VIVEKANANDA COLLEGE

College with Potential for Excellence

Residential & Autonomous – A Gurukula Institute of Life-Training
Re-accredited with 'A' Grade (CGPA 3.59 out of 4.00) by NAAC
Affiliated to Madurai Kamaraj University
Tiruvedakam West, Madurai District– 625 234

Department of Zoology

B.Sc., Zoology

SYLLABUS

Choice Based Credit System (CBCS) & Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2019-20 and after)

POST GRADUATE AND RESEARCH DEPARTMENT OF ZOOLOGY
B.Sc. ZOOOLOGY
(Outcome Based Education Curriculum Framework
(For those students admitted during the Academic Year 2018-19 and after)

Vision

- Unravel hidden research potentials & Entrepreneurial avenues in Zoology
- Bring a behavioural change in subject knowledge, scientific aptitude and instrumental skills to attract students with best caliber
- Raise students to international standards

Mission

- Strategic plans for translating goals and objectives by curriculum design, good teaching methods and evaluation
- Academic and research collaborations
- Bio track –A forum to update knowledge
- Hands on training at Bio industries

Programme Educational Objectives (PEOs)

A graduate of B.Sc. Zoology programme after three years will

PEO 1	Acquire comprehensive knowledge of zoology and excel in the chosen area
PEO 2	Develop confidence to prepare for competitive examinations
PEO 3	Inculcate students to pursue higher education and life-long learning
PEO 4	Motivate students to develop an aptitude for animal preservation.
PEO 5	Train the youth for self-employment generation to become an entrepreneur

Graduate Attributes (GAs)

	Attributes	Description	Part
GA 1	**Modern Tool Usage**	Application of appropriate techniques, resources and modern tools to complex activities with an understanding of the limitations	**Hand**
GA 2	**Environment and Sustainability**	Understanding the impact of solutions in societal and environmental contexts for sustainable development	**Hand**
GA 3	**Technical and Entrepreneurial Skills**	Creating confidence to become an entrepreneur by providing entrepreneurial and technical skills	**Hand**
GA 4	**Capacity**	Ability to face the realities of life and withstand current challenges	**Hand**
GA 5	**Graduate and Society**	Application of reasoning to assess social health, safety, legal and cultural issues and the consequent responsibilities relevant to the social practice	**Heart**
GA 6	**Ethics and Values**	Application of ethical principles, professional ethics, responsibilities and norms of the life through value oriented life training	**Heart**
GA 7	**Creativity**	Demonstration of knowledge, understanding of management principles and application of these to one's own work to manage projects and in multidisciplinary environments	**Heart**
GA 8	**Harmonious Development of Individual**	Making an individual as perfect man through the harmonious development of physical, emotional and intellectual cultures	**Heart**
GA 9	**Adaptability**	Accepting the ground realties and adapt to the situation to overcome frustrations and failures.	**Heart**
GA 10	**Knowledge**	Application of knowledge of the respective discipline to the solution of complex problems in the day-to-day life	**Head**
GA 11	**Critical Thinking**	Analysis of problems to reach substantiated conclusion by using the principles of mathematics,	**Head**

		natural and social sciences and byusing research-based knowledge and research methods	
GA 12	**Problem Solving**	Designing of solution for complex problems that meet the specified needs with appropriate consideration as to public health and safety, cultural and societal environment	**Head**
GA 13	**Leadership Quality**	Functioning effectively as an individual, as a member or a leader in diverse teams and in multidisciplinary settings	**Head**
GA 14	**Communication**	Communication with society at large, such as, effective reporting, documentation designing, effective presentations and clear instructions	**Head**
GA 15	**Life-long learning**	Recognizing the need for independent and life-long learning in the context of technological changes	**Head**

Programme Outcome (POs)

P.No.	Programme Outcome
PO1	Disciplinary Knowledge and Critical Thinking
PO2	Effective Communication and Digital Literacy
PO3	Social Interaction and Problem Solving
PO4	Effective Citizenship and Social Responsibility
PO5	Professional Ethics and Human Values
PO6	Environment and Sustainability
PO7	Self –directed and life – long learning

Programme Specific Outcomes (PSO)

On completion (after three years) of B.Sc Zoology programme, the students are able to

PSO 1	Knowledge on animal taxonomy, preservation techniques and physiology will enable to become museum keepers.
PSO 2	Understand organization of cell, cell organelles and its function, genetics, evolutionary relations and significance with physiology at molecular level.
PSO 3	Applications of the techniques chemical reactions and biology module in Biotechnology, Bioinformatics, Biostatistics, Immunology, Lab technology and Microbiology.
PSO 4	Use the animals in human welfare, societal behavior, diagnosis of disease, ancestry study, system regulations, source as food and genetics and developmental counseling.
PSO 5	Enhance Bio-entrepreneurial skills to be self employable.

Mapping of PEO with PO

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO6**	**PO7**
PEO 1							
PEO 2							
PEO 3							
PEO 4							
PEO 5							

Mapping of PO with GA

	GA	**GA**	**GA**	**GA**	**GA**	**GA**	**GA**	**GA**	**GA**	**GA**	**GA**	**GA**	**GA**	**GA**	**GA**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PO 1															
PO 2															
PO 3															
PO 4															
PO 5															
PO 6															
PO 7															

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST – 625 234
PG AND RESEARCH DEPARTMENT OF ZOOLOGY
Programme: B.Sc. Zoology (Under CBCS and Outcome Based Education (OBE))
SCHEME OF EXAMINATIONS
FIRST SEMESTER

Part	Study Component	Subject Code	Course Title	Hours	Credit	CIA Marks	ESE Marks	Total Marks
I	Tamil	P1LT11	Tamil: Ikkala Kavithaiyum Urai Nadaiyum	6	3	25	75	100
	Sanskrit	P1LS11	Fundamental Grammar &History of Sanskrit Literature –I					
II	English	P2LE11/ P2CE11	General English- I	6	3	25	75	100
III	Core	09CT11	Invertebrates – I	4	4	25	75	100
III	Core	09CT12	Invertebrates – II	4	4	25	75	100
III	Core	09CP23	Practical – I	2	-	-	-	-
III	Allied	07ATZ1	Allied-1: Chemistry for Biologist -1	4	4	25	75	100
III	Allied	07APZ3	Allied-I: Volumetric Analysis	2	-	-	-	-
IV	Non Major	09NE11	Human Anatomy	2	2	25	75	100
			TOTAL	**30**	**20**	**-**	**-**	**-**

SECOND SEMESTER

Part	Study Component	Course Code	Course Title	Hours	Credits	CIA Marks	ESE Marks	Total Marks
I	Tamil	P1LT21	Tamil: Ikkala Kadhai Illakiyamum Makkal Thagavaliyalum	6	3	25	75	100
	Sanskrit	P1LS21	Poetry, Grammar & History of Sanskrit Literature –II					
II	English	P2LE21/ P2CE21	English for Communicative Skills- II	6	3	25	75	100
III	Core	09CT21	Chordates – I	4	4	25	75	100
	Core	09CT22	Chordates – II	4	4	25	75	100
	Core	09CP23	Core Practical –I	2	4	40	60	100
	Allied-I	07ATZ2	Allied-1: Chemistry for Biologist – II	4	4	25	75	100
	Allied-I	07APZ3	Allied-1: Volumetric Analysis	2	2	40	60	100
IV	Non Major Elective	09NE21	Food and Nutrition	2	2	25	75	100
			TOTAL	**30**	**26**	**-**	**-**	**-**

THIRD SEMESTER

Part	Study Component	Subject Code	Course Title	Hours	Credit	CIA Marks	ESE Marks	Total Marks
I	Tamil	P1LT31	வுயஅடை: முயீலையஅரஅ ீயமவாை ஜுடயமலையஅரஅ யேனயபயஅரஅ	6	3	25	75	100
I	Sanskrit	P1LS31	Prose, Poetics and History of Sanskrit Literature –III					
II	English	P2LE31	English for Academic and Professional Excellence-I	6	3	25	75	100
III	Core	09CT31	Cell Biology	4	4	25	75	100
III	Core	09CT32	Genetics	4	4	25	75	100
III	Core		Practical – II	2	-	-	-	-
III	Allied	08AT01	Allied-II: Plant diversity	4	4	25	75	100
III	Allied	08AP03	Allied-II: Botany Practical	2	-	-	-	-
IV	Skill Based	09SB31	Public Health and Hygiene	2	2	25	75	100
			TOTAL	**30**	**20**			

FOURTH SEMESTER

Part	Study Component	Course Code	Course Title	Hours	Credits	CIA Marks	ESE Marks	Total Marks
I	Tamil	P1LT41	Tamil: Sanga Illakiyamum Neethi Elakiyamum	6	3	25	75	100
	Sanskrit	P1LS41	Drama and History of Sanskrit Literature –IV					
II	English	P2LE41	English for Academic and Professional Excellence-II	6	3	25	75	100
III	Core	09CT41	Developmental Biology	4	4	25	75	100
	Core	09CT42	Physiology	5	4	25	75	100
	Core	09CP43	Core Practical II	2	4	40	60	100
	Allied-II	08AT02	Allied-II: Taxonomy of Angiosperms& Plant Physiology	4	4	25	75	100
	Allied-II	08AP03	Allied-II: Botany Practical	2	2	40	60	100
IV	Skill Based	09SB41	Clinical Lab Technology	2	2	25	75	100
			TOTAL	**30**	**26**			

FIFTH SEMESTER

Part	Study Component	Course Code	Title of the Paper	Hours	Credit	CIA Marks	ESE Marks	Total Marks
III	Core	09CT51	Biochemistry and Biophysics	5	4	25	75	100
	Core	09CT52	Biotechnology	5	4	25	75	100
	Core	09CT53	Microbiology and Immunology	5	4	25	75	100
	Core	09CP63	Practical – III	7	-	-	-	-
	Elective	09EP51	Biostatistics, Computer Applications & Bioinformatics	5	5	25	75	100
IV	Skill Based	09SB51	Sericulture	2	2	25	75	100
	ES	ESUG51	Environmental Studies	2	2	25	75	100
			TOTAL	**30**	**21**			

SIXTH SEMESTER

Part	Study Component	Course Code	Course Title	Hours	Credits	CIA Marks	ESE Marks	Total Marks
III	Core	09CT61	Evolution	6	4	25	75	100
	Core	09CP62	Practical – III	2+2	4	40	60	100
	Elective	09EP61	Dairy Farming	5	5	25	75	100
	Elective	09EP62	Environmental Biology	5	5	25	75	100
IV	Skill Based	09SB61	Fish Culture	2	2	25	75	100
	Skill Based	09SB62	Vermitechnology	2	2	25	75	100
	Skill Based	09SB63	Zoology for Competitive Examinations	2	2	25	75	100
	VE	VEUG61	Value Education	2	2	25	75	100
V	EA	EAUG61	Extension Activities	-	1	25	75	100
			TOTAL	**28**	**27**			

தமிழ்த்துறை,

விவேகானந்த கல்லூரி,திருவேடகம் மேற்கு - 625 234.

Programme: B.A., BSc., (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2018 – 2021 and after)

பாடத்திட்டத்தின் கட்டமைப்பு (PROGRAMME STRUCTURE)

UG Language PART – I TAMIL		SEMESTER : I
Name of the Course :இக்காலக் கவிதையும் உரைநடையும்		
Course Code :P1LT11	**Hours per week : 18**	**Credit : 03**
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

பார்வை (Vision)

- பூர்விக மொழியான நமது தாய்மொழியின் வாயிலாக மாணவர்களிடையே தமிழினத்தின் பாரம்பரிய பண்பாட்டுக் கூறுகளைக் கற்பித்து அதனை பரப்ப வழிவகை செய்தல்.

பணி (Mission)

- செம்மொழியான தமிழ் மொழியின் வாயிலாக கல்வியின் தரத்தினை வளப்படுத்துதல்.
- தாய் மொழியின் வாயிலாக மாணவர்களிடம் காணப்படக்கூடிய ஆக்கப்பூர்வமான சுய சிந்தனைத் திறன்களை வெளிக்கொணர்தல்.

நிரல் கல்வி திட்டத்தின் குறிக்கோள்கள்

(Programme Educational Objectives)

- செம்மொழியான தமிழ் மொழியின் இலக்கியம் மற்றும் இலக்கணத்தின் வரலாறு தொடர்பான சிறப்பு கூறுகளை வழங்குதல்.
- தமிழ் இலக்கியத்தின் வாயிலாக பண்டைய தமிழர்கள் தங்கள் வாழ்க்கையில் பின்பற்றிய சுய ஒழுக்கங்களையும், அதன் மதிப்புகளையும் எடுத்துரைத்து அதனை செயல்படுத்த வழிவகை செய்தல்.
- தாய் மொழி அல்லாத பிற மொழியினைக் கற்றுத் தேர்ந்த மாணவர்களுக்குத் தமிழ் மொழியில் உள்ள இலக்கியத்தின் உறுதியான திறன்களை எடுத்துரைத்து, அதனை அம்மாணவர்கள் பெற முயற்சித்தல்.
- அனைத்து வகைகளிலும் முழுமையான ஆளுமைத் திறன்களின் வளர்ச்சியை ஊக்குவித்தல்.

Programme Outcomes (POs)

1. தமிழர்களின் பெருமையினை உணர்ந்து கொள்ளுதல்.
2. படைப்பாளர்களின் தன்மைகளை அறிந்து படைப்பாற்றல் பெறுதல்.
3. வாழ்க்கையின் ஒழுக்க நெறிகளைக் கடைபிடித்தல்.
4. மொழியினைப் பிழையின்றி பேச எழுதப்பழகுதல்
5. இலக்கியங்களின் படைப்பாளர்களின் வரலாற்றினை அறிந்து கொள்ளுதல்.

முன்னுரை (Preamble)

1. மரபின் பழம்பெருமையினை உணர்தல்.
2. புதுக்கவிஞர்களின் படைப்பாக்கங்கள் வழி பொருள், கட்டமைப்பு அறிவித்தல்.
3. தனி மனித ஒழுக்கம் கடைபிடித்தல்.
4. தமிழ் எழுத்துக்களின் வகைமைகளை அறிதல்.
5. தமிழிலக்கியத்தின் மரபு மற்றும் புதுக்கவிதையின் வரலாற்றினை அறிவித்தல்.

பாடதிட்டத்தின் முடிவுகள்(Course Outcomes (COs)

On the successful completion of the course, students will be able to

NO.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	உரைநடை இலக்கியத்தின் வாயிலாகவும், மரபுக்கவிதை - புதுக்கவிதையின் வாயிலாகவும் தனி மனித மற்றும் சமூக ஒழுக்கங்கள் குறித்து வரையறை செய்தல்.	K_1, K_2
CO 2	உயிர் எழுத்துக்கள், மெய்யெழுத்துக்கள், உயிர்மெய்யெழுத்துக்கள், சார்பெழுத்துக்கள் ஆகியன குறித்தும் அவற்றை எழுதும் விதங்கள் குறித்தும் வகைப்படுத்தும் திறன் அறிதல்.	K_2, K_3
CO 3	மரபுக்கவிதை வாயிலாக படைப்பாளர்களின் காலகட்டத்தையும், படைப்பின் வழியாக அக்காலகட்ட மக்களின் வாழ்க்கை நிகழ்வுகளின் வரலாற்றினையும் விவரித்தல்.	K_2, K_3
CO 4	தாய் மொழியின் சிறப்பு, பொதுவுடைமை சிந்தனை, அறியாமை நீக்கல், உண்மைத்துறவு நிலை குறித்த சமூக நிலைகளை கலந்துரையாடுதல்	K_2
CO 5	மொழியினைப் பிழையின்றி எழுதுதல் -பேசுதல், ஒலி வேறுபாட்டினை அறிந்து மயக்கம் நீக்குதல் போன்ற ஒரு மொழியின் பயன்பாட்டுத் தன்மையைத் தெளிவுறுத்தல்.	K_1, K_2, K_3

K_1-Knowledge **K_2-Understand** **K_3-Apply**

Mapping of CO and PO

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	3	3	9	3	1	9
CO2	9	3	9	3	3	1	9
CO3	9	3	9	9	9	3	9
CO4	3	9	3	9	9	-	9
CO5	9	3	3	3	3	-	9
	39	21	27	33	27	03	45

Note: Strong -9 Medium -3 Low -1

பாடத்திட்டம்(ளுலடடயடிரள)

அலகு : 1	தமிழ்ச்செய்யுள் : மரபுக்கவிதைகள் 1.பாரதியார் கவிதைகள் 1. தமிழ் (நான்கு பத்தி) 2. நடிப்புச் சுதேசிகள் 2. பாரதிதாசன் கவிதைகள் 1. நீங்களே சொல்லுங்கள் 2. புதியதோர் உலகம் செய்வோம் 3. நாமக்கல் கவிஞர் வெ.இராமலிங்கம் பிள்ளை 1.குருதேவர் இராமகிரு'ணர் (3 பாடல்கள்) 4. கவிமணி தேசிய விநாயகம் பிள்ளை 1.கோவில் வழிபாடு 5. அரசஞ்சண்முகனார் 1.மதுரை ஸ்ரீமீனாட்சியம்மைத் திருவடிப்பத்து (முதல் ஐந்து பாடல்கள்)	18 மணிநேரம்

அலகு: 2	தமிழ்ச்செய்யுள் : புதுக்கவிதைகள் 6. அன்னை - கவிஞர் கண்ணதாசன் 7. கிழக்கு விழிக்கும் நேரம் - கவிஞர் வைரமுத்து (கொடிமரத்தின் வேர்கள்) 8. அவர்கள் வருகிறார்கள் - மு.மேத்தா (சுதந்திர தாகம்) 9. புதுக்கவிதைகள் - க.நா.சுப்ரமண்யம் (கவிதை) 10. நாம் இருக்கும் நாடு - தமிழன்பன் (வாக்கு வரம் தரும் தெய்வம்) 11. தீர்த்தக்கரையினிலே - முருகு சுந்தரம் (ஒலிபெருக்கி) 12. ஹைக்கூ பூக்கள் - க.ராமச்சந்திரன்	**18 மணிநேரம்**
அலகு: 3	தமிழ் உரைநடை இலக்கியம் சுவாமி சித்பவானந்தரின்சிந்தனைகள்	**18 மணிநேரம்**
அலகு: 4	தமிழ் இலக்கணம் - எழுத்து 1. முதல் எழுத்துக்கள்,சார்பெழுத்துக்கள் 2. மொழி முதல் எழுத்துக்கள்,மொழி இறுதி எழுத்துக்கள் 3. வல்லெழுத்து மிகும் இடங்கள்,வல்லெழுத்து மிகா இடங்கள்	**18 மணிநேரம்**
அலகு: 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத் தமிழும் அ) 1.புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும் 2.மரபுக்கவிதையின்தோற்றமும் வளர்ச்சியும் ஆ) மரபுப்பிழை நீக்குதல் - பிறமொழிச் சொற்களை நீக்குதல் - பிழையற்ற தொடரைத் தேர்ந்தெடுத்தல் - ஒருமை பன்மை மயக்கம் - ஓர் எழுத்து ஒரு மொழிக்குரிய பொருள் - ஒலி வேறுபாடுகளும் பொருள் வேறுபாடுகளும் - பொருத்தமான பொருள் - பொருத்தமான தொடர் அறிதல்.	**18 மணிநேரம்**

பாட நூல்கள்;(Text books)

1. தமிழ்ச் செய்யுள் தொகுப்பு (தமிழ்த்துறை வெளியீடு)
2. சுவாமி சித்பவானந்தரின் சிந்தனைகள் (தமிழ்த்துறை வெளியீடு)

பார்வை நூல்கள்(Reference Books)

1.தமிழ் இலக்கிய வரலாறு - பேரா.முனைவர் பாக்யமேரி,நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட், 41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,அம்பத்தூர், சென்னை- 600 098.
2.தமிழ் இலக்கிய வரலாறு- மு.வரதராசனார்சாகித்திய அகாடமி,தலைமை அலுவலகம்,ரவீந்திர பவன்,35,பெரோஸ்'ா சாலை,புதுதில்லி.

கற்பிக்கும் முறைகள்;(Pedagogy)

விரிவுரை கொடுத்தல்,கலந்துரையாடல், காட்சிப் பதிவுகளின் வழியாக புலப்படுத்துதல்.

கற்பிக்க உதவுதல்; (Teaching Aids)

கரும்பலகை பயன்படுத்துதல், காட்சி திரைவழியாகப் புலப்படுத்துதல்.

DEPARTMENT SANSKRIT
Programme: B.A./B.Sc.(CBCS and OBE)
(For those students admitted during the Academic Year 2019-20 and after)

PART –I:**Sanskrit**		SEMESTER- I
Course Title **:FUNDAMENTALGRAMMARANDHISTORYOF SANSKRITLITERATURE –I**		
CourseCode:**P1LS11**	Hours per week: **6**	Credits:**3**
CIA Marks: **25**	ESEMarks:**75**	Total Marks: **100**

Preamble:

Sanskrit is offered as an alternative language under Part –I for B.A./ B.Sc students during first four semesters the above column explains the scheme of the I semester.

Course Outcomes (COs)

On the successful completion of the course, students will be able to

Number	Statement	Knowledge Level
CO1	IdentifyingDevanāgarĪscript,DescribemodernliteratureandIllustrate	K1,K2
CO2	Discriminate spirituality in Literature	K2
CO3	Classify and discuss traditional names of Divine beings to animals in the world	K2
CO4	Describe and defend history of early Sanskrit literature	K2
CO5	Practice Creativity and Demonstrate various culture of world	K2,K3

K1-Knowledge **K2**-Understand **K3**-Apply

Mapping of CO and PO

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO 6**	**PO 7**
CO1	9	9	3	9	9	-	9
CO2	3	3	9	9	9	-	9
CO3	9	3	9	9	9	-	3
CO4	9	9	9	9	9	-	9
CO5	9	9	3	9	9	-	9
	39	33	33	45	45		39

Note: Strong -9, Medium -3, Low -1

Syllabus

Unit1: Introduction to Sanskrit script, Verbs, noun sand Pronouns. Introduction: Definitions and Scope of Sanskrit.–Sanskrit (DevanāgarĪ) scripts. Formation of verbs and nouns. Characteristics of pronoun.

Unit2: Introduction to History of early (vedic) Sanskrit literature. Classification of Vedas. Content of Vedas.Moral values inculcated through Vedas.

Unit 3: Introduction to Purāṇa literature. Origin of Purāṇa literature. Classification of Purāṇa. Mahāpurāṇa and Upapurāṇa. moral, social, environmental values inculcated through Purāṇas.

Unit 4: Introduction to Kāvya (poetry) literature. Definition of Kāvya. Types of Kāvya. Characteristics of Mahākāvya. Description of moral, social, environmental values inculcated through Kāvyas

Unit 5: Introduction to Translation. Strategies adopted in translation. Translating Sanskrit verses into English.Translating English sentences into Sanskrit. Introducing International Phonetic code (IPC).Transliteration from Sanskrit (DevanagarĪ)script to IPC. Transliterating from IPC to Sanskrit (DevanagarĪ) script.

Text Book

- Sāhityarasakaṇa, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai - 625010. Year of publication 1996.

- A History of Sanskrit Literature, compiled by Dr.S.Jagadisan, Published by AMG Publications, Madurai-625010. Year of publication 1996.

Refernce Books

- A Short History of Sanskrit Literature, byT.K.RamachandraAiyyar,published by R.S.Vadhyar &Sons, Kalpathi, Palakkad-678003
- A History of Sanskrit Literature, by A. Berriedale Keith, published by Mothilal Banarsidass Publishers Private Limited, Delhi, 2017.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

UG Programme, Part -II English (CBCS-OBE) - SEMESTER I

(For those students who joined in the academic year 2019-2020 onwards)

PART II		
Course Title : **English for Communication Skills–I**		
Course Code: P2LE11 / P2CE11	Hours per week: **6**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Preamble:

The students are expected to inculcate English socio-linguistic competence and moral values through world literature in English for communication skills.

Course Outcome (CO):

On the successful completion of the course, the students will be able to:

tate One	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)		
CO1	Recognize listening, and reading proficiency through prose discourse	K1	K2	K3
CO2	Use and interpret imaginative and creative skill through poetry	K1	K2	K3
CO3	State socio-linguistic influence of authors found in Short Stories	K1	K2	K3
CO4	Demonstrate acquired grammar skill in listening, speaking, reading and writing	K1	K2	K3
CO5	Execute and exercise English communication skills for academic excellence	K1	K2	K3

K1-Knowledge **K2**-Understand **K3**-Apply

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	-	9
CO2	3	9	3	3	9	-	3
CO3	9	9	9	9	9	-	3
CO4	9	3	3	-	-	-	9
CO5	9	9	9	3	3	-	9
	39	39	33	24	24	-	33

Note: Strong -9 Medium -3 Low -1

Syllabus

Unit-1 Prose

1. *The Secret of Work*- Swami Vivekananda
2. *Uncle Podger Hangs a Picture* – Jerome K. Jerome
3. *What Kind of Peace Do We Want?* – J.F. Kennedy

Unit-2 Poetry

1. *The Paradox of our Times* – Dalailama
2. *Mirror* – Sylvia Plath
3. *Goodbye Party for Miss Pushpa T.*S – Nissim Ezekiel

Unit-3 Short Stories

1. *The Romance of a Busy Broker* - O Henry
2. *A Shadow* – R K Narayan
3. *The Plastic God Box* – C S Lakshmi aliasAmbai

Unit-4 Grammar

1. Parts of Speech
(Noun, adjective, pronoun, verb, adverb, preposition, conjunction and interjection)
2. Tenses and their Usages *(for the three Sessional Exam)*

Unit-5 Composition

1. Letter Writing: Formal/informal
2. Paragraph Writing
3. Hints Development

Text Books

1. Swami Vivekananda. "Work and Its Secret: The Secret of Work.*"Links: Indian Prose in English.* Ed. G.S.Balarama Gupta. New Delhi: Macmillan Indian Limited, 1989.
2. Dr.P.C.James Daniel, ed. *Gateway to English: An Anthology of Prose*. Chennai: Harrows Publications, 2018.
3. Dr.M.Moovendhan, ed.*Wings of Poesy*. Chennai: Thamarai Publications, 2018 (or)
<https://bhoomicollege.org/sites/default/files/The%20Paradox%20of%20our%20Times%202012.pdf>*The Paradox of our Times*
<https://allpoetry.com/poem/8498499-Mirror-by-Sylvia-Plath>*Mirror*
<https://www.poemhunter.com/poem/goodbye-party-for-miss-pushpa-t-s/>*Goodbye Party for Miss Pushpa T.*S
4. Abhijit Acharijee, and Rakesh Ramamoorthy, ed. *Frontiers of Communication: An Anthology of Short Stories and Prose*. Chennai: Cambridge University Press, 2018.
5.KV Joseph and Ae Augustine. *Trinity Grammar a Handbook*.New Delhi: Trinity Press, (or)
G.Radhakrishna Pillai. *Emerald English Grammar and Composition*. Emerald Publisher.

Refernce Books

1. Swami Vivekananda. "Work and Its Secret: The Secret of Work.*" The Complete Works of Swami Vivekananda*. Vol-II. Kolkata: Advaita Ashrama, 1989.
2. Board of Editors. *Pearls in a String: English for Communication*. Chennai: Emerald Publishers, 2009.
3. Steuart H King, ed. *New Vistas in English Prose*. Bombay: Blackie & Sons Publishers, 1980.
4. MG Narasimha Murthy, ed. *Famous Indian Stories*. Mumbai: Orient BlackSwan, 2009.
5. Raymond Murphy and Louise Hashemi. *English Grammar in Use Supplementary Exercises*. Cambridge: CUP, 2004.
6. K.V.Joseph. *A Textbook of English Grammar and Usage*. New Delhi: TATA McGraw Hill Education Private Limited, 2012.
7. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.

Pedagogy

Teacher made aids and Mechanical (ITC) Aids, Chalk and Talk with interactive session.
Note: (Additional online sources, presentation, and test will be given by the respective teachers in the English Language Lab. [*Either 8.45 am to 9.30 am or 5.00 pm to 5.45 pm*]).

Teaching Aids

Course Texts, Reference books, Writing Board, and Online Sources.

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Core Subject Theory**		SEMESTER **- I**
Subject Title **: INVERTEBRATES - I**		
Subject Code: **09CT11**	Hours per week: **4**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To enable the studentsacquire knowledge on general characteristics, classification of Invertebrates and study the organization of various organs and organ systems.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on general characteristic features, morphology and classification of Invertebrates (Protozoa – Helminthes)	K1
CO 2	Understand the diversity and distribution of invertebrate fauna at different habitats	K2
CO 3	Study the lifecycle and adaptation of Protozoan and helminthes parasites of human, mode of transmission and treatment	K2
CO 4	Trace the origin, evolutionary relationships, phylogeny and affinities of minor phyla.	K2
CO 5	Apply studied information to have knowledge on cattle and human diseases, observe marine animals at their natural habitats and understand their biodiversity through field visit	K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	3	-	3	9	9	3
CO 2	9	1	3	3	3	9	3
CO 3	9	1	9	3	9	3	3
CO 4	9	1	9	3	3	3	3
CO 5	9	1	9	9	9	9	3
	45	7	30	21	33	33	15

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	9	-	-	3	-
CO 2	9	-	-	3	-
CO 3	-	-	-	9	-
CO 4	3	3	-	3	-
CO 5	9	-	-	3	3
	30	3	-	27	3

Syllabus

UNIT-I:	Phylum Protozoa General Characters of the phylum and classification upto class level Type study : Paramecium General topics : a) Locomotion in protozoa	**(12 Hrs)**

	b) Nutrition in protozoa c) Etiology and life cycle of protozoan parasites of man (Entamoeba, Plasmodium and Trypanosoma)	
UNIT-II:	Phylum Porifera General characters of the phylum and classification upto class level Type study : Ascon sponge General topics : a) Canal system in sponges b) Spicules of sponges. c) Reproduction in sponges	**(12 Hrs)**
UNIT- III:	Phylum -Coelenterata General characters of the phylum and classification up to class level Type study : Obelia General topics : a) Polymorphism in hydrozoa b) Coral reefs c) Ctenophora Structure and affinities	**(12 Hrs)**
UNIT- IV:	Phylum Platyhelminthes General characters of the phylum and classification upto class level. Type study : *Fasciola hepatica* General topics : a) Origin of metazoa b) Origin of bilateria	**(12 Hrs)**
UNIT- V:	Phylum Aschelminthes General characters of the phylum and classification upto class level Type study : Ascaris General Topics : a) Helminthes parasites - Enterobius and Wucheraria - Disease and control b) Parasites adaptations in Helminthes.	**(12 Hrs)**

Text Books

Jordan, E.I. and Verma, P.S. 2014 – Invertebrate Zoology, Chand& Co Limited, New Delhi.

Reference Books

- Pechenik, Jan A 2014 – Biology of the Invertebrates, Tata Mcgraw – Hill Pub. Company Ltd., New Delhi
- Vasantika Kashyap, 2013, Life of Invertebrates, Second Revised Edition, Vikas Pub. House Pvt. Ltd., New Delhi
- Kotpal, R.L. 2012. Modern Text Book of Zoology, Invertebrates (Animal diversity – I), Rastogi Publications, Meerut
- Barnes, R.D. 2006,Invertebrate Zoology, IV Edition, Holf Saunders International edition
- Ekambaranatha Ayyar and Ananthakrishnan, T.N. 2005, A manual of Zoology, volume I, Invertebrate, Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai.

Pedagogy

Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board

Assessment

Distribution of questions and marks

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST – 625 234

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Core Subject Theory**		SEMESTER **- I**
Subject Title **: INVERTEBRATES - II**		
Subject Code: **09CT12**	Hours per week: **4**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To enable the students understand basic aspects of invertebrate biology with their salient features and study of animal organization, comparative anatomy and functional morphology

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Learn the general characteristics and classification of invertebrates (Annelida – Echinodermata)	K1
CO 2	Study the biodiversity of invertebrates in different habitats	K2
CO 3	Can trace the development and affinities of invertebrates	K2
CO 4	Acquire knowledge on social and economical importance of insects	K2, K3
CO 5	Learn the adaptive radiation of marine forms	K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	-	-	-	-	-	-
CO 2	9	-	-	-	-	-	-
CO 3	9	-	-	-	-	-	-
CO 4	9	-	9	-	9	-	-
CO 5	9	-	-	-	-	-	-
	45	-	9	-	9	-	-

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	9	-	-	-	-
CO 2	9	-	-	-	-
CO 3	-	3	-	3	-
CO 4	-	-	-	9	9
CO 5	-	9	-	-	-
	18	12	-	12	9

Note: Strong -9 Medium- 3, Low-1

Syllabus

UNIT-I:	Phylum Annelida General characters and classification upto class level with examples. Type study : Nereis General topics : a) Origin of coelom and metamerism b) Adaptive radiation in polychaetes	**(12 Hrs)**
UNIT-II:	Phylum Arthropoda General characters and classification up to class level with examples. Type study : Prawn General topics :	**(12 Hrs)**

	a) Peripatus - Structure and affinities b) Larval forms of crustacea.	
UNIT- III:	External characters of Scorpion, Centipedes and Millipedes General topics : a) Social Life of Insects b) Economic Important of Insects	**(12 Hrs)**
UNIT- IV:	Phylum Mollusca General characters and classification upto class level with examples Type study : Pila General topics : a) Torsion in gastropods b) Cephalopods as advanced Molluscs	**(12 Hrs)**
UNIT- V:	Phylum Echinodermata General characters and classification up to class level with examples. Type of study : Star fish General topic : a) Larval forms of echinoderm b) Affinities of echinoderm.	**(12 Hrs)**

Text Books

Jordan, E.I. & Verma, P.S. 2011, Invertebrate Zoology, Chand & Company Ltd, New Delhi.

Reference Books

- Kotpal , R.L, 2011. Invertebrates, Rastogi Publications
- Kotpal, R.L. 2004. Modern Text Book of Zoology, Invertebrates (Animal diversity – I), Rastogi Publications, Meerut.
- Pechenik, Jan. A 2000, Biology of the Invertebrates, Tata Mcgraw – Hill Pub. Co. Ltd., New Delhi.
- Meglitsch Paul. A 1972. Invertebrate Zoology, Second Edition, Oxford University Press, London.
- Barrington, E.J.W. 1967 – Invertebrate Structure and Function. The English Language Book, Society, London.

Pedagogy

Chalk & Talk, Group Discussion, PPT, Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board, live animals and cultures

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2018-19 and after)

PART – III: Allied Theory	**SEMESTER - I**	
Course Title: **Chemistry for Biologist-I**		
Course Code: 07ATB1/07ATZ1	Hours per week: 2	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to

- ✓ Understand the basic organic principles study the principles of titrimetric elaborately.
- ✓ Acquire an idea about the catalysis and photochemistry
- ✓ Have a knowledge on general principles of titrimetry

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Relate the types of isomerism and understand thefundamentals of organic chemistry	K1 &K2
CO 2	Classify the types electrophiles and nucleophiles and understand the types of organic reactions	K2
CO 3	Understand the types of cleavage and have an idea about the formation and stability of intermediates	K2
CO 4	Define the laws of photochemistry and demonstrate the types of catalysis	K1 &K2
CO 5	Explain the basic concepts of titrimetric	K2

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**
CO 1	3	1	1	1	1	1	3
CO 2	3	1	1	1	1	1	3
CO 3	3	1	1	1	1	1	3
CO 4	3	1	1	1	1	1	3
CO 5	3	1	1	1	1	1	3
	15	**5**	**5**	**5**	**5**	**5**	**15**

Mapping of CO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	-	-	-	-	-
CO 2	1	1	3	3	-
CO 3	1	1	3	3	-
CO 4	-	3	3	1	-
CO 5	-	-	1	3	-
	2	**5**	**10**	**10**	**-**

Note: Strong-9 Medium-3 Low-1

SYLLABUS

UNIT-I: ORGANIC BASIC PRINCIPLES- I

Empirical formula – molecular formula – structural formula – calculation of empirical formula and molecular formula from percentage composition – isomerism – structural isomerism-chain isomerism, position isomerism, functional isomerism and metamerism – stereoisomerism - geometrical isomerism (cis & trans of alkenes), optical isomerism – optical isomerism in lactic acid.

UNIT-II: ORGANIC BASIC PRINCIPLES- II

Electrophiles, nucleophiles and their types – types of organic reactions – substitution, addition, elimination, rearrangement, and polymerization (definition and examples only) – resonance and tautomerism – differences between resonance and tautomerism.

UNIT- III: ORGANIC BASIC PRINCIPLES- III

Valency of carbon atom – hybridization of carbon in methane – tetrahedral arrangement of carbon in methane – fission of a covalent bond – homolytic and heterolytic fission –differences between homolytic and heterolytic cleavage – definition, formation and stability of carbocation, carbanion and free radical.

UNIT- IV: CATALYSIS AND PHOTOCHEMISTRY

Catalysis: Definition – homogeneous and heterogeneous catalysis – characteristics of catalyst – catalytic promoters – catalytic poisoning – autocatalysis – acid-base catalysis – enzyme catalysis and its characteristics.

Photochemistry: Definition of photochemical reactions – comparison of thermal and photochemical reactions – Jablonski diagram – internal conversion, intersystem crossing, fluorescence and phosphorescence – chemiluminescence and bioluminescence (definition and examples only).

UNIT- V: GENERAL PRINCIPLES OF TITRIMETRY

Mole concept – molecular weight – formula weight – equivalent weight – concentrations terms – molarity, normality and weight percentage – indicator, analyte, titrant, end point – principle of titrimetry – primary and secondary standards – preparing standard solutions – standardizing the secondary standard solutions.

Text Books

Ancillary chemistry K. Ratinamuthu (Study material will be provided) Semester – I and II

Reference Books

1. Bahl & Arun Bahl, *Advanced Organic Chemistry* by S.Chand &Company Ltd, NewDelhi, 2012Edition.
2. Soni, P.L., Mohan Katyal,*Text book of Inorganic Chemistry* by P, Sultan Chand & Sons, NewDelhi, 2010Edition.
3. Arun Bahl, B.S.Bhal & G.D.Tuli *Essentials of Physical chemistry*, S.Chand Publishing Company, New Delhi, 2010 Edition.

Pedagogy

2. Chalk & Talk, Group Discussion, PPT, Field visit

Teaching Aids

3. Green Board, LCD Projector, Interactive White Board, live animals and cultures

B.Sc. Zoology CBCS Syllabus **- SEMESTER – I**
(For those who Join in June 2016 and After)

Part – IV : Non-Major Elective		
Subject Title : HUMAN ANATOMY		
Subject Code: 09NE11	**Hours per week: 2**	**Credit: 2**
Sessional Marks: 25	**Summative Marks: 75**	**Total Marks: 100**

2hrs/week-30 hrs

Objectives:

To enable the students

- *Study of various human tissues and skeletal systems*
- *Understand structure and functions of selected organs and organ systems*

Unit –I

Types of Tissues, Exoskeleton – Skin and hair
Endoskeleton- Skull, fore limb and hind limb

Unit –II

Structure of Tooth and alimentary canal
Structure of Kidney and Nephron

Unit-III

Structure of lungs
Structure of heart, blood and blood groups

Unit-IV

Structure of brain
Structure of eye and ear

Unit-V

Endocrine glands and their secretions
Male and female reproductive system

Text book

Best and Taylor – 1965.The living body – Chapman & Hall, London

Reference Book:

1. Marieb, M. 2006. Human Anatomy & Physiology, Dorling Kindersley (India) Pvt. Ltd., Delhi.
2. P.S. Verma and V. K. Agarwal 1985. Animal physiology, S. Chand & Company, New Dlhi.

விவேகானந்த கல்லூரி
தமிழ்த்துறை

அலகு - 1	தமிழ்ச் சிறுகதை இலக்கியம் பூ மலரும் காலம் (ஜி.மீனாட்சி)	(18 மணிநேரம்)

Programme : B.A., BSc., (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2019 – 2022 and after)

PART – I : **TAMIL**	SEMESTER : **II**	
Course Title : **இக்காலக் கதை இலக்கியமும் மக்கள் தகவலியலும்**		
Course Code **: P1LT21**	Hours per week **: 18**	Credit **: 03**
CIA Marks : **25**	ESE Marks : **75**	Total Marks : **100**

Preamble

1. சமூக வெளிப்பாடுகளை உணர்த்துதல்
2. தனிமனித நேர்மை உணர்த்துதல்
3. இதழ்கள் பற்றிய அடிப்படை அறிவை புகட்டுதல்
4. சொற்களின் வகைமை அறிதல்
5. சிறுகதை - புதின வரலாற்றினைத் தெளிவுபடுத்துதல்

Course Outcomes (COs)

On the successful completion of the course, students will be able to

CO	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	சிறுகதைகள் மற்றும் புதினத்தின் வாயிலாக தனி மனித மற்றும் சமூக ஒழுக்கங்கள் குறித்து தன்மையினை வரையறை செய்தல்.	K_1, K_2
CO 2	இதழ்கள், பேட்டி வகைகள், நிர்வாக அமைப்பு முறைகள் ஆகியன குறித்த செய்திகளை கலந்துரையாடுதல்.	K_2, K_3
CO 3	சிறுகதை, புதினம் போன்ற இக்கால இலக்கியத்தின் தன்மைகளையும், அதனைப் படைத்த படைப்பாளர்களின் வரலாற்றினையும் விவரித்தல்.	K_2, K_3
CO 4	பெயர், வினை, இடை, உரி, வினா, விடை, வேற்றுமை, தொகைகள் ஆகியன குறித்த தெளிவும், அவற்றை வகைப்படுத்தும் திறன் குறித்தும் அறிதல்.	K_2
CO 5	வாக்கியங்களைக் கண்டறிதல், சொற்களை ஒழுங்குபடுத்துதல், ஆங்கிலத்திற்கு நிகரான தமிழ்ச்சொற்களை கண்டறிதல், வழுவுச்சொற்களை நீக்குதல் போன்ற ஒரு மொழியின் பயன்பாட்டுத் தன்மையை தெளிவுறுத்தல்.	K_1, K_2, K_3

K_1-Knowledge **K_2-Understand** **K_3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	3	9	9	3	3	9
CO 2	9	3	9	9	3	3	9
CO 3	9	9	3	3	3	3	9
CO 4	9	9	1	9	9	-	9
CO 5	9	3	3	3	9	-	9
	45	27	25	33	27	09	45

Note: Strong-9 Medium-3 Low-1

பாடத்திட்டம் (Syllabus)

அலகு - 2	தமிழ் நாவல் இலக்கியம் வேரில் பழுத்த பலா (சு.சமுத்திரம்)	(18மணிநேரம்)
அலகு - 3	மக்கள் தகவலியல் 1. இதழ்கள் தொடங்குவதற்குரிய வழிமுறைகள் -செய்த நிறுவனம் தொடங்குவதற்கான முறைமை கூறல். 2. செய்தித்தாள் நிர்வாக அமைப்பு - நிர்வகிக்கும் முறை 3. பேட்டி - அதன் வகைகள் - செய்தி திரட்டும் கலையை அறிதல் 4. செய்தி - செய்தி விளக்கம் - செய்தியின் விளக்கம் மற்றும் வகைமை அறிதல் 5. பல்வேறு வகையான செய்திகள்	(18மணிநேரம்)
அலகு - 4	தமிழ் இலக்கணம் - சொல் 1 நான்கு வகைச் சொற்கள் 1. வினா - விடை வகைகள் 2. வேற்றுமைகள் 3. தொகைகள் வேற்றுமைத் தொகை, வினைத்தொகை, பண்புத்தொகை, உவமைத்தொகை, உம்மைத்தொகை, அன்மொழித்தொகை	(18மணிநேரம்)
அலகு - 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும் அ) 1. சிறுகதையின் தோற்றமும் வளர்ச்சியும். 2. புதின இலக்கியத்தின் தோற்றமும் வளர்ச்சியும். ஆ) தொடரும் தொடர்பும் அறிதல் - பிரித்து எழுதுதல் பொருந்தாச் சொல்லைக் கண்டறிதல் - வழுவுச்சொற்களை நீக்கிய தொடரைக் குறிப்பிடுதல்- சொற்களை அகர வரிசைப்படுத்தல்- வேர்ச்சொல்லைத் தேர்வு செய்தல் - எவ்வகை வாக்கியம் எனக் கண்டு எழுதுதல் - சொற்களை ஒழுங்குபடுத்திச் சொற்றொடர் ஆக்குதல் - ஆங்கிலச்சொல்லுக்கு நிகரான தமிழ்ச் சொல் அறிதல்.	(18மணிநேரம்)

பாட நூல்கள்

1. சிறுகதைகள் பத்து - ஜி. மீனாட்சி நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட்,41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,அம்பத்தூர், சென்னை- 600 098.
2. நாவல் - வேரில் பழுத்த பலா - சு.சமுத்திரம் அறிவுப்பதிப்பகம் (பி) லிட்., 16(142),ஜானி ஜான்கான் சாலை,இராயப்பேட்டை, சென்னை - 600 014.
3. இதழியல் கலை (டாக்டர்.மா.பா.குருசாமி) தாயன்பகம்,6-வது தெரு, ஏ.கே.எம்.ஜி.நகர், திண்டுக்கல் - 624 001.
4. தமிழ் இலக்கிய வரலாறு - முனைவர்பாக்யமேரி நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட்,41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,அம்பத்தூர், சென்னை- 600 098.

பார்வை நூல்கள்

1. மக்கள் தகவல் தொடர்பியல் அறிமுகம் (டாக்டர் கி. இராசா)
2. இதழியல் (ச.ஈஸ்வரன்)
3. இதழியல் (டாக்டர் இரா.கோதண்டபாணி)
4. இதழியல் ஓர் அறிமுகம் (டாக்டர் அந்தோணி இராசு)
5. தமிழ் இலக்கிய வரலாறு (மு.வரதராசனார்)

Pedagogy

விரிவுரை கொடுத்தல்,கலந்துரையாடல், காட்சிப் பதிவுகளின் வழியாக புலப்படுத்துதல், கதை எழுதப் பயிற்சி கொடுத்தல், இதழ் ஒன்றை உருவாக்கக் கற்றுக்கொடுத்தல்

Teaching Aids

கரும்பலகை பயன்படுத்துதல், காட்சி திரைவழியாக புலப்படுத்துதல்.

DEPARTMENTSANSKRIT

Programme:B.A./ B.Sc.(CBCSandOBE)

(For those students admitted during the Academic Year 2019-20 and after)

PART–I**:Sanskrit**		SEMESTER**– II**
CourseTitle**: POETRY,GRAMMAR & HISTORYOFSANSKRIT LITERATURE –II**		
CourseCode: **P1LS21**	Hoursperweek:**6**	Credits:**3**
CIAMarks:**25**	ESEMarks: **75**	TotalMarks:**100**

Preamble

Sanskrit is offered as an alternative language under Part –I for B.A./ B.Sc students during first four semesters the above column explains the scheme of the II semester.

Course Outcomes (COs)

On the successful completion of the course, students will be able to

	Statement	**Knowledge Level**
CO1	TounderstandSanskrit poetryliterature	K1,K2
CO2	Comparingliteraturewith modernlife	K2
CO3	Classifyand discuss theimportance of Sanskrit Literature	K2
CO4	Describeand defend history of early Sanskrit Literature	K2
CO5	Practice Creativity and Demonstrate different aspects of life as portrayedin Sanskrit literature	K2,K3

K1-Knowledge **K2-**Understand **K3-**Apply

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO 6	PO 7
CO1	3	9	9	9	9	1	9
CO2	9	9	3	9	9	-	9
CO3	3	3	9	9	9	-	9
CO4	9	9	9	9	3	-	9
CO5	9	9	9	9	3	-	9
	33	39	39	45	33	1	45

Note: Strong -9 Medium -3 Low -1

Syllabus

Unit 1: Introduction to Sanskrit poetry literature such as Gnomic, Didactic and devotional Campūs literature and its contents.

Unit2: Kalividambanam-scholars-teachers-Astrologers.

Unit3: Kalividambanam-Physicians -Relatives- PseudoMonks.

Unit4: Sabhāraňjanaśatakam -Wisdomanditsacquisition

Unit5: Sabhāraňjanaśatakam-Poetry

Text Book(s)

1. Kalividambanam and Sabhāraňjanaśatakam of Nīlakṇṭhadīkṣita Translated into English by Dr.Srinivasa Sharma and Prof C.R. Anantaraman pub. Sri Sadguna Publication, Chidambaram- 2.Yr.2014.
2. A Short History of Sanskrit Literature, by T.K. Ramachandra Aiyyar, published by R.S. Vadhyar&Sons,Kalpathi,Palakkad -678003.

Reference Books

A History of Sanskrit Literature, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai-625010.Year of publication1996.

Pedagogy

Chalk &Talk, Group Discussion, PPT

TeachingAids

Green Board, LCD Projector, Interactive White Board

UG Programme, Part -II English (CBCS-OBE) **- SEMESTER II**
(For those students who joined in the academic year 2019-2020 onwards)

PART II		
Course Title : **English for Communication Skills–II**		
Course Code: P2LE21 / P2CE21	Hours per week: **6**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Preamble:

The students are expected to inculcate English socio-linguistic competence and moral values through world literature in English for communication skills.

Course Outcome (CO):

On the successful completion of the course, the students will be able to:

State One	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)		
CO1	Repeat listening, and reading proficiency through prose discourses	K1	K2	K3
CO2	Interpret philosophical thoughts found in poetry	K1	K2	K3
CO3	Discuss characters and their psychological behaviour found in One-Act Plays	K1	K2	K3
CO4	Demonstrate acquired grammar skill in listening, speaking, reading and writing	K1	K2	K3
CO5	Create and develop creative writing through composition exercises	K1	K2	K3

K1-Knowledge **K2-**Understand **K3-**Apply

Mapping CO with PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	3	9	9	9	-	9
CO2	9	3	9	3	9	3	9
CO3	9	9	9	3	9	3	9
CO4	9	3	3	-	-	-	9
CO5	9	9	9	3	3	-	9
	45	39	39	18	30	06	45

Note: Strong- 9 Medium-3 Low- 1

Syllabus

Unit-1 Prose

1. Swami Vivekananda - *Sisters and Brothers of America,*(Chicago address at the World Parliament of Religions, 11th Sep, 1893.)
2. A.P.J. Abdul Kalam - The Power of Prayer
3. Martin Luther King Jr. – I Have a Dream

Unit-2 Poetry

1. Robert Browning – *Incident of the French Camp*
2. Robert Frost – *Stopping by Woods on a Snowy Evening*
3. Kamala Das – *My Grandmother's House*

Unit-3 One-Act Plays

1. Allan Noble – *The King of Barvender*
2. Charles Wells – *Hijack*
3. Rabindranath Tagore – *Chitra*

Unit-4 Grammar

1. Voices
2. Direct and Indirect Speech

(for the three Sessional Exam)

Unit-5 Composition

1. Note Making
2. Report Writing
3. Transcoding (interpreting graphs, diagrams, Charts and data)

Text Book(s)

1. **Swami Vivekananda** - *Sisters and Brothers of America,* (Chicago address at the World Parliament of Religions, 11th Sep, 1893.) <http://www.advaitayoga.org/advaitayogaarticles/svchicagoadd.html>
2. **Dr.P.C.James Daniel**, ed. *Gateway to English: An Anthology of Prose*. Chennai: Harrows Publications, 2018.
3. **Abhijit Acharijee, and Rakesh Ramamoorthy**, ed. *Frontiers of Communication: An Anthology of Short Stories and Prose*. Chennai: Cambridge University Press, 2018.
4. **Dr.M.Moovendhan**, ed.*Wings of Poesy*. Chennai: Thamarai Publications, 2018 (or) <https://www.poemhunter.com/poem/incident-of-the-french-camp/> <https://www.poetryfoundation.org/poems/42891/stopping-by-woods-on-a-snowy-evening> <https://www.poemhunter.com/poem/my-grandmother-s-house/>
5. **T. Maruthanayagam and M.Sindhu**, ed. *Curtain Raisers: An Anthology of One Act Plays*. Chennai: New Century Book House, 2018.
6. **KV Joseph and Ae Augustine**. *Trinity Grammar a Handbook*.New Delhi: Trinity Press,(OR) G.Radhakrishna Pillai. *Emerald English Grammar and Composition*. Emerald Publisher.

Refernce Books

1. The Art Institute of Chicago**,** "Sisters and Brothers of America!" <https://www.artic.edu/articles/710/sisters-and-brothers-of-america>
2. **Steuart H King**, ed. *New Vistas in English Prose*. Bombay: Blackie & sons Publishers, 1980.
3. **Dr.A.Shanmugakani**, ed. *Prose for Communication: An Anthology of Prose*. Madurai: Manimekala Publishing House, 2008.
4. **Jagdish Chander**, ed. *Eight Short Plays*. Chennai: OUP, 1978.
5. **Allan Noble**. *The King of Barvender*: London: Gowans & Gray, 1927.
6. **Rabindranath Tagore**.*Chitra - A Play in One Act*. New Delhi: Read Books Ltd., 2013.
7. **K.V.Joseph**. *A Textbook of English Grammar and Usage*. New Delhi: TATA McGraw Hill Education Private Limited, 2012.
8. **Raymond Murphy and Louise Hashemi.** *English Grammar in Use Supplementary Exercises*. Cambridge: CUP, 2004.
9. **A. J. Thomson and A. V. Martinet**. *A Practical English Grammar*. New Delhi: OUP, 1986.
10. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.

Pedagogy

Teacher made aids and Mechanical (ITC) Aids, Chalk and Talk with interactive session.

Note: (Additional online sources, presentation, and test will be given by the respective teachers in the English Language Lab. [*Either 8.45 am to 9.30 am or 5.00 pm to 5.45 pm*]).

TeachingAids

Green Board, LCD Projector, Interactive White Board and Online Sources

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST – 625 234

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Core Subject Theory**		SEMESTER **- II**
Subject Title **: CHORDATES – I**		
Subject Code: **09CT21**	Hours per week: **4**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To enable the students acquire knowledge on general features, classification and evolution of chordates and study of organs and organ systems to understand their functional aspects

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Learn the general characteristics, classification with common examples of chordates, Prochordates specialized characters and peculiar development	K1, K2
CO 2	Understand the comparative external features of various vertebrates	K2
CO 3	Knowledge on morphological and anatomical features of vertebrates	K2, K3
CO 4	Acquire knowledge on organs of communicative and sensory systems of vertebrates	K1, K3
CO 5	Understand the structural organization of skeletal system in vertebrates	K1, K2, K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO6**	**PO7**
CO 1	9	3	-	-	3	-	-
CO 2	9	1	1	-	-	-	-
CO 3	9	1	-	-	-	-	-
CO 4	9	1	-	-	3	-	-
CO 5	9	1	-	-	3	-	-
	45	7	1	-	9	-	-

Mapping of CO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	9	-	-	1	-
CO 2	-	9	-	-	-
CO 3	1	9	-	-	-
CO 4	1	9	-	3	-
CO 5	1	9	-	3	-
	12	36	-	7	-

Note: Strong- 9 Medium-3 Low- 1

Syllabus

UNIT-I:	**Protochordata** General characters and classification with examples – Amphioxus - Detailed study, General characters of Balanoglossus and Ascidian. Affinities of Balanoglossus, Retrogressive Metamorphosis in Ascidian	**(12 Hrs)**
UNIT-II:	**Vertebrata** General characters and classification upto classes with examples Agnatha – salient features of Petromyzon External characters of Scoliodon, Frog, Calotes, Pigeon and Rabbit	**(12 Hrs)**

UNIT- III:	Comparative anatomy in Vertebrates - Integumentary system, Digestive system and Respiratory system	**(12 Hrs)**
UNIT- IV:	Comparative anatomy in Vertebrates - Circulatory system, Nervous system and Receptor organs	**(12 Hrs)**
UNIT- V:	Endoskeleton (Frog only) and Endocrine glands Comparative anatomy of Urinogenital system	**(12 Hrs)**

Text Books

Ekambaranatha Ayyar, M. and Ananthakrishnan, T.N. 2013 – A Manual of Zoology Part II (Chordata) S. Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai.

Reference Books

- Gupta R.C and Girish Chopra, 2003 - Comparative Anatomy of Chordates – R.Chand& Co, New Delhi
- Jordan E.L, 2003 – Chordate zoology – S. Chand & Co, Chennai
- Kotpal, R.L. 2004 – Modern Text Book of Zoology Vertebrates, Second Edition, Rastogi Publications, Meerut.
- Harvey Pough F., Heifer, J.B. and McFarland, W.N. 1985 vertebrate life, Macmillan Pub. Co. New York.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST – 625 234

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Core Subject Theory**		SEMESTER **- II**
Subject Title **: CHORDATES - II**		
Subject Code: **09CT22**	Hours per week: **4**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To enable the students basic understanding and the study of salient features, Origin, organization, comparative anatomy and trace the evolution

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Study the origin, ancestors and descendents of chordates	K1, K3
CO 2	Understand the adaptive characters and accessory organs of vertebrates	K1, K2
CO 3	Study the specialized features of Amphibians, identification features of poisonous and non-poisonous snakes	K2
CO 4	Study the structures, its mechanisms and adaptation in Aves	K2, K3
CO 5	Study the mammalia through origin, aquatic adaptations and feeding accessories	K1, K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO6**	**PO7**
CO 1	9	-	-	-	3	3	3
CO 2	9	-	-	-	3	3	1
CO 3	9	-	9	3	9	9	-
CO 4	9	-	3	-	3	9	-
CO 5	9	-	-	-	-	3	-
	45	-	12	3	18	27	4

Mapping of CO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	3	9	-	9	-
CO 2	1	9	-	-	-
CO 3	9	-	-	9	-
CO 4	1	9	-	-	-
CO 5	1	3	-	-	-
	15	30	-	18	-

Note: Strong- 9 Medium-3 Low- 1

Syllabus

UNIT-I:	Origin and Phylogeny of Vertebrates, Amphibia, Reptilia and Birds	**(12 Hrs)**
UNIT-II:	Parental care in fishes, Migration in fishes and Accessory respiratory organs in fishes	**(12 Hrs)**
UNIT- III:	Parental care in Amphibia, Neoteny in Amphibia and Poisonous and non-poisonous snakes of South India	**(12 Hrs)**
UNIT- IV:	Flight adaptation and mechanism of flight in birds, Migration in birds and Flightless birds	**(12 Hrs)**

UNIT- V:	Prototherians, Metatherians and Eutherians, Dentition in mammals, Aquatic mammals and Origin of mammals.	**(12 Hrs)**

Text Books

Jordan, E.L. and Verma, P.S. 2011. Chordate Zoology, S.Chand & Co Ltd

Reference Books

Kotpal, R.L. 2011. Vertebrates, Rastogi Publications

Gupta R.C and Girish Chopra, 2003 - Comparative Anatomy of Chordates – R.Chand & Co, New Delhi

Newmann, 1981, The Phylum chordata, Biology of vertebrates and their kin, Satish Book Enterprises, Agra.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST – 625 234

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Core Subject Theory**		SEMESTER **- II**
Subject Title **: PRACTICAL - I**		
Subject Code: **09CP23**	Hours per week: **2**	Credit: **4**
CIA Marks: **40Marks**	ESE Marks: **60 Marks**	Total Marks: **100 Marks**

Preamble

Visualize and assimilate morphological and anatomical features by dissection demonstration, preserved specimens, charts and models and observe animals at their habitat & understand their biodiversity.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Student will understand the dissection and mounting of organism, organs through demonstration	K1
CO 2	Perform mounting of body parts, locomotory parts and also perform simulated models of dissection through computers.	K2
CO 3	Identify the anatomical and special features from the prepared models and charts.	K2
CO 4	Identify morphological and special characteristics of animals through various phylum and classes	K2
CO 5	Locate, mark and collect the diversity species in agriculture, apiary and marine habitats.	K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	-	-	-	3	-	3
CO 2	9	9	-	-	3	-	3
CO 3	9	3	-	-	-	-	-
CO 4	9	3	-	-	-	-	-
CO 5	9	-	-	-	-	9	9
	45	15	-	-	6	9	15

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	-	-	-	-
CO 2	3	-	3	-	-
CO 3	1	-	-	-	-
CO 4	9	1	-	3	-
CO 5	9	-	-	3	9
	25	1	3	6	9

Note: Strong- 9 Medium-3 Low- 1

Syllabus

INVERTEBRATES	**(12 Hrs)**
A. Demonstration Cockroach- Dissection - Digestive system, Nervous systems & Reproductive system Mounting - Mouth parts and Salivary glands Earthworm – Dissection - Digestive and Nervous systems Mounting - Body setae and Penial setae House fly - Mounting -Mouthparts Virtual Dissection – Earthworm, Cockroach, Honey bee, Housefly, Mosquito using softwares	

B. Chart/Models

Pila - Digestive system and Nervous system
Freshwater mussel - Digestive system

C. Spotters

Protozoa *Amoeba, Plasmodium, Paramecium* Entire and conjugation.
Porifera Gemmules and Spicules.
Coelenterata *Obelia* Colony, Medusa, *Physalia*, Any One Coral, Sea Anemone.
Helminthes Liverfluke-Entire, *Taenia*(Entire and Scolex).
Nematoda *Ascaris* Male and Female.
Annelida *Nereis*, Leech .
Arthropoda *Zoea, Nauplius,* Millipede and Centipede
Mollusca *Chiton,* Sepia,*Nautilus,* Octopus.
Echinodermata Starfish, Sea urchin , Sea cucumber.

D. Field Visit Observation and identification of insect pests of agricultural crops.
Vist to Vermifarm and observación of Earthworm species
Visit to Apiary

CHORDATES

A. Dissection and mounting

Fish – Dissection and observation of visceral organs
Shark- Mounting of Placoid Scales
B. Virtual Dissection - Frog, Calotes and Chick using softwares.

C. Chart/Models

Frog - Arterial system and Venous system, brain and spinal nerves

D. Spotters

Amphioxus,Balanoglossus, Ascidian, Petromyzon
Narcine, Anabas, Echines, Hippocampus, Eel
Rhacophorus and *Alytes*
Krait, Cobra, Viper, *Typhlops, Enhydrina, Draco* and Chaemeleon
Beaks and feet in birds, Ant eater and Bat
Osteology of Rabbit – Skull, Typical Vertebra, Pectoral and pelvic girdle – Fore limb and Hind limb

E. Field visit

Rameshwaram, Kurusadai Island & Mandapam - Biodiversity study of marine animals.

Text Books

Kapoor, 2014 Practical Zoology, Silver Line Publications, Allahabad, Uttrapradesh

Reference Books

- Pechenik, Jan A 2014 – Biology of the Invertebrates, Tata Mcgraw – Hill Pub. Company Ltd., New Delhi
- Vasantika Kashyap, 2013, Life of Invertebrates, Second Revised Edition, Vikas Pub. House Pvt. Ltd., New Delhi
- Kotpal, R.L. 2012. Modern Text Book of Zoology, Invertebrates (Animal diversity – I), Rastogi Publications, Meerut
- Barnes, R.D. 2006,Invertebrate Zoology, IV Edition, Holf Saunders International edition
- Ekambaranatha Ayyar and Ananthakrishnan, T.N. 2005, A manual of Zoology, volume I, Invertebrate, Viswanathan (Printers and Publishers) Pvt. Ltd., ChennaiKotpal, R.L. 2011. Vertebrates, Rastogi Publications
- Gupta R.C and Girish Chopra, 2003 - Comparative Anatomy of Chordates – R.Chand & Co, New Delhi
- Newmann, 1981, The Phylum chordata, Biology of vertebrates and their kin, Satish Book Enterprises, Agra.

Pedagogy

Chalk and talk, Charts and models, Smart board, Group Discussion, PPT, Preserved animals, slides and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board, Microscope – Dissection, Compound, Deep vision and Phase Contrast Microspcose.

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST – 625 234

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Allied Theory**		SEMESTER **- II**
Course Title **: Chemistry for Biologist-II**		
Course Code: 07ATB2/07ATZ2	Hours per week: 2	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to,

- ✓ understand the concept of acids and bases and chemical bonding
- ✓ acquire knowledge about aminoacid, proteins and vitamins and their functions
- ✓ study and assess the effect of selected pesticides, fungicides and polutions

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Learn the historical development for the definitions of acid and base.	K1
CO 2	Understand the different approaches to types of chemical bonding	K2
CO 3	Acquire knowledge of aminoacids, proteins and vitamins and their biological functions	K2&K3
CO 4	Learn and assess the effect of selected pesticides, fungicides and polutions	K1&K2
CO 5	Obtained the knowledge of different types of air polution	K1& k2

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	3	1	1	1	1	1	3
CO 2	3	1	1	1	1	1	3
CO 3	3	1	1	1	1	1	3
CO 4	3	1	1	1	1	9	3
CO 5	3	1	1	1	1	9	9
	15	**5**	**5**	**5**	**5**	**21**	**21**

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	1	3	3	1	-
CO 2	-	3	3	3	-
CO 3	-	9	3	9	1
CO 4	-	1	3	9	1
CO 5	-	1	1	1	-
	1	**17**	**13**	**23**	**2**

Note: Strong- 9 Medium-3 Low- 1

Syllabus

UNIT-I: **ACIDS AND BASES**

Introduction– Arrhenius concept –Bronsted-Lowry concept –Lewis concept – Cady, Elsey concept – Lux-Flood concept – Usanovich concept –pH concept.

UNIT-II: **CHEMICAL BONDING**

Ionic Bond – lattice energy – Born-Haber cycle – properties of ionic compounds - covalent bond, polar covalent bond – characteristics of covalent bond – Fajan's Rule – metallic bond – hydrogen bondand its types.

UNIT- III: **AMINOACIDS, PROTEINS AND VITAMINS**

Preparation (Gabriel Phthalimide and strucker synthesis) – properties of amino acids and glycine – zwiter ion – polypeptides – proteins, classification. Vitamins: classification and biological functions of vitamins A, B_6, B_{12}, C, D, E and K(Structural elucidation not required)

UNIT- IV: **PESTIDCIDES AND FUNGICIDES**

Pesticides: Introduction – classification – organic and inorganic pesticides – characteristics – safe handling of pesticides – impact of pesticides on and environment

Fungicides: Introduction –classification –sulfur, copper, mercury containing compounds

UNIT- V: POLLUTIONS

Air pollution: Introduction – composition of air– chemical reactions occurring in air due to sunlight – sources of air pollution – classification and effects of air pollutants – Effects of CFC – Ozone layer – depletion Greenhouse effect and its causes.

Water pollution: Types, sources, sewage, industrial effluents, inorganic pollutants –control – water treatment.

Soil pollution: Definition– importance of soil – pH of soil – acidity & alkalinity and their causes (6 causes – emphasis towards industrial waste.

Text Books

1. Ancillary chemistry K. Ratinamuthu (Study material will be provided) Semester – I and II

Reference Books

1. Bahl & Arun Bahl *Advanced Organic Chemistry* by, S.Chand &Company Ltd, NewDelhi, 2012Edition.
2. Soni P.L. Mohan Katyal *Text book of Inorganic Chemistry* by, Sultan Chand & Sons, NewDelhi, 2010 Edition.
3. Arun Bahl, Bhal B.S &.Tuli G.D *Essentials of Physical chemistry* S.Chand Publishing Company, New Delhi, 2010Edition.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Botany / B.Sc. Zoology/Physics (CBCS and LOCF)

(For those students who admitted during the Academic Year 2018-19 and after)

PART – III: **Allied Practical**		SEMESTER **I**
Course Title: **VOLUMETRIC ESTIMATION**		
Course Code: **07APB3 / 07APZ3 / 07APP3**	Hours per week: **2**	Credits:**-**
CIA Marks: -	ESE Marks:-	Total Marks: -

Preamble

Students are enabled to

- ✓ Make solutions of different concentration and understand the principles behind volumetric analysis.
- ✓ Experience hands on training in volumetric titration

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO1	Anticipate, recognize, and respond properly to potential hazards in laboratory procedures	K1, K2 & K3
CO2	Perform accurate quantitative measurements	K1, K2 & K3
CO3	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CO4	Keep accurate and complete experimental records	K1, K2 & K3
CO5	Interpret experimental results and draw reasonable conclusions and Communicate effectively through oral and written reports	K1, K2 & K3

K_1-Remembering **K_2-**Understanding **K_3-**Applying

Mapping of CO and PO

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO6**	**PO7**
CO 1	1	1	3	1	3	3	1
CO 2	9	1	9	1	3	3	1
CO 3	3	1	9	1	3	3	1
CO 4	3	1	9	1	3	3	1
CO 5	3	1	9	1	3	3	1

Note: Strong- 9 Medium-3 Low- 1

Mapping of CO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	1	3	3	1	-
CO 2	-	1	3	3	-
CO 3	-	1	1	1	-
CO 4	3	3	3	1	-
CO 5	3	3	3	1	1
	7	**11**	**13**	**7**	**1**

Note: Strong-9 Medium-3 Low- 1

Syllabus

UNIT-I:

Concepts of molecular formula, molecular weight, equivalent weight, normality, molality, molarity and weight percentage – problems related to preparation of different concentrations of solutions – list of lab apparatus and their uses.

UNIT-II:
Principle of volumetric estimation – definitions of titration, standard solution, analyte, titrant, indicator, end point, equivalent point – primary standard and secondary standard – preparation of standard solution.

UNIT-III: **ACIDIMETRY AND ALKALIMETRY**
1. Estimation of Sodium Hydroxide
   (Standard sodium carbonate *vs.*Link sulphuric acid *vs.* Given sodium hydroxide)
2. Estimation of Sodium Carbonate
   (Standard sodium hydroxide *vs.* Link hydrochloric acid *vs.* Given sodium carbonate)
3. Estimation of Sulphuric acid
   (Standard oxalic acid *vs.* Link sodium hydroxide *vs.* Given sulphuric acid)
4. Estimation of Hydrochloric acid
   (Standard oxalic acid *vs.*Link sodium hydroxide *vs.* Given sodium hydrochloric acid)

UNIT-IV: **REDOX TITRATIONS**
PERMANGANOMETRY
1. Estimation of oxalic acid
   (Standard ferrous sulphate *vs.* Link potassium permanganate *vs.* Givenoxalic acid)
2. Estimation of potassium permanganate
   (Standard sodium hydroxide *vs.* Link oxalic acid *vs.* Given potassium permanganate)
3. Estimation of ferrous sulphate
   (Standard oxalic acid *vs.* Link potassium permanganate *vs.* Given ferrous sulphate)
4. Estimation of ferrous ammonium sulphate
   (Standard ferrous sulphate *vs.*Link potassium permanganate *vs.*Given ferrous ammonium sulphate)

UNIT-V: DICHROMETRY
Estimation of Potassium dichromate
(Potassium permanganate *vs.*Link ferrous ammonium sulphate *vs.*Given potassium dichromate)

Text Book
1. Venkateswaran, V., Veerasamy, R. and Kulandaivelu, A.R. *Basic Principles of Practical Chemistry*, 2nd Ed., Sultan Chand & Sons, New Delhi, 2017.
2. Thomas, A.O. *B.Sc. Main Practical Chemistry*, Scientific Book Centre, Cannanore, 2003.

Reference Books
1. Gnanaprakasam, N.S. and Ramamurthy, G. *Organic Chemistry Lab Manual*, S. Viswanathan Pvt. Ltd, 2007.
2. Jeffery, G.H., Basset, J. and others, *Vogel's Textbook of Quantitative Chemical Analysis*, ELBS, 5th Ed., London, 1989.

Pedagogy
Chalk & Talk, Group Discussion, PPT

Teaching Aids
Green Board, LCD Projector, Interactive White Board

B.Sc. Zoology CBCS Syllabus - **SEMESTER – II**

(For those who join in June 2016 and after)

Part – IV : Non-Major Elective		
Subject Title : **FOOD AND NUTRITION**		
Subject Code: **09NE21**	Hours per week: **2**	Credit: **2**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

2hrs/week- 30 hrs

Objectives

To enable the students

- *Reveal the types, source and importance of nutrients*
- *Expose disorders of malnutrition and food born diseases*

Unit-I Food as a source of nutrients

Definition- functions of food- recommended daily allowances for nutrients- nutritive value of foods- Balanced diet.

Unit-II Nutrients

Carbohydrates, Proteins, Fats, Minerals and Vitamins.

Unit-III Disorders of Malnutrition

Kwashiorkor – Marasmus – Obesity – Anaemia -Epidemic dropsy and Deficiency diseases.

Unit-IV Food sanitation and Hygiene

Water – Food- food spoilage- Preservation- Control of Insects and Rodents

Unit-V Food Borne Diseases

Food poisoning-Poisoning organisms – Bacteria, Mold and Yeast.

Text book:

- Mudambi R. and Rajagopal V. 2001. Fundamentals of Foods and Nutrition– Wiley Eastern Limited – New Delhi.

விவேகானந்த கல்லூரி
தமிழ்த்துறை

Programme: B.A., B.Sc., (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2019 – 2022 and after)

PART – I **TAMIL**		SEMESTER : **III**
Course Title : **காப்பியமும் பக்தி இலக்கியமும் நாடகமும்**		
Course Code **: P1LT31**	Hours per week **: 18**	Credit **: 3**
CIA Marks : **25**	ESE Marks : **75**	Total Marks : **100**

Preamble

1. வாழ்க்கையின் உறுதிப்பொருள்களான அறம், பொருள், இன்பம் வீடுபேறு ஆகியனவற்றை உணர்த்துதல்.
2. இறைவழிபாட்டு சிந்தனைகளை வளர்த்தல்.
3. புராண இதிகாச கருத்துக்களை நாடகம் வாயிலாக எளிமைப்படுத்தி தனிமனித நிலைகளை எடுத்துக்காட்டல்.
4. மரபுக்கவிதைகளின் வகைமைகளை அறிதல்.
5. காப்பியம் மற்றும் பக்தி இலக்கியத்தின் வரலாற்றினை அறிவித்தல்.

Course Outcomes (COs)

On the successful completion of the course, students will be able to

NO.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	காப்பிய இலக்கியங்களின் வாயிலாக அறம், பொருள், இன்பம், வீடுபேறு என்ற வாழ்க்கையின் உறுதிப்பொருட்கள், எவ்வுயிரையும் தம்முயிர்போல மதித்தல், பிறர் மனை நோக்கா நிலை, பகைமை பாராட்டாத தன்மை, ஆணவம் இல்லா வாழ்க்கை போன்றவைகளை வரையறை செய்த தன்மைகளை உணர்த்துதல்.	K_1, K_2
CO 2	மரபு இலக்கணங்களான அணிகள், பாவகைகளின் வாயிலாக மாணவர்களின் இலக்கியச்சுவை உணர்வினை வளர்த்து, கற்பனைத் திறன்களை அறிவித்தல்.	K_2, K_3
CO 3	பக்தி இலக்கியங்களின் வாயிலாக இறைவழிபாட்டுச் சிந்தனைகளை தனிமனித வாழ்க்கை நிகழ்வுகளின் வழி வெளிப்படுத்தி, உலக இயல்புகளை மொழிந்து, பரம்பொருளை அடையக்கூடிய வழிவகைகளையும், சமரச சன்மார்க்க நெறிகளையும் தெளிவுறுத்துதல்.	K_2, K_3
CO 4	புராண, இதிகாச நாடக கதைகளின் வழி அக்காலகட்ட மக்களின் சமூக நிலைகளைக் கலந்துரையாட செய்தல்.	K_2
CO 5	காப்பியம் மற்றும் பக்தி இலக்கியம் தோன்றிய காலகட்ட வரலாற்றினை விவரித்தல். இதழ்கள் தொடர்பான சிந்தனைகள் வளர கற்றுக்கொடுத்தல்.	K_1, K_2, K_3

K_1-Knowledge **K_2-Understand** **K_3-Apply**

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	3	3	9	3	9
CO2	9	3	3	9	9	3	9
CO3	9	3	9	9	3	3	9
CO4	9	3	3	3	9	-	9
CO5	9	3	3	9	3	-	9
Weightage of the course	45	21	21	33	33	09	45

Note: Strong- 9 Medium-3 Low- 1

பாடத்திட்டம் (Syllabus)

அலகு - 1	**தமிழ்க் காப்பிய இலக்கியம்** 1. சிலப்பதிகாரம் (வழக்குரை காதை) 2. மணிமேகலை (ஆபுத்திரன் திறம் அறிவித்த காதை) 3. கம்பராமாயணம் (வாலி வதைப்படலம்) 4.வில்லிப்புத்துரார் பாரதம் (கண்ணன் தூதுச்சருக்கம்) 5. கந்த புராணம் (அயனைச் சிறை நீக்கும் படலம்)	18மணிநேரம்
அலகு - 2	**தமிழ் பக்தி இலக்கியம்** 1. தேவாரம் - திருஞானசம்பந்தர் (திருவேடகப் பதிகம்) 2. திருவாசகம் - மாணிக்கவாசகர் (பிடித்த பத்து) 3. திருமந்திரம் - திருமூலர் (10 பாடல்கள்) 4. திருப்பாவை - ஆண்டாள் (10 பாசுரங்கள் தெரிவு செய்யப்பெற்றவை) 5. பராபரக்கண்ணி - தாயுமானவர் (10 கண்ணிகள் தெரிவு செய்யப்பெற்றவை)	18மணிநேரம்
அலகு - 3	**நாடகம்** 1. வைகையில் வெள்ளம் வரும் - சேதுபதி	18மணிநேரம்
அலகு - 4	**தமிழ் இலக்கணம் - அணிகள்** 1.அணிகள் - உவமை - உருவகம் - பிறிது மொழிதல் - தற்குறிப்பேற்றம் வஞ்சப்புகழ்ச்சி - சிலேடை - வேற்றுமை அணி 2.பாவகைகள் - வெண்பா - ஆசிரியப்பா 3.கடிதம் வரைதல் - விண்ணப்பம் - புகார்க் கடிதம் - பாராட்டுக் கடிதம்	18மணிநேரம்
அலகு - 5	**தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத் தமிழும்** அ) 1. காப்பிய இலக்கிய வரலாறு 2. பக்தி இலக்கிய வரலாறு ஆ) பத்திரிக்கைச் செய்தி எழுதுதல் - நேர்காணல் எடுத்தல் - துணுக்குகள் எழுதுதல்.	18மணிநேரம்

பாட நூல்கள்

1. தமிழ்ச் செய்யுட் தொகுப்பு - தமிழ்த்துறை வெளியீடு
2. நாடகம் - வைகையில் வெள்ளம் வரும் - சேதுபதி. பாவை பப்ளிகேஷன்ஸ் - சென்னை - 14.

பார்வை நூல்கள்

1. நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட்,41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,
2. அம்பத்தூர், சென்னை- 600 098.
3. தமிழ் இலக்கிய வரலாறு - பேரா.முனைவர் பாக்யமேரி,
4. தமிழ் இலக்கிய வரலாறு- மு.வரதராசனார்
5. சாகித்திய அக்காதெமி,தலைமை அலுவலகம்,ரவீந்திர பவன்,
6. 35,பெரோஸ்ஷா சாலை,புதுதில்லி.

Pedagogy

விரிவுரை கொடுத்தல், கலந்துரையாடல், காட்சிப் பதிவுகளின் வழியாக புலப்படுத்துதல்.

Teaching Aids

கரும்பலகை பயன்படுத்துதல், காட்சி திரைவழியாகப் புலப்படுத்துதல்.

DEPARTMENT OF SANSKRIT

Programme:B.A./ B.Sc.(CBCS and OBE)

(For those students admitted during the Academic Year 2019-20 and after)

PART–I**: Sanskrit**		SEMESTER**– III**
CourseTitle**: PROSE, POETIC SANDHISTORY OF SANSKRIT LITERATURE –III**		
CourseCode: **P1LS31**	Hoursperweek:**6**	Credits**:3**
CIAMarks:**25**	ESEMarks: **75**	TotalMarks:**100**

Preambe:

Sanskrit is offered as an alternative language under Part –I for B.A. / B.Sc students during first four semesters theabovecolumn explainsthe scheme ofthe III semester.

Course Outcpmes (COs)

On the successful completion of the course, students will be able to

	Statement	**Knowledge Level**
CO1	\Understand the important aspects of prose literature	K2
CO2	Discriminate spirituality in Literature	K2
CO3	Basic knowledge of Sanskrit poetics	K1
CO4	Describe and defend history of early Sanskrit literature	K2
CO5	Practice Creativity and Demonstrate various culture of World	K2,K3

K1-Knowledge **K2-**Understand **K3-**Apply

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO 6	PO 7
CO1	9	9	9	3	9	-	9
CO2	9	9	9	9	3	-	3
CO3	3	3	9	9	9	1	3
CO4	9	9	9	9	9	-	9
CO5	9	9	9	9	3	-	3
	39	39	45	39	33	1	27

Note: Strong -9, Medium -3, Low -1

Syllabus

Unit1: Prose-Śukanāsopadeśaḥ, poetics –Upamā, Ullekhā. History of Sanskrit Literature– GadyaKāvyas- Introduction to Gadya Kāvyas-structure of Gadya Kāvyas- Kathā and Ākhyāyikā

Unit 2: Prose – Pañcatantra (introduction), poetics –Rūpaka, Apahnuti. History of Sanskrit Literature – DaśakumāracaritamofDaṇḍin, Vāsavadattaof Subandhu.Popular tales

Unit 3: Prose - Akarṇahṛdayogardabhaḥ, poetics –Utprekṣā, Atiśayokti. History of Sanskrit Literature- Kādambarī of Bāṇabhaṭṭa-structure of Kādambarī. Historical Kāvyas- Harṣacaritam of Bāṇabhaṭṭa.

Unit 4: Prose - Simhajambukakathā, poetics –Dīpaka, Arthāntaranyāsa. History of Sanskrit Literature- works of Vākpati, Bilhaṇa, Kalhaṇa, Vāmanana bhaṭṭabāṇa.

Unit 5: Prose –Pāpabuddhi and Puṇyabuddhikathā, poetics – Śleṣa, Vyatireka. History of Sanskrit Literature-HistoryofCampū-literature works of Trivikramabhaṭṭa, Somadeva, Bhoja, Abhinavakālidāsa, Anantabhaṭṭa, Cidambarakavi, Rājāśarabhoji**,** NĪlakaṅṭhadīkṣita, Veṅkaṭādri.

Text Books

1. Sāhityarasakaṇa, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai - 625010. Yearofpublication 1996.
2. A History of Sanskrit Literature, compiled by Dr.S. Jagadisan, Published by AMG Publications, Madurai -625010. Yearofpublication 1996.

Refernce Books

1. A Short History of Sanskrit Literature, byT.K.Ramachandra Aiyyar, published by R.S.Vadhyar & Sons,Kalpathi,Palakkad-678003
2. A History of Sanskrit Literature, by A.Berriedale Keith, Published by Mothilal Banarsi dass Publishers Private Limited, Delhi, 2017.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

UG Programme, Part -II English (CBCS-OBE) - SEMESTER III (For those students who joined in the academic year 2018-2019 onwards)		
PART II		
Course Title : **English for Academic and Professional Excellence-I**		
Course Code: P2LE31 / P2CE31	Hours per week: **6**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Preamble:

The students are expected to inculcate English socio-linguistic competence and moral values through world literature in English for communication skills.

Course Outcome (CO):

On the successful completion of the course, the students will be able to:

State One	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)		
CO1	Appraise various authors' socio-linguistic interests through prose discourses	K1	K2	K3
CO2	Develop comprehension skills through poetry	K1	K2	K3
CO3	Critique the discourses, characters and their psychological behaviour found in a Englishnovel	K1	K2	K3
CO4	Demonstrate acquired grammar skill in listening, speaking, reading and writing	K1	K2	K3
CO5	Design and Repeat creative writing through composition exercises	K1	K2	K3

K1-Knowledge **K2-**Understand **K3-**Apply

Programme Outcome

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	-	9
CO2	9	3	9	9	9	-	3
CO3	9	9	9	3	9	1	3
CO4	3	9	3	-	-	-	9
CO5	9	9	9	1	-	-	3
	39	39	39	22	27	1	27

Note: Strong- 9 Medium-3 Low- 1

Syllabus

Unit-1 Prose

1. *The Indian National Education*- Swami Chidbhavananda
Educating the Adult (*Chapter I*)
2. *Women not the Weaker Sex* (gender) – Mahatma Gandhi
3. *Travel by Train* – John Boynton Priestley

Unit-2 Poetry

1. *The Toys* – Coventry Patmore
2. *The Soul's Prayer* – Sarojini Naidu
3. *Where the mind is Without Fear* - Rabindranath Tagore

Unit-3 Novel

Oliver Twist - Charles Dickens [*Abridged*]
(For the three Sessional Exam)

Unit-4 Grammar

1. Concord and Question Tag
2. Spotting Errors

(For the three Sessional Exam)

Unit-5 Composition

1. Covering Letter and RésuméPreparation -1 (UK)
2. Interview skills
3. Dialogue Writing

Text Book

.1. Swami Chidbhavananda. *The Indian National Education*. Tirupparaithurai: Sri Ramakrishna Tapovanam, 2017.
2. Dr.P.C.James Daniel, ed. *Gateway to English: An Anthology of Prose*. Chennai: Harrows Publications, 2018.
3. *Poetry*. Chennai: Main Spring Publishers, (or)
<https://www.poetryfoundation.org/poems/44845/the-toys-56d22417d5e2e>
<https://www.poemhunter.com/poem/the-soul-s-prayer/>
<https://www.poetryfoundation.org/poems/45668/gitanjali-35>
4.Charles Dickens, *Oliver Twist.* London: Wordsworth Classic, 1992.
5. Abhijit Acharijee, and Rakesh Ramamoorthy, ed. *Frontiers of Communication: An Anthology of Short Stories and Prose*. Chennai: Cambridge University Press, 2018.
6. KV Joseph and Ae Augustine. *Trinity Grammar a Handbook*. New Delhi: Trinity Press... (or)
G.Radhakrishna Pillai. *Emerald English Grammar and Composition*. Emerald Publisher. (or)
Owen Hargie, David Dickson, and Dennis Tourish. *Communication Skills for Effective Management*. New York: Palgrave Macmillan, 2004.
7. Hari Mohan Prasad, and Uma Rani Sinha. *Objective English for Competitive Examinations*. New Delhi: McGraw Hill Education, 2016. (Prescribed chapters will be given.)

Refernce Book

1. Swami Chidbhavananda. *Vedanta Society*. <https://sfvedanta.org/authors/swami-chidbhavananda/>
2. Dr.A.Shanmugakani, ed. *Prose for Communication: An Anthology of Prose*. Madurai: Manimekala Publishing House, 2008.
3. Charles Dickens, *Oliver Twist* (*the Parish Boy's Progress).* London: Richard Bentley, 1839.
4. K.V.Joseph. *A Textbook of English Grammar and Usage*. New Delhi: TATA McGraw Hill Education Private Limited, 2012.
5. A. J. Thomson, and A. V. Martinet. *A Practical English Grammar*. New Delhi: OUP, 1986.
6. Books by Dickens, Charles (sorted by popularity). <http://www.gutenberg.org/ebooks/author/37>
7. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.
8. Edgar Thorpe, and Showick Thorpe. *Objective English for Competitive Examinations*. New Delhi: Pearson India Education, 2017.

PEDAGOGY: Teacher made aids and Mechanical (ITC) Aids, Chalk and Talk with interactive session.
Note: (Additional online sources, presentation, and test will be given by the respective teachers in the English Language Lab. [*Either 8.45 am to 9.30 am or 5.00 pm to 5.45 pm*]).

TEACHING AIDS: Course Texts, Reference books, Writing Board, and Online Sources.

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2019-20 and after)

PART – III **: Core Subject Theory**		SEMESTER **- III**
Subject Title **: CELL BIOLOGY**		
Subject Code: **09CT31**	Hours per week: **2**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To enable the studentsto acquire knowledge on organisational arrangements of cellular organelles of prokaryotes and eukaryotes, their structural setup and their biological functions.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Inculcate knowledge on working principles of microscopes, cell fractionation, staining and identification of cell types	K1,K2,K3
CO 2	Get deeper understanding on organisation and functional aspects of cellular organelles, plasma membrane, endoplamic reticulum, golgi body and lysosomes.	K1,K2,K3
CO 3	Comprehends on morphological, chemical composition, structure and functions of synthesising organelles of mitochondria and ribosomes.	K1,K2,K3
CO 4	Develop analyse on structure of oncogenes and nucleus, differentiation of chromosomes, different types of cell division	K1,K2,K3
CO 5	Appreciate through principles of microscopes the organisation of DNA, RNA types, its role in gene regulation and protein synthesis.	K1,K2,K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	-	-	-	1	-	9
CO 2	9	-	-	-	3	-	3
CO 3	9	-	-	-	3	-	3
CO 4	9	-	3	-	3	3	3
CO 5	9	-	-	-	3	-	9
	45	-	3	-	13	3	27

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	9	3	-	-
CO 2	-	9	-	3	-
CO 3	-	9	-	3	-
CO 4	-	9	-	9	-
CO 5	-	-	9	-	-
	3	36	12	15	-

Syllabus

UNIT-I:	Microscopy: Principles of light and electron microscope. Cell as the basic unit of living organism – Cell theory – isolation of cellular components – Homogenisation – fractionation – Centrifugation – Fundamentals of fixation – Staining methods	**(12 Hrs)**
UNIT-II:	Plasma Membrane: Ultra structure – Chemical composition and functions, Endoplasmic reticulum: Structure, types and functions Golgi complex: Structure, Composition and functions Lysosome: Structure, forms,	**(12 Hrs)**

	functions and origin	
UNIT- III:	Mitochondria: Structure, Chemical composition – Functions – Kreb's cycle – Oxidative phosphorylation, Ribosome: Structure – Chemical composition – Functions and origin	**(12 Hrs)**
UNIT- IV:	Nucleus & Nucleolus: Structure and functions, Chromosome: Structure Giant Chromosomes - Cell Cycle: Cell division – Mitosis & Meiosis - Cancer Cells – types and properties- Cell aging- events.	**(12 Hrs)**
UNIT- V:	Nucleic Acids: Molecular Structure of DNA & RNA – Types of RNA & DNA replication, Role of RNA and ribosome in protein synthesis, Regulation of protein synthesis (Lac Operon).	**(12 Hrs)**

Text Books

Cytology,Verma P.S. & Agarwal V.K. (2008) .S.Chand & Co. New Delhi.

Reference Books

- De Robertis E.D.P. & De Robertis (2001). Cell and Molecular Biology, E.M.F.
- David M.Prescott (1988).CELLS- Principles of Molecular Structure and Functions, Jones and Bartlett Publications
- Gerald Karp (1985). Cell Biology, McGraw Hill Book Co..

Pedagogy

Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST – 625 234

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2019-20 and after)

PART – III **: Core Subject Theory**		SEMESTER **- III**
Subject Title **: GENETICS**		
Subject Code: **09CT32**	Hours per week: **4**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To enable the studentsto acquire knowledge on principles of genetic mechanism, determination of sex and diseases related to genetics.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Get overall idea of Mendelian works on inheritance and the deviation from Mendelian concepts.	K1,K2,K3
CO 2	Understand the architect of differential inheritance due to multiple allelism, polygene and their associated problems.	K1,K2,K3
CO 3	Impart knowledge on the deviation of Mendelian concepts through the linkage and crossing over and also mapping of chromosome.	K1,K2,K3
CO 4	Find out the methods of sex determinations, factors, and also acquire how sex related diseases and their transmission.	K1,K2,K3
CO 5	Trace and identify the mechanism of non-genetic inheritance, genetic diseases and pedigree. Promotional methods of genetic mechanism through qualitative traits.	K1,K2,K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	-	1	-	3	-	-
CO 2	9	-	9	-	9	-	3
CO 3	9	-	3	-	3	-	3
CO 4	9	-	9	3	9	-	3
CO 5	9	-	9	3	9	-	9
	45	-	31	6	33	-	18

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	-	9	-	1	-
CO 2	-	3	-	1	-
CO 3	-	9	3	3	-
CO 4	-	3	-	9	-
CO 5	-	9	-	9	-
	-	33	3	23	-

Syllabus

UNIT-I:	Principles of Inheritance- Interaction of genes (Factor hypothesis) a) Historical ideas- Mendel's work- Mendel's laws of inheritance- Mendelian ratio- Test cross- Back cross- Pleiotropism- Penetrance and expressivity. b) Non-allelic interactions- Complementary genes, Epistasis, Supplementary genes, duplicate genes, Collaborator genes and Lethal genes.	**(12 Hrs)**

UNIT-II:	Polygenic inheritance and Multiple allelism a) Definition- Mode of inheritance of Kernel colour in Wheat and Skin colour in Man- Difference between Polygenic and Mendelian inheritance; Multple allele b) Definition- Mode of inheritance of Coat colour in Rabbit and ABO- blood groups in Man- Problems relating to inheritance of ABO- blood groups - Genetics of MN blood group and Problems. c) Genetic basis of Rh- Blood groups and their significance	**(12 Hrs)**
UNIT- III:	Linkage and Crossing-over a) Definition- Linkage- Linkage groups- Kinds of Linkage- Detection of linkage- Significance. b) Crossing over- Significance and evidences of Crossing over. c) Chromosomal Mapping- types.	**(12 Hrs)**
UNIT- IV:	Sex determination and sex linkage a) Mechanism of Sex determination- various theories- Role of hormone and environment in sex determination. b) Sex linked inheritance in Man- Colour blindness, Haemophilia and Eye colour in *Drosophila*- inheritance of sex limited and sex influenced genes- holandric genes.	**(12 Hrs)**
UNIT- V:	a) Extra- chromosomal inheritance- inheritance of Shell coiling in Snail, Kappa particles in *Paramecium* and Sigma particles in Drosophila. b) Inborn errors of Metabolism - Phenylketonuria, Alkaptonuria, Albinism, Muscular dystrophy c) Human genetics- Role of Pedigree analysis- Twin study- Syndromes- Turner syndrome, Down syndrome, Klinefelter syndrome, Cri du Chat Syndrome and Wolf syndrome Genetic counselling- Eugenics, Euthenics and Euphenics	**(12 Hrs)**

Text Books

Genetics – Verma P.S. & VK Agarwal (2008) S. Chand & Co.

Reference Books

- Principles of Genetics- Sinnott, Dunn and Dobzhansky,Mc.GrawHill Pub. Co.
- Principles of Genetics- E.J. Gardner etal (1991),Wiley Eastern & Co
- Human Genetics- E.A. Carlson ,(1985) Mc.Graw Hill Pub. Co.
- Genetics – S. Sambamurthy (2005) Narosa Publication.

Pedagogy

Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF BOTANY

Programme: B.Sc. Zoology (CBCS and OBE)

(For those students admitted during the 2019 - 2020 and after)

PART – III **: Ability Enhancement Course**		SEMESTER - **III**
Course Title: **PLANT DIVERSITY**		
Course Code:**08AT01**	Hours per week:**4**	Credit:**4**
CIA : **25 Marks**	ESE : **75 Marks**	Total : **100 Marks**

Preamble

- To understand the life history of cryptogams
- To understand the evolution of plants
- To identify the different groups studied

Course Outcome

On the successful completion of the course, students will be able

CO Number	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	To understand the morphology, life cycle of the selected forms of Algae To distinguish the variation of different classes of Algae To apply the uses of Algae in day to day life	K1,K2 & K3
CO2	To appreciate the morphology, life cycle of the selected forms of Fungi To realize the interrelationship between symbiotic life of Lichens To apply the uses of fungi in their day to day life	K1,K2 & K3
CO3	To know and realize the various forms, characteristics and reproduction of Bryophytes	K1,K2 & K3
CO4	To know and realize the various forms, characteristics and reproduction of Pteridophytes	K1,K2 & K3
CO5	To know and realize the various forms, characteristics and reproduction of Pteridophytes To understand the various forms of plant diversity among lower group of plant kingdom	K1,K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	1	1	3	3	1	1
CO 2	9	1	1	9	9	9	9
CO 3	9	1	1	3	3	3	3
CO 4	9	1	1	9	9	9	9
CO 5	9	1	1	3	1	9	9
	45	**5**	**5**	**25**	**25**	**31**	**31**

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	1	3	1	9	2
CO 2	1	1	-	3	1
CO 3	-	3	3	3	1
CO 4	-	1	3	3	1
CO 5	-	1	1	3	1
	2	**9**	**8**	**21**	**6**

Note: Strong-9, Medium- 3 and Low-1

Syllabus

UNIT NO	CONTENT	HOURS
Unit – I	**ALGAE:** General characteristics of Algae **-** FritschClassification of Algae (Class level only) **–** Occurrence, distribution, thallus structures life history of *Nostoc* and *Sargassum*– Economic Importance of Algae	**12**
Unit – II	**FUNGI:** General characteristics of Fungi - Alexopolous and Mims Classification of Fungi - Structure and Reproduction *Puccinia* – Economic Importance of Fungi - *Lichens*: Nature of association, habit and habitat, classification and morphology of lichen thallus. (Reproduction need not be discussed)	**12**
Unit – III	**BRYOPHYTES:**General characteristics of Bryophytes – Structure, Reproduction and life cycle of *Funaria.*	**12**
Unit – IV	**PTERIODOPHYTES -** General characteristics of Pteridophytes – Morphological and internal structure, Stellar variation, Reproduction and life cycle of *Lycopodium*.	**12**
Unit – V	**GYMNOSPERMS -** General characteristics of Gymnosperms – Morphological, Anatomical Structure and life cycle of *Cycas* (Excluding the Developmental Studies) - Economic Importance of Gymnosperms	**12**

Text Books:

1. An introduction to Embryophyta –Pteridophytes - N.S. Parihar, Surjeet Publications, Delhi, 2012 Ed.
2. Introduction to Mycology - C.J.Alexopoulos, Willey Eastern Pvt. Ltd, 2013 Ed.
3. Botany for Degree Students Gymnosperms - P.C. Vashishta, S.Chand & Company Ltd, Delhi, 2014 Ed.

Reference books

1. Morphology of Gymnosperms – Coulter, M. Jhon, Surjeet Publications, Delhi, 2014 Ed.
2. Botany for Degree Students Algae – P.C. Vashishta, S.Chand & Company Ltd, Delhi, 2014 Ed.
3. An introduction to Embryophyta –Bryophytes - N.S. Parihar, Surjeet Publications, Delhi, 2013 Ed.

Pedagogy

Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board

B.Sc. Zoology CBCS Syllabus **- SEMESTER – III**
(For those who join in June 2016 and after)

Part – IV : Skill Based Subject		
Subject Title : **Public Health and Hygiene**		
Subject Code: **09SB31**	Hours per week: **2**	Credit: **2**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *Inculcate the importance of public health and hygiene*
- *Consciousness on importance, source and quality of water*

UNIT I:

Scope of Public Health and Hygiene – Concepts of Health and Disease –. Nutrition and Health: Classification of foods – Nutritional deficiencies – Vitamin deficiencies – Balanced diet – Nutritional requirements of special groups.

UNIT II:

Environment and Health: Water-sources – Water quality standards – Solid waste and excreta disposal – Sewage treatment.

UNIT III:

Communicable diseases: Respiratory infections- Measles, Mumps and Diptheria, Intestinal infections- Poliomyletis, Typhoid and Amoebiasis, Arthropod infections- Filariasis and Dengue , Zoonosis- Rabies and Japanese encephalitis, Surface infections: Tetanus and AIDS.

UNIT IV:

Non-Communicable Diseases: Coronary Heart Disease – Hypertension – Diabetes – Obesity – Occupational Health Hazards: Physical, Chemical, Mechanical, Biological and Psychological. Mental health- Causes of mental ill-health-alcoholism and Drug dependence.

UNIT V:

Health Education: Health planning in India – Health programmes in India – WHO – Non-governmental Voluntary Health Organizations. First aid and Nursing: Methods – Dressing – care — Preparations.

Text books:

- Park and Park, 1995. Text Book of Preventive and Social Medicine, M/s. Banarsidas Bhanot Publishers, Jabalpur.
- Verma P.S. 1998. Medical Zoology, Rastogi Publications, New Delhi.

Reference Books:

- Gopalan, C. 1985, Nutritive values of Indian foods, ICMR, New Delhi
- Rajvir Bhawar, 2008. Text Book of Public Health and Community Medicines, Published by Armed Forces Medical College, Pune.

Pedagogy

Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board

விவேகானந்த கல்லூரி
தமிழ்த்துறை

Programme : B.A., BSc., (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2019 – 2022 and after)

PART – I **TAMIL**		SEMESTER : **IV**
Course Title : **சங்க இலக்கியமும் நீதி இலக்கியமும்**		
CourseCode **: P1LT41**	Hours per week **: 18**	Credit **: 03**
CIA Marks : **25**	ESE Marks : **75**	Total Marks : **100**

Preamble

1. பண்டைத் தமிழர்களில் ஒரு சமூகம் சார்ந்த வாழ்க்கை முறையினை உணர்த்துதல்.
2. தனிமனித வாழ்க்கைகளின் வழி களவு- கற்பு ஒழுக்க நெறிமுறைகளை வெளிப்படுத்துதல்.
3. வாழ்வில் கடைபிடிக்க வேண்டிய நீதிநெறிகளைப் புகட்டுதல்.
4. அகம், புறம் சார்ந்த வாழ்க்கைக்கான இலக்கண வரம்புகளை தெளிவுபடுத்துதல்.
5. சங்கஇலக்கிய மற்றும் நீதிஇலக்கிய காலகட்டங்களின் வரலாற்றினை விவரித்தல்.

Course Outcomes (COs)

On the successful completion of the course, students will be able to

NO.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	பண்டைத் தமிழர்களில் ஒரு சமூகம் சார்ந்த ஒழுக்கங்கள் குறித்த நிலையினை வரையறை செய்தல்.	K_1, K_2
CO 2	ஐந்திணை மக்களின் அகஒழுக்கங்கள் குறித்த செய்திகளை கலந்துரையாடுதல்.	K_2, K_3
CO 3	சங்க இலக்கியம் மற்றும் நீதி இலக்கிய காலகட்டங்களில் வாழ்ந்த மக்கள் மற்றும் அவர்களின் வாழ்க்கையினை பதிவுசெய்த படைப்பாளர்கள் ஆகியோரின் வரலாற்றினை விவரித்தல்.	K_2, K_3
CO 4	பழங்கால மக்களின் அகம், புறம் தொடர்பான வாழ்க்கை நிகழ்வுகளின் மரபுநிலைகள் குறித்த திறன்களை அறிவித்தல்.	K_2
CO 5	வாக்கியங்களைக் கண்டறிதல், சொற்களை ஒழுங்குபடுத்துதல், ஆங்கிலத்திற்கு நிகரான தமிழ்ச்சொற்களை கண்டறிதல், வழுவுச்சொற்களை நீக்குதல் போன்ற ஒரு மொழியின் பயன்பாட்டுத் தன்மையை தெளிவுறுத்தல்.	K_1, K_2, K_3

K_1-Knowledge **K_2-Understand** **K_3-Apply**

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	3	9	9	9	9	9
CO2	9	9	9	9	9	3	9
CO3	9	9	9	9	9	9	9
CO4	9	3	3	9	9	9	9
CO5	9	3	9	9	9	3	9
	45	27	39	45	45	33	45

Note: Strong-9, Medium- 3 and Low-1

பாடத்திட்டம் (Syllabus)

அலகு - 1	தமிழ்ச் சங்க இலக்கியம் (பத்துப்பாட்டு) 1. முல்லைப்பாட்டு	**(18 மணிநேரம்)**

அலகு - 2	தமிழ்ச் சங்க இலக்கியம் (எட்டுத்தொகை) 1.நற்றிணை - (3பாடல்கள்) 2.குறுந்தொகை - (5பாடல்கள்) 3.கலித்தொகை - (2பாடல்கள்) 4.அகநானூறு - (2பாடல்கள்) 5.புறநானூறு - (3பாடல்கள்)	**(18 மணிநேரம்)**
அலகு - 3	தமிழ் நீதி இலக்கியம் 1. திருக்குறள் (செய்நன்றி அறிதல், காலம் அறிதல், குறிப்பு அறிதல்) 2. பழமொழி நானூறு (கல்வி அதிகாரம்) 3. கொன்றை வேந்தன் (10 பாடல்கள்) 4. மூதுரை (10 பாடல்கள்)	**(18 மணிநேரம்)**
அலகு - 4	தமிழ் இலக்கணம் - பொருள் 1. அகப்பொருள் (அகத்திணைகள் - முதல், கரு, உரிப்பொருள்) 1. புறப்பொருள் (புறத்திணைகள் - வெட்சி முதல் பெருந்திணை வரையுள்ள 12திணைகள்) 2. மரபியல் (பெயர் மரபுகள் - ஆண்பால்பெயர், பெண்பால்பெயர், இளமைப்பெயர்)	**(18 மணிநேரம்)**
அலகு - 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும் 1. சங்க இலக்கிய வரலாறு 2. நீதி இலக்கிய வரலாறு 3. புத்தக மதிப்புரை, தமிழ்த் திரைப்பட விமர்சனம், கவிதை படைத்தல்.	**(18 மணிநேரம்)**

பாட நூல்கள் (Text Books)

1. தமிழ் செய்யுட் தொகுப்பு (தமிழ்த்துறை வெளியீடு)

பார்வை நூல்கள் (Reference Books)

1. தமிழ் இலக்கிய வரலாறு - சி.சேதுராமன் பாவை பப்ளிகேஷன்ஸ்,16(142)ஜானிஜான்கான் சாலை, இராயப்பேட்டை, சென்னை - 600014.
2. தமிழ் இலக்கிய வரலாறு - முனைவர் பாக்யமேரி நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட்,41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,அம்பத்தூர், சென்னை- 600 098.

Pedagogy

விரிவுரை கொடுத்தல், கலந்துரையாடல், காட்சிப் பதிவுகளின் வழியாக புலப்படுத்துதல், பயிற்சி கொடுத்தல்.

Teaching Aids

கரும்பலகை பயன்படுத்துதல், காட்சி திரைவழியாக புலப்படுத்துதல்.

DEPARTMENT SANSKRIT
Programme: B.A./B.Sc.(CBCS and OBE)
(For those students admitted during the Academic Year 2019-20 and after)

PART–I **:** Language		SEMESTER–IV
CourseTitle: **DRAMA AND HISTORY OF SANSKRIT LITERATURE–IV**		
CourseCode:**P1LS41**	Hoursper week: **6**	Credits:**3**
CIAMarks: **25**	ESEMarks:**75**	TotalMarks: **100**

Preambles:

Sanskrit is offered as an alternative language under Part –I for B.A. / B.Sc students during first four semesters the above column explainsthe scheme of the IV semester.

Course Outcomes (COs)

On the successful completion of the course, students will be able to

	Statement	Knowledge Level
CO1	Understand Sanskrit drama literature	K1,K2
CO2	Comparing drama with modern life	K2
CO3	Classify and discuss the importance of Sanskrit drama Literature	K2
CO4	Describe and defend history of early Sanskrit literature	K2
CO5	Practice Creativity and Demonstrate different aspects of spoken sanskrit	K2,K3

K1-Knowledge **K2-**Understand **K3-**Apply

CO and PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO 6	PO 7
CO1	9	9	9	9	3	-	3
CO2	9	9	3	9	3	3	3
CO3	9	9	3	9	9	-	3
CO4	3	9	9	9	9	-	3
CO5	9	9	9	9	9	3	3
	39	45	33	45	33	6	15

Note: Strong-9 Medium-3 Low -1

Syllabus

Unit1: Introduction to Sanskrit drama literature, introduction and scope of spoken Sanskrit.

Unit2: Characteristics features of Sanskrit dramas and Varieties of Sanskrit dramas, spoken Sanskrit for personal use.

Unit 3: Karṇabhāra up to Karṇa revealing his life history to Śalya, Dramas of Bhāsa, spoken Sanskrit for Educational purpose

Unit4: Karṇabhāra upto the curse of Karṇa by Paraśurāma, Dramas of Kālidāsa, Moral and social aspects of dramas of Kālidāsa, spoken Sanskrit for commercial purpose.

Unit5: Karṇabhāra upto the end of the play, Dramas of Bhavahūti, Moral and social aspects of dramas of Bhavahūti and other dramas.

Text Books

1. Karṇa bhāra of Bhāsa, Pub. By R.S.Vadyar & Sons, Palakkad, Kerala,2004
2. A History of Sanskrit Literature, compiled by Dr.S. Jagadisan, Published by AMG Publications, Madurai -625010. Year of publication1996.

Refernce Books

1. A Short History of Sanskrit Literature, by T.K.Ramachandra Aiyyar, published by R.S. Vadhyar & Sons, Kalpathi, Palakkad-678003.
2. A History of Sanskrit Literature, by A. Berriedale Keith, published by Mothilal Banarsi dass Publishers Private Limited, Delhi, 2017.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

UG Programme, Part -II English (CBCS-OBE) **- SEMESTER IV**
(For those students who joined in the academic year 2018-2019 onwards)

PART II		
Course Title : **English for Academic and Professional Excellence-II**		
Course Code: P2LE41/ P2CE41	Hours per week: **6**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Preamble:

The students are expected to inculcate English socio-linguistic competence and moral values through world literature in English for communication skills.

Course Outcome (CO):

On the successful completion of the course, the students will be able to:

	Course Outcome	**Knowledge Level (according to Bloom's Taxonomy)**		
CO1	Examine authors' motivations on life-training through various discourses	K1	K2	K3
CO2	Demonstrate the power of rhetoric skills through dramatic interactions	K1	K2	K3
CO3	Identify and demonstrate language skill and proficiency through objective English for competitive examinations/methods	K1	K2	K3
CO4	Author effective discourses for Public Speaking through acquired grammar skills	K1	K2	K3
CO5	Weigh current global issues through soft skills trained lessons and create writing through composition tools	K1	K2	K3

K1-Knowledge **K2**-Understand **K3**-Apply

Programme Outcome

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1	9	3	9	9	9	-	3
CO2	9	3	9	9	9	3	3
CO3	9	3	3	-	-	-	3
CO4	9	9	9	1	1	-	3
CO5	9	9	9	3	3	-	3
	45	27	39	22	22	3	15

Note: Strong-9 Medium-3 Low -1

SYLLABUS

Unit-1 Prose

The Indian National Education by Swami Chidbhavananda

1. The Teacher
2. The Student
3. University Education on the Gurukula Pattern

Unit-2 Drama

1. William Shakespeare's *The Merchant of Venice*
   (Act-IV, Scene-I:Court scene)
2. Shakespeare's *Julius Caesar*
   (Act-III, Scene-II: Mark Antony and Brutus Speech)
3. Shakespeare's *Twelfth Night*

(Act-V, Scene-I: Before Olivia's House)

Unit-3 English for Competitive Examinations

1. Synonyms and Antonyms
2. One word Substitution &Analogy
3. Foreign Words and Phrases in English

Unit-4 Art of Public Speaking Skills

1. Master of Ceremony/Anchoring Skills
2. Welcome Address, Introducing a Speaker,
3. Presidential Address, Keynote or Chief Guest's Address and Vote of Thanks

Unit-5 Soft-Skills for Capacity Building

1. Interpersonal skills (*Greetings* and Leave-taking Etiquette etc.)
2. Group Discussion for Placement
3. Covering Letter and RésuméPreparation -2 (USA)

Text Books:

1. Swami Chidbhavananda. The Indian National Education. Tirupparaithurai: Sri Ramakrishna Tapovanam, 2017.

2. Richard Proudfoot, et al. The Arden Shakespeare Complete Works. London: Bloomsbury, 2016.(Prescribed Acts will be given.)

3. Bikram K. Das. Functional Grammar & Spoken & Written Communication in English. New Delhi: Orient BlackSwan,(or) Mary Ellen Guffey, and Richard Almonte. Essentials of Business Communication. Toronto: Nelson Education, 2007.

4. Dale Carnegie. The Art of Public Speaking.Massachusetts: Wyatt North Publishing, 2013.

5. Hari Mohan Prasad, and Uma Rani Sinha. Objective English for Competitive Examinations. New Delhi: McGraw Hill Education, 2016. (Prescribed chapters will be given.)

Refernce Books

1. Swami Chidbhavananda. Vedanta Society. <https://sfvedanta.org/authors/swami-chidbhavananda/>

2. Edgar Thorpe, and Showick Thorpe. Objective English for Competitive Examinations. New Delhi: Pearson India Education, 2017.

3. W M. Cullen Bryant, ed. The Complete Works of Shakespeare. New York: The Amies Publishing Company, 1888.

4. William James Craig, ed. The Complete Works of William Shakespeare (The Oxford Shakespeare. London: Oxford University Press, 1914.

5. Stephen E Lucal. The Art of Public Speaking. New York: McGraw-Hill Education, 2015.

6. K.V.Joseph. A Textbook of English Grammar and Usage. New Delhi: TATA McGraw Hill Education Private Limited, 2012.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2019-20 and after)

PART – III **: Core Subject Theory**		SEMESTER **- IV**
Subject Title **: DEVELOPMENTAL BIOLOGY**		
Subject Code: **09CT41**	Hours per week: **4**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To enable the studentsto acquire knowledge on right from the genesis of the embryo organisation of cells and tissues leading to structure, developmental complexity with in organisations and their interactions.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Understand the historical theories of development and understand the origin shapes and types of gametes.	K1, K2, K3
CO 2	Acquire knowledge on events of the fertilization, cleavage pattern and causes for the cellular differentiation of blastomeres.	K1, K2, K3
CO 3	Understand the differential modifications and functions of developmental and embryonic cells and the process of development of brain, heart, eye and kidney.	K1, K2, K3
CO 4	Analyse the reproductive cycles and events of human reproduction, mechanism of various metamorphosis and regeneration.	K1, K2, K3
CO 5	Trace the applications and methods of human welfare in embryology.	K1, K2, K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	-	-	3	3	-	-
CO 2	9	-	-	1	-	-	-
CO 3	9	-	-	-	-	-	3
CO 4	9	-	-	-	-	-	3
CO 5	9	-	9	9	9	-	3
	45	-	9	13	12	-	9

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	-	-	3	9	1
CO 2	1	9	3	3	1
CO 3	1	3	3	9	1
CO 4	3	3	3	9	1
CO 5	1	1	1	9	3
	6	16	13	39	7

Note: Strong-9 Medium-3 Low -1

Syllabus

UNIT-I:	a) Historical reviews-Theory of Preformation, Theory of Epigenesis, Baer's law and Biogenetic law b) Gametogenesis- Spermatogenesis, Oogenesis c) Types of eggs -structure of spermatozoa and ovum in mammals.	**(12 Hrs)**

UNIT-II:	a) Fertilization: Acrosomal reaction, Cortical reaction, Physiological and biochemical changes, significance-Parthenogenesis. b) Planes and types of cleavage patterns. c) Fate maps in Amphioxus, Frog and Chick	**(12 Hrs)**
UNIT- III:	a) Blastulation and Gastrulation in Amphioxus, Frog and Chick. b) Organogenesis: Derivatives of Ectoderm, Mesoderm and Endoderm-Development of Brain, Eye, Heart and Kidney. c) Foetal membranes in Chick	**(12 Hrs)**
UNIT- IV:	a)Human reproduction; Menstrual cycle-Menopause, pregnancy-Parturition – lactation - hormonal control -Types and Functions of Placenta. b). Amphibian metamorphosis: Anatomical and Biochemical changes, role of hormones in metamorphosis, role of hormones in insect metamorphosis. c) Regeneration: Definition –mechanism and types- factors controlling regeneration	**(12 Hrs)**
UNIT- V:	a) Gradient theory- Organizer- Concept, Spemann's experiment, Mechanism of Induction- Nuclear transplantation experiments in *Acetabularia.* b) Differentiation- Types, processes, competence- Nucleo cytoplasmic interaction c) Human welfare and Embryology- Birth control, Infertility, Test tube Baby - Intra cytoplasmic Sperm injection (ICSI) and Intra Uterine Insemination (IUI) and Teratogenesis	**(12 Hrs)**

Text Books

Verma, S and Agarwal, V.K, 2005, Chordate Embryology, S.Chand & Co, New Delhi.

Reference Books

- Balinsky, B.I, 1981, An Introduction to Embryology, Holt Saunders, New York.
- 2. Berrill, N.J, 1986, Developmental Biology, McGraw Hill, New Delhi.

Pedagogy

Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2019-20 and after)

PART – III **: Core Subject Theory**		SEMESTER **- IV**
Subject Title **: PHYSIOLOGY**		
Subject Code: **09CT42**	Hours per week: **4**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To enable the studentsto understand the knowledge on structure and functions physiology of various organ systems. And to create awareness on nutritional deficiencies.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on physiological role of major and minor nutrient.	K1, K2, K3
CO 2	Impart knowledge on structure and physiology of circulatory and respiratory systems in animals.	K1, K2, K3
CO 3	Analyse the physiology of excretion, ionic balance and chemical coordination in animals.	K1, K2, K3
CO 4	Obtain knowledge on types and constructions, physiological and chemical coordination of neuromuscular system.	K1, K2, K3
CO 5	Gain the knowledge on structure and physiology of receptors (ear and eye) and endocrine glands and circadian rhythm	K1, K2, K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO6**	**PO7**
CO 1	9	-	9	-	-	-	3
CO 2	9	-	3	-	3	-	3
CO 3	9	-	-	-	-	3	1
CO 4	9	-	3	-	-	-	3
CO 5	9	-	3	3	3	3	3
	45	-	18	3	6	6	13

Mapping of CO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	3	3	-	3	3
CO 2	3	3	3	3	-
CO 3	-	3	3	3	-
CO 4	-	3	3	9	-
CO 5	3	3	9	9	-
	9	15	15	27	3

Note: Strong-9 Medium-3 Low -1

Syllabus

UNIT-I:	a) Definition and brief history of Physiology - the fields and branches of physiology. Nutrition and types - Food- composition, classification - the physiological role of major nutrient and minerals; Vitamins- chemical nature of vitamins, classification and their role in animal life. b) Digestion and absorption of carbohydrate, protein and lipids in man.	**(12 Hrs)**
UNIT-II:	a) Circulation- types of circulatory system, circulatory media found in animals, types of heart, origin and conduction of heart beat, composition of blood, general functions of blood, blood clotting mechanisms, blood transfusion, blood volume and blood pressure. b) Respiration –- Respiratory pigments, transport of respiratory gases-Oxygen	**(12 Hrs)**

	dissociation curve, respiratory quotient.	
UNIT- III:	a) Excretion- major excretory substances- classification of animals based on excretory products, structure of human kidney, nephron and its ultra-structure, mechanism of urine formation and excretion – hormonal control. b) Structure of human kidney, nephron and its ultra-structure, mechanism of urine formation and excretion – hormonal control. b) Osmoregulation – definition, Osmoregulators, osmoconformers, stenohaline and euryhaline organisms, Osmoregulation in fishes and crustaceans- Thermoregulation – Suspended animation – Hibernation, Aestivation, Diapause.	**(12 Hrs)**
UNIT- IV:	a) Nervous system- Central Nervous system and Autonomous Nervous system- physiological role of sympathetic and parasympathetic Nervous system- Ultra structure of a typical neuron, concept of synapse- nerve impulse conduction- neuro muscular junction- reflex action- reflex arc. b) Muscular system- ultra structure of skeletal fibres- general properties of muscle fibre contractile proteins- mechanism of muscle contraction, biochemical changes during muscle contraction.	**(12 Hrs)**
UNIT- V:	a) Receptors- types - structure and functioning of phonoreceptor (Human ear) and photoreceptor (Human eye) b) Endocrine system- structure, hormones and role of pituitary gland, thyroid gland, Para-thyroid gland, adrenal gland and Islets of Langerhans. c) Chronobiology- biological rhythms, and biological clock.	**(12 Hrs)**

Text Books

- Essentials of Animal Physiology – S.C Rastogi ,2002, Wiley Easernt Ltd. New Delhi.
- General physiology- A.Mariakuttikan & N. Arumugam 2006,Saras Pub,Nagercoil.

Reference Books

- General & comparative Animal physiology – William S. Hoar 2004.,Prentice-Hall
- Animal physiology - Kunt Schmidt ,2000-Eastern Economy Ed.
- Comparative Animal physiology - C.L Prosser and F.A.Brown 1965,W.B.Saunder's Co
- Animal physiology and related Biochemistry – R.C. Dalela Verma,1995. Jai Prakash Nath and Co.

Pedagogy

Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST – 625 234

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2018 - 19 and after)

PART – III **: Core Practical**		SEMESTER **- II**
Course Title **: PRACTICAL - II**		
Course Code: **09CP43**	Hours per week: **2**	Credits: **4**
CIA: **40 Marks**	ESE: **60 Marks**	Total: **100 Marks**

Preamble

Visualize and analyse the morphology and anatomy of cell types, cell division, its methods of genetic inheritance and diseases, developmental stages of embryo and its associated structural and physiological activities and excretory products of animals.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on cell types, cell division, identification of genetic materials and perform micro technique.	K1, K2, K3
CO 2	Demonstrate the principles of Mendelian and non-Mendelian inheritance.	K1, K2, K3
CO 3	Observe genetic modification, differential inheritance due to multiple allelism, polygene and their associated problems.	K1, K2, K3
CO 4	Identify, analyse and prepare various developmental stages of embryo and its associated structures.	K1, K2, K3
CO 5	Trace the excretory products of physiological activities and their testing techniques in animals.	K1, K2, K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	-	-	-	3	-	3
CO 2	3	-	3	-	3	-	3
CO 3	3	-	3	3	3	-	3
CO 4	9	-	-	-	9	3	3
CO 5	9	-	-	-	3	3	9
	33	-	6	3	21	6	21

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	1	9	9	3	-
CO 2	1	9	3	3	-
CO 3	1	9	3	3	-
CO 4	1	9	3	9	-
CO 5	-	1	3	3	-
	4	37	21	21	-

Note: Strong-9 Medium-3 Low -1

Syllabus

CELL BIOLOGY

1. Study of Cell types – Observation of prepared slides
2. Study of buccal epithelium in human and Onion peeling
3. Mitosis – Study of stages in Onion root tip meristem
4. Meiosis – Study of stages of grass hopper testis –squash
5. Micro technique- Preparation of permanent slides (Demonstration only).
6. Identification of the genetic material(chromosome)by simple staining – Giant

chromosome in *Chironomus* larva

7. Spotters
   I. Watson and Crick model of DNA
   II. DNA Replication
   III. Lac Operon
   IV. Clover leaf model of tRNA
   V. Coding dictionary

GENETICS

1. Survey of simple Mendelian traits in man in small population.
2. Use of beads to study Monohybrid, Dihybrid and Test crosses.
3. Distribution of tasters and non-tasters in the class population (PTC tasting).
4. Polygenic inheritance of quantitative traits – observations and graphical representations may be made using height and weight of the students.
5. ABO Blood grouping.
6. Genetic basis and significance of
   a) Gynandromorphism
   b) Shell coiling in *Limnaea.*
   c) Klinefelters, Down and Turner's Syndromes
   d) Colour blindness and Hypertrichosis.
7. Fraternal, identical and Siamese twins
8. Drosophila culture and identification of various stages.

DEVELOPMENTAL BIOLOGY

1. Study of structure of egg of an insect, frog and Chick.
2. Temporary mounting of Chick blastoderm.
3. Effect of Thyroxine in tadpoles of Frog (Demonstration only)

SPOTTERS

a) Observation of cleavage, Blastula and Gastrula of Frog (Slides).
b) Whole mount of 24 Hours and 48 Hours chick embryo (Slides)
c) Placental types – Observation

PHYSIOLOGY

1. Effect of temperature on the opercular movement of fish.
2. Study of oxygen consumption by a fish
3. Test for the detection of excretory products (Ammonia, Urea and Uric acid).
4. Study of blood corpuscles- Preparation of blood smear and counting of blood corpuscles using haemocytometer.
5. A study on ECG strip and report
6. Effect of activities on blood pressure in Man.

Pedagogy

Chalk and talk, Charts and models, Smart board, Group Discussion, PPT, Preserved animals, slides and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board, Microscope – Dissection, Compound, and Phase Contrast Microscopes.

DEPARTMENT OF BOTANY

Programme: B.Sc. Zoology (CBCS and LOCF)

(For those students admitted during the 2021 - 22 and after)

PART – III : Allied		SEMESTER - **IV**
Course Title: **TAXONOMY OF ANGIOSPERMS & PLANT PHYSIOLOGY**		
Course Code:**08AT02**	Hours per week:**4**	Credit:**4**
CIA: **25 Marks**	ESE: **75 Marks**	Total**: 100 Marks**

Preamble

- To understand the life history of angiosperms
- To know the mechanism of some metabolic activities of plants
- To know the various kinds of hormones involved in plants growth

Course Outcome

On the successful completion of the course, students will be able

CO Number	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	To understand and distinguish the morphology of angiosperms To identify the higher plants	K1, K2 & K3
CO2	To appreciate and differentiate the morphology of selected angiosperms To apply the uses of economic important higher plants in their day to day life	K1, K2 & K3
CO3	To know and understand the biological mechanisms of water absorption and transpiration	K1, K2 & K3
CO4	To know and understand the biological mechanisms of food and energy synthesis in plants	K1, K2 & K3
CO5	To know and realize the growth and flowering of higher plants To apply the techniques of growth and flowering in their higher studies and research	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CO with PO

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO6**	**PO7**
CO 1	9	1	1	3	1	3	3
CO 2	9	1	1	3	3	3	9
CO 3	9	1	1	3	3	3	3
CO 4	9	1	1	1	1	1	1
CO 5	9	1	1	3	3	3	3
	45	**5**	**5**	**13**	**11**	**13**	**19**

Mapping of CO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	-	3	1	3	1
CO 2	-	1	1	3	-
CO 3	-	-	1	1	1
CO 4	-	1	9	3	3
CO 5	-	1	9	9	1
	-	**6**	**21**	**19**	**6**

Note: Strong-9, Medium- 3 and Low-1

Syllabus

UNIT NO	CONTENT	HOURS
Unit – I	Outline classification of Bentham and Hooker's classification & merits and demerits – ICBN - Botanical survey of India - Important technologies in morphological features	**12**
Unit – II	Vegetative, floral characters and Economic importance of Annonaceae, Caesalpiniaceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae, Poaceae.	**12**
Unit – III	**Plants and water relations**: Osmosis – water potential concept – Plasmolysis – Mechanism of Absorption of water - transpiration and Guttation.	**12**
Unit – IV	**Photosynthesis**: Structure of chloroplast – Light reaction – Z pigment system - Cyclic and Non - cyclic photophosphorylation - Dark reaction – C_3 and C_4 cycles.	**12**
Unit – V	**Plant Growth Regulators:** Auxins, Cytokinins Gibberellins, Ethylene and ABA (Excluding Biosynthesis) - Physiology of flowering – Photoperiodism and Vernalization.	**12**

Text Books:

1. Plant Taxonomy, Saxena and Saxena, A Pragti Edition, Pragati PVT Ltd, Meerut, 2017 Ed.
2. Economic Botany, V Singh, PC Pande and DK Jain, Rastogi Publications, 2015 Ed.
3. Fundamentals of Plant Physiology – VK Jain, S Chand and Company Ltd. New Delhi, 2017 Ed.

Reference books

1. Taxonomy of Angiosperms- B.P. Pandey, S.Chand & Company Ltd, Delhi, 2014 Ed.
2. Economic Botany- A Comprehensive Study, SL Kochhar, Cambridge University Press, 2016 Ed.
3. Plant Physiology – Suraj Mandal, Campus Books, New Delhi, 2014 Ed.

B.Sc. Zoology (Allied Botany) CBCS Syllabus - **SEMESTER – IV**

(For those who join in June 2015 and after)

PART – III : Allied Subject Practical		
Subject Title: **Practical I (Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms, Taxonomy and Plant Physiology)**		
Subject Code:**08CP03**	Hours per week: **2**	Credit: **2**
Sessional Marks: **40**	Summative Marks: **60**	Total Marks: **100**

Preamble

- To understand the plant diversity and thallus construction of selected forms
- To get hands on knowledge on identification of angiosperms
- To understand the basic physiological activities of higher plants.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	To revise the morphology and reproductive structures in Algae, Fungi and Lichens Bryophytes, Pteridophytes and Gymnosperms.	K1, K2 & K3
CO2	To familiarize the internal structures, spore bearing parts of selected plant forms, Lichens, and Bryophyte. To identify macro micro algae, fungal colonies, lichen forms and fossil plants	K1, K2 & K3
CO3	To compare the life cycles of Algae, Fungi, Lichens, Bryophytes, Pteridophytes and Gymnosperms	K1, K2 & K3
CO4	To understand and Become a expert for higher plant identification	K1, K2 & K3
CO5	To understand the mechanism physiological activities of higher plants.	K1, K2 & K3

K1 – Knowledge **K2** – Understand **K3** – Apply

Mapping of CO with PO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CO 1	9	1	1	3	3	1	1
CO 2	9	1	1	3	3	1	1
CO 3	9	1	1	3	3	1	1
CO 4	9	1	1	1	1	1	1
CO 5	9	1	1	1	1	1	1
	45	**5**	**5**	**11**	**11**	**5**	**5**

9-Strong 3-Medium 1-Low

CLO-PSO Mapping

	PSO1	PSO2	PSO3	PSO4	PSO5
CLO1	-	-	3	3	1
CLO2	-	-	-	3	-
CLO3	-	-	3	9	-
CLO4	-	1	3	9	-
CLO5	-	3	1	9	1
	-	**4**	**10**	**30**	**2**

9-Strong **3**-Medium **1**-Low

Syllabus

UNIT NO	CONTENT	HOURS
Unit – I	Micropreparation of types prescribed in *Nostoc, Sargassum, Puccinia* and Lichens	**6**
Unit – II	Micropreparation of types prescribed in *Funaria* & *Lycopodium*	**6**
Unit – III	Micropreparation of types prescribed in *Cycas*	**6**
Unit – IV	Identifying, observing and sketching the floral parts of the plants and economic importance of Annonaceae, Caesalpiniaceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae and Poaceae.	**6**
Unit – V	Demonstration of the following physiological experiments: Four leaf experiment, Foliar Transpiration, Ganong's Light screen, Ganong's Potometer, Mohl's half leaf experiment, Evolution of O_2 during photosynthesis, Arc Auxanometer, Clinostat, Phototropism, Kuhne's fermentation vessel	**6**

Text Books

1. Botany for Degree Students Gymnosperms - P.C. Vashishta, S.Chand & Company Ltd, Delhi, 2014 Ed.
2. Practical Taxonomy of Angiosperms – R.K. Singha, Inter. Publishing House, Delhi, 2013 Ed.
3. Plant Physiology - Jain, V.K, S.Chand & Company Ltd, Delhi, 2013 Ed.

Reference books

1. Taxonomy of Angiosperms- B.P. Pandey, S.Chand & Company Ltd, Delhi, 2014 Ed.
2. College Botany – Ganfule Hirendra (Chandra) Vol. I, New centre book agency, London, 2013 Ed.
3. The structure and reproduction of Algae Vol. I & II - F.E.Fritsch, Cambridge University Press.

Pedagogy

Chalk & Talk, Experiment

Teaching Aids

Black Board, Green Board, Chart, Specimen, Plant Material, Permanent Slide, Online virtual Lab & Interactive White Board

B.Sc. Zoology CBCS Syllabus - **SEMESTER – IV**
(For those who join in June 2016 and after)

Part – IV : Skill Based Subject		
Subject Title : **Clinical Lab Technology**		
Subject Code: **09SB41**	Hours per week: **2**	Credit: **2**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives

To enable the students

- *Principles, applications and working mechanisms of biomedical instruments*
- *Haematological techniques*

UNIT I BIOMEDICAL DIAGNOSTIC LABORATORY-1:

Laboratory bio safety – general plan and organization –biomedical waste management, Applications of autoclave, centrifuge, microscope.

UNIT IIBIOMEDICAL DIAGNOSTIC LABORATORY -2

Chromatography, Colorimetry andX-ray

UNIT III BIOMEDICAL DIAGNOSTIC LABORATORY -3

Ultra Sound scan, Doppler scan, CT scan and MRI

UNIT IV HEMATOLOGICAL TECHNIQUES

Haemoglobinometer, Haemocytometer, ECG and ESR

UNIT VBIOMEDICAL STANDARDS AND DISORDERS:

Lipid profile, urine profile, semen analysis, stool examination; anaemia, diabetes, jaundice, bleeding disorders, CHD and Arthritis.

Text Book:

- Mukherjee, 1989. Medical Laboratory Technology - Volume I, II & III –L. McGraw Hill Publ. Co.

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Core Subject Theory**		SEMESTER **- V**
Subject Title **: BIOCHEMISTRY AND BIOPHYSICS**		
Subject Code: **09CT51**	Hours per week: **5**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To enable the students to understand the broad spectrum of bio- molecules in their structure, metabolism and functions. They are also made awareness of biophysical properties among the living systems

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge in biomolecule structure, classification and biophysical principles.	K1,K2 & K3
CO 2	Understand the properties of biomolecules and various law's bio-physical principles.	K1,K2 & K3
CO 3	Explore the metabolic pathways and their products in the living system.	K1,K2 & K3
CO 4	Apply the biophysical principles in the living systems.	K1,K2 & K3
CO 5	Analyse the products of biomolecules and biophysical principles in living system.	K1,K2 & K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	-	-	-	-	-	3
CO 2	9	-	-	-	-	-	3
CO 3	9	-	3	-	-	3	3
CO 4	3	-	3	-	3	-	3
CO 5	3	-	3	-	1	-	3
	33	-	9	-	4	3	15

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	9	3	9	-
CO 2	3	9	3	9	-
CO 3	3	9	3	9	-
CO 4	-	3	3	-	3
CO 5	-	3	3	3	3
	9	33	15	30	6

Note: Strong-9, Medium- 3 and Low-1

Syllabus

UNIT-I **12 hours**

a. Acids, Bases, Dissociation constant, indicators, p^H, Buffers, Electrolytes, isotopes, isomerism.

b. Biologically important chemical bonds and their importance.

c. Classification, structure and properties of Carbohydrates, Lipids, Protein and Amino acids.

UNIT-II **12 hours**

a. Structure and function of cholesterol, biosynthesis of cholesterol.

b. Enzymes and Co enzymes: Classification and properties of enzymes-factors affecting enzyme action.

c. Theories of enzyme action-Mechanism of enzyme action- Role of Coenzymes and isoenzymes.

UNIT-III **12 hours**

a. Metabolism of carbohydrates (Glycolysis, Glycogenesis, Glyconeogenesis and Glycogenolysis)
b. Metabolism of Protein (deamination, transamination, transdeamination and urea synthesis)
c. Metabolism of Lipid (β-oxidation, biosynthesis of glycerol)

UNIT-IV **12 hours**

a. Biological oxidation: Definition- The respiratory chain-Oxidative phosphorylation
b. Production of ATP and energy budget in the metabolism of major nutrients.
c. High energy compounds-definition-biologically important high energy compounds.

UNIT-V **12 hours**

a. Colloids –introduction. Types of colloidal solution-general properties of colloidal solution, Brownian movement, Osmotic pressure, dialysis, Donnan membrane equilibrium. Surface tension
b. Adsorption, hydrotrophy, diffusion (passive and active), transport across the cell membrane-pinocytosis, transport of ions.
c. Thermodynamics-definitions of different terms, Free energy, heat energy, enthalpy, entropy, exothermic and endothermic reactions. Bioelectricity - definition and measurement-action potential-membrane potential, Redox potential.

Text Books

- Deb A.C. 2003. Fundamentals of Biochemistry, New central book agency, Kolkatta
- Subramanian, M.A. 2005. Biophysics- Principles and Techniques, M.J.P. Publication, Chennai.

Reference Books

- Ambika Shanmugam 2003. Fundamentals of Biochemistry, Madras Medical College, Chennai
- Lehninger 2008. Biochemistry, Kalyani Publications, New Delhi
- R.N. Roy 2006. Biophysics, Kolkatta
- Salil Bose 1982. Elementary Biophysics, Jyothi books, Madurai.

Pedagogy

Chalk and talk, Group Discussion and PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Core Subject Theory**		SEMESTER **- V**
Subject Title **: BIOTECHNOLOGY**		
Subject Code: **09CT52**	Hours per week: **5**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Enable the students to understand the basic knowledge on concepts, tools, techniques and applications of biotechnology.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on concepts and various tools and techniques in biotechnology	K1,K2
CO 2	Understand the functions of the tools under various disciplines of biotechnology	K2,K3
CO 3	Explore the culture techniques, gene modification, gene amplification and environmental bioremedies using in biotechnology	K2,K3
CO 4	Gain knowledge on the principles and applications of various molecular techniques	K2, K3
CO 5	Inculcate the entrepreneurial skills using the tools and techniques in biotechnology	K1, K2, K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	-	3	-	9	3	9
CO 2	9	-	3	-	9	3	9
CO 3	9	-	3	-	3	9	9
CO 4	9	-	3	-	9	3	9
CO 5	3	-	3	-	1	3	9
	39	-	15	-	31	21	45

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	-	1	9	9	1
CO 2	-	1	9	9	1
CO 3	-	3	9	9	-
CO 4	-	3	9	9	3
CO 5	-	1	9	9	9
	-	9	45	45	14

Note: Strong-9, Medium- 3 and Low-1

Syllabus

Unit: I Introduction and Molecular Tools

a. Definition – Scope and importance- Biotechnology as an interdisciplinary pursuit - Intellectual Property Right (IPR) and Ethics in biotechnology

b. Enzymes – Restriction endonucleases (Type I, II & III), DNA-ligase, Reverse transcriptase, DNA polymerase, Terminal transferase - Linkers and Adaptors

c. Vectors – pBR322, Ti plasmid, SV40 - Basic ideas about Phagemid, Cosmid, Bacterial Artificial Chromosome (BAC), Yeast Artificial Chromosome (YAC), Transposons as vectors, Shuttle and Expression vectors.

Unit-II Recombinant DNA Technology

a. Gene cloning in Prokaryotes - DNA-gene library, genomic library - cDNA library
b. Integration of DNA fragments into vector - Transfer of rDNA into bacterial cell
c. Screening of recombinants - Selection of recombinants - DNA- sequencing

Unit: III Techniques

a. **Molecular techniques**- Agarose Gel Electrophoresis – RFLP, RAPD, Polymerase Chain Reaction (PCR) – Blotting Techniques- Molecular probes and Hybridization- DNA finger Printing- Microarray
b. **Animal Cell culture techniqu**es: Basic aspects of Animal cell, tissue and organ culture-Immobilized cell culture - Insect cell culture-Whole embryo culture
c. **Plant cell culture techniques:** *In vitro* culture technique – Introduction for plant cell, tissue and organ culture

Unit-IV Applied Biotechnology

a. **Animal-**Transgenic animals-Sheep& Fish- Animal bioreactor and molecular farming - Products from animal cell culture - Tissue plasminogen activator (tPA), blood factor VIII, Erythropoietin (EPO)
b. **Plant-**Disease resistant plant production-Production of stress resistant plants – Insect resistant transgenic plants
c. **Microbes-**Biofertilizers, Biopesticides, Primary and secondary metabolites-Ethanol production- Single cell protein (SCP) - Biogas production- Biohydrogen- Mushroom culture

Unit - V Biotechnology in Medicine and Environment

a. **Medicine:** Recombinant vaccines - Improved contraceptives & Vaccines to control fertility-Antibiotic production- Penicillin., Monoclonal antibody production and its applications
b. DNA probes in diagnosis of diseases- Production of Human peptide hormones and insulin-Gene therapy

c. Environment: Genetically Modified Organisms (GMOs) for the management of environmental wastes - Bioremediation – i*n situ* and *ex situ* process- Microbial degradation of Xenobiotics – Biomining and Ore leaching.

Text Books

- Dubey R.C. 2012. A text book of Biotechnology, S .Chand and Company Ltd., New Delhi

Reference Books

- Das H.K. 2007. Text Books of Biotechnology, Wiley Precise text books.
- Channarayappa, 2006. Molecular BiotechnologyPrinciples and practices, University Press.
- Satyanarayana U. 2008. Biotechnology, Books and Allied, Kolkatta
- Lohar S. 2005. Biotechnology Praksh MJP publications Chennai.

Pedagogy

Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board, Smart Board &Electrophoresis apparatus

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Core Subject Theory**		SEMESTER **- V**
Subject Title **: MICROBIOLOGY AND IMMUNOLOGY**		
Subject Code: **09CT53**	Hours per week: **5**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Enable the students to understand the basic knowledge on microbes, their structures and behaviour. To study the immune system and basic immunotechniques

Course outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on basic concepts of microbiology and immunology	K1&K2
CO 2	Understand the classification , structure and behaviour of microbes and immune system	K1&K2
CO 3	Analyze the microbial physiology in various media and the cellular morphology of immune system	K1&K2&K3
CO 4	Explore the impact of microbes in different media and to gain the knowledge on types and response of different immune system	K1&K2&K3
CO 5	Impart the knowledge on microbes in daily life and to empower to develop the skills in immunotechniques	K1&K2&K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	-	3	3	9	3	9
CO 2	9	-	3	3	9	3	9
CO 3	9	-	3	3	9	3	9
CO 4	9	-	3	3	3	1	9
CO 5	9	-	3	3	3	1	9
	45	-	15	15	33	14	45

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	9	-	-	-	-
CO 2	-	3	9	-	-
CO 3	-	3	9	-	-
CO 4	-	3	9	3	3
CO 5	-	3	9	3	3
	9	12	36	6	6

Note: Strong-9, Medium- 3 and Low-1

Syllabus

UNIT-I **12 hours**

a. History and scope of Microbiology: Classification of microorganisms- Structural features of Bacteria, Virus, Actinomycetes and Fungi: Reproduction of Viruses (T4 Phage and HIV)
b. Bacterial growth and nutritional requirements: Culture of Microorganisms – Types of culture media, Cultural characteristics of bacteria
c. Isolation and enumeration, methods and maintenance of culture; preservation of microbes, reproduction in Bacteria – Conjugation, Transformation and Transduction

Unit II **12 hours**

a. Food Microbiology: Fermented food, Food spoilage, Food poisoning, physical and chemical methods in food preservation.
b. Soil Microbiology: Common soil microbes; symbiotic and asymbiotic organisms; physiology of nitrogen fixation.
c. Water Microbiology: Coliform bacteria and MPN, Estimation of Total Plate Count, Index, Faecal Streptococci.

Unit III **12 hours**

a. Study of common bacterial and viral diseases of man – Causative organisms, mode of transmission, pathogenicity, symptoms and their preventive measures
b. Diseases of Gastro – enteric System – Cholera, Typhoid. Respiratory System – Diphtheria, Tuberculosis
c. Nervous System – Leprosy, Polio and Rabies – Genital System – AIDS, Fungal Diseases

Unit IV **12 hours**

a. Immune system – Types of Immunity – Innate and acquired immunity: Passive and active
b. Lymphoid organs – Primary and secondary organs, GALT & BALT. Lymphocytes – Sub-Population of T&B Cells
c. Immunoglobulin – Types, structure and functions-Antigen-Antibody reactions – Vaccination principles – Vaccines – Preparations and immunization

Unit V **12 hours**

a. Immune Response – Acquired immune response – Humoral immunity and Cell Mediated Immunity – Complements – classical and alternate pathway – MHC and HLA – Structure and function.
b. Immune techniques – principles of precipitation – VDRL slide test, Double immuno diffusion and Immuno-electrophoresis – ELISA and Radio Immuno Assay.
c. Hypersensitivity, transplantation – grafting – immune deficiency-Types and diseases.

Text Books

- Michael J.Pelczar, J.R. Ecschan, Noel R Krieg 2010. Microbiology an Application Based Approach, Tata McGraw Hill Education Private Ltd, NewDelhi
- Ananthnarayanan,& Jayaram Panicker, 2010. Text Book of Microbiology, Universities Press

Reference Books

- Gangal S. and Sontakke, S. 2013 Text Book of Basic and Clinical Immunology, University Press (India) Pvt, Ltd, Hyderabad
- Hannigan B.M., Moore, C.B.T. and Quinn, D.G. (2010). Immunology, Viva books, New Delhi
- Sharma, P.D. 1998. Microbiology, Rastogi Publications
- Meena Kumari S. 2005 Microbial Physiology, M.J.P. Publishers , Chennai
- Vijaya Ramesh, K. 2005, Environmental Microbiology, M.J.P. Publishers Chennai
- Kuby, T. 1994. Immunology, P.G. Publishing Pvt., Ltd., New Delhi
- Tizard I.R. 1995. Immunology – An Introduction IV ED. Saunders College Publications, Philadelphia

Pedagogy

Chalk and talk, Group Discussion and PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Elective Subject Theory**		SEMESTER **- V**
Subject Title **: BIOSTATISTICS, COMPUTER APPLICATION & BIOINFORMATICS**		
Subject Code: **09EP51**	Hours per week: **5**	Credit: **5**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Enable the students to acquire knowledge on principle, methods, analysis and interpretation of biology data through statistical and computational techniques.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	To acquire knowledge on history, data and instruments of statistics and bioinformatics	K1,K2 &K3
CO 2	To retrieve, present and evaluate the data using statistics and computational tools	K1,K2 &K3
CO 3	Interpertate retried, analyzed data using methods, techniques through soft packages and statistical tools	K1,K2 &K3
CO 4	Explore, predict and to study the applications of statistical and computational biology	K1,K2 &K3
CO 5	To develop the skills in computational biology and computer data based works by using concepts, tools and techniques	K1,K2 &K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	3	1	-	-	-	-	3
CO 2	9	3	3	-	-	-	3
CO 3	9	3	3	-	-	-	3
CO 4	3	3	3	-	-	-	9
CO 5	3	3	3	-	-	-	9
	27	13	12	-	-	-	27

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	-	-	3	-	9
CO 2	-	3	9	-	9
CO 3	-	1	9	-	9
CO 4	-	1	9	-	9
CO 5	-	1	9	-	9
	-	6	39	-	45

Note: Strong-9, Medium- 3 and Low-1

Syllabus

UNIT- I **12 hours**

a. Scope of Biostatistics- Types of Data- Importance of data collection
b. Classification, tabulation and frequency distribution.
c. Representation of data- Diagrammatic and graphical methods – Bar (Simple, Composite and Percentage) Pie, Histogram and Frequency curve.

UNIT – II **12 hours**

a. Measures of Central tendency- calculation of Mean, (Arithmatic, Geomatric, Harmonic) Median and Mode- Their merits and demerits.

b. Measures of Dispersion – Calculation of range, Quartile deviation, mean deviation, standard deviation
c. Variance and co-efficient of variation

UNIT-III **12 hours**

a. Chi- square analysis- Calculation of gene frequency in a Mendelian population
b. Probability- Theorem and calculation
c. Students t- test and its significance

UNIT IV **12 hours**

a. History, Classifications of computer-main frame, mini, micro and super computer
b. Number systems -Decimal to binary. Popular software packages- MS word, power point, MS Excel
c. Web and multimedia-Web browsers, E-mail-creating ID, management of mail.

UNIT V **12 hours**

a. History and concepts of Bioinformatics, Biological databases; Types of databases.
b. Basic and functional genomics - gene alignment, BLAST, Tools in BLAST. Multiple sequence alignment, CLUSTAL W
c. Phylogenetic analysis, SwissProt- Expasy- Proteomic tools.

Text Books

- Palanichamy S.and Manoharan. S. 2003. Statistical methods for Biologists, Paramount Pub, Palani
- Ignacimuthu, 2006. Basic Bioinformatics, Narosa Publishers, New Delhi

Reference Books

- An Introduction to Biostatistics, 2004, S.Sundar Rao and J.Richard, Prentice Hall of India Private Ltd, New Delhi
- Introductory Practical Biostatistics, B.N.Misra *et al.,*1983,Naya Prakash, Kolkatta
- Bioinformatics- D.R Westhead, J.H. Parish and R.M. Twyman 2003.Viva Books, Pvt.Ltd, New Delhi.
- Bioinformatics, Lohar,P.S 2009, MJP Publishers, Chennai
- Fundamental concept of Bioinformatics- Dan E. Krane & Michael L. Raymer, 2003. Pearson.Edu. New Delhi.
- Recent advances in Bioinformatics-IrfarA.Khan. Atiya Khanum,2002, Ukaz. Pub. Hyderabad.

Pedagogy

Chalk and talk, Group Discussion and PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

Programme: B.Sc., Zoology, (Under CBCS and LOCF)
(For those students admitted during the Academic Year 2021 - 22 and after)

Part – IV : Skill Enhancement Course		
Subject Title : **SERICULTURE**		
Course Code: **09SE51**	Hours per week: **2**	Credits: **2**
CIA Marks: **25**	ESE Marks: **75**	Total Marks: **100**

Objectives

- Understand sericulture as a cottage industry and exposure to silkworm rearing
- Mulberry cultivation and pathology
- Awareness creation to make them an entrepreneur

Syllabus

UNIT I:

History of Sericulture – Sericulture as cottage industry - Types of Silk worms – Mulberry and Non-mulberry– Economic importance of silk and its by products (4 Hours)

UNIT II:

Mulberry cultivation – Methods of propagation – Irrigation – Manuring - Diseases and Pests of Mulberry – Control measures. (6 Hours)

UNIT III:

Life cycle of *Bombyx mori* – Voltinism - Silk gland – Rearing House and appliances – Rearing methods- Pathology of silk worm and control. (6 Hours)

UNIT IV:

Characteristics of Cocoons – Stiffling – Process of Silk reeling (4 Hours)

UNIT V:

Identification of silk worm larvae, pupa and Imago,Morphology of silk gland, DFL, Rearing appliances and ChandrikaProcedure for getting financial assistance from Agencies and schemes (4 Hours)

Text Books

An Introduction to Sericulture, 2006,G. Ganga of J. Sulochana Chetty, Oxford & IBH, Publishing Company, NewDelhi

Reference books

Principles of Sericulture, 1996, H.Aruga, Oxford & IBH, Publishing Company, New Delhi

Pedagogy

- Chalk and talk, Group Discussion and PPT

Teaching Aids

- Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

Part – IV: Common Subject Theory		
Course Title: **ENVIRONMENTAL STUDIES**		
Course Code: **ESUG51**	Hours per week: **2**	Credits: 2
CIA: **25Marks**	ESE Marks: **75**	Total Marks: **100**

Objectives

- Disseminate information of Environment of national and international issues
- Environmental consciousness creation among the students
- Facilitation of environmental leadership among students

Syllabus

Unit-I **5 hrs**

Introduction – Nature, scope and importance of Environmental studies – Natural Resources and conservation – forest, water and energy.

Unit-II **5 hrs**

Ecosystem – concept – structure and function, energy flow, food chain, food web and ecological pyramids

Unit-III **5hrs**

Biodiversity – definition, types – values – India, a mega diversity zone – Hotspots – Endangered and endemic species – threat to biodiversity and conservation

Unit-IV **5 hrs**

Environmental pollution – Air pollution- causes and effect – Ozone depletion – Global warming – acid rain – Water pollution – Noise pollution – Solid waste management – Nuclear hazard

Unit-V **4hrs**

Human population and the environment – Population growth – variation among nations – effects of population explosion – family welfare programme – environment and human health.

Text books

Environment studies – R.Murugesan (2009), Milleneum Pub. Madurai-16

Pedagogy

- Chalk and talk, Group Discussion and PPT

Teaching Aids

- Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Core Subject Theory**		SEMESTER **- VI**
Subject Title **: EVOLUTION**		
Subject Code: **09CT61**	Hours per week: **6**	Credit: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To acquire knowledge in theories of origin of life and evolution. To study various evolutionary forces, radiation and phylogeny in species.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on process of evolution through principles, theories and evidences	K1,K2, & K3
CO 2	Understand the basic concept of evolution through various evolutionary processes.	K1,K2, & K3
CO 3	Ensure the progress, barriers and attainments in the events of evolutionary processes.	K1,K2, & K3
CO 4	Analyse the structure and outcomes of the evolutionary processes of speciation	K1,K2, & K3
CO 5	Impart the knowledge on fossil and fossilization and also in evolutionary sequences / ancestral behaviours of mammals.	K1,K2, & K3

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	3	-	3	-	-	3	-
CO 2	3	-	-	-	-	3	1
CO 3	3	-	-	-	-	3	1
CO 4	3	-	-	-	-	3	3
CO 5	3	-	1	-	-	9	3
	15	-	4	-	-	21	8

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	1	9	1	3	-
CO 2	1	9	3	3	-
CO 3	1	9	3	3	-
CO 4	1	9	1	3	-
CO 5	1	9	3	3	-
	5	45	11	15	-

Note: Strong-9, Medium- 3 and Low-1

Syllabus

Unit – I **12 hours**

a. Origin of Life: Oparin-Haldane Theory,
b. Evidences for Evolution from Morphology and comparative anatomy, Embryology, Physiology and Biochemistry.
c. Lamarckism and Neo-Lamarckism

Unit – II **12 hours**

a) Darwinism: Natural selection, Neo-Darwinism – Types of selection- Experimental evidences.

b) Modern synthetic theory- Hardy-Weinberg's Law – Behaviour of genes in natural population
c) Genetic Drift – Evolutionary Significance.

Unit - III **12 hours**

a) Species Concept – Sub Species and Sibling Species, Allopatric and Sympatric Speciation, Isolating Mechanism – Types and Examples
b) Distribution of Animals – Barriers – Continental Drift Hypothesis Extinction – Types and causes
c) Mimicry and colouration.

Unit – IV **12 hours**

a) The Geological Records – Geological time scale– Survey of Geological periods
b) Fossils: methods of fossilisation –types
c) Methods of detection - Lead and Carbon Method.

Unit –V **12 hours**

a) Adaptive Radiation in Mammals.
b) Evolution of Man- Biological and cultural.
c) Evolution of horse- Orthogenesis.

Text Book

- VeeraBala Rastogi, 2005. Organic Evolution, Kedarnath Ramnath Pub.

Reference Books

- Strickberger, 1994. Evolution, ELBS Publishers.
- Moody P.A.1995. Introduction to evolution, Kalyani Pub, New Delhi.
- Dobzhansky, Th., Ayala, F. J., Stebbins, G. Ledyard & Valentine, J. W., 1977. Evolution W. H. Freeman and Company, San Francisco
- Chattopadhay, 2002. Life – origin, Evolution and adaptation, Books and Allied P Ltd, Kolkata.

Pedagogy

Chalk and talk, Group Discussion and PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

PART – III**: Core Lab**		SEMESTER **- II**
Course Title**: PRACTICAL - III**		
Course Code: **09CP62**	Hours per week: **6**	Credits: **4**
CIA: **40 Marks**	ESE: **60 Marks**	Total: **100 Marks**

Preamble

To enable the students to have hands on experiments in the field of biochemical, Microbiological, Biotechnological tools and Biophysical process. They are further made to analyse the environmental parameters and process also analyse these with appropriate statistical tools. They are also exposed to the different packages in genome analysis and protein designing further they are exposed to the various aspects of Microbiology, Immunology and Dairy science in the evolutionary prospects.

Course Outcomes (CO)

On the successful completion the students are enable

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on the principles of biophysical, biochemical, biotechnological tools and also to certain the analytical methods of environments, statistics using computer system	K1, K2, K3
CO 2	Understand the basis of biological experiment using different principles and methodology	K1, K2, K3
CO 3	Analyse the results of various biological, ecological and parameter measurements through the statistical tools	K1, K2, K3
CO 4	Ensure the applications of the biological experiment in the prospects of evolutionary aspects	K1, K2, K3
CO 5	Trace the employing, marketing and development strategies in the Microbiological and Dairying	K1, K2, K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CO with PO

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO6**	**PO7**
CO 1	3	3	3	-	3	3	3
CO 2	3	-	3	-	3	3	3
CO 3	9	-	3	-	3	3	3
CO 4	3	-	1	-	-	3	1
CO 5	3	3	3	-	3	1	3
	21	6	13	-	12	13	13

Mapping of CO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	3	3	9	1	-
CO 2	1	1	9	9	--
CO 3	1	1	9	9	-
CO 4	1	3	9	9	-
CO 5	3	3	3	3	9
	9	**11**	**39**	**31**	**9**

Note: Strong-9, Medium- 3 and Low-1

Syllabus

Biochemistry & Biophysics, Biotechnology, Microbiology and Immunology
Biostatistics, Computer Applications and Bioinformatics

Biochemistry &Biophysics

Objectives

To enable the students to

- Experiments to observe certain physiological aspects
- Analysis of blood and water samples

1. Study of salivary amylase enzyme activity. Effect of temperature and p^H
2. Tests for albumen, Sugar and Urea in Urine.
3. Qualitative tests for carbohydrate, protein and lipid.
4. Study of p^H meter and measurement of p^H of various water samples.
5. Estimation of Ascorbic acid (Vitamin-C)
6. Analysis of Slide Preparation: Haemin and Uric acid crystals.

Biotechnology

Objectives

To enable the students to

- Screen industrially important microbes
- Isolation of genomic and plasmid DNA

1. Primary screening of industrially important microbes
2. Isolation of Genomic DNA
3. Isolation of Plasmid DNA
4. Demonstration of Agarose gel Electrophoresis
5. Immobilization of yeast cells
6. PCR demonstration
7. Spotters - Typical gene cloning experiment, Electrophoretic apparatus, Southern blotting, Northern blotting and DNA sequencing

Microbiology and Immunology

Objectives

To enable the students to

- Introduction of basic techniques in microbiology
- Principles and uses of microbiological instruments
- Dissection & observation of lymphoid organs
- Introduction of basic techniques in Immunology

1. Cleaning of glass wares – Sterilizing media and equipment's
2. Preparation of media for Microbes.
3. Distribution of microbes in Nature- Soil, Water and in Air.
4. Cultural characterization of Bacteria
5. Simple staining of bacteria
6. Differential staining of bacteria – Gram staining.
7. Microscopic examination of live bacterial population. Hanging drop technique
8. Spotters: Autoclave/ pressure cooker and Colony counter.
9. Dissection to show lymphoid organs in Chick.
10. Observation of spleen cells-Slide.
11. Bleeding and serum separation.
12. Demonstration of agglutination by blood group antigen.
13. Demonstration of R.B.C. and W.B.C. count.
14. Spotters : Various Lymphoid organs in chick and human

Biostatistics, Computer Applications and Bioinformatics

Objectives

To enable the students to

- Apply statistical Programmes in biological Studies
- Handle the various basic tools of bioinformatics

Biostatistics

2. Collection of Data
3. Frequency Distribution (with number of Seed Pods)
4. Calculation of Mean, Median, Mode and Standard Deviation
5. Chi-Square analysis for Mendelian Cross (Monohybrid & Dihybrid)
6. Probability with tossing of coins.

Computer Applications

1. MS Word and its applications
2. Excel – Bar diagram, Pie diagram and Histogram
3. PowerPoint
4. Data base retrieval from internet
5. Email Creation and sending documents

Bioinformatics

1. Browsing the internet using websites
2. Browsing the internet using search Engines
3. Searching the data bases
   a. in NCBI
   b. in PDB
   c. in Swiss – Prot
4. Getting gene sequences from data bank
   a. Nucleotide sequences
   b. Protein sequences

5. Analyzing Protein sequences using ROSMOL and JMOL
   a. Structure
   b. Bond length between molecules
   c. Bond angle between molecules

SEMESTER – VI

Evolution, Dairy Farming and Environmental biology

Evolution

Objectives

To enable the students to

- Finger print study and experiments with beads to understand evolutionary concepts
- Principles of natural selection and genetic drift in large and small population

1. Variation in finger prints in Man.
2. Experiment with beads to illustrate gene pool concept & production of genotypes
3. Experiment to study natural selection in large population
4. Experiment to study principles of genetic drift in small population.
5. Spotters- Homologous and Analogous organs, Evolutionary importance of *Peripatus, Limulus* and *Nautilus*, Study of vestigial organs, Petrified fossils (Stone fossil)

Dairy Farming

Objectives

To enable the students to

- **Observe of Dairy process, testing and identification of breeds**
- **Detect the quality of milk**

1. Identification of breeds of Cow and exotic cows
2. Computation of ration for calf and pregnant cow
3. Experiment to identify the specific gravity of milk using Lactometer
4.dectetion of adulteration using MBR test, alcohol test and H_2SO_4 tests
5. Visit to dairy processing Centre and Veterinary hospital

Environmental biology

Objectives

To enable the students to

- **Observation of eco system**
- **Estimation of ecological parameters**

1. Morphometric study of fresh water pond
2. Food web and Food chain
3. Identification of fresh water and marine plankton
4. Animal association
5. Estimation of dissolved oxygen in water samples
6. Measurement of soil temperature, pH and moisture

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Elective Subject Theory**		SEMESTER **- VI**
Subject Title **: DAIRY FARMING**		
Subject Code: **09EP61**	Hours per week: **5**	Credit: **5**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To gain knowledge in breeds, physiology and management in dairy and dairy farm.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on the dairy breed animals, their digestive physiology and ingredients.	
CO 2	Understand the modern techniques in breeding and management of dairy animals at various stages.	
CO 3	Impart knowledge on management of dairy products, its production and by-products	
CO 4	Analyze the quality production of dairy animals and dairy products	
CO 5	Trace the employability and marketing methods using dairy techniques and through field visits.	

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	3	-	3	1	3	3	3
CO 2	3	-	9	-	9	3	3
CO 3	3	-	9	-	9	3	3
CO 4	3	-	9	-	9	3	3
CO 5	3	1	3	-	3	3	3
	15	1	33	1	33	15	15

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	3	3	9	-
CO 2	3	3	9	3	3
CO 3	3	3	9	9	9
CO 4	3	3	3	9	3
CO 5	3	3	9	9	9
	15	15	33	39	24

Note: Strong-9, Medium- 3 and Low-1

Syllabus

UNIT-I:	a. Scope of Dairy farming, Dairy breeds of India- Cow and Buffalo b. Exotic breeds-Cow c. Systems of breeding – Hybrid vigour – grading up merits and demerits of inbreeding and outbreeding.	**(12 Hrs)**
UNIT-II:	a. Digestive system of Cow and glands related to digestion b. Common cattle feed – their nutritive value – minerals- Feed additives and silage preparation. c. Feeding and management of pregnant cow and calf	**(12 Hrs)**

UNIT- III:	a. Viral diseases – rinderpest, Foot and mouth disease b. Bacterial diseases – Mastitis, Anthrax, Haemorrhagic – septicaemia c. Metabolic diseases – Milk fever and bloot.	**(12 Hrs)**
UNIT- IV:	a. Anatomy of udder and physiology of milk production b. Milk – composition, Pasteurization and Nutritive value, Colostrum and their importance, Techniques to produce quality milk- Techniques to detect milk adulteration, Spoilage of milk c. Preparation of Dahi, Butter,Ghee, Gova, Flavoured milk, butter milk, ice cream .	**(12 Hrs)**
UNIT- V:	a. Housing and equipments for dairy cows- Records to be maintained in a Dairy b. Artificial insemination – Semen collection and storage c. Role of co-operative societies in milk production and Marketing.	**(12 Hrs)**

Text Books

- G.C. Banerjee 2012 - A Text book of Animal Husbandry – Oxford & IBH Publication, New Delhi.

Reference Books

- Sukumar De, 2008. Outline of Dairy technology, Oxford University Press
- Handbook of Animal husbandry, 2000. Publication and information division- ICAR, New Delhi

Pedagogy

Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2018-19 and after)

PART – III **: Elective Subject Theory**		SEMESTER **- VI**
Subject Title **: ENVIRONMENTAL BIOLOGY**		
Subject Code: **09EP62**	Hours per week: **5**	Credit: **5**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

To obtain knowledge an environmental factor, structure, barriers. Its measurement and management

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on fundamental concepts, structure and types of ecosystem	
CO 2	Understand the behavioral patterns found in organisms at different ecological levels.	
CO 3	Ensure the reciprocal relationship and impact between organisms and environment.	
CO 4	Trace the problems of adverse environment and its management	
CO 5	Create awareness on protects patterns, conservation and management of environment	

K1-Knowledge **K2-Understand** **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	3	-	-	-	-	3	-
CO 2	3	-	-	-	-	3	-
CO 3	3	-	-	-	-	3	-
CO 4	3	-	3	-	3	3	-
CO 5	3	-	3	3	3	3	9
	15	-	6	3	6	15	9

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	-	-	1	-
CO 2	3	3	-	9	-
CO 3	-	-	-	9	-
CO 4	-	-	3	9	-
CO 5	3	-	3	9	-
	9	3	6	37	-

Note: Strong-9, Medium- 3 and Low-1

Syllabus

UNIT-I **12 hours**

a. Introduction and scope - Soil profile and fauna: Water- properties, water problem in terrestrial habitat.
b. Light- light in relation to aquatic habitat, effect on organisms
c. Temperature-range, thermal stratification, tolerance, homeothermic, Poikilothermic animals, adaptations to extremes of temperature and effects on organisms.

UNIT-II **12 hours**

a. Interspecific relationship- Symbiosis- Mutualism and Commensalism, Antibiosis, Parasitism, Predation and Competition- Intraspecific relationship- Colonisation, aggregation and social organization.
b. Ecosystem- Definition, components, Pond and forest as an ecosystem- trophic levels, Food chain and Food web- Ecological pyramids, energy flow and productivity
c. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.

UNIT-III **12 hours**

a. Community- Definition, structure and characteristics- Ecotone, edge effect and ecological niche
b. Community dynamics- ecological succession and climax community.
c. Population ecology- characteristics- Natality, Mortality, Dispersal, age pyramid, population estimation- Regulation and dynamics of population.

UNIT-IV **12 hours**

a. Characteristics, Zonation and fauna and adaptations of fresh water, marine and estuary habitats
b. Terrestrial habitats- forests, deserts, caves, fauna and their adaptations
c. Parasitic adaptations- Ecto and endo

UNIT-V **12 hours**

a. Environmental pollutants- Types- Air pollution- Sources, Effects and control measure
b. Water pollution- Sources, Effects and control measures- Radioactive and Noise pollution
c. Natural Resources-Wild life - Conservation and management.

Text Books

- Verma, P.S and Agarwal, V.K 2000. Environmental biology, S.Chand & Co, New Delhi.
- Rastogi, V.B and Jayaraj, M.S, 1984. Animal Ecology and distribution of animals, Kedarnath, Ramnath, Meerut.

Reference Books

- Arora, M.P. 2011. Ecology, Himalaya Publishing house, New Delhi
- Rana, S.V.S. 2009. Essentials of Ecology and Environmental science, Prentice- Hall of India, New Delhi.
- Odum, E.P 1983. Basic Ecology, Saunder's College Publishing, New York.

Pedagogy

Chalk and talk, Group Discussion and PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22and after)

Part – IV: Skill Enhancement Course		
Course Title: **FISH CULTURE AND VERMITECHNOLOGY**		
Course Code: **09SE61**	Hours per week: **2**	Credits: **2**
CIA: **25Marks**	ESE: **75Marks**	Total: **100Marks**

Objectives

- Impart the knowledge on common food fishes and enhancement of fish productivity
- Management and maintenance of fish pond and various types of fish culture
- Common fish diseases, treatment and control measures
- Role of vermitechnology for sustainable agriculture and environmental management
- Product from the vermitechnology.

Syllabus

UNIT I:

Scope and importance of aquaculture – Physical and chemical characteristic features of water bodies– Types of culture systems (Traditional, intensive, semi-intensive and extensive) (5 Hours)

UNIT II:

Selection of cultivable species – Site selection for fish farming – construction of fish ponds – Types of fish ponds – Maintenance and management of ponds. Fish Feeds (5 Hours)

UNIT III:

Types of fish culture – Monoculture, Monosex-culture and Poly culture, Common fish diseases - Prevention and treatment (5 Hours)

UNIT IV:

Rearing and culturing of earthworm – Vermicompost unit – vermibed preparation, Precomposting – composting by earthworms – methods – management – harvesting of vermicast. (4Hours)

UNIT V:

Vermicast – characteristics – quality analysis – vermiwash – characteristics, Earthworm as food and medicinal importance – Role of KVIC and NABARD. (5 Hours)

Text Books

Fish Culture 1993 G. Santhanakumar, JJ publications

Vermiculture, 2012 M.Seetha Lekshmy and R.Santhi, Saras Publication

Reference books

- An introduction to fishes 2011 S.Khanna, Silver line publications
- Fish & Fisheries 2010 Pandey & Shukla, Rastogi PulicationsA manual of Fresh water Aqua culture 1997 R. Santhanam, Oxford and IBH Pub.
- Vermicomposting for sustainable agriculture (2003): BK Gupta – Agrobios

Pedagogy

- Chalk and talk, Group Discussion and PPT

Teaching Aids

- Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

Part – IV: Skill Enhancement Course		
Subject Title: **PROJECT**		
Course Code: **09SE62**	Hours per week: **2**	Credits: **2**
CIA Marks: **25**	ESE Marks: **75**	Total Marks: **100**

Course learning outcomes:

On completion of the course, the students are able to

- ✓ Know how to develop an aptitude for research in zoology.
- ✓ Know how to learn research methodology and literature review
- ✓ Learn to identify the appropriate research topic and presentation

Procedure:

- Topics of zoological interest can be selected for the project. Project is to be done by a group not exceeding 5 students.
- Every student should submit typed (A4 paper, 12 Font, 1.5 Space, 20- 30 pages), spirally bind project report duly attested by the supervising teacher and the Head of the Department on the day of practical examination before a board of two Examiners for viva voce examination. The viva-voce based on the project is conducted individually.
- Project topic once chosen shall not be repeated by any later batches of students. List of projects submitted year wise is to be maintained in a register and submitted before the examiners if requested.
- The project report contains the following components:
    1. Preliminary (Title page, declaration, certificate of the supervising teacher, content etc.)
    2. Introduction with relevant literature review and objective
    3. Material and Methods
    4. Results
    5. Discussion
    6. Conclusion / Summary
    7. References.

Tour Visit

Study tour and field / institutional visit, Students are directed to visit one research institute/ preferably within the state of Tamil Nadu. Scientifically prepared hand written/typed study tour report along with photographs of candidate at the places of visit must be submitted by each student during summative examination for evaluation. The board of examiners can decide the scheme of evaluation of project, study tour report and viva voce.

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

Part – IV: Skill Enhancement Course		
Subject Title : **ZOOLOGY FOR COMPETITIVE EXAMINATIONS**		
Course Code: **09SE63**	Hours per week: **2**	Credits: **2**
CIA Marks: **25**	ESE Marks: **75**	Total Marks: **100**

To enable students to

- Appear for competitive exams
- Have overall subject kmowledge essential for employment

Syllabus

UNIT I **(5 Hours)**

a) Non - Chordata:- General organisation - Classification with diagnostic features up to classes. Protozoa:- Structure, reproduction and life history of Amoeba Paramecium, Trypanosoma, Plasmodium, Monocystis, Leishmania - locomotion, nutrition, economic importance. Porifera: Sponges canal system, skeleton, reproduction and economic importance. Coelenterata:- Diploblastic organization - life history of obelia and Aurelia, Metagenesis - Polymorphism in Hydrozoa Corals and Croal formation - relationships of Cnidaria and Acnidaria. Helminthes:- Structure and life history of Planaria, Fasciola, Teania, Ascaris and Wucheraria - parasitic adaptations - Helminthes in relation to man. Annelida:- Neries, earthworm and leech - Coelom and metamerism - modes of life in polychactes. Onychophora:- Structure, affinities and distribution of Peripatus. Arthropoda:- Prawn, Scropion and Cockroach - Larval forms and parasitism in Crustacea - Mouth parts, vision, respiration and excretion Metamosphosis and social life in insects. Mollusca:- Freshwater mussel, pila, sepia - oyster culture and pearl formation. Echinodermata:- General organisation - Water vascular system Larval forms and affinites.

b) Prochordata:- Amphioxus, Balanoglossus - Ascidian retrogressive Metamorphosis, neoteny and affinities. Chordata:- General Organisation - Characters, Outline classification Up to class level. Pisces:- Locomotion, migration, respiration, economic importance structure and affinities of Dipnoi. Amphibia:- Origin of Amphibians - Parental care - South Indian amphibians. Reptiles:- Origin - Conquest of land - adaptations to live on land Adaptive radiation - Temporal Vacuties - identification of poisonous and non-poisonous snakes - poison apparatus - south Indian examples. Birds:- Origin - fight adaptations - mechanism of flight - double respiration - migration - Flightless birds, their structure and distribution. Mammals:- Dentition, skin derivatives - distribution - adaptive radiation - Prototheria and Metatheria, their Phylogenetic relationship - South Indian examples.

UNIT II **(5 Hours)**

a) Cell and Molecular Biology:- Cellular Organeles - Structure and function - Plasma membrane, mitochondria, golgi bodies, endoplasmic reticulum and ribosomes - Nucleolus and nucleus - Chloroplast - Cell division (Mitosis & meiosis) - Chromosomes - DNA structure and function, replication of DNA, Genetic code - RNA and protein synthesis. Gene expression - Recombinant DNA, Genetic cloning - Genetic engineering, its uses in agriculture, biology and medicine - Sex chromosomes and sex determination.

b) Genetics:- Laws of inheritance - Linkage, principle of gene mapping multiple alleles, blood groups - mutation (Natural and induced) Sex Linked and Sex Limited inheritance - Chromosome number and form ploidy - cytoplasmic inheritance - Karyotypes - Normal and abnormal genetic disorder - Bio-chemical genetics - regulation of gene expression in prokaryotes and Eukaryotes - population genetics - Eugenics. Mean, Median and standard deviation.

UNIT III **(5 Hours)**

a) Bio Chemistry:- Structure of carbohydrates, amino acids, proteins lipids - Glycolysis and Kreb's cycle - oxidation, reduction - oxidative phosphorylation - energy conservation and release, cyclic AMP, ATP enzymes – mechanism. Hormones, their classification biosynthesis and function. Physiology:- with reference to mammals, digestion, nutrition, balanced diet in man - assimilation, intermediary/metabolism. Composition of blood - Coagulation, Transport of oxygen, Carbondioxide, Blood pigments, Mechanism of respiration, Muscles, mechanism of muscle contraction, Temperature regulation, Acid base balance and homeostasis, Nerve impluses and conduction, neurotransmitters. Receptors, photo, phono and chemoreception. Nephron and urine formation, Endocrine glands, ovary and

pituitary organs and their inter relationship, Physiology of reproduction in humans, Normal Zoologydevelopment in insects and pheromones. Bioluminescence, Biological rhythms, Physiology of immune response Antigens - Immunoglobulins, humoral and cell mediated immunity. T & B cells, mechanism of antibody formation - AIDS.

b) Development Biology:- Gametogenesis - fertilization - type of eggs - blastulation and gastrulation in Amphioxus, frog and chick morphogenetic movements - organizer potency, organogenesis with reference to hear, eye kideny brain - Formation and fate of extra embryonic membranes in chick. Placenta, types, functions, Regeneration - Aging and senescence - metamorphosis in Frog - Cancerous growth.

UNIT IV **(5 Hours)**

a) Environmental Biology:- Biotic and abiotic factors, their role, Intra and interspecific association. Biogeochemical cycles. Ecosystem, concept and components - energy flow, food chain, food web, trophic levels. Ecological succession, Community structure - Stratification. Population and Population dynamic - Habitat, ecology, adaptations in marine fresh water and terrestrial habitats. Wild life, need for conservation management and methods of conservation. Sanctuaries with special reference to Tamil Nadu. Pollution - air, water and land - Perspective policy planning for the environment.

b) Evolution:- Origin of life - Evolutionary thought - Contributions of Lamarck Darwin and De Varies - present status of Darwinism and Lamrkism - modern synthetic concept - Hardy Weinberg Law - Polymorphism and mimicry in evolution. Specification, species concept - Isolation mechanisms and their role, role of hybridization in evolution. Fossils and Fossilization Origin and evolution of man - Cultural evolution and Biochemical evolution.

UNIT V **(5 Hours)**

a) Animal distribution: Zoogeographical distribution - Continental and island fauna - Continental drift - Discontinuous distribution adaptive radiation. Natural resources and their conservation. Alternative sources of energy.

b) Economic Zoology:- Parasitism and Commensalim - Protozoan Parasites and diseases, helminth parasites and diseases of man and domestic animals - Beneficial and destructive insects Insect pests on crops and stored products - Control methods. Sericulture, apiculture, poultry, pisciculture and induced breeding, Shell fisheries, Aquaculture practices in Tamil Nadu and their impact on the environment and on agriculture.

E - Resources

https://www.slideshare.net/guest5024e5c/u01-basis-of-life
https://www.slideshare.net/jessidildy/phylum-echinodermata-2016
https://youtu.be/MPwXzV58eIY
https://youtu.be/ld7NUAHGS7U
https://www.slideshare.net/janardanchaudhary3/gametogenesis-fertilization-implantation-and-1st-wk-development
https://www.slideshare.net/selvarajselva1/developmental-biology-232262057
https://www.slideshare.net/arielroth/5-darwin-and-the-eye-part-2-11697529
https://www.slideshare.net/selvarajselva1/zoology-for-competitive-examinations
https://youtu.be/mk8tOD0t8M0
http://www.authorstream.com/Presentation/santhanamselvaraj-4174676-human-excretory-system/

SEMESTER – VI

(For those who joined in June 2014 and After)

PART – IV : Common Course Theory		
Course Title **: Value Education**		
Course Code: **VEUG61**	Hours per week: **2**	Credit: **2**
CIA: 25 Marks	**ESE: 75 Marks**	Total Marks: **100**

Syllabus

UNIT I: The heart of Education:

Introduction – Eternal Value – Integrated approach to value education - one for all and all for one – Responsibilities of a citizen – Habit Vs wisdom – purifying mind pollution – Respect for all Religions – Parents, teachers and fellow students – The need and benefit of exercise and meditation for students.

UNIT II: The Value of Body and Life Energy

Introduction – what are the causes for paid, Disease and death? Three Basic needs for all living Beings – Personal Hygeine Five Factors of Balance in Life – The need and benefits of physical Exercise – The value and Base of Life energy – The value and Base of Bio-magnetism - You are your own best caretaker.

The Marvelous nature of mind

Introduction- Bio-magnetism – The base of the mind – characterisation of the Genetic Centre – metal frequency – practice for a creative mind - benefits of meditation.

UNIT III: Analysis of Thought

Introduction – An Explosition on the nature of thought– six roots for thoughts – Introspection for analysis of thoughts-practical techniques for analysis of thoughts. Benefits of Blessings

Effects of good vibrations – Make Blessing a Daily Habit

UNIT IV: Moralisation of Derive

Introduction – moralization of desire - Analyse your desires – Summary of practice.

Neutralision of Anger:

Introduction – meaning – characteristics of Anger – Anger is a Destructive emotion – Anger spoils our relationship with others – Some common misconception about anger – will power and method success through awareness – method of neutralisation of anger.

UNIT V: Eradication of Worries

Worry is a mental disease – Nature's Law of cause and effect – factors beyond our control – How to deal with problems – analyse your problem and eradicate worry Harmonious Relationships

Introduction – Three angles of life – The value of harmony in personal relations – Love and Compassion – pleasant face and loving words – appreciation and gratitude to parents and teachers – Bringing needed reforms in educational institutions Why should we serve others? Brotherhood – A scientific Basis for Universal Brotherhood protection of the environment – non-violence and the five fold moral culture.

Text Book: Value Education for Health, Happiness and Harmony

Based on the Philosophy and Teachings of Swami Vethanthiri Maharisi) Published By: Brain Trust, Aliyar A Wing of World Community Service Centre

Pedagogy

- Chalk and talk, Group Discussion and PPT

Teaching Aids

- Green Board, LCD Projector, Interactive White Board

SEMESTER – VI

(For those who joined in June 2008 and after)

PART – V : Common Course Theory		
Course Title **: EXTENSION ACTIVITIES**		
Course Code: **EAUG61**	Hours per week:	Credit: **1**
CIA: 25 Marks	**ESE: 75 Marks**	Total Marks: **100**

Syllabus

UNIT-I:

Community Development-I: definition – structure and composition – community based issues – need for awareness – Developmental Programmes.

UNIT – II:

Community Development–II: Rural Scenario – need of the Community – need for the community service – role of youth in community building – communal harmony – literacy – Educational Recreation.

UNIT – III:

Volunteer Empowerment: Women's Emancipation – formation of Youth Clubs – Self-Help Groups – Youth and Development.

UNIT – IV:

Social Analysis: Social issues – cultural invasion – media infiltration – human rights Education/Consumer Awareness – Adolescents Reproductive – HIV/AIDS/STD – Social harmony/National integration – Blood Donation.

UNIT – V:

Introduction to NSS: Basic Concepts – profile – aims – objectives – symbol – Motto – structure – Regular activities – Special Camping Programme – Adventure Programme – National Days and Celebrations.(Applicable to NSS Students)

(OR)

NCC- Origin – Organisation – Ministry of Defence – Armed forces – commands – Defence establishments in Tamil Nadu

Civil Defence – Aid to civil authorities – Disaster management – Leadership – Man management – Adventure activities – Social service

Reference:

National Service Scheme Manual (Revised), Ministry of Human Resources Development, government of India.

Pedagogy

- Chalk and talk, Group Discussion and PPT

Teaching Aids

- Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2019 - 20 and after)

PART – III **: Allied**		SEMESTER **- III**
Course Title **: ANIMAL ORGANISATION**		
Course Code: **09AT01**	Hours per week: **4**	Credits: **4**
CIA: **25 Marks**	ESE: **75 Marks**	Total: **100 Marks**

Preamble

Students are enable to gain basic knowledge on taxanomical methods, outline classification of animals, morphological, anatomical and functional features of representative animals.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Inculcate knowledge on animal classification and taxonomical methods with suitable examples.	K1
CO 2	Understand the structure ingestion and egestion of bioprocesses in feeding and respiration of representative animals.	K2
CO 3	Make awareness on movement of fluids, body and structural in invertebrates and chordates representatives.	K2
CO 4	Observe a structure and functional aspects of nervous system, receptors in earthworm, insects and human.	K2
CO 5	Trace the structure and processes of excretion, reproduction in selected invertebrates and chordates.	K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CO with PO

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO6**	**PO7**
CO 1	9	3	-	3	9	9	3
CO 2	9	1	3	3	3	9	3
CO 3	9	1	9	3	9	3	3
CO 4	9	1	9	3	3	3	3
CO 5	9	1	9	9	9	9	3
	45	7	30	21	33	33	15

Mapping of CO with PSO

Department	**Botany**					**Chemistry**				
PSO/CLO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CLO 1	1	3	1	9	2	3	-	1	1	-
CLO 2	1	1	-	3	1	3	-	-	-	-
CLO 3	-	3	2	3	1	1	1	-	1	-
CLO 4	-	1	3	2	1	-	-	-	-	-
CLO 5	-	1	1	3	1	-	-	1	-	-
	2	**9**	**6**	**20**	**6**	**8**	**3**	**2**	**2**	**-**

Note: Strong-9, Medium- 3 and Low-1

Syllabus

UNIT-I: 1. Principles of taxonomy – Binomial nomenclature - Animal Organisation – body types – protozoa – metazoa – types of coelom – types of symmetry **(12 Hrs)**

2. Outline classification of Invertebrates and the salient features of the Phyla with examples. Outline classification of Chordates upto classes giving examples

UNIT-II:	1. Feeding and digestion in Amoeba and Frog. 2. Respiration in Amoeba, Cockroach, Gills in Fish and Lungs in bird.	**(12 Hrs)**
UNIT- III:	1. Circulatory system in *Paramecium,* Earthworm and Calotes. 2. Locomotion in Amoeba, *Paramecium,* and Earthworm 3. Flight mechanism in Pigeon.	**(12 Hrs)**
UNIT- IV:	1. Nervous system of Earthworm. 2. Human brain and ear. 2. Receptors – photoreceptors of Euglena, insects and man.	**(12 Hrs)**
UNIT- V:	1. Excretion in Amoeba and Earthworm. 2. Excretion in Man- Structure of kidney and urine formation. 3. Reproductive system of Rabbit.	**(12 Hrs)**

Text Books

- A Text Book of Invertebrates –2004. Nair *et al.,* Saras Publications.
- A Text Book of Chordates – 2004. Thangamani, *et.a.l.,* Saras Publications

Reference Books

- A Manual of Zoology, Vol. I- Invertebrata, 1982. Ekambaranatha Ayyar and Ananthakrishnan.
- A Manual of Zoology, Vol. II – Chordata – 1982. Ekambaranatha Ayyar and Ananthakrishnan.

Pedagogy

Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST – 625 234

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2019 -20 and after)

PART – III **: Allied**		SEMESTER **- IV**
Course Title **: BIOLOGY AND HUMAN WELFARE**		
Course Code: **09AE02**	Hours per week: **4**	Credits: **4**
CIA: **25 Marks**	ESE: **75 Marks**	Total: **100 Marks**

Preamble

To enable the students to develop knowledge on various diseases, transmission and remedies. Also develop knowledge on entrepreneurial avenues in biology.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on structure, mode of infection, development and remedies of virus and viral diseases.	K1
CO 2	Understand the structure, mode of infections, biology and remedies of bacteria and bacterial diseases.	K2
CO 3	Impart knowledge on differential diseases caused by fungal, protozoan and helminthes.	K2
CO 4	Explore the avenues, opportunities and limitations of sericulture, fish culture and vermiculture	K2
CO 5	Trace the organisation, characteristics, candidates, culture and entrepreneurial values of biogas, mushroom culture, apiculture.	K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CO with PO

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO6**	**PO7**
CO 1	3	-	9	3	3	1	1
CO 2	3	-	9	3	3	1	1
CO 3	3	-	9	3	3	1	-
CO 4	3	-	3	1	-	9	3
CO 5	3	-	3	1	-	9	3
	15	-	33	11	9	21	8

Mapping of CO with PSO

Department	**Botany**					**Chemistry**				
PSO/CO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	-	3	1	2	1	3	-	-	1	-
CO 2	-	1	1	3	-	3	-	-	-	-
CO 3	-	-	1	1	1	1	-	-	1	-
CO 4	-	1	9	3	3	-	-	-	1	-
CO 5	-	1	9	9	1	-	-	-	-	-
	-	**6**	**21**	**18**	**6**	**7**	**-**	**-**	**3**	**-**

Note: Strong-9, Medium- 3 and Low-1

Syllabus

UNIT-I:	a. Structure of a typical virus b. Brief account on Viral diseases c. Polio, Rabies and AIDS	**(12 Hrs)**

UNIT-II:	a. Structure of typical Bacteria b. Brief account on Bacterial diseases c. Cholera, Tuberculosis and Tetanus	**(12 Hrs)**
UNIT- III:	a. Fungal diseases – Ringworm and Black piedra b. Protozoan diseases – Amoebic dysentery and Malaria c. Helminth parasites – Ancylostoma and Wucheraria	**(12 Hrs)**
UNIT- IV:	a. Sericulture – Scope – Silkworm biology – Life cycle – common diseases and control – silkworm rearing methods. b. Fish culture – Scope and Importance – types of culture – identification of common edible fishes- induced breeding- common diseases and control – maintenance of fish pond. c. Vermiculture – Features of exotic and indigenous species – rearing and culturing – Characteristics of Vermicast and Vermiwash – Economics of Vermiculture.	**(12 Hrs)**
UNIT- V:	a. Biogas production – characteristic features of biogas – production of biogas – uses b. Mushroom culture – nutritive and medicinal value – Morphology of Indian oyster mushroom – cultivation of paddy straw mushroom – Advantages. c. Apiculture – biology of honey bee – bee hive – honey extraction – medicinal value – bee wax and bee venom.	**(12 Hrs)**

Text Books

- Text Book of Clinical Protozoology – N.S. Ruprah, Oxonian Press.
- Text Book of Microbiology – 2004 Ananthanarayanan, Orient Longman.

Reference Books

- Text Book of Preventive and Social Medicines – Park and Davis.
- Handbook on Mushrooms – 1988. Nita Bahi, Oxford and IBH.
- Biogas Technology- A Practical Handbook – Khandelwal & S.S. Mahdi.
- An Introduction to Sericulture Ganga shetty, Oxford and IBH.
- Vermicomposting for sustainable agriculture 2005 Gupta, Agrobios.

Pedagogy

Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2018 - 19 and after)

PART – III **: Allied**		SEMESTER **- II**
Course Title **: PRACTICAL - I**		
Course Code: **09AP03**	Hours per week: **2**	Credits: **4**
CIA: **40 Marks**	ESE: **60 Marks**	Total: **100 Marks**

Preamble

Visualize, analyse and observe the various types of organisms in microbes, invertebrata and chordata, their organ systems, adaptations, their diversity and behavioral patterns.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

bNo.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on the body systems in the representative animals	K1,K2,K3
CO 2	Notify the specific characters, identifying structures in the preserved, stuffed and dried animals.	K1,K2,K3
CO 3	Observe the microscopic organisms to analyse their survival skills.	K1,K2,K3
CO 4	Demonstrate the staining and mounting techniques in microbes and representative insects.	K1,K2,K3
CO 5	Trace the entrepreneurial skills, biodiversity, habitat, environment through the field visit.	K1,K2,K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	3	-	-	-	3	3	1
CO 2	3	-	-	-	3	9	3
CO 3	1	-	-	1	3	3	1
CO 4	1	-	-	1	1	3	3
CO 5	-	-	9	3	3	9	3
	8	-	9	5	13	27	11

Mapping of CO with PSO

Department	Botany					Chemistry				
PSO/CLO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	-	3	1	3	1	1	-	1	1	1
CLO 2	-	1	1	3	-	1	-	-	3	1
CLO 3	-	-	1	1	1	-	-	1	1	1
CLO 4	-	1	9	3	3	-	-	-	-	3
CLO 5	-	1	9	9	1	1	-	-	-	-
	-	**6**	**21**	**19**	**6**	**3**	**-**	**2**	**5**	**6**

Note: Mapping Score Strong-9, Medium- 3 and Low-1

Syllabus

1. Observation of the following -Spotters **(12 Hrs)**
   - Paramoecium conjugation
   - Obelia (entire)

- Hydra (entire)
- Taenia (entire)
- Scolex of Taenia
- Ascaris male and female
- Neries (entire)
- Penaeus
- Pila (entire) and shell of Fresh water mussel)
- Starfish (entire)
- Amphioxus, Balanoglossus, Scoliodon
- Cobra, Viper, Pigeon
- Skull of Pigeon dorsal and ventral view
- Pectoral girdle of pigeon
- Fore and hind limb of Frog
- Synsacrum of bird

2. Simple staining of Bacteria from milk and sewage water.
3. Mounting of mouth parts of Mosquito, Housefly and Honey bee.
4. Identification of Ascaris (male & female) and Tapeworm.
5. Identification of egg, larva, pupa and adult of silk moth.
6. Dissection to show silk glands.
7. Common appliances used in silkworm rearing and apiculture.
8. Visit to Biogas production, Mushroom culture and Fish culture centres.

Text Books

Kapoor, 2014 Practical Zoology, Silver Line Publications, Allahabad, Uttrapradesh

Reference Books

- Pechenik, Jan A 2014 – Biology of the Invertebrates, Tata Mcgraw – Hill Pub. Company Ltd., New Delhi
- Vasantika Kashyap, 2013, Life of Invertebrates, Second Revised Edition, Vikas Pub. House Pvt. Ltd., New Delhi
- Kotpal, R.L. 2012. Modern Text Book of Zoology, Invertebrates (Animal diversity – I), Rastogi Publications, Meerut
- Barnes, R.D. 2006,Invertebrate Zoology, IV Edition, Holf Saunders International edition
- Ekambaranatha Ayyar and Ananthakrishnan, T.N. 2005, A manual of Zoology, volume I, Invertebrate, Viswanathan (Printers and Publishers) Pvt. Ltd., ChennaiKotpal, R.L. 2011. Vertebrates, Rastogi Publications
- Gupta R.C and Girish Chopra, 2003 - Comparative Anatomy of Chordates – R.Chand & Co, New Delhi
- Newmann, 1981, The Phylum chordata, Biology of vertebrates and their kin, Satish Book Enterprises, Agra.

Pedagogy

Chalk and talk, Charts and models, Smart board, Group Discussion, PPT, Preserved animals, slides and Field visit

Teaching Aids

Green Board, LCD Projector, Interactive White Board, Microscope – Dissection, Compound, Deep vision and Phase Contrast Microspcose.