, Starfish Amphioxus, Shark, Frog, Calotes, Pigeon feather

Text Books

1. Ekambaranatha Iyyar and T. N. Ananthakrishnan, 1995 A manual of Zoology Vol.I (Part 1, S. Viswanathan, Chennai.

2. Ganguly, Sinha an d A dhikari , 2 0 11 . Biology of Animals: Volume I, New Central Book Agency; 3rd revised edition.

3. Sinha, Chatterjee and Chattopadhyay, 2 0 1 4. Advanced Practical Zoology, Books & Allied Ltd; 3rd Revised edition.

4. Lal ,S. S, 2016 . Practical Zoology Invertebrate, Rastogi Publications.

5. Verma, P. S. 2010. A Manual of Practical Zoology: Invertebates, S Chand.

6. Lal S S, 2009. Practical Zoology Vertebrate, Rajpal and Sons Publishing, 484pp.

References Books

1. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science.

2. Barnes, R.D. (1982). Invertebrate Zoology, V Edition. Holt Saunders International Edition.

3. Barrington, E.J.W. (1979). Invertebrate Structure and Functions. II Edition, E.L.B.S. and Nelson

4. Boradale, L.A. and Potts, E.A. (1961). Invertebrates: A Manual for the use of Students. Asia Publishing Home.

5. Lal, S.S. 2005. A text Book of Practical Zoology: Invertebrate, Rastogi, Meerut

Web Resources

1. https://nbb.gov.in/
2. http://www.agshoney.com/training.htm
3. https://icar.org.in/
4. http://www.csrtimys.res.in/
5. http://csb.gov.in/
6. https://iinrg.icar.gov.in/
7. https://www.nationalgeographic.com/animals/invertebrate

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO 1	3	3	1	2	3	1	2
CO 2	3	2	2	3	2	1	3
CO 3	3	3	1	2	3	2	3
CO 4	3	3	1	2	3	1	2
CO 5	2	2	2	3	1	2	2
TOTAL	14	13	12	12	12	7	12
AVERAGE	2.8	2.6	2.4	2.4	2.4	1.4	2.4

3 – Strong, 2 – Medium, 1 - Low

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2
CO2	3	2	2	2	3
CO3	2	3	3	2	2
CO4	3	3	3	3	3
CO 5	2	3	2	3	2
Total	13	14	13	13	12
Average	2.6	2.8	2.6	2.6	2.4

SEMESTER I
NON-MAJOR ELECTIVE NME I

ORNAMENTAL FISH FARMING & MANAGEMENT

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
ZU231NM1	1	-	-	1	2	2	30	25	75	100

Pre- requisite

Introductory understanding of basic aquaculture principles and fish biology.

Learning Objectives

1. To identify various ornamental fish species, their habitat requirements, and the key factors influencing their health and well-being in captivity.
2. To gain skills on the techniques of ornamental fish breeding, rearing, disease control and economics of ornamental fish farming.

Course Outcome:

On the successful completion of the course, student will be able to**:**		
CO1	identify commercially important ornamental fishes, including indigenous and exotic varieties.	**K1**
CO2	explore food and feeding habits in ornamental fishes, including formulated feed and live feed.	**K2**
CO3	gain expertise in the maintenance of aquariums and water quality management.	**K3**

K1 - Remember; **K2** - Understand; **K3** - Apply

Units	Contents	No. of Hours
I	Introduction to ornamental fish keeping. Scope and importance of ornamental fish culture. Domestic and global scenario of ornamental fish trade and export potential. Commercially important ornamental fishes - Indigenous and exotic varieties.	**6**
II	Biology of egg layers and live bearers. Food and feeding in ornamental fishes. Formulated feed and Live feed; Live feed culture. Breeding, hatchery and nursery management of egg layers (e.g. Goldfish) and live bearers (e.g. Guppy).	**6**
III	Aquarium design and construction; Accessories - aerators, filters and lighting. Aquarium plants and their propagation. Maintenance of aquarium and water quality management. Ornamental fish diseases, their prevention, control and treatment methods.	**6**
IV	Conditioning, packing, transport, and quarantine methods. Economics, trade regulations, domestic and export marketing strategies.	**6**
V	**Practical** 1) Identification of locally available ornamental fishes - Egg layers and live bearers. 2) Identification of locally available live feed organisms.	**6**

Self-Study	Scope and importance of ornamental fish culture, Food and feeding in ornamental fishes, Aquarium construction; Accessories - aerators, filters and lighting, Export marketing strategies

Text books

1. Swain SK., Sarangi N. and Ayyappan S. 2010. Ornamental fish farming. ICAR, New Delhi.
2. Living Jewels – A handbook on freshwater ornamental fish, MPEDA, Kochi.
3. Dey V.K.A. 1997. A handbook on aquafarming ornamental fishes. MPEDA, Kochi.
4. Ahilan, B., Felix N. and Santhanam R. 2008. Text book of aquariculture. Daya Publishing House, New Delhi.

References:

1. Tarit Kumar Banrjee (2016). *Applied Zoology*. London: New Central Agency (P) Ltd.
2. Supriti Sarkar, Gautam Kundu, Korak Kanti Chaki (2016). *Introduction to Economic Zoology* London: New Central Agency (P) Ltd.
3. Nagendra S. Pawar. (2008). *Applied Zoology*. New Delhi: Adhyayan Publishers.
4. Sukumar De. (2005). *Outlines of Dairy Technology*. New Delhi: Oxford University Press.
5. Williamson. G and Payne. J. A. (1978). *An introduction to Animal Husbandry in the Tropics*. London: Longman Group Limited.

Web links:

1. http://ecoursesonline.iasri.res.in/course/view.php?id=297
2. https://www.ofish.org/
3. https://krishijagran.com/agripedia/income-generation-by-ornamental-fish-culture/
4. https://99businessideas.com/ornamental-fish-farming/

MAPPING WITH PROGRAMME OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	3	1	3
CO2	3	3	3	3	3	3	1
CO 3	1	1	2	2	2	3	3
TOTAL	7	6	7	6	8	7	7
AVERAGE	2.3	2	2.3	2	2.6	2.3	2.3

*S - Strong; M - Medium; L-Low

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES

COs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2
CO2	3	2	2	2	3
CO3	2	3	3	2	2
Total	8	8	8	8	8
Average	2.6	2.6	2.6	2.6	2.6

SEMESTER I

FOUNDATION COURSE - INTRODUCTION TO ZOOLOGY

Course Code	L	T	P	S	Credits	Inst. Hours	Total hours	Marks		
								CIA	External	Total
ZU231FC1	1	1	-	-	2	2	30	25	75	100

Pre-requisite:

Students should know the basic concepts of biology such as systemic classification, Grades in organization, parts of the cell, role of environment, culture of different organisms.

Learning objectives

1. To provide the knowledge of fundamental principles in zoology that will be a foundation for their later advanced courses in more specific biological subjects.
2. Familiarize with animal classification schemes and diagnostic characteristics as well as developing an understanding of and ability to apply basic zoological principles.

Course Outcomes

COS	On the successful completion of the course, student will be able to**:**	**Cognitive level**
CO1	describe the basic concepts of taxonomy, organization, structure and role of cell, environmental issues, importance of culturing organisms.	**K1**
CO2	apply classification principles and identify animals, its organ system on the basis of its function, environmental problems, benefits of culturing organisms.	**K2**
CO3	enhance leadership qualities, team spirit, participate in learning activities and communicate effectively among the peer.	**K3**

K1 - Remember; **K2** - Understand; **K3** - Apply

Unit	Content	Hours
I	**Systematic and binomial system of nomenclature**: meaning of the terms taxonomy, Systematic, classification and nomenclature, Need of classification. **Systematics:** Kingdom Protista- Salient features, examples; Kingdom Animalia-**Introduction to different Phyla**: Protozoa, Porifera, Coelenterata, Platyhelminthes, Aschelminths, Annelida, Arthropoda, Mollusca, Echinodermata, Hemichordata and Chordata	6
II	**Physiology and Biochemistry**: Introduction to organ systems- Digestive, Respiratory system, Endocrine and Circulatory system, Urinogenital system, Nervous system, Reproductive system.	6
III	**General structure Cell**: Ultrastructure of prokaryotic and eukaryotic cell. Different cell organelles- endoplasmic reticulum, Golgi bodies, mitochondria, lysosome, nucleus, nucleolus. Modern concept of gene: DNA as genetic material, structure of DNA as given by Watson and Cricks model and RNA.	6

IV	**Environmental Biology:** Principal layers of atmosphere- Exosphere, Thermosphere, Mesosphere, Stratosphere, Troposphere. Lithosphere Hydrosphere, Environmental issues- Global warming, green house effects, acid rain.	6
V	**Applied Zoology**: Aquaculture - Pisciculture, Prawn culture and Pearl culture, Sericulture, Apiculture.	6

Self-Study	Need of classification, Organisation - organ systems, Differentiation of Prokaryotic and Eukaryotic cell, Outline of layers of atmosphere**.**

Text books

1. Ekambaranatha Iyer, 2000. A Manual of Zoology, 10th edition, Viswanathan, S., Printers & Publishers Pvt Ltd.
2. Kumar P. and Mina U. (2018) Life Sciences: Fundamentals and Practice, Part-I, 6th Edn., Pathfinder Publication.
3. Verma P.S. and Agarwal V.K. (2016). Cell Biology (Cytology, Biomolecules, Molecular Biology), Paperback, S. Chand, and Company Ltd.
4. Verma P.S., Tyagi B.S & Agarwal V.K., 2010. Animal Physiology, S. Chand & Co. Ltd., New Delhi Publishing.
5. Arumugam, N., Murugan, T., Johnson Rajeshwar, J. and Ram Prabhu, R., Applied Zoology, 2020, Saras Publication, Nagercoil.

References

1. Jordan, E.L. and Verma P.S, 1995. Invertebrate Zoology, 12th edn. S. Chand& Co
2. Kotpal R.L. 2019. Modern Text Book of Zoology, Invertebrates 9th Ed., Rastogi Publications, Gangotri, Shivaji Road, Meerut.
3. Rastogi, S.C., Cell Biology, 2008, New Age International (P) Limited, Publishers, New Delhi, 2nd Ed.
4. Powar, C.B., Cell Biology, 2013. Himalaya publishing House, Bombay.
5. Goel, K. A. and K.V. Sastry. 1998, A Text Book of Animal Physiology, 6th Revised edition. Rastogi Publications
6. Sarada Subrahmanyam, Madhavan Kutty, K., & Singh H.D., 2018. Text Book of Human Physiology, S. Chand & Co, New Delhi.
7. Sreekumar, S. 2010. Basic physiology, PHI learning private ltd., New Delhi.
8. Saha, T.K. 2010. Ecology and Environmental biology, Books and Allied, Kolkata.
9. Concepts of Aquaculture. Santhana Kumar and A. M. Selvaraj. 2012. Meenam Publications, Nagercoil.

10. Web Resources

1. https://byjus.com/biology/animal-kingdom-animalia-subphylum/
2. https://www.verywellhealth.com/organ-system-1298691
3. https://biologydictionary.net/organ-system/
4. https://www.noaa.gov/jetstream/atmosphere/layers-of-atmosphere

SEMESTER - I

SPECIFIC VALUE-ADDED COURSE

PET KEEPING AND CARE

Course Code:	Credits	Total Hours	Total Marks
ZU231V01	**1**	30	100

Pre requisite:

A foundational knowledge of animal behaviour, basic care practices, and an interest in the welfare of animals is important.

Objectives:

To provide comprehensive knowledge about pet ownership and promote awareness of ethical responsibilities towards pets.

On completion of this course, students will be able to:		
CO 1	identify legal regulations and guidelines related to pet ownership	K1
CO 2	interpret pet behaviour and communication cues	K2
CO 3	utilize grooming routines and implement basic first aid and emergency care techniques.	K3
CO 4	analyze the impact of legal regulations on animal welfare and responsible pet care.	K3
CO 5	assess living conditions and space availability and the appropriateness of nutrition and feeding plans.	K5
CO 6	design strategies for responsible pet selection based on living conditions and lifestyle	K6

Unit	Content	Hours
I	**Introduction to Pet Keeping**: Importance of pets in Indian culture and society - commonly kept pets in India and their roles - Legal regulations and guidelines for pet ownership - Cultural considerations in pet care - Ethical responsibilities towards pets and animal welfare.	6
II	**Selecting the Right Pet:** Assessing living conditions and space availability - Choosing pets based on lifestyle and family dynamics - Pros and cons of popular pet choices - Identifying local and indigenous pet breeds.	6
III	**Practical Aspects of Pet Care:** Nutrition and feeding practices - Grooming routines - common health concerns specific to India - Basic first aid and emergency care.	6
IV	**Nurturing Healthy Relationships with pets:** Pet behaviour and communication - Training techniques for pets and households - promoting mental and physical stimulation for pets.	6
V	**Community Engagement and Advocacy:** Promoting responsible pet ownership in local communities - organizing and participating in pet care workshops - Collaborating with local animal welfare organizations - raising awareness about pet-related issues in India.	6

Reference books:

1. David Alderton: The complete book of pets & pet care: the essential family reference guide to pet breeds and pet care
2. Selvam R.K. Veera. 2010. Handbook of per care and management. Soujanya Books. 1st edn. Jaipur.
3. Dash, S.K. 2008. Hand book of veterinary practices. 1st edition. Kalyani Publishers.
4. Sapre, V A. and Dakshinkar, N.P. 2020. Hand book for veterinary physician. 17th edn. CBS
Publishers.
5. Bhikane, A.U. and Kawithar, S.B. 2022. Handbook for veterinary clinicians. Agribiovet Press.

SEMESTER II

CORE COURSE II: LAB ON CHORDATA

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
ZU232CC1	**4**	**1**	**1**	**-**	**6**	**6**	**90**	**25**	**75**	**100**

Pre-requisite

Students should know the taxonomical classification of chordates in relation to their functional morphology.

Learning objectives

1. To develop an in-depth knowledge on the structures and distinct features of Phylum Chordata.
2. To identify the animals of each subphylum and class based on their characteristic features.

Course Outcomes

On the successful completion of the course, student will be able to:		
1	recall the name and distinct features of different sub phylum belonging to phylum Chordata.	**K1**
2	explain the structural organization, function and evolutionary aspects of chordates.	**K2**
3	interpret the biological significance and the conservation of chordates.	**K3**

K1 - Remember; **K2** - Understand; **K3** - Apply

Units	Contents	No. of Hours
I	General Characters and Classification of Phylum Chordata: origin of Chordata, differences between non-chordates and chordates, general characters, affinities and systematic position of Hemichordata (*Balanoglossus*), Urochordata (*Ascidia*), Cephalochordata (*Amphioxus*).	18
II	Agnatha: Characteristics of subphylum vertebrata. General characters and classification up to class level, Agnatha (*Petromyzon*), - Pisces (*Scoliodon sorrakowah*), circulatory system, sense organs. - types of scales and fins - accessory respiratory organs - air bladder - parental care - migration - economic importance.	18
III	Amphibia: General characters and classification up to orders with names of the examples only - Type study –*Rana hexadactyla* - Morphology, Digestive system, respiratory systemm, Urinogenital system, , Endoskeleton: Skull, typical vertebra,	18

	atlas, girdles and limbs. Adaptive features of Anura, Urodela and Apoda - Neoteny in Urodela - Parental care in Amphibia.	
IV	Reptilia: General characters and classification - Type study – (*Calotes versicolor* - Morphology, endoskeleton of *Varanus*). Extinct reptiles. Snakes of South India: Poisonous snakes - *Naja naja*, King cobra and Viper, Non-poisonous snakes - Python, Rat snake (*Ptyas mucosa*) and Wolf snake (*Lycodon aulicus*). Poison apparatus and biting mechanism of poisonous snakes - Skull in reptiles as basis of classification	18
V	Aves and Mammalia**:** Aves: general characters and classification – type study - *Columba livia* - exoskeleton - flight adaptations, Migration. Mammalia: general characters and classification - type study - Rabbit - nervous system. Adaptations of aquatic mammals, egg laying mammals, marsupials, flying mammals. Dentition in mammals.	18

Self-study	General characters of Chordates, types of scales and fins. Parental care in amphibia, Poisonous snakes and Flight adaptations

Text book

1. N. Arumugam, A. Thangamani, S. Prasanna Kumar, L.M. Narayanan, 2022. Chordate Zoology, Saras Publication, Nagercoil.
2. Kotpal, R. L. 2019. Chordata and Comparative Anatomy. Rastogi publications. Meerut, U.P.

References Books

1. Singh, B.D. A Text Book of Zoology Chordata Paperback – 1. Kedar Nath Ram, Meerut, Uttar Pradesh.
2. Kotpal, R.L. A, 2009. Modern text book of Zoology Vertebrates, Rastogi publications. Meerut, U.P.
3. Young, J. Z., 2004. The Life of Vertebrates. III Edition. Oxford university press.
4. Waterman, Allyn J. et al., 1971. Chordate Structure and Function, Mac Millan & Co., New York.
5. Hall B.K. and Hallgrimsson B., 2008. Strickberger's Evolution. IV Edition. Jones and Bartlett Publishers Inc.

Web resources

1. https://byjus.com/biology/phylum-chordata-classification/
2. https://www.uou.ac.in/sites/default/files/slm/BSCZO-201.pdf
3. https://sunyorange.edu/biology/resources/library/prehistoric-life/chordates.html
4. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SBC1201.pdf
5. file:///C:/Users/91944/Desktop/Chordata%20Verma%20college.pdf

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	3	2	3	3	2	2	2	3
CO2	3	1	2	2	2	2	3	2	2	2	1	2
CO3	3	2	1	2	2	1	3	2	1	1	1	2
TOTAL	9	5	5	7	7	5	9	7	5	5	4	7
AVERAGE	3	1.6	1.6	2.3	2.3	1.6	3	2.3	1.6	1.6	1.3	2.3

3 – Strong, 2- Medium, 1- Low

SEMESTER II
CORE LAB COURSE: CHORDATA

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								Internal	External	Total
ZU232CP1	-	-	2	-	2	2	30	25	75	100

Pre-requisite

Students should know the taxonomical classification of chordates in relation to their functional morphology.

Learning Objectives

1. To identify the structures and distinct features of phylum Chordata
2. To distinguish the characteristic features of each subphylum and class

Course Outcomes

On the successful completion of the course, student will be able to:		
1	identify and recall the name and distinct external and internal features of animals belonging to phylum Chordata.	**K1**
2	explain the structural organization of various organs and systems in different classes of vertebrates.	**K2**
3	analyze, compare, and distinguish the morphological features and developmental stages of chordates	**K3**

K1 - Remember; **K2** - Understand; **K3** – Apply

Units	Contents	No. of Hours
I	**Dissections**: Frog (Demo): External features, Digestive system, Arterial system, 5^{th} Cranial nerve, 9^{th} and 10^{th} cranial nerves.	6
II	**Mounting**: Fish: Placoid and Ctenoid scales, Frog: hyoid apparatus and brain (Demo).	6
III	**Osteology**: Frog: skull, vertebral column, pectoral girdle, pelvic girdle, Forelimb, hindlimb. Chelonia - anapsid skull. Pigeon – skull, synsacrum.	6
IV	**Specimen and Slides**: Balanoglossus, Tornaria larva, Amphioxus, Petromyzon, Ammocoetus larva. Pisces: *Torpedo, Channa, Hippocampus, Exocoetus, Echieneis, Catla, Clarius.* Scales: placoid, cycloid, ctenoid Amphibia: Ichthyophis, , Bufo, Axolotl larva Reptilia : Draco, *Chemaeleon, Gecko, Uromastix, Vipera russelli, Naja, Enhydrina, Typhlops Trionyx, Crocodilus,* Aves: *Psittacul*a, Bubo, Corvus, Pavo; Collection and study of different types of feathers: Quill, Contour, Filoplume, Down Mammalia: Ornithorhynchus, Tachyglossus, Pteropus, Funambulus, Loris, Hedgehog	8
V	**Embryology**: Life cycle of Frog - Placenta in mammals.	4

Text Books

1. Lal S. 2009. *Practical Zoology Vertebrate*, Rajpal and Sons Publishing, New Delhi.
2. Verma P. S, 2000. *A Manual of Practical Zoology: Chordates*, S. Chand Limited. New Delhi.

Reference Books

1. Robert William Hegner, 2015. *Practical Zoology*, Biblio Life. Macmilla London.
2. Young, J, Z., 1972. *The life of Vertebrates*. Oxford University. London.
3. Kotpal, R.L. A, 2009. Modern text book of Zoology Vertebrates- Rastogi publications. Meerut, U.P.

Web Resources

1. https://bit.ly/3CzTEy8
2. https://www.youtube.com/watch?v=b04hc_kOY10
3. http://tolweb.org/Chordata/2499
4. https://www.nhm.ac.uk/
5. https://bit.ly/3Av1Ejg

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	3	2	3	3	2	2	2	3
CO2	3	1	2	2	2	2	3	2	2	2	1	2
CO3	3	2	1	2	2	1	3	2	1	1	1	2
TOTAL	9	5	5	7	7	5	9	7	5	5	4	7
AVERAGE	3	1.6	1.6	2.3	2.3	1.6	3	2.3	1.6	1.6	1.3	2.3

3 – Strong, 2- Medium, 1- Low

SEMESTER II

ELECTIVE COURSE II: ALLIED ZOOLOGY II

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
ZU232EC1	-	4	-	-	3	4	60	25	75	100

Prerequisite

Students should be known about structure and role of body organs, development, inheritance, immunity against diseases and behavioral aspects of animal.

Learning Objectives

1. To impart knowledge on Physiology, Immunology, Genetics and Animal behavior.
2. To instill interdisciplinary skills for availing employment opportunities.

Course Outcomes

On the successful completion of the course, student will be able to:		
1.	recall the internal parts and developmental stages, patterns of inheritance and different types of animal behavior.	**K1**
2.	recognize the major functions of organ and immune systems in the human body and their role and analyze the stages of development in frog.	**K2**
3.	correlate the physiological processes of animals and relationship of organs system, inheritance of characters.	**K3**

K1 - Remember; **K2** - Understand; **K3** - Apply

Units	Contents	No. of Hours
I	Physiology: Respiration- Respiratory pigments and transport of gases. Structure and functions of lungs. Mechanism of blood clotting. Types of excretory products – ornithine cycle. Structure of neuron– Conduction of nerve impulse, Mechanism of vision and hearing.	12
II	Developmental Zoology: Structure of sperm and ovum (human). Fertilization (sea urchin), Cleavage: types, blastulation, gastrulation and organogenesis of Frog; Placentation in mammals.	12
III	Immunology: Immunity – types of immunity. innate and acquired - active and passive; Antigens and Antibodies; Immunological organs and cells – responses in humans – innate ad acquired immunity - vaccination schedule.	12
IV	Human Genetics: Human Chromosomes – Sex Determination in Humans; Patterns of Inheritance: Autosomal Dominant, Autosomal Recessive, X-linked, Y-linked, ABO blood typing.	12

	Multiple Allelic and Polygenic; Genetic Counselling	
V	Animal Behaviour**:** foraging, display, courtship, alarming behaviour, Communication in insects, Shelter and Nest Construction, Parental Care, Learning Behaviour.	12

Self-study	Biological Rhythms, Immune cells.

Textbook

1. Verma P. S .and Agarwal V K 2018. *Developmental Biology, Chordata embryology.* S. Chand & Co., India
2. Chaki, K K, Kundu, G, Sarkar, S 2011. *Introduction to General Zoology*: Volume I. new Central Book Agency, India.

References Books

1. Owen, J. A., Punt, J. & Stanford, S. A. 2013. Kuby *Immunology.* New York: W.H. Freeman & Company
2. Klug, W. S., Cummings, M. R. & Spencer, C. 2019. *Concepts of Genetics*. (12th ed.). New Jersey: Pearson Education
3. Mathur, R. 2005. *Animal Behaviour*. Meerut: Rastogi Publications, Meerut, Uttar Pradesh.
4. Verma P.S. & Agarwal- *Developmental Biology, Chordata embryology* S. Chand & Co., India.
5. Subramanian. M.A. 2019. *Developmental Zoology.* MJP Publishers, India.

Web Resources

1. https://www.onlinebiologynotes.com/nerve-impulse-conduction/
2. https://www.onlinebiologynotes.com/physiology-of-vision/
3. https://www.onlinebiologynotes.com/developmental-biology-of-frog-embryonic-development/
4. https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html
5. https://www.youtube.com/watch?v=b04hc_kOY10

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	2	2	2	1	2	2	3	2	2	2	3
CO2	1	1	1	2	2	2	2	2	2	2	1	2
CO3	2	2	2	3	3	2	3	3	2	2	2	3
TOTAL	4	5	5	7	6	6	7	8	6	6	5	8
AVERAGE	1.3	1.6	1.6	2.3	2.2	2.2.	2.3	2.7	2.2	2.2	1.6	2.7

3 - Strong; 2 - Medium; 1 - Low

SEMESTER II

ELECTIVE LAB COURSE II: LAB ON ALLIED ZOOLOGY II

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
ZU232EP1	-	-	2	-	2	2	30	25	75	100

Pre-requisite:

Students should be aware of surrounding living invertebrates and vertebrates and their basic structural differentiations and their habitats.

Learning Objectives

1. To develop practical skills in basic concepts of biology.
2. To foster a deeper understanding of fundamental biological principles.

Course Outcomes

On the successful completion of the course, student will be able to:		
1.	recognize museum specimens, stages of cleavage, vital organs, genetic diseases of human.	**K1**
2.	explain the economic importance of animals, clinical procedures, dominant and recessive characters of humans.	**K2**
3.	use the skills relevant to basic and applied Zoology for identification and differentiation of animal forms.	**K3**

K1 - Remember; **K2** - Understand; **K3** – Apply

Experiments

1. Chick embryo 24, 48 & 72 hrs (Mounting)
2. Identification of blood groups.
3. Simple Mendelian traits in man.
4. Test for excretory products in animals.
5. Mounting of frog's egg.
6. Model making of nest.

Spotters: Haemoglobin, ornithine cycle, Neuron, Frog's egg, Gastrula of frog, Human Placenta, Immunoglobulin, Thymus, Human karyosome, Down's syndrome, Bird's nest, Parental care (fish & birds) - Pouched mammals (Kangaroo & Koala).

Virtual laboratory / CD can be used as and when necessary.

MAPPING WITH PROGRAMME OUTCOMES

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	2	3	2	3	3	2	2	1
CO2	2	1	1	1	2	3	2	3	2	3	3	1
CO3	3	2	1	2	1	2	2	3	2	2	2	2
Total	8	5	4	6	5	8	6	9	7	7	7	4
Average	2.7	1.6	1.3	2.2	1.6	2.7	2.2	3	2.3	2.3	2.3	1.3

*3 - Strong; 2 - Medium; 1 - Low

SEMESTER II

NON-MAJOR ELECTIVE NME II
BIOCOMPOSTING FOR ENTREPRENEURSHIP

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
ZU232NM1	-	1	1	-	2	2	30	25	75	100

Pre-requisite

Students should aware about the effect of chemical pollution and the importance of organic farming.

Learning Objectives:

1. To highlight the importance of Bio composting for entrepreneurship in waste management.
2. To enable students for setting up Bio compost units and bins for waste reduction.

Course Outcomes

On the successful completion of the course, students will be able to:		
1.	define the process of bio composting by earthworms and explain the economic cost of establishing small Biocompost units as a cottage industry.	**K1**
2.	demonstrate composting techniques for various applications like solid waste management, industrial waste recycling using sugarcane bagasse, etc	**K2**
3.	establish a small Biocompost units as a cottage industry.	**K3**

K1- Remember; **K2**- Understand; **K3**- Apply

Units	Contents	No. of Hours
I	Biocomposting – Definition, types; home composting, vermicomposting, aerobic composting, anaerobic composting. Compost Ingredients - ecological importance.	6
II	Biocomposting technology: Field pits - ground heaps – tank - large-scale - batch and continuous methods – biology of the composting process. Humification of organic material. .Compost enrichment.	6
III	Methods of composing - Preparation of Biocompost pit and bed for Bangalore method, Indore method, Coimbatore method, NADEP method .	6
IV	Applications of Biocompost in soil fertility maintenance, promotion of plant growth, value added products, waste reduction, etc. Drawbacks of using composts.	6

V	Economics of establishment of a small biocompost unit – project report proposal for Self Help Group (Income and employment generation).	6

Self-study	Biocomposting – Definition, types and ecological importance.

Text Books

1. Seetha Lekshmy, M. and Santhi. R, 2012. *Vermitechnology.* Nagercoil: Saras Publications, Nagercoil.
2. Mary Violet Christy. A, 2008. *Vermitechnology.* MJP Printers and Publishers Pvt. Ltd., Chennai.

References

1. Bikas R. Pati& Santi M. Mandal, 2019. Recent trends in composting technology. IK International Publishing House Pvt. Ltd.
2. Dohama, A.K, 2004. *Vermicompost*, New Delhi: Vivekananda Kendra (NARDEP), Kaakumari.
3. Dahama, A.K, 2009. *Organic farming for sustainable Agriculture* (2nded.). Agrobios. Jodhpur
4. Sultan Ahmed Ismail, 2005. *The Earthworm* (2nded.).: Other India Press, Goa
5. Gupta, P.K, 2003. *Vermicomposting for sustainable Agriculture.* Agrobios, Jodhpur.

Web Resources

1. https://www.dhsgsu.edu.in/images/Community-College/02-COMPOSTING-TECHNIQUES.pdf
2. https://www.trustbasket.com/blogs/composting/methods-of-composting-indoor-method-bangalore-method-coimbatore-method-nadep-method
3. https://aggie-horticulture.tamu.edu/earthkind/landscape/dont-bag-it/chapter-2-composting-fundamentals/
4. https://www.brainkart.com/article/Composting_35265/
5. https://www.epa.gov/recycle/composting-home

MAPPING WITH PROGRAMME OUTCOMES
MAPPING WITH PROGRAMME SPECIFIC OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	3	2	3	2	3	3	2	3	2
CO2	3	1	1	3	2	3	2	3	3	2	2	3
CO3	3	2	2	2	2	2	2	2	2	3	2	2
TOTAL	6	5	4	8	6	8	6	8	8	7	7	7
AVERAGE	2.2	1.6	1.3	2.7	2.2	2.7	2.2	2.7	2.7	2.3	2.3	2.3

3 - Strong; 2 - Medium; 1 - Low

SEMESTER II
SKILL ENHANCEMENT COURSE SEC-1
ANIMAL BEHAVIOUR

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
ZU232SE1	1	1	-	-	2	2	30	25	75	100

Prerequisite

Students should have the basic understanding of animal biology, strong observational and analytical skills.

Learning Objectives

1. To understand the biological properties of animal behavior, with an evolutionary and ecological emphasis
2. To develop practical skills related to studying and analyzing animal behavior.

Course Outcomes

On the successful completion of the course, students will be able to:		
1.	Gain a comprehensive understanding of the key concepts related to the genetics, evolution, perception, learning, decision making and chronobiology of animal behaviour.	**K1**
2.	explain the evolutionary and ecological factors influencing social behaviour, the complexity of decision-making process in animals and the concepts of biological clocks.	**K2**
3.	interpret animal behaviour patterns, social behaviour dynamics, predict and manage animal physiology and behaviour, solve behavioural problems, optimise human health and well-being.	**K3**

K1- Remember; **K2**- Understand; **K3**- Apply

Unit	Contents	No. of hours
I	**Basics of Animal Behaviour** : Defining animal behaviour, Importance and significance of studying animal behaviour, Approaches to behavioural studies, Genetic basis of behaviour, Heritability of behaviour, Habitat and its impact on influencing behaviour, Social interactions and their role in shaping behaviour, Ethology and recording animal behaviour.	6
II	**Evolution and Social Behaviour:** Natural selection and Social Behaviour, Sexual selection, Altruism, Mating systems and Sexual strategy and social organisation, Animal perception, Communication in Social animals, Group living, Parental Care, Visual adaptations to	6

	unfavourable environments.	
III	**Animal and the Environment:** Habitat selection, Coordination and Orientation, Homeostasis and Behaviour, Physiology and Behaviour in changing environments, Conditioning and Learning, Biological aspects of learning, Cognitive aspects of learning. Foraging behaviour, Competition, Environmental challenges and stressors.	6
IV	**Understanding Complex Behaviour:** Instinct, learning, Cognition and Memory, Decision making behaviour in Animals, Mechanism of Decision making, Complex reproductive behaviours, Complex behaviour of honey bees, Languages and mental representation, Animal awareness and Emotion.	6
V	**Chronobiology**: Circadian rhythm, Biological Clock, concept of central and peripheral clock system; circadian pacemaker system; photoperiodism, Influence of circadian rhythms on mating, feeding, and other behaviours, Ultradian and Infradian Rhythms, Chronobiology and Aging, Chrono pharmacology, chrono medicine, chronotherapy.	6

Self-study	Parental Care, Homeostasis

Textbook

1. Agarwal, V.K, 2009. *Animal Behaviour* (*Ethology*). S. Chand and Company Ltd., New Delhi.
2. Saha T. K, 2009. *An Introduction to Animal behaviour*. Emkay Publications, New Delhi.

Reference Books

1. Sanjib Chattopadhyay 2012. *LIFE: Evolution, Adaptation and Ethology*. Books and Allied (P) Ltd., Kolkata
2. Chandrashekaran, M.K, 1985. *Biological Rhythms*. Madras Science Foundation, Chennai.
3. Mohan P. Arora, 2016. *Animal Behavior*. Himalaya Publishing House. Chennai.
4. Auprey Manning and Mariam Stamp Dowkins, 2012. *An Introduction to Anima behavior*. Cambridge University Press. UK.
5. Machve K. K, 2016. *Evolution of Animal Behaviour*. Manglam Publications. Thiruvananthapuram

Web Resources

1. https://www.ncbs.res.in/content/animal-behaviour
2. https://bit.ly/3i6wUxR
3. https://www.behaviour.univie.ac.at/
4. https://www.ru.nl/bsi/
5. http://www.apiindia.org/pdf/progress_in_medicine_2017/mu_75.pdf

MAPPING WITH PROGRAMME OUTCOMES

MAPPING WITH PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	2	3	2	3	3	2	3	2
CO2	3	1	2	3	2	3	2	3	3	2	2	3
CO3	3	2	1	2	2	2	2	2	2	3	2	2
Total	9	5	5	8	6	8	6	9	8	7	7	7
Average	3	1.6	1.6	2.7	2	2.7	2	3	2.7	2.3	2.3	2.3

***3 - Strong; 2 - Medium; 1 - Low**

SEMESTER I & II
Life Skill Training I: Catechism
Course Code: UG232LC1

Hours	Credit	Total Hours	Total Marks
1	1	30	100

Objectives:

1. To develop human values through value education
2. To understand the significance of humane and values to lead a moral life
3. To make the students realize how values lead to success

Course Outcome	Upon completion of this course the students will be able to
CO-1	understand the aim and significance of value education
CO-2	develop individual skills and act confidently in the society
CO-3	learn how to live lovingly through family values
CO-4	enhance spiritual values through strong faith in God
CO-5	learn good behaviours through social values

Unit I

Value Education:

Human Values – Types of Values – Growth – Components – Need and Importance

Bible Reference: Matthew: 5:3-16

Unit II

Individual Values: Esther

Vanishing Humanity – Components of Humanity – Crisis – Balanced Emotion – Values of Life

Bible Reference: Esther 8:3-6

Unit III

Family Values: Ruth the Moabite

Respecting Parents – Loving Everyone – Confession – True Love

Bible Reference: Ruth 2:10-13

Spiritual Values: Hannah

Faith in God – Wisdom – Spiritual Discipline – Fear in God – Spiritually Good Deeds

Bible Reference: 1 Samuel 1:24-28

Unit IV

Social Values: Deborah

Good Behaviour – Devotion to Teachers – Save Nature – Positive Thoughts –The Role of Youth in Social Welfare

Bible Reference: Judges 4:4-9

Unit V

Cultural Values: **Mary of Bethany**

Traditional Culture – Changing Culture – Food – Dress – Habit – Relationship – Media – The Role of Youth

Bible Reference: Luke 10:38-42

Text Book

Humane and Values. Holy Cross College (Autonomous), Nagercoil

The Holy Bible

SEMESTER I & II
Life Skill Training I: Moral
Course Code: UG232LM1

Hours	Credit	Total Hours	Total Marks
1	1	30	100

Objectives:

1. To develop human values through value education
2. To understand the significance of humane and values to lead a moral life
3. To make the students realize how values lead to success

Course Outcome	Upon completion of this course the students will be able to
CO-1	understand the aim and significance of value education
CO-2	develop individual skills and act confidently in the society
CO-3	learn how to live lovingly through family values
CO-4	enhance spiritual values through strong faith in God
CO-5	learn good behaviours through social values

Unit I

Value Education:

Introduction – Limitations – Human Values – Types of Values – Aim of Value Education – Growth – Components – Need and Importance

Unit II

Individual Values:

Individual Assessment – Vanishing Humanity – Components of Humanity – Crisis – Balanced Emotion – Values of Life

Unit III

Family Values:

Life Assessment – Respecting Parents – Loving Everyone – Confession – True Love

Unit IV

Spiritual Values:

Faith in God – Wisdom – Spiritual Discipline – Fear in God – Spiritually Good Deeds

Unit V

Social Values:

Good Behaviour – Devotion to Teachers – Save Nature – Positive Thoughts – Drug Free Path – The Role of Youth in Social Welfare

Unit VI

Cultural Values:

Traditional Culture – Changing Culture – Food – Dress – Habit – Relationship – Media – The Role of Youth

Text Book

Humane and Values. Holy Cross College (Autonomous), Nagercoil