JAYARAJ ANNAPACKIAM COLLEGE FOR WOMEN (AUTONOMOUS)

A Unit of the Sisters of St. Anne of Tiruchirappalli
Accredited with 'A+' Grade (Cycle 4) by NAAC
DST FIST Supported College
Affiliated to Mother Teresa Women's University, Kodaikanal

PERIYAKULAM – 625 601, THENI DT. TAMIL NADU.

B.Sc. ZOOLOGY

(2023-2026)

P.G. AND RESEARCH CENTRE OF ZOOLOGY

U. G. PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Apply scientific knowledge to real life situations to become competent and committed.
2.	Acquire Industry specific skills and equip them to emerge as entrepreneurs.
3.	Explore the knowledge and acclimatize it in the ever-changing work environment.
4.	Design and conduct experiments /demos/create models to analyze and interpret data.
5.	Communicate effectively on the findings of sciences and incorporate with existing knowledge.
6.	Evolve theories and develop innovative discipline specific ideas.

U. G. PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Develop a broad fundamental knowledge on the faunal diversity, classification, morphological features, adaptation and its biological activity.	PO1
2.	Explain how animals' function and interact with respect to biological, Chemical and physical processes in natural and impacted environments.	PO5
3.	Survey the human life processes and exhibit their ability to analyze the biochemical and clinical samples and to diagnose the health ailments and aspire for healthy living.	PO3
4.	Perform experimental procedures and interpret the results in the areas of Physiology, Ecology, Cell Biology, Genetics, Applied Zoology, Biochemistry, Animal Biotechnology, Immunology and Research Methodology.	PO4
5.	Explore discipline specific and transferable skills that are relevant to Zoology in job trades and fetch employment opportunities.	PO2, PO6

U.G. COURSE PATTERN - (2023 - 2026) (UGC/ TANSCHE/ MTU)

Sem.	Part	Code	Title of the Course	Hours	Credit
I	I	23GT1GS01/ 23GH1GS01	Tamil-I/ Hindi-I	6	3
	II	23GE1GS01	English - I	4	3
	III	23ZO1MC01	Invertebrata - I	5	4
		23ZO1MC02	Invertebrata - II	4	3
		23ZO1CP01	Invertebrata and Chordata - Lab	2	-
		23CH1AC1A/ 23CH1AC1B	Allied Chemistry - I Allied Chemistry - II	3	3
		23CH1AP1A/ 23CH1AP1B	Allied Chemistry - I - Lab Allied Chemistry - II - Lab	2	1
	IV	23AE1PE01	**AEC 1**-I Professional English	2	2
	IV	23ZO1FC01	**Foundation Course:** Fundamentals of Zoology	2	2
	V	23STPNS01/ 23STPNC01/ 23STPPE01/ 23STPCC01/ 23STPRR01/ 23STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**21**
II	I	23GT2GS02/ 23GH2GS02	Tamil-II/ Hindi-II	6	3
	II	23GE2GS02	English - II	4	3
	III	23ZO2MC03	Chordata - I	4	4
		23ZO2MC04	Chordata - II	5	5
		23ZO2CP01	Invertebrata and Chordata - Lab	2	2
		23CH2AC2A/ 23CH2AC2B	Allied Chemistry - III Allied Chemistry - IV	3	3
		23CH2AP2A/ 23CH2AP2B	Allied Chemistry - III - Lab Allied Chemistry - IV - Lab	2	1
	IV	23AE2VE02	**AEC - 2:** Sustainability Life Skills	2	2
		23SE2CE02	**SEC - 1:** Effective English	2	2
	V	23STPNS01/ 23STPNC01/ 23STPPE01/ 23STPCC01/ 23STPRR01/ 23STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**25**

Sem.	Part	Code	Title of the Course	Hours	Credit
III	I	23GT3GS03/ 23GH3GS03	Tamil-III/ Hindi-III	6	3
	II	23GE3GS03	English - III	4	3
	III	23ZO3MC05	Cell Biology and Molecular Biology	5	5
		23ZO3MC06	Genetics	3	3
		23ZO3CP02	Cell Biology and Genetics - Lab	2	1
		23BO3AC3A/ 23BO3AC3B	General Botany - I Ethnobotany and Medicinal Botany	3	3
		23BO3AP3A/ 23BO3AP3B	General Botany- I - Lab Ethnobotany and Medicinal Botany - Lab	2	1
	IV	23SE3ZO03	**SEC - 2:** Fermented foods and beverages	1	1
		23ZO3GE01/ 23GE3NC01	**GE -1:** Global Environmental Issues/ National Integration and Personality Development	2	2
		23AE3ES03	**AEC - 3:** Environmental Studies	2	2
	V	23STPNS01/ 23STPNC01/ 23STPPE01/ 23STPCC01/ 23STPRR01/ 23STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**24**
IV	I	23GT4GS04/ 23GH4GS04	Tamil-IV/ Hindi-IV	6	3
	II	23GE4GS04	English - IV	4	3
	III	23ZO4MC07	Animal Physiology	6	6
		23ZO4CP03	Animal Physiology - Lab	3	2
		23BO4AC4A/ 23BO4AC4B	General Botany - II Nursery, Gardening and Floriculture	3	3
		23BO4AP4A/ 23BO4AP4B	General Botany - II - Lab Nursery, Gardening and Floriculture - Lab	2	1
	IV	23SE4OA4C	**SEC - 3:** Office Fundamentals	3	2
		23ZO4GE02/ 23GE4NC02	**GE - 2:** Food, Nutrition and Health/ Organization and Health Programme in NCC	2	2
		23AE4CB04	**AEC - 4:** Capacity Building	1	1
	V	23STPNS01/ 23STPNC01/ 23STPPE01/ 23STPCC01/ 23STPRR01/ 23STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	1*
			Total	**30**	**23+1***

Sem.	Part	Code	Title of the Course	Hours	Credit
V	III	23ZO5MC08	Immunology and Microbiology	6	6
		23ZO5MC09	Biochemistry	6	5
		23ZO5MC10	Evolution	5	3
		23ZO5CP04	Immunology, Microbiology, Biochemistry and Evolution - Lab	5	2
		23ZO5DE1A/ 23ZO5DE1B/ 23ZO5DE1C	**Discipline Specific Elective - 1** Biostatistics and Research Methodology Human reproductive Biology Aquatic Zoology	4	3
	III	23ZO5DE2A/ 23ZO5DE2B/ 23ZO5DE2C	**Discipline Specific Elective - 2** Clinical Lab Technology Livestock Management and Animal Husbandry Wild Life Conservation and Management	4	3
	IV	23ZO5IN01/ 23ZO5IT01	Internship/ Industrial Training (Carried out in II-year Summer Vacation) (30 hours) / at least 6 days (IV Sem)	-	2
	V	23SLPEX01	**Service-Learning Programme:** Extension JACEP	-	-
			Total	**30**	**24**
VI	III	23ZO6MC11	Developmental Biology	6	5
		23ZO6MC12	Genetic Engineering and Biotechnology	5	4
		23ZO6MC13	Ecology	5	4
		23ZO6CP05	Developmental Biology, Biotechnology and Ecology - Lab	4	2
		23ZO6PR01	Project*	4	3
		23ZO6DE3A/ 23ZO6DE3B/ 23ZO6DE3C	**Discipline Specific Elective - 3** Bioinformatics Entomology Agrochemicals and Pest Management	3	2
	IV	23SE6ZO04	**Skill Enhancement Compulsory Course (SEC) - 4 (Domain specific skill courses) -** Ornamental Fish Culture	3	2
	V	23ZO6SS01/ 23ZO6SS02/ 23ZO6SS03/ 23ZO6SS04/ 23ZO6SM01	**Self-Study Course:** Bionomics Dietetics Bioinstrumentation Maternal Child Health Care MOOCs	-	2*
		23SLPEX01	**Service Learning Programme:** Extension (JACEP)	-	1
			Total	**30**	**23+2***
			Total	**180**	**140+3***

*** Extra Credits - Self Study Paper, MOOCs**

*** Group Project**

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

Semester	Part	Course Code	Course Title
I	III	23ZO1AC1B	General Zoology I
		23ZO1AP1B	General Zoology I -Lab
II	III	23ZO2AC2A	Allied Zoology II
		23ZO2AC2B	General Zoology II
		23ZO2AP2A	Allied Zoology II -Lab
		23ZO2AP2B	General Zoology II- Lab

CERTIFICATE COURSE

Code	Title of the Course	Hours	Credit
23ZO1SD01	**Skill Development Programme (SDP)** Mushroom culture	60	2

CERTIFICATE COURSE ON GANDHIAN THOUGHT

Code	Title of the Course	Hours	Credit
CCHYGT01	Life of Mahatma Gandhi	60	2
CCHYGT02	Non-Violence And Sarvodaya		

CONTINUOUS INTERNAL ASSESSMENT COMPONENT (CIA) - 2023-2026 -UG

CIA components for Practical can be decided by the respective Departments.

Passing Minimum in the Continuous Internal Assessment is Compulsory for appearing the External Semester Examination

Theory:

Component	Marks	Marks
Internal test I	40	Converted to 25
Internal test II	40	
Quiz	10	
Assignment	5	
Attendance	5	
Total	**100**	**25**

PRACTICAL:

Continuous Internal Assessment (CIA) - 40 Marks

External Practical Exam - 60 Marks

PROJECT WORK (UG)

The ratio of marks for Internal and External Examination is 50:50. The Internal Components of Project Work are given below:

THE INTERNAL COMPONENTS OF PROJECT

Components	Marks
First Review	10
Second Review	10
Final Review (Internal Viva Voce)	30
Total	**50**

EXTERNAL VALUATION OF PROJECT WORK

Components	Marks
Project Report	25
External Viva Voce	25
Total	**50**

INTERNSHIP (UG)

Components	Marks
Internal	50 Marks
External	50 Marks
Total	**100 Marks**

INTERNAL COMPONENTS:

Components	Marks
Report Submission	25 Marks
Presentation and viva (internal)	25 Marks
External (Awarded by the Respective Guide / Intern site)	50 Marks

PASSING MINIMUM FOR EXTERNAL SEMESTER EXAMINATION -UG

Semester Examination		
Theory	40% out of 75 Marks (i.e. 30 Marks)	40% out of 100 Marks (i.e. 40 Marks)
Practical	40% out of 60 Marks (i.e. 24 Marks)	

INTERNAL QUESTION PATTERN - UG (2023-2026)

Max. Marks - 40 **Duration - 2 Hours**

Section	Bloom's level	Course Outcome	Questions
A MCQs (10×1=10)	K1	CO1	1.
		CO1	2.
		CO1	3.
		CO1	4.
		CO1	5.
		CO1	6.
		CO1	7.
		CO1	8.
		CO1	9.
		CO1	10.
B Answer all the Questions (2×5=10)	K2	CO2	11. a) (or) 11. b)
	K3	CO3	12. a) (or) 12. b)
C Answer all the questions (2×10=20)	K4	CO4	13. a) (or) 13. b)
	K5	CO5	14. a) (or) 14. b)

INTERNAL QUESTION PATTERN (Fully Internal Papers) - UG (2023-2026)

Max. Marks - 40; **Duration - $1\frac{1}{2}$ Hours**

Section	Bloom's level	Course Outcome	Questions
A MCQs (10×1=10)	K1	CO1	1.
		CO1	2.
		CO1	3.
		CO1	4.
		CO1	5.
		CO1	6.
		CO1	7.
		CO1	8.
		CO1	9.
		CO1	10.
B Answer all the Questions (2×5=10)	K2	CO2	11. a) (or) 11. b)
	K3	CO3	12. a) (or) 12. b)
C Answer all the questions (2×10=20)	K4	CO4	13. a) (or) 13. b)
	K5	CO5	14. a) (or) 14. b)

UG - EXTERNAL QUESTION PATTERN

For Credits 5 and above

Sections	Bloom's level	Course Outcome	Questions
A MCQs 15×1=15	K1	CO1	1
			2
			3
			4
			5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
B Answer All the Questions 5×2=10	K2	CO2	16
			17
			18
			19
			20

C Answer ALL the Questions 5×5=25	K1	CO1	21. a)
			Or
			21. b)
	K2	CO2	22. a)
			Or
			22. b)
	K3	CO3	23. a)
			Or
			23. b)
	K4	CO4	24. a)
			Or
			24. b)
	K5	CO5	25. a)
			Or
			25. b)
D Answer All the Questions 5×10=50	K1	CO1	26. a)
			Or
			26. b)
	K2	CO2	27. a)
			Or
			27. b)
	K3	CO3	28. a)
			Or
			28. b)
	K4	CO4	29. a)
			Or
			29. b)
	K5	CO5	30. a)
			Or
			30. b)

UG - EXTERNAL QUESTION PATTERN

For Below 5Credits

Sections	Bloom's level	Course Outcome	Questions
A MCQs 15×1=15	K1	CO1	1
			2
			3
			4
			5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
B Answer ALL the Questions 5×6=30	K1	CO1	16. a)
			Or
			16. b)
	K2	CO2	17. a)
			Or
			17. b)
	K3	CO3	18. a)
			Or
			18. b)
	K4	CO4	19. a)
			Or
			19. b)
	K5	CO5	20. a)
			Or
			20. b)
C Answer All the Questions 3×10=30	K2	CO2	21. a)
			Or
			21. b)
	K3	CO3	22. a)
			Or
			22. b)
	K4	CO4	23. a)
			Or
			23. b)

பொதுத்தமிழ் - 1 (பிற துறை மாணவிகளுக்கு மட்டும்)

பருவம்: ஒன்று **நேரம்: 6**

குறியீடு: 23GT1GS01 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	பாரதியார் காலந்தொட்டு தற்காலப் புதுக்கவிதைகள் வரை கவிதை இலக்கியம் அறிமுகப்படுத்தப்படுவதால் படைப்பாற்றல் திறன் அறிந்து கொள்வர்.	PSO-1	K1
CO - 2	புதுக்கவிதை வரலாற்றினை புரிந்து கொள்வார்.	PSO-5	K2
CO - 3	இக்கால இலக்கிய வகையினைக் கற்பதன் மூலம் படைப்பாக்கத் திறனைப் பெறுவர்.	PSO-2	K3
CO - 4	இக்கால இலக்கிய மொழியறிவோடு சிந்தனைத் திறன் அடையும் ஆற்றலை உணர்வர்.	PSO-3	K4
CO - 5	நவீன இலக்கிய உத்திகளைப் பயன்படுத்தி தமிழ் மொழியைப் பிழையின்றி எழுதவும், புதிய கலைச்சொற்களை உருவாக்கும் திறன் பெறுவர்.	PSO-4	K5

K1- நினைவு கூர்தல் K2-புரிதல், K3- பயன்படுத்துதல், K4 - பகுத்தல், K5 - மதிப்பீடு,

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I							பொதுத்தமிழ் - 1 (பிற துறை மாணவிகளுக்கு மட்டும்)					**Hours: 6**
Code : 23GT1GS01												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	5	2	3	3	3	5	3	2	3	3	3.18
CO - 2	4	3	3	5	3	3	3	3	3	4	5	3.55
CO - 3	3	4	3	3	5	5	4	5	3	3	3	3.73
CO- 4	3	4	5	3	3	3	4	3	5	3	3	3.55
CO - 5	5	3	3	3	3	3	3	3	3	5	3	3.36
Overall Mean Score												**3.47**

Result: The score for this course is **3.47** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

அலகு 1: மரபுக் கவிதை

1. பெ. சுந்தரனார் - தமிழ்த் தெய்வ வணக்கம்
2. பாரதிதாசன் - சிறுத்தையே வெளியில் வா
3. கவிமணி - புத்தரும் சிறுவனும்
4. முடியரசன் - மொழி உணர்ச்சி
5. கண்ணதாசன் - ஆட்டனத்தி ஆதிமந்தி (ஆதிமந்தி புலம்பல்)
6. சுரதா - துறைமுகம்
7. தமிழ் ஒளி - கடல் **18 Hours**

அலகு 2: புதுக்கவிதை

1. அப்துல் ரகுமான் - வீட்டுக்கொரு மரம் வளர்ப்போம்
2. ஈரோடு தமிழன்பன் - ஒரு வண்டி சென்ரியூ கவிதைகள் - (ஐந்து மட்டும்)
3. வைரமுத்து - வேறென்ன வேண்டும்
4. மு. மேத்தா - வாழைமரத்தின் சபதம்
5. அறிவுமதி - வள்ளுவம் பத்து
6. நா. முத்துக்குமார் - ஆனந்த யாழை மீட்டுகிறாய்
7. சுகிர்தராணி - சபிக்கப்பட்ட முத்தம்
8. இளம்பிறை - நீ எழுத மறுக்கும் எனது அழகு **18 Hours**

அலகு 3: சிறுகதைகள்

1. ஜெயகாந்தன் - வாய்ச்சொற்கள்
2. புதுமைப்பித்தன் - கடிதம்
3. உமா மகேஸ்வரி - கரு
4. தி. ஜானகிராமன் - முள்முடி
5. விழி பா. இதயவேந்தன் - சிதறல்கள்
6. சு. சமுத்திரம் - காகிதஉறவு
7. அம்பை - வீட்டின் மூலையில் சமையல் அறை
8. மலையாளச் சிறுகதைகள் - செப்புமொழிபதினெட்டுடையாள் - (மொழிபெயர்ப்புக் கதை) தந்தையும் மகனும் **18 Hours**

அலகு 4: பாடம் சார்ந்த இலக்கிய வரலாறு **18 Hours**

அலகு 5: மொழித்திறன் போட்டித் தேர்வு

1. பொருள் பொதிந்த சொற்றொடர் அமைத்தல்
2. ஓர் எழுத்து ஒரு மொழி
3. வேற்றுமை - உருபுகள்
4. திணை, பால், எண், இடம்
5. கலைச்சொல்லாக்கம், மொழிபெயர்ப்பு **18 Hours**

(குறிப்பு: அலகு 4, 5 ஆகியன போட்டித் தேர்வு நோக்கில் நடத்தப்பட வேண்டும்)

பாட நூல்கள்

1. தமிழ்த்துறை வெளியீடு (தொகுப்பு) - பொதுத்தமிழ் - 1
ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி
(தன்னாட்சி), பெரியகுளம்.

2. முனைவர் சி. பாலசுப்பிரமணியன் - தமிழ் இலக்கிய வாலாறு,
பாவை பப்ளிகேஷன்ஸ், சென்னை - 60
இரண்டாம் பதிப்பு - 2016.

பார்வை நூல்கள்:

1. பெ. சுந்தரனார் - மனோன்மணீயம்
நியூ செஞ்சுரி புக் ஹவுஸ்
சென்னை.

2. முடியரசன் - முடியரசன் கவிதைகள்,
பாரிநிலையம்,
சென்னை.

3. பாரதிதாசன் - பாரதிதாசன் கவிதைகள்,
மணிவாசகர் பதிப்பகம்,
சென்னை

4. கவிமணி - ஆசிய ஜோதி
பாவை பப்ளிகேஷன்ஸ்
சென்னை.

5. கண்ணதாசன் கவிதைகள் - ஆட்டனத்தி ஆதிமந்தி
வானதி பதிப்பகம்,
சென்னை.

6. வைரமுத்து - வைரமுத்து கவிதைகள்
திருமகள் நிலையம்,
சென்னை.

7. மு. மேத்தா - மு. மேத்தா கவிதைகள்,
கவிதா வெளியீடு,
சென்னை.

8. கவிஞர் சிற்பி - சிற்பியின் கவிதை வானம்,
மணிவாசகர் பதிப்பகம்,
சென்னை.

9. நா. முத்துக்குமார் - ஆனந்த யாழை மீட்டுகிறாய்
இணையவழி தகவல் திரட்டு

10. சுகிர்தாராணி - சபிக்கப்பட்ட முத்தம்
இணையவழி தகவல் திரட்டு

11. ஜெயகாந்தன் - ஜெயகாந்தன் சிறுகதைகள்,
கவிதா பப்ளிகேஷன்ஸ்,
சென்னை.

12. ச. சுபாஷ் சந்திரபோஸ் (தொகுப்பாசிரியர்) - புதுமைப்பித்தன் சிறுகதைகள், பாவை பப்ளிகேஷன்ஸ், சென்னை.

13. தி. ஜானகிராமன் - தி. ஜானகிராமன் படைப்புகள், ஐந்திணைப் பதிப்பகம், சென்னை.

14. சு. சமுத்திரம் - சு. சமுத்திரம் கதைகள், ராஜராஜன் பதிப்பகம், சென்னை.

15. தமிழாக்கம் கோ. பிச்சை - செப்புமொழி பதினெட்டுடையாள், நியூசெஞ்சுரி புக் ஹவுஸ், சென்னை.

16. சி. பாலசுப்பிரமணியன், - தமிழ் இலக்கிய வரலாறு பாவை பப்ளிகேஷன்ஸ், சென்னை - 600 014.

17. புலவர் குழந்தை - மாணவர் அடிப்படைத் தமிழ் இலக்கணம், சாரதா பதிப்பகம், சென்னை - 600 014.

18. எ.ஃப். பாக்கியமேரி - வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு நியூசெஞ்சுரி புக் ஹவுஸ், சென்னை.

PART I - HINDI - COURSE PATTERN (2023 - 2026)

Part	Sem.	Code	Title of the Paper	Hours/ Week	Credit
I	I	23GH1GS01	Paper - I - Prose, Short Story and Grammar - I	5	3
	II	23GH2GS02	Novel, One act Play, and Grammar - II	5	3
	III	23GH3GS03	Poetry and History of Hindi Literature, Alankar	5	3
	IV	23GH4GS04	General Essay, Technical Hindi, Translation, and Letter Writing	5	3
		Total		**20**	**12**

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

TESTING AND EVALUATION

Course	Continuous Internal Assessment	Semester Examination
Hindi	25%	75%

Continuous Internal Assessment Component (CIA)

Component	Marks	Marks
Internal test I	40	Converted to 25
Internal test II	40	
Quiz	10	
Assignment	5	
Attendance	5	
Total	**100**	**25**

CONTINUOUS INTERNAL ASSESSMENT COMPONENT (CIA)

CIA components for Practical can be decided by the respective Departments.

Passing Minimum in the Continuous Internal Assessment is Compulsory for appearing the External Semester Examination

Passing Minimum for CIA Examination	
Theory	40% out of 25 Marks (i.e. 10 Marks)

PASSING MINIMUM FOR EXTERNAL SEMESTER EXAMINATION -UG

Semester Examination		
Theory	40% out of 75 Marks (i.e. 30 Marks)	40% out of 100 Marks (i.e. 40 Marks)
Practical	40% out of 60 Marks (i.e. 24 Marks)	

PAPER I - PROSE, SHORT STORY AND GRAMMAR - I

Semester: I **Hours: 5**

Code : 23GH1GS01 **Credits: 3**

1. Prose : Naveen Hindi Patamala Part-3

Published by Dakshina Bharathi Hindi Prachar Sabha,

Thyagaraya Nagar, Chennai - 600 017.

The following Lessons have been prescribed

a) Shiraj Ki Gurubhakthi

b) Shri Krishn

c) Gupth Rupya

d) Karmaveer Kamaraj

2. Short Story : Kahani Manjari

Edited by: Dakshin Bharath Hindi Prachar Sabha,

Thyagaraya Nagar, Chennai - 600 017.

The following short stories have been priscribed

a) Badegar kee beti	-	Premchand
b) Thayee	-	Vishwamranava Shrama Kaushik
c) Paanch minute	-	Mohanlalji Mahato yogi
d) Usne Kaha tha	-	Chandra dharshama Guleri

3. Grammar 1 : Vyakaran Pradeep Published by Ramdev, Hindi Bhaan,

63, Tagore Nagarm Allahabad -2

The following topics have been prescribed

a) Noun b) Gender and Number

c) Pronoun d) Adjectives

COMMUNICATIVE ENGLISH - I

Semester: I **Hours: 4**

Code : 23GE1GS01 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Discover a fair degree of competence in self-expression in both writing and speaking	PSO-5	K1
CO - 2	Comprehend by reading texts	PSO-2	K2
CO - 3	Articulate academic resources	PSO-4	K3
CO - 4	Focus on independent learning	PSO-3	K4
CO - 5	Estimate critical and analytical thinking	PO-1	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**COMMUNICATIVE ENGLISH -I**							**Hours: 4**
Code : 23GE1GS01											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	5	3	3	3	5	4	3	3	3	5	3.73
CO - 2	4	3	3	5	4	3	4	5	3	4	3	3.73
CO - 3	4	3	3	3	5	3	4	3	3	5	3	3.55
CO - 4	3	3	5	3	4	3	3	3	5	4	3	3.55
CO - 5	5	3	4	3	4	3	5	3	4	4	3	3.73
Overall Mean Score												**3.65**

Result: The score for this course is **3.65** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I **12 Hours**

1. Listening and Speaking
    a. Introducing self and others
    b. Listening for Information
    c. Pronunciation (without phonetic symbols)
    i. Essentials of pronunciation
    ii. American and British pronunciation
2. Reading and Writing
    a. Reading short articles - newspaper reports / fact based articles
        i. Skimming and scanning
        ii. Diction and tone
        iii. Identifying topic sentences
    b. Reading aloud: Reading an article/report
    c. Journal (Diary) Writing
3. Study Skills - I
    a. Using dictionaries, encyclopaedias, thesaurus

UNIT II **12 Hours**

1. Listening and Speaking
    a. Listening with a Purpose
    b. Effective Listening
    c. Tonal Variation
    d. Listening for specific information
    e. Asking for Information
    f. Giving Information
2. Reading and Writing
    a. Types of Reading: Extensive and Intensive Reading
    b. Reading a Prose Passage
    c. Reading a Poem
    d. Reading a Short Story
3. Paragraphs: Structure and types
    a. What is a Paragraph?
    b. Paragraph Structure
    c. Topic Structure
    d. Unity
    e. Coherence
    f. Connections between Ideas: Using Transitional words and expressions
    g. Types of Paragraphs

4. Study skills - II

   Using the internet as a resource

   a. Online search

   b. Know the keyword

   c. Refine your search

   d. Guidelines for using the Resources

   e. E- Learning resources of Government of India

   f. Terms to know

UNIT III **12 Hours**

1. Listening and Speaking

   a. Giving and following instructions

   b. Asking for and giving directions

   c. Continuing discussions with connecting ideas

2. Reading and writing

   a. Reading feature articles (from newspapers and magazines)
   b. Reading to identify point of view and perspective (opinion pieces, editorials etc.)
   c. Descriptive writing - writing a short descriptive essay of two to three paragraphs

UNIT IV **12 Hours**

1. Listening and Speaking

   a. Giving and responding to opinions

2. Reading and writing

   a. Note taking

   b. Narrative writing - writing narrative essays of two to three paragraphs

UNIT V **12 Hours**

1. Grammar in Context
   Naming and Describing
   a. Nouns and Pronouns
   b. Adjectives

Involving Action- I

   a. Verbs
   b. Concord

Involving Action- II

   a. Verbal- Gerund, Participle, Infinitive

   b. Modals

Tense

   a. Present

   b. Past

   c. Future

COURSE BOOKS:

- Communicative English (For Students of Arts and Science Colleges) Tamilnadu State Council for Higher Education (TANSCHE)
- Savarimuttu, Rohan J. S, and G. Petricia Alphine Nirmala, *English Grammar and Usage - An Ideal Companion for Advanced Learners*. New Century Book House (P) Ltd, 2016.

BOOKS FOR REFERENCE

1. Kumar, Manoj. *English Communication: Theory and Practice. Scholar* .Tech Press, 2018.
2. Nachmuthu, Cambridge. *Advanced Communication English.* Cambridge Publishers, 2011.

WEB SOURCES

1. https://www.youtube.com/watch?v=Y94s85-Crew
2. https://www.esolcourses.com/content/topicsmenu/listening.html
3. https://www.ox.ac.uk/students/academic/guidance/skills/plagiarism?wssl=

INVERTEBRATA - I

Semester: I **Hours: 5**

Code : 23ZO1MC01 **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the characteristics and classifications of major Invertebrate phyla	PSO - 1	K1
CO - 2	Memorize the key morphological and anatomical structures and physiological process of Invertebrates.	PSO - 2	K2
CO - 3	Apply the knowledge of Invertebrate to understand their physiological adaptations, ecological roles and biological diversity.	PSO - 4	K3
CO - 4	Compare and contrast the life cycles and reproductive strategies of different Invertebrate taxa.	PSO - 3	K4
CO - 5	Evaluate the exceptional attributes of different classes of Invertebrates.	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**INVERTEBRATA - I**							**Hours: 5**
Code : 23ZO1MC01											**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	3	3	3	5	3	2	3	3	3.18
CO - 2	4	3	3	3	5	3	4	5	3	3	3	3.55
CO - 3	3	3	2	5	3	3	3	3	2	5	3	3.18
CO - 4	3	3	5	3	4	3	3	4	5	3	3	3.55
CO - 5	3	5	2	3	3	5	3	3	2	3	5	3.36
Overall Mean Score												**3.36**

Result: The score for this course is **3.36** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: CLASSIFICATION AND PROTISTA

Concept and general characters of five kingdom of life. Animal kingdom - Systems of classification and nomenclature, Levels of organization. General characters of Protista and classification up to class with an example. Type study - Paramecium. General topics - Protozoan diseases, Life Cycle of Plasmodium, Nutrition in Protozoa, Locomotion in Protozoa. **(15 Hours)**

UNIT II: PORIFERA

Characters and classification up to class with an example, Type study - Leucosolenia, Scypha. General topics - Canal system in sponges, Skeleton in sponges. **(15 Hours)**

UNIT III: COELENTERATA AND CTENOPHORA

Characters and classification up to class with an example. Type study - Obelia Colony. General topics - Polymorphism in Coelenterate, Types of corals, Coral reefs, Structure of coral polyp. Characters and affinities of Ctenophora.**(15 Hours)**

UNIT IV: PLATYHELMINTHES AND ASCHELMINTHES

Platyhelminthes - Characters and classification up to class with an example. Type study - Liver fluke. General topics - Platyhelminth parasites of man - *Taenia solium*, *Taenia saginata*, *Hymenolepis nana*, *Diphyllobothrium latum*, *Schistosoma haematodium*. Aschelminthes - Characters and classification up to class with an example. Type study - *Ascaris*. General topics - Nematode parasite of man - *Ascaris lumbricoides, Wuchereria bancrofti*, *Dracunculus medinensis*, *Ancylostoma duodenale*, *Enterobius vermicularis*, *Tricocephalus trichuris.* Parasitic adaptations of helminth parasites. **(15 Hours)**

UNIT V: ANNELIDA

Characters and classification up to class with an example. Type study - Earth worm. General topics - Coelom and coelomoducts, Metamerism in Annelida, Filter feeding in Polychaetes. **(15 Hours)**

COURSE BOOK:

- Nair, N. C., Leelavathy, S., Soundara Pandian, N., Murugan, T and Arumugam, N. A. (2019). Text Book of Invertebrates, Saras Publication, Nagercoil.

  Unit I: Chapter 1, 2, 3.

  Unit II: Chapter 4.

  Unit III: Chapter 5, 6.

  Unit IV: Chapter 7, 8.

  Unit V: Chapter 9.

BOOKS FOR REFERENCE:

1. Barnes, R.D. Invertebrate Zoology (2006) VII Edition. Holt Saunders International Edition.
2. Ekambaranatha Ayyar and Ananthakrishnan, T.N. Manual of Zoology Volu m e I, Part I (2019). S. Viswanathan Pvt. Ltd. Chennai.
3. Kotpal, R.L. (2020). Modern text book of Zoology Invertebrates, 12th Edition, Rastogi Publications, Meerut.
4. Jordan and Verma (2022). Invertebrate Zoology S. Chand & Co, New Delhi.
5. Anderson D. T. (2001). Invertebrate Zoology, 2nd Edition, Oxford University Press, New Delhi.
6. Barrington, E.J.W. (2012). Invertebrate Structure and Function. English Language Book Society.
7. Hyman, L.H. (1967). The Invertebrates (6 vols). McGraw-Hill Companies Inc. New York.

INVERTEBRATA - II

Semester: I **Hours: 4**

Code : 23ZO1MC02 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the characteristics and classifications of major phyla in Invertebrates	PSO - 1	K1
CO - 2	Memorize the key morphological and anatomical structures and physiological process of Invertebrates.	PSO - 2	K2
CO - 3	Apply the knowledge of Invertebrate to understand their physiological adaptations, ecological roles and biological diversity.	PSO - 3	K3
CO - 4	Compare and contrast the life cycles and reproductive strategies of different Invertebrate taxa.	PSO - 4	K4
CO - 5	Evaluate the exceptional attributes of different classes of Invertebrates.	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**INVERTEBRATA - II**							**Hours: 4**
Code : 23ZO1MC02											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	4	3	3	2	5	3	4	3	2	3.27
CO - 2	3	2	4	4	5	2	3	5	4	4	2	3.45
CO - 3	3	2	5	4	4	2	3	4	5	4	2	3.45
CO - 4	3	2	4	5	4	2	3	4	4	5	2	3.45
CO - 5	3	5	2	4	4	5	3	4	2	4	5	3.73
Overall Mean Score												**3.47**

Result: The score for this course is **3.47** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Arthropoda I: Characters and classification up to class with examples. Brief descriptions of *Limulus* and Sacculina, Type study - *Penaeus* (External morphology, Appendages, Respiratory system, Excretory system, Reproductive system and Life history. **(12 Hours)**

UNIT II

Arthropoda II: General topics: Crustacean larvae. Mouth parts of Insects, Metamorphosis of insects, Beneficial Insects, Social life in insects, Salient features of Arachnids, Affinities of Peripatus. **(12 Hours)**

UNIT III

Mollusca: Characters and classification up to class with an example. Type study - Pila (External morphology, Pallial complex, Digestive system, Respiratory system, Nervous system and Reproductive system). General topics - Cephalopod as an advanced Mollusc,Economic importance of Mollusca. **(12 Hours)**

UNIT IV

Echinodermata: Characters and classification (up to class) of Echinodermata with an example. Type study - Starfish. (External morphology, Pedicellaria, Digestive system, Sense organs and Reproductive system) General topics: Echinoderm larva and Water vascular system. **(12 Hours)**

UNIT V

Minor Phyla: Acoelomate Phyla - General characters and affinities (Mesozoa and Nemertinea), Pseudocoelomate Phyla - Definition and affinities (Endoprocta, Acanthocephala, Rotifera, Gastrotricha, Kinorhyncha, Nematomorpha), Coelomate Phyla - General characters and affinities (Ectoprocta, Brachiopoda, Phoronida, Chaetognatha, Priapulida, Sipunculida, Echiuroida and Pogonophora). **(12 Hours)**

COURSE BOOK:

- Nair, N. C., Leelavathy, S., Soundara Pandian, N., Murugan, T and Arumugam, N. A. (2019). Text Book of Invertebrates, Saras Publication, Nagercoil.

  Unit I: Chapter 10.

  Unit II: Chapter 10.

  Unit III: Chapter 11.

  Unit IV: Chapter 12.

  Unit V: Chapter 13.

BOOKS FOR REFERENCE:

1. Barnes, R.D. Invertebrate Zoology (2006) VII Edition. Holt Saunders International Edition.
2. Ekambaranatha Ayyar and Ananthakrishnan, T.N. Manual of Zoology Vol - I, Part I (2019). S. Viswanathan Pvt. Ltd. Chennai.
3. Kotpal, R.L. (2020). Modern text book of Zoology Invertebrates, 12th Edition, Rastogi Publications, Meerut.
4. Jordan and Verma (2022). Invertebrate Zoology S. Chand & Co, New Delhi.
5. Anderson D. T. (2001). Invertebrate Zoology, 2nd Edition, Oxford University Press, New Delhi.
6. Barrington, E.J.W. (2012). Invertebrate Structure and Function. English Language Book Society.
7. Hyman, L.H. (1967). The Invertebrates (6 vols). McGraw-Hill Companies Inc. New York.

INVERTEBRATA AND CHORDATA - LAB

Semester: I **Hours: 2**
Code : 23ZO1CP01 **Credit: -**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Compare the general biology of few Invertebrates.	PSO - 3	K1
CO - 2	Discover the major groups of invertebrates.	PSO - 5	K2
CO - 3	Categorize the invertebrate animals in their specific taxonomic position.	PSO - 1	K3
CO - 4	Mount the body setae of earthworm.	PSO - 4	K4
CO - 5	Prepare the mouth parts of honey bee and mosquito.	PSO - 2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				INVERTEBRATA AND CHORDATA - LAB							Hours: 2
Code : 23ZO1CP01											Credit: -
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	4	2	5	4	2	2	4	2	5	4	2	3.27
CO - 2	4	5	2	4	3	5	4	3	2	4	5	3.73
CO - 3	5	2	3	3	4	2	5	4	3	3	2	3.27
CO - 4	3	2	4	5	4	2	3	4	4	5	2	3.45
CO - 5	3	2	4	4	5	2	3	5	4	4	2	3.45
Overall Mean Score												**3.43**

Result: The Score for this Course is **3.43** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

EXTERNAL CHARACTERS:

Earthworm, Cockroach

DISSECTION:

Cockroach - Digestive system

- Nervous system

MOUNTING:

Body setae of Earthworm

Mouth Parts of Honey Bee

Mouth Parts of Cockroach

Mouth Parts of Mosquito

Sting of Honey Bee

SPOTTERS:

Amoeba, Paramecium, Euglena, Clathrina, Sycon, Obelia, Aurelia, Physalia, Liver fluke, Tapeworm, Planaria, Ascaris (Male and Female), Nereis, Peripatus, Limulus, Millipede, Centipede, Prawn, Nauplius larva, Zoea larva, Sepia, Octopus, Chiton, Sea urchin, Sea Cucumber, Starfish.

SURVEY OF CAMPUS INSECTS - Collection and submission of insects.

ALLIED ZOOLOGY - I

Semester: I **Hours: 3**

Code : 23ZO1AC1A **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the general characteristics and classifications of major phyla in Invertebrates	PSO - 1	K1
CO - 2	Explain the distinctive features of key specimens in Invertebrates.	PSO - 5	K2
CO - 3	Interpret the evolutionary significance and importance of Invertebrates.	PSO - 3	K3
CO - 4	Analyze the structural and functional organizations of Invertebrates.	PSO - 4	K4
CO - 5	Evaluate the exceptional attributes of different classes of Invertebrates.	PSO - 2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**ALLIED ZOOLOGY - I**							**Hours:**
Code : 23ZO1AC1A											**Credit:**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	3	4	3	5	4	2	3	3	3.36
CO - 2	4	5	2	2	3	5	4	3	2	2	5	3.36
CO - 3	3	4	5	4	3	4	3	3	5	4	4	3.82
CO - 4	4	4	2	5	4	4	4	4	2	5	4	3.82
CO - 5	4	4	2	4	5	4	4	5	2	4	4	3.82
Overall Mean Score												**3.64**

Result: The score for this course is **3.64** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Invertebrates: Salient features of invertebrates, Binomial Nomenclature, Outline classification of animals. Levels of organization - Grades of organization, Symmetry and Coelom. **Protozoa:** General characters with an example. Salient features of Amoeba, Euglena and Paramecium. Nutrition in protozoa. **Porifera:** General characters with an example. Salient features of ascon and sycon sponge. **(9 Hours)**

UNIT II

Coelenterata: General characters with an example. Salient features of Hydra Physalia, Aurelia and Obelia. Polymorphism in coelenterate, Types of corals and Structure of coral polyp. **Platyhelminthes:** General characters with an example. Salient features of Tape worm Planaria, Schistosoma and Liver fluke. Parasitic adaptations of liver fluke, Platyhelminth parasites of man. **(9 Hours)**

UNIT III

Aschelminthes: General characters with an example. Salient features of Ascaris, Ancylostoma, Dracunculus and Wuchereria. Parasitic adaptations of nematodes, Nematode parasites in man. **Annelida:** General characters with an example. Salient features of Earth worm, Chaetopterus and Nereis. Metamerism in annelids. **(9 Hours)**

UNIT IV

Arthropoda: General characters with an example. Salient features of prawn, spider, tick, mite and Limulus. Larval forms of crustacea, Beneficial insects, Affinities of Peripatus and appendages of prawn. **(9 Hours)**

UNIT V

Mollusca: General characters with an example. Salient features of Pila, sepia, and octopus. Oyster culture, Economic importance of Mollusca. **Echinodermata:** General characters with an example. Salient features of star fish, sea cucumber and sea urchin, Water vascular system, Larval forms of Echinodermata. **(9 Hours)**

COURSE BOOK:

- Arumugam, N., N.C. Nair, S. Leelavathy, N. Soundara Pandian. (2013). Invertebrate Zoology, 5th Edition, Saras Publication, Nagercoil.
  Unit I: Chapter 1, 2, 3.
  Unit II: Chapter 4, 5.
  Unit III: Chapter 6, 7.
  Unit IV: Chapter 8.
  Unit V: Chapter 9, 10.

BOOKS FOR REFERENCE:

1. Barnes, R.D. (2006). Invertebrate Zoology. VII Edition. Holt Saunders InternationalEdition.
2. Ekambaranatha Ayyar and Ananthakrishnan, T.N. (2019). Manual of Zoology Vol - I, Part I S.Viswanathan Pvt. Ltd. Chennai..
3. Kotpal, R. L. (2020). Modern text book of Zoology Invertebrates, 12th Edition, Rastogi Publications, Meerut.
4. Jordan and Verma (2022). Invertebrate Zoology S. Chand & Co, New Delhi.
5. Anderson D. T. (2001). Invertebrate Zoology, 2nd Edition, Oxford University Press, New Delhi.
6. Barrington, E. J. W. (2012). Invertebrate Structure and Function. English Language Book Society.
7. Hyman, L. H. (1967). The Invertebrates (6 vols). McGraw-Hill Companies Inc. New York.

GENERAL ZOOLOGY - I

Semester: I **Hours: 3**

Code : 23ZO1AC1B **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Discuss the basic principles of taxonomy, nomenclature of Invertebrates.	PSO - 1	K1
CO - 2	Interpret the structural organization of chordates.	PSO - 2	K2
CO - 3	Analyse the life cycle of malarial parasite and identify poisonous and non-poisonous snakes	PSO - 3	K3
CO - 4	Discriminate the prokaryotic and eukaryotic cells	PSO - 4	K4
CO - 5	Integrate the inheritance of sex-linked diseases	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**GENERAL ZOOLOGY - I**							**Hours: 3**
Code : 23ZO1AC1B											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	3	4	3	5	4	2	3	3	3.36
CO - 2	4	3	2	2	5	3	4	5	2	2	3	3.18
CO - 3	4	3	5	4	4	3	4	4	5	4	3	3.91
CO - 4	4	4	2	5	4	4	4	4	2	5	4	3.82
CO - 5	4	5	3	4	4	5	4	4	3	4	5	4.09
Overall Mean Score												**3.67**

Result: The Score for this Course is **3.67** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Outline classification of animals, Introduction to principles of taxonomy, principles of binomial nomenclature, levels of organization - symmetry, salient features of Invertebrata. General characters of phyla of Invertebrata with an example each. Salient features of amoeba, sycon, hydra, liver fluke, ascaris, earthworm, cockroach, pila, starfish. Paramecium - conjugation. Obelia - Polymorphism.

(9 Hours)

UNIT II

Salient features of chordates. General characters of classes of Chordata with an example. Salient features of Balanoglossus, Amphioxus, Ascidian, Shark, Frog, Calotes, Pigeon and Rabbit. **(9 Hours**)

UNIT III

Life cycle of plasmodium, Economic importance of insects, Economic importance of fishes. Identification of poisonous and nonpoisonous snakes Migration in birds, Adaptations of aquatic mammals. **(9 Hours)**

UNIT IV

Prokaryotic and Eukaryotic cells, General structure of animal cell, Mitotic cell division, Structure and functions of chromosomes, Watson and Crick model of DNA, General features of cancer cells, Types of cancer. **(9 Hours)**

UNIT V

Mendelian experiments - Monohybrid and Dihybrid cross. Multiple alleles - ABO blood groups in man. Polygenes - Skin colour in man, Sex determination in man, and Sex-linked inheritance in man - X linked inheritance and Y linked inheritance. Syndromes - Down's, Klinefelter's and Turner's syndrome. **(9 Hours)**

COURSE BOOKS:

1. Arumugam, N., N.C. Nair, S. Leelavathy, N. Soundara Pandian. (2013). Invertebrate Zoology, 5th Edition, Saras Publication, Nagercoil.
   Unit I: Chapter 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
   Unit III: Chapter 2, 8.
2. Arumugam, N., A. Thangamani, S. Prasannakumar, L. M. Narayanan, (2013). Chordate Zoology, 7th Edition, Saras Publication, Nagercoil.
   Unit II: Chapter 1, 2, 3, 4, 5, 6, 7, 8.
   Unit III: Chapter 4, 6, 7, 8.
3. Arumugam, N. (2019). Cell Biology, 10th Edition, Saras Publication, Nagercoil.
   Unit IV: Chapter 4, 13, 14, 15, 16.
4. Arumugam, N. and Meyyan, R. P. (2015). Genetics and Evolution, 6th Edition, Saras Publication, Nagercoil.
   Unit V: Chapter 2, 4, 5, 9, 10, 12

BOOKS FOR REFERENCE:

1. Nair, N.C., Leelavathy, S., Soundara Pandian, N., Murugan, T. and Arumugam, N. (2019). A Textbook of Invertebrates. Saras Publication, Nagercoil.
2. Thangamani A, Prasannakumar Narayanan LM, Arumugam N. (2019). A Text Book of Chordates, Saras Publication, Nagercoil.
3. Kotpal., (2020). Modern textbook of zoology. 4th edition. R. L. Rastogi publication, Meerut.
4. Jordan E. L., and Verma P.S., (2014). Chordate Zoology. 15th Edition. Chand and Co., New Delhi.
5. Arumugam N., Murugan S., Johnson J., and Ram Prabu R. (2005) Applied zoology, saras publications, Nagercoil.
6. C. B. Power, (2019). Cell Biology, 3rd edition. Himalaya Publishing House Pvt.Ltd., Bombay.
7. Verma P.S. & Agarwal V.K. (2014). Genetics. 9th edition. Chand and Co., New Delhi.
8. Verma P.S. and Agarwal V.K. (2016) Cell Biology (Cytology, Biomolecules, Molecular Biology), Paperback, S. Chand and Company Ltd.
9. Meyyan R.P., (2010). Genetics, Saras Publication, Nagercoil.

ALLIED ZOOLOGY - I - LAB

Semester: I **Hours: 2**

Code : 23ZO1AP1A **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Compare the general biology of few Invertebrates.	PSO - 3	K1
CO - 2	Recognize the major groups of invertebrates.	PSO - 2	K2
CO - 3	Categorize the invertebrate animals in their specific taxonomic position.	PSO - 1	K3
CO - 4	Mount the body setae of earthworm.	PSO - 4	K4
CO - 5	Prepare the mouth parts of honey bee and cockroach	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				ALLIED ZOOLOGY - I - LAB							Hours: 2
Code : 23ZO1AP1A											Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	3	2	5	3	4	2	3	4	5	3	2	3.27
CO - 2	4	3	2	3	5	3	4	5	2	3	3	3.36
CO - 3	5	2	2	3	3	2	5	3	2	3	2	2.91
CO - 4	2	2	2	5	3	2	2	3	2	5	2	2.73
CO - 5	3	5	2	3	4	5	3	4	2	3	5	3.55
Overall Mean Score												3.16

Result: The Score for this Course is **3.16** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

DISSECTION:

Cockroach - Digestive system

Cockroach - Nervous system

MOUNTING:

Body setae of Earthworm

Mouth Parts of Honey Bee and Cockroach

Sting of Honey Bee

Survey of butterfly in the campus.

Vermicompost preparation.

SPOTTERS:

Amoeba, Paramecium, Euglena, Obelia, Liver fluke, Tapeworm, Planaria, Ascaris (Male and Female), Nereis, Peripatus, Limulus, Millipede, Centipede, Prawn, Pila, Nauplius larva, Zoea larva, Sepia, Octopus, Sea urchin, Sea Cucumber, Starfish.

GENERAL ZOOLOGY – I - LAB

Semester: I **Hours: 2**

Code : 23ZO1AP1B **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Compare the general biology of few Invertebrates.	PSO - 3	K1
CO - 2	Categorize the invertebrate animals in their specific taxonomic position.	PSO - 1	K2
CO - 3	Mount the body setae of earthworm.	PSO - 4	K3
CO - 4	Detect the different stages of mitosis.	PSO - 2	K4
CO - 5	Develop the knowledge on inheritance of Mendelian traits.	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**GENERAL ZOOLOGY - I - LAB**							**Hours: 2**
Code : 23ZO1AP1B											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	2	2	5	3	4	2	2	4	5	3	2	3.09
CO - 2	5	2	2	3	3	2	5	3	2	3	2	2.91
CO - 3	4	2	2	5	3	2	4	3	2	5	2	3.09
CO - 4	3	2	3	4	5	2	3	5	3	4	2	3.27
CO - 5	3	5	3	4	4	5	3	4	3	4	5	3.91
Overall Mean Score												**3.25**

Result: The Score for this Course is **3.25** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

DISSECTIONS:

Cockroach - Nervous System

Cockroach - Digestive system

MOUNTINGS:

Body setae of Earth worm

Sting of honey bee

Placoid scales

OBSERVATIONS:

Observation of Mitosis in onion root tip

Observation of Mendelian traits in man

Monohybrid cross

Observation of syndromes - Down's, Klinefelter's and Turner syndrome

SPOTTERS:

Amoeba, Obelia, Ascaris (Male and Female), Neries, Prawn, Octopus, Star fish, Amphioxus, Anabas, Bufo, Naja Naja, King fisher, Bat.

ALLIED CHEMISTRY - I

Semester: I **Hours: 3**
Code : 23CH1AC1A **Credit: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Acquire knowledge on the basic concepts of periodic table of elements, atomic structure, chemical bonding, biomolecules, empirical and molecular formula and sources of polymers	PSO-1	K1
CO-2	Describe the periodic properties of elements, different models of atom, classification of carbohydrates, deducing molecular formula and classification of polymers	PSO-2	K2
CO-3	Illustrate the periodic variations of elements, atomic structure, chemical bonding, classification of amino acids, Zwitter ion empirical and molecular formula and preparation of polymers	PSO-3	K3
CO-4	Analyse the periodic properties of elements, orbits, orbitals, MO diagram, proteins, aminoacids, empirical and molecular formula and properties of polymers	PSO-4	K4
CO-5	Evaluate the properties of periodic table elements, types of overlapping of orbitals, structure of carbohydrates, molecular formula and applications of polymers	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				ALLIED CHEMISTRY - I							Hours: 3
Code : 23CH1AC1A											Credit: 3
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	4	4	4	3	5	4	3	3	4	3.81
CO - 2	3	3	5	5	3	3	3	5	3	3	3	3.55
CO - 3	3	5	3	3	3	3	3	3	5	3	3	3.36
CO - 4	3	3	3	3	3	5	3	3	3	5	3	3.36
CO - 5	3	3	3	3	5	4	3	3	3	4	5	3.55
Overall Mean Score												3.53

Result: The score for this course is **3.53** (High Relationship)
Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: PERIODIC TABLE:

Modern periodic table - groups and periods - classification of elements on the basis of electronic configuration - properties of elements - atomic radii - ionic radii - size of atoms and ions - ionization energy - electronegativity -electron affinity-trends in perodic table **(9 Hours)**

UNIT II

a) STRUCTURE OF ATOM:

Bohr model of an atom - merits and demerits - Sommerfield modification - wave nature - de Broglie's equation - difference between orbit and orbital - shapes of atomic orbitals

b) BONDING:

Valence Bond(VB) theory - s-s, s-p and p-p overlap - application to the formation of simple molecules like hydrogen and oxygen - Molecular Orbital(MO) theory - MO diagram for H_2, O_2 and F_2 - difference between VB theory and MO theory **(9 Hours)**

UNIT III

a) CARBOHYDRATES:

Definition - sources - classification-reducing and non reducing sugars Properties of glucose: addition with HCN, $NaHSO_3$ and Phenyl hydrazine-sucrose: inversion of sucrose- uses-Ring and Haworth structure of glucose and fructose- tests for carbohydrates

b) AMINO ACIDS: Classification - Properties : dipolar structure -Zwitter ion - uses

c) PROTEINS: Color reactions of proteins-structure of protein - vitamins:Classification - sources - deficiency diseases **(9 Hours)**

UNIT IV: DEDUCING MOLECULAR FORMULA:

Detection of nitrogen, halogen and sulphur in organic compounds (Lassigne's test) - definition of Empirical Formula (EF), Molecular Formula(MF) and Structural Formula (SF)- calculation of empirical and molecular formula from their percentage composition- difference between EF, MF and SF. **(9 Hours)**

UNIT V: POLYMER CHEMISTRY:

Definition - classification of polymers based on origin, mode of formation, structure and application - rubber - natural rubber - vulcanization - synthetic rubbers - preparation and uses of buna rubbers and neoprene- plastics: Thermoplastics and thermosetting plastics - distinction and uses - resins: Definition - preparation and uses of bakelite. **(9 Hours)**

COURSE BOOK

1. Mary Imelda Jayaseeli, M. Kalanithi, C. Mary Anbarasi, Sr. T. Johny Dathees and Sr. S. Sahaya Leenus, Allied Chemistry-I , New Century Book House (P)Ltd., Chennai, first edition, 2020

GENERAL CONCEPTS IN CHEMISTRY-I

Semester: I **Hours: 3**
Code : 23CH1AC1B **Credit: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the properties of hydrogen, hydrogen peroxide, oxides, halogen compounds, ozone, ideal and real gases, kinetic reactions, alkaloids and terpenoids	PSO-1	K1
CO - 2	Explain the classification of hydrogen, hydrogen peroxide, oxides, ozone, alkaloids and terpenoids and describe the behaviour of ideal gases and rate of the reactions	PSO-2	K2
CO - 3	Illustrate the structure of hydrogen peroxide and ozone, enzyme catalysed reactions, alkaloids and terpenoids and deviation of real gases	PSO-3	K3
CO - 4	Analyse the strength of hydrogen peroxide, halogen compounds, behaviour of real gases, order and molecularity of reactions, isolation of alkaloids and terpenoids	PSO-4	K4
CO - 5	Evaluate the properties of hydrogen, hydrogen peroxide, oxides, halogen compounds and ozone, ideal and real gases, rate constant of reaction, alkaloids and terpenoids	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I						**GENERAL CONCEPTS IN CHEMISTRY-I**					**Hours: 3**
Code : 23CH1AC1B											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	4	3	5	3	3	3	4	3.55
CO - 2	3	3	5	5	3	3	3	5	3	3	3	3.55
CO - 3	4	5	3	3	3	3	4	3	5	3	3	3.55
CO - 4	3	3	3	3	3	5	3	3	3	5	3	3.36
CO - 5	3	3	3	3	5	4	3	3	3	4	5	3.55
Overall Mean Score												**3.51**

Result: The score for this course is **3.51** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: HYDROGEN AND HYDROGEN PEROXIDE:

a) Hydrogen : isotopes of hydrogen -separation of the isotopes -properties and uses of heavy hydrogen -position of hydrogen in the periodic table - ortho and para hydrogen - separation - difference in structure and properties - hydrides - definition - classification -preparation and properties.

b) Hydrogen peroxide: manufacture, properties structure and uses of hydrogen peroxide - estimation of hydrogen peroxide by permanganimetry - strength of hydrogen peroxide in volume strength, normality and percentage - calculation of strength on these different terms. **(9 Hours)**

UNIT II: OXIDES,WATER AND OZONE:

a) Oxides : Definition -classification - properties.

b) Ozone: manufacture, composition, structure and properties.

c)Halogen compounds: Dichloromethane, chloform, carbontetrachloride, DDT and BHC - preparation, properties and uses. **(9 Hours)**

UNIT III: GASEOUS STATE:

Postulates of kinetic theory of gases - derivation of expression for pressure of gases on the basis of kinetic theory - deducing the basic gas laws - derivation of real gases from ideal behaviour - reasons for deviation - derivation of van der Waals gas equation - explanation of behaviour of real gases on the basis of van der Waals gas equation. **(9 Hours)**

UNIT IV: CHEMICAL KINETICS:

Rate of reaction - rate law and rate constant - order and molecularity of reactions - derivation of first order rate constant - half -life period - examples of second order, third order reactions - enzyme kinetics. **(9 Hours)**

UNIT V: ALKALOIDS AND TERPENOIDS:

a) **Alkaloids:** Definition -occurrence - extraction of alkaloids and general properties -classification of alkaloids - structures of cocaine, papaverine, piperine and nicotine (structural elucidation not required).

b) **Terpenoids:** Introduction - classification - occurrence - isolation - general properties - isoprene rule - structures of citral, geraniol, terpeniol, menthol and dipentene (structural elucidation not required). **(9 Hours)**

COURSE BOOKS:

1. K. Ratinamuthu, R.Victoria, Semester -I, Text book of Ancillary Chemistry, Educational publishers, Madurai. **Unit I - III**
2. A. Mary Imelda Jayaseeli, M. Kalanithi, C. Mary Anbarasi, S. Pooranalakshmi, Allied Chemistry III and IV, Shanlax publications., Madurai, first edition, 2022. **Unit IV**
3. K. Ratinamuthu, R.Victoria, Semester -IV, Text book of Ancillary Chemistry, Educational publishers, Madurai. **Unit V**

ALLIED PRACTICAL: VOLUMETRIC ESTIMATION

Semester: I **Hours: 2**

Code : 23CH1AP1A **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognize the techniques of titrimetric analyses	PSO - 1	K1
CO - 2	Describe the procedures to do the volumetric titration using double burette method	PSO - 2	K2
CO - 3	Estimate the amount of substance present in the given solution	PSO - 3	K3
CO - 4	Demonstrate the different types of titrations such as acidimetry, alkalimetry and permanganometry	PSO - 4	K4
CO - 5	Develop problem solving and analytical skills	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**ALLIED PRACTICAL: VOLUMETRIC ESTIMATION**							**Hours: 2**
Code : 23CH1AP1A											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.64
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 3	3	5	3	3	4	4	3	3	5	4	4	3.73
CO - 4	4	3	3	3	4	5	4	3	3	5	4	3.73
CO - 5	3	3	4	4	5	4	3	4	3	4	5	3.82
Overall Mean Score												**3.73**

Result: The score for this course is **3.73** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

A double titration involving making up of the solution to be estimated following double burette method

ACIDIMETRY AND ALKALIMETRY:

1. Estimation of NaOH
2. Estimation of Na_2CO_3
3. Estimation of HCl
4. Estimation of oxalic acid

PERMANGANIMETRY:

1. Estimation of ferrous sulphate
2. Estimation of ferrous ammonium sulphate
3. Estimation of oxalic acid

IODOMETRY:

Estimation of potassium dichromate (demonstration only)

REFERENCE:

Practical guide prepared by the Chemistry Department

ALLIED PRACTICAL: SEMIMICRO INORGANIC QUALITATIVE ANALYSIS

Semester: I **Hours: 2**

Code : 23CH1AP1B **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire skills to perform precipitation and centrifugation methods	PSO-1	K1
CO - 2	Explain the tests for cations and anions present in a given inorganic sample	PSO-2	K2
CO - 3	Apply the procedures of analysis to check the quality of an inorganic substance	PSO-3	K3
CO - 4	Analyse the characteristic reaction of cation and anion in a given sample	PSO-4	K4
CO - 5	Appraise safety measures in handling chemicals	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**ALLIED PRACTICAL: SEMIMICRO INORGANIC QUALITATIVE ANALYSIS**						**Hours: 2**	
Code : 23CH1AP1B										**Credit: 1**	
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.64
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 3	3	5	3	3	4	4	3	3	5	4	4	3.73
CO - 4	4	3	3	3	4	5	4	3	3	5	4	3.73
CO - 5	3	3	4	4	5	4	3	4	3	4	5	3.82
Overall Mean Score												**3.73**

Result: The score for this course is **3.73** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

Analysis of a simple salt containing one cation and one anion.

i) ANIONS:

Carbonate, sulphate, nitrate, chloride, bromide, oxalate, borate, phosphate, chromate and fluoride

ii) CATIONS:

Lead, copper, cadmium, bismuth, antimony, iron, aluminium, zinc, manganese, cobalt, nickel, barium, strontium, calcium, magnesium and ammonium

COURSE BOOK:

1. V. Venkateswaran, R. Veerasamy and A. R. Kulandaivelu , Basic principles of Practical chemistry , Sultan Chand and sons, 2nd edition, 2012

PROFESSIONAL ENGLISH

Semester: I **Hours: 2**

Code : 23AE1PE01 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognise their own ability to improve their competence in using the language	PSO-1	K1
CO - 2	Relate to the language with confidence, ensuring communication is intelligible	PSO-2	K2
CO - 3	Employ unfamiliar vocabularies in their context	PSO-3	K3
CO - 4	Correlate their professional communication skills	PSO-4	K4
CO - 5	Assess the errors while framing sentences	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I							**PROFESSIONAL ENGLISH**					**Hours: 2**
Code : 23AE1PE01												**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	4	3	4	5	4	3	3	4	3.82
CO - 2	3	4	3	5	3	4	3	5	3	3	4	3.64
CO - 3	4	3	5	4	4	3	4	4	5	4	3	3.91
CO - 4	4	3	3	4	5	3	4	4	3	5	3	3.73
CO - 5	3	5	3	3	3	5	3	3	3	3	5	3.55
Overall Mean Score												**3.73**

Result: The score for this course is **3.73** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: THE ART OF QUESTIONING **6 Hours**

The Art of Questioning Paper-1 (Chamber 1-Orator: Units 1-5)

The Art of Questioning Paper-2 (Chamber 1-Orator: Units 1-3)

UNIT II: RECEPTIVE RESPONSE **6 Hours**

Receptive Response Paper-1 (Chamber 2 - Orator: Units 1-3)

Receptive Response Paper-2 (Chamber 2 - Orator: Units 1-4)

UNIT III: EASY EXPRESSIONS **6 Hours**

Easy Expressions Paper-1 (Chamber 2 - Orator: Units 1-4)

Easy Expressions Paper-2 (Chamber 2 - Orator: Units 1-3)

UNIT IV: EVERY DAY ENGLISH **6 Hours**

Every Day English Paper-1 (Chamber 3 - Orator: Units 1-5)

Every Day English Paper-2 (Chamber 3 - Orator: Units 1-3)

UNIT V: TELEPHONE SKILLS **6 Hours**

Buzz-Telephone skills - Basic (Chamber 6 - Kaleidoscope)

Buzz-Telephone skills - Customer support: Topics 1-5 (Chamber 6 - Kaleidoscope)

Buzz-Telephone skills - Front Office (Chamber 6 - Kaleidoscope)

COURSE SOFTWARE:

Lady Hawk Software

Component	Marks
Internal test I	40
Internal test II	40
Dialogue/ Conversation	10
Expressions Using Chart	5
Attendance	5
Total	**100**

FUNDAMENTALS OF ZOOLOGY

Semester: I **Hours: 2**

Code : 23ZO1FC01 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Explain the biological organization of organisms and their coordination with the environment	PSO - 3	K1
CO - 2	Analyze the nature and role of biological macromolecules in living systems	PSO - 4	K2
CO - 3	Understand the structure and functions of cellular organelles	PSO - 1	K3
CO - 4	Elucidate the principles of growth and development	PSO - 2	K4
CO - 5	Assess the importance of biodiversity conservation and management	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**FUNDAMENTALS OF ZOOLOGY**							**Hours: 2**
Code : 23ZO1FC01											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	2	5	3	4	2	3	4	5	3	2	3.27
CO - 2	3	2	4	5	4	2	3	4	4	5	2	3.45
CO - 3	5	3	3	3	4	3	5	4	3	3	3	3.55
CO - 4	3	2	3	2	5	2	3	5	3	2	2	2.91
CO - 5	4	5	2	2	3	5	4	3	2	2	5	3.36
Overall Mean Score												**3.31**

Result: The score for this course is **3.31** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Definition of Life, Characteristics of Living organisms, Difference between plants and animals. Definition - Taxonomy, Animal kingdom, System of classification, Binomial nomenclature Levels of Organization, Outline Classification of Invertebrates and chordates with one example. Branches of Zoology, Scales in Biology - cells, Tissues, organ systems, organisms. Evolution of Life - special creation vs. organic evolution. **(6 Hours)**

UNIT II

Biochemistry: Biomolecules, Properties of water, pH - acids and Bases, Carbohydrates - Biological properties, Definition - isomers, epimers, enantiomers. Protein - Biological properties, Essential and non-essential amino acids. Lipids - Properties, saturated and unsaturated fatty acids, cholesterol, steroids. Definition - Enzymes, Enzyme - Substrate complex, Catalyst, Cofactor, Active site, Difference between protein and Enzymes. Physiology: Definition, Nutrition, Introduction to biological systems (respiratory system, digestive system, nervous system and circulatory system), composition of blood, Blood groups. **(6 Hours)**

UNIT III

Cell Biology: Definition, cells, Prokaryotic vs Eukaryotic cells, Ultra structure of a cell. Cell organelles in brief - Plasma membrane, Endoplasmic reticulum, Mitochondria, Ribosome, Golgi apparatus, Nucleus. Importance of Cell division, Brief note on Cell Cycle, Mitosis and Meiosis. Genetics: Definition, Genes, Alleles, Inheritance, Traits, Recombination, Crossover, Syndromes. Nucleic Acids - Nitrogenous Bases (Purines and Pyrimidines), Nucleotides and Nucleosides.

(6 Hours)

UNIT IV

Developmental Biology: Definition - Sperm and Egg, Gametogenesis, Fertilization, Types of Cleavage -- Holoblastic and Meroblastic, Blastulation, Gastrulation, Ectoderm, Endoderm, Mesoderm. Ecology: Definition, Environment, Ecosystem, Biotic and Abiotic Components, Food chain, Food web, Ecological Pyramid, Populations, communities, Overview of Environmental Pollution. **(6 Hours)**

UNIT V:

Immunology: Immunity, Definition, Types of Immunity - Innate and Acquired, Immune cells - T cells and B cells. Antigen- Antibody, Types of Immune responses - primary and secondary, Immunization. Microbiology: Outline of Five kingdom classification of microorganisms, Ultra structure of a bacteria, Microbial growth curve. **(6 Hours)**

COURSE BOOK

- Course material prepared by the Faculty of PG and Research Centre of Zoology, Jayaraj Annapackiam College for Women (Autonomous), Periyakulam

BOOKS FOR REFERENCE

1. Nair, N.C., Leelavathy, S., Soundara Pandian, N., Murugan, T. & Arumugam, N. (2012). A Textbook of Invertebrates. Saras Publication, Nagercoil.
   Unit I: Chapter I
2. Arumugam N., (2019). Organic Evolution. Saras Publication, Nagercoil
   Unit I: Chapter I
3. Arumugam N, Dulsy Fatima, Narayanan L.M, Meyyan R.P, Nallasingam K. and Prasannakumar S., (2018). Biochemistry. Saras Publication, Nagercoil.
   Unit II: Chapter: 7,8,14, 15, 43, 61
4. Mariakuttiken A. and Arumugam N., (2017). Animal Physiology. Saras Publication, Nagercoil.
   Unit II: Chapter: 1, 15,170
5. Power, C.B. 2009. Cell Biology. Himalayan Publishing House, New Delhi.
   Unit III: Chapter: 1, 10, 16, 17, 18
6. M.A. Subramanian, 2019. Developmental Biology, MJP Publishers, Chennai.
   Unit IV: Chapter 1, 6, 9
7. Mani A., Narayanan L.M., Dulsy Fatima A. M., Selvaraj and Arumugam N. (2013). Immunology and Microbiology. Saras Publications, Nagercoil.
   Unit V: 1,5,13, 89, 102

   https://science.umd.edu/classroom/BSCI363/inouye/assignments/resources/glossary.html

   https://egyankosh.ac.in/bitstream/123456789/42002/1/Unit-2.pdf

   https://coabnau.in/uploads/1619150897_GPB2.2TheoryNote.pdf

PART - V - STUDENT TRAINING PROGRAMME

NATIONAL SERVICE SCHEME

U. G. PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAM THE STUDENTS WILL BE ABLE TO
1.	Gain theoretical knowledge and apply the expertise in different fields.
2.	Acquire Industry specific skills and can emerge as entrepreneurs.
3.	Develop critical and rational thinking to solve societal issues.
4.	Explore the knowledge and acclimatize it in the ever changing work environment.
5.	Evolve theories and develop innovative discipline specific ideas.
6.	Comprehend the nuances and develop innovative, discipline-specific ideas.

U. G. PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THE PROGRAM THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO-1	Get knowledge about National Service Scheme.	PO-1
PSO-2	Acquire leadership skills and readiness to serve the society.	PO -2
PSO-3	Enhance perspectives of social issues in different point of views Think and act effectively in a critical situation.	PO-3
PSO-4	Develop positive attitude towards betterment of the society through voluntary service.	PO-4
PSO-5	Preserve nature, ethos and traditions and practices of the society.	PO-1

NATIONAL SERVICE SCHEME

Semester: I -IV **Hours: 2**

Code : 23STPNS01 **Credit: 1***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire the basic knowledge about NSS	PSO-1	K1
CO - 2	Uphold the value system based on the social, political and moral bases	PSO-1, PSO-2	K2
CO - 3	Understand and identify the needs of the society	PSO-1, PSO-2, PSO - 4	K3
CO - 4	Develop the capacity to meet emergencies and attain knowledge to concentrate on personal health and hygiene	PSO2-, PSO-4 PSO-5	K4
CO - 5	Face the challenges particularly to become women entrepreneurs	PSO-1	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I -IV				**NATIONAL SERVICE SCHEME**							**Hours: 2**
Code : 23STPNS01											**Credit: 1***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	**1**	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	3.81
CO - 2	4	5	4	3	4	3	4	3	4	4	4	3.90
CO - 3	5	4	4	4	4	4	4	3	4	4	3	3.90
CO - 4	4	4	5	3	4	4	5	4	3	3	4	4.00
CO - 5	5	4	4	3	4	4	4	5	4	3	4	3.90
Overall Mean Score												**3.90**

Result: The score for this course is **3.90** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: BASICS OF NSS

Introduction –History and Growth – Aim and Objectives – NSS Motto – NSS Symbol - NSS Badge – NSS Day - Code of Conduct- NSS Regular Activities & Special Camp.

UNIT II: PERSONALITY DEVELOPMENT

Personality Development – Know Thyself- Body Language- Forming Values Etiquette and Manner - Team Building and Team Work – Problems of Youth – Drug abuse - Drug Dependence /Addiction –Alcoholism – Suicide - Sexual Problems – Diseases.

UNIT III: SOCIAL SERVICE

Aim of Social Service – Social Service Organizations - Social Problems - Need for Social Service - Scope of Social Services - Functions of Social Services - Principles of First Aid - Important things kept in the First Aid Box - Snake Bite - Dog Bite - Insect Bite - Heat Stroke - Drowning - Electric Shock - Artificial Respiration – Hemorrhage – Stroke - Heart Attack – Symptoms – Fainting.

UNIT IV: NUTRITIOUS FOOD AND WOMEN'S HEALTH

Nutrition - Adequacy – Balance - Calorie Management - Dietary Density – Moderation – Variety - Calculation of Calorie Permittance - Calculation of Protein Percentages - Food Sources - Vitamins the Importance of Dietary Nutrition Women's Health

UNIT V: ECOLOGY AND ROLE OF WOMEN IN SOCIETY

Environment - Environmental Elements - Environmental concerns - Changing Climate – Global warming – Women achievers - Women's Place in Society - Social Issues against Women - The Ways to Empower Women.

COURSE BOOK:

- Arul Sunila.J, Flora Pauline Mary.V, Preethi.J, Padmasree. A. D, Girija Bai. T, Arul Irudaya Jeyanthi.J, Abinaya. D, *NOT ME BUT YOU*, Acca Printing Press, 2022

Components	Marks
Attendance	20
Assessment (Involvement in activities)	50
Test	30
Total	**100**

QUESTION PATTERN

NATIONAL SERVICE SCHEME-23STPNS01

Class: II UG **Time: 2 Hours**

Date: **Max.: 30 Marks**

Course Outcome	**Bloom's K-level**	**Q. No**	SECTION – A 2x5=10 Answer All Questions Internal choice
			SECTION – B 2x10=20 Answer any TWO of the following

NATIONAL CADET CORPS

U.G. PROGRAMME OUTCOMES (2023 - 2026)

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the expertise of their discipline in related scenario.
2.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
3.	Accomplish the basic understanding of the relationship between education and human life and enhance their perspectives on the various functions of their studies in the diverse contexts of the society.
4.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
5.	Develop skills like collaboration, higher-order thinking, problem solving and self-direction through effective use of technologies and resources.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities such as self-esteem, positive attitude, self-discipline, and self-motivation.

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
1	Reinforce the aims, motto, vision and mission of the NCC through the academic curriculum.	PO-1, PO-3
2	Train the students, to be graduates with all round development, who apart from their own subject, can successfully compete in other fields such as defense/paramilitary/ police forces and civil services.	PO-1, PO-4
3	Perform in social service activities and creating awareness about social evils in society.	PO-1, PO-5, PO-6.
4	Explain the tri services organization, comprising the army, navy and air force, engaged in grooming the youth of the country into disciplined and patriotic citizens.	PO-2, PO-6
5	Demonstrate "B" and "C" certificate examination of NCC helps in getting jobs in different forces and also security related jobs.	PO-1, PO-2, PO-5,PO-5, PO-6

NATIONAL CADET CORPS

Semester: I - IV **Hours: 240**

Code : 23STPNC01 **Credits: 1***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the history, honors and awards of Indian Military.	PSO - 1,PSO - 2, PSO - 4	K1
CO - 2	Explain the map and weapon training to remove the fear of a weapon from the hearts of youth.	PSO - 1, PSO - 4	K2
CO - 3	Illustrate the different types of disasters under different circumstances.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K3
CO - 4	Analyze the practical knowledge in community development and other social programs.	PSO - 4, PSO - 5	K4
CO - 5	Assess the personality development and develop technical skill of first Aid.	PSO - 1, PSO - 2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I - IV											**Hours: 240**
Code : 23STPNC01				**NATIONAL CADET CORPS**							**Credits: 1***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	3	3	3	4	3	4	4	3	3	3	3.4
CO - 2	3	4	3	3	4	3	4	4	3	4	4	3.54
CO - 3	3	3	4	4	4	4	3	4	4	3	5	3.72
CO - 4	3	3	4	5	4	4	3	3	4	5	4	3.81
CO - 5	3	3	5	4	3	4	3	3	4	5	4	3.72
Overall Mean Score												**3.64**

Result: The score for this course is **3.64** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I: ARMED FORCES AND MILITARY HISTORY

Army, Police and Central Armed Police Forces, Modes of Entry into Army, Police and CAPF, Aims and Objectives of NCC , Organisation, Training and NCC Song , Incentives , Honors and Awards, Biographies of Renowned Generals, War Heroes : Param Veer Chakra Awardees, Study of Battles of Indo-Pak Wars 1965, 1971, & Kargil, War Movies, "B" and "C" certificate examinations.

UNIT II: MAP READING, FCBC AND WEAPON TRAINING

Introduction to Map Reading, Conduct of Map Reading, Introduction to Field Craft and Battle Craft, Indication of landmark, Observation, Camouflage & Concealment, Fire and Move Capsule, Knots, Lashing and Strecthers, Organisation of Infantry Battalion & its weapons. Characterstics of a Rifle and its Ammunition, Stripping, Assembling, Care, and Cleaning of 7.62 SLR, Loading, Cocking and Unloading, Lying Position, Holding and Aiming, Trigger Control and Firing a Shot, Theory of Group and Snap Shooting, Obstacle Training

UNIT III: DISASTER MANAGEMENT AND CIVIL AFFAIRS

Civil Defence Organisation and NDMA, Types of Emergencies / Natural Disasters, Fire Services & Fire Fighting, Traffic Control During Disaster Under Police Supervision, Collection & Distribution of Aid Material, Essential Services and their Maintenance. Aim of aid to civil authority - Role of NCC Cadets during natural calamities - Types of disaster- Essential services during natural calamities

UNIT IV: NATIONAL INTEGRATION AND SOCIAL AWARENESS

Basics of Social Service and Its Need, NGOs Role & Contribution, Drug Abuse and Trafficking, Causes & Prevention of HIV / AIDS and Role of Youth, Counter Terrorism, Traffic Control Organisation and Anti Drunken Driving, Religions, Culture, Traditions and Customs of India. National Interests, Objectives, Threats and Opportunities. Unity in Diversity. National Integration Council. Contribution of Youth in Nation Building. Leaders of Political / Regional Parties, Media Persons, Women Representatives, Eminent Public Representatives, Representatives of Business

UNIT V: PERSONALITY DEVELOPMENT, LEADERSHIP AND FIRST AID

Factors Influencing and Shaping Personality : Physical, Social, Psycological and Philosophical Types of Leadership, Time Management, Stress Management Skills, Interview Skills, Sociability : Social Skills Ettiquettes And Mannerism, Injuries to Internal Organs, Burns and Scalds, Snake Bite, Scorpion Bite & Rabid Dog Bite, Foreign Bodies in Eye, Ear and Nose, Insensibility or Unconsciousness, Artificial Respiration.

BOOK FOR REERENCE:

- Mishra R.C., A Handbook of NCC, Kanti Prakashan, Etawah, 2000.

Scheme of Evaluation	
Summative Examination (2 hours)	25 Marks
Continuous Internal Assessment	75 Marks
Total	**100 Marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	Attendance - 240 hours	10 Marks
2.	Special Camp	40 Marks
3.	"B" and "C" certificate examination	25 Marks
Total		**75 Marks**

Question Pattern for Summative Examination

Total Marks: 25 **Time: 2 hours**

Section - A

Answer All Questions 5× 1= 5Marks
(Multiple Choice Questions)

Section - B

Answer All Questions 2 × 5=10 Marks
(Either or Questions)

Section - C

Answer any one Questions 1 × 10=10 Marks
(One Question Out of Two)

PHYSICAL EDUCATION (2023-2026)

Code	Year	Paper Title	Hours	Credit
23STPPE01	I & II	Yoga and Physical Wellness	120	1*

YOGA AND PHYSICAL WELLNESS

Semester: I to IV **Hours: 120**

Code : 23STPPE01

COURSE OUTCOMES

- To develop Physical and mental fitness.
- To motivate and encourage students to involve themselves in physical skills through the Sports and Games and Yoga.
- To promote harmonious all-round development of the students

UNIT I: ASANAS (24 hours)

Meaning - Benefits - Postures: Sitting - Standing - Prone - Supine.

UNIT II: PRANAYAMA (24 hours)

Meaning - Benefits - Steps in Pranayama: Puraka, Khumbaka, Rechaka - Mudras: Chin mudra, Chinmaya mudra, Brahma mudra.

UNIT III: SURYANAMASKAR (24 hours)

Meaning - Benefits - Steps - Poses (12 posture)

UNIT IV: NUTRITION (24 hours)

Meaning - Balanced Diet - Daily Energy Requirement - Nutrient Balance - Nutrition Intake - Body Mass Index

UNIT V: FIRST AID (24 hours)

Meaning - Injuries to bones and Muscles, Sprain, Strain, Muscle Cramp and joints Dislocation and Fractures - Snake-bite, Dog bite

BOOKS FOR REFERENCE:

1. Elangovan.R, (2002), 'Utarkalvi Oru Arimugam', Ashwin Publication, Triunelveli.
2. Chandrasekaran.K, (1999), 'Sound Health through Yoga, Prem Kalyan Publication, Sedapatti.
3. John Ambulance Association, 'First Aid to the Injured' New Delhi
4. Prabhakar Eric, (1995), 'The way to Atheletic Gold', Affliated East West Pvt. Ltd., New Delhi.
5. Sathyanesan, R.C., 'Hand Broken Physical Education', Gheena Publishers, Madurai

SCHEME OF EVALUATION

1.	Summative Examination (2 hours)	:	25 marks
2.	Continuous Internal Assessment	:	75 marks
	Total	**:**	**100 marks**

SCHEME OF EVALUATION FOR COTINUOUS INTERNAL ASSESSMENT

1.	Attendance (240 hrs)			:	20 marks
	❖ Theory Class	:	120 hrs		
	❖ Games	:	60 hrs		
	❖ Field Work	:	60 hrs		
2.	Performance in any one Game			:	10 marks
3.	Performance in any one of Athletic event			:	10 marks
4.	Performance in Yoga / Rhythmic activities			:	10 marks
5.	Rhythmic activities				10 marks
6.	Field Work			:	15 marks
	Total			**:**	**75 marks**

QUESTION PATTERN FOR SUMMATIVE EXAMINATION

Total marks: 25 **Time: 1 $^{1/2}$ hours**

SECTION - A

Answer All Questions (5x1=5)

(Choose the best Answer)

SECTION - B

Answer any two questions (2x2=4)

(Four question out of four)

SECTION - C

Answer any Two out of Four questions

(2x5=10)

(Four question out of Four)

SECTION - D

Answer any one question (1x6=6)

(One question out of two)

CONSUMER CLUB

PROGRAMME OUTCOMES:

PO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario
2.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
3.	Express the cultural and environmental diversity that they have been exposed in various studies
4.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities
5.	Develop higher-order thinking, problem solving and self-direction skills through effective use of technologies and other resources
6.	Increase self-awarness, set and pursue meaningful goals, and develop positive personal qualities

PROGRAMME SPECIFIC OUTCOMES:

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO-1	Aware of consumer's rights, responsibilities and consumer production Act,1986	PO-1
PSO-2	Instill right-consciousness, confidence to question violations of citizen and consumer rights and fight for justice	PO-1, PO-4, PO-6
PSO-3	Work with other voluntary consumer organizations to enhance consumer movement in the society	PO-3, PO-6
PSO-4	Make informed purchase decision as individual and inculcating the behavior in others also	PO-3, PO-4, PO-6
PSO-5	Gain practical knowledge and become good consumer as well as entrepreneur	PO-4, PO-5, PO-6

CONSUMER CLUB

Semester: I-IV **Hours: 120**

Code : 23STPCC01 **Credit: 1***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire the knowledge of aware of the nature, rights and responsibilities of consumer	PSO - 1	K1
CO - 2	Understand the concepts of food trade and certification	PSO - 4	K2
CO - 3	Identify misleading advertisement, consumer court and consumer redressal	PSO - 3,5	K3
CO - 4	Analyze the concept of food adulteration and ecofriendly products	PSO - 2	K4
CO - 5	Evaluate practical experience through field visit and interact with experts	PSO - 2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I-IV				**CONSUMER CLUB**							**Hours: 120**
Code : 23STPCC01											**Credit: 1***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	3	4	3	3	3	3	4	3	4	3.45
CO - 2	3	3	4	3	4	3	4	4	3	4	3	3.45
CO - 3	4	4	3	4	3	4	3	3	4	3	4	3.54
CO - 4	3	3	4	3	4	3	4	4	3	4	3	3.45
CO - 5	4	3	4	3	4	3	4	3	4	3	4	3.54
Overall Mean Score												**3.48**

Result: The score for this course is **3.48** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Basics of Consumer: Consumer - Meaning - Difference between Consumer and Buyer - Consumerism - Nature of Consumerism - Roots of Consumerism - Rights and Responsibilities of Consumer- Consumer Protection - Rights of Consumer under Consumer Protection Act 1986- Do's and Don'ts of consumer.

UNIT II

Trade Mark & Certification: Definition - Objectives - Types of Trademark - Categories of Trademark-Registrar of Trademark - Powers and functions of Registrar of Trademark - Certification: Certification Marks issued for different products in India - Types of certifications.

UNIT III

Advertisement & Food Adulteration: Definition - Features of Advertisement - Misleading Advertisement - Online Consumer - Rights of online consumer - Food Adulteration**: Introduction - Types of Food Adulteration - Causes of Food Adulteration - Methods of Food Adulteration - Food Adulteration in Developing Countries - Health Hazards of Food Adulteration - Mitigation Measures for Addressing Food Adulteration** - How can Adulteration to be prevented - Food Contamination.

UNIT IV

Eco-Friendly Consumer, Consumer Redressal & Grievance: Eco-Friendly consumer Products - Eco-friendly products for daily life - Innovative and Eco-friendly Business ideas - Green Consumerism - Important steps of Green Consumerism - Green marketing strategies- Consumer Court - Objectives - Consumer Disputes Redressal Agencies - Model Form of Complaints - How to file a Complaint in Consumer Court - Grievance -Features of Grievance - Causes of Grievance - Where to file a Complaint-Redressal settlement machinery.

UNIT V

Field Visit.

COURSE BOOKS:

- Material prepared by the Consumer Club

BOOK FOR REFERENCE:

1. Dr. L. Natarajan, Business Legislation, Merit India Publication, 2017.
2. Consumer Movement, Robert N. Mayer, Twayne Publishers Inc., U.S.,1989
3. Consumer Education and Economics, Charles A. Malouf, 2002

E-RESOURCES:

1. https://www.Consumer-Awareness-Protection-Empirical-Evidence/dp/1723301108
2. https://www.himpub.com/documents/Chapter1482.pdf
3. https://www.Consumer-Education-Veena-Gandotra/dp/9382007008

SCHEME OF EVALUATION

1.	Summative Examination (1 hour)	:	25 marks
2.	Continuous Internal Assessment	:	75 marks
	Total	**:**	**100 marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	Field Visit	25 Marks
2.	Report	25 Marks
3.	Involvement	10 Marks
4.	Case Study	10 Marks
5.	Attendance	5 Marks
Total		**75 Marks**

Total the marks of I, II, III & IV will be converted to 75 marks

INTERNAL TEST (THEORY)

Total Marks: 25 **Time: 1 Hour**

Section - A

Answer All Questions 5 x 1= 5 Marks
(Multiple Choice Questions)

Section - B

Answer All Questions 2 x 5= 10 Marks
(Either Or Questions)

Section - C

Answer Any One Question 1 x 10 =10 Marks
(One Question Out of Three)

RED RIBBON CLUB

PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario
2.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities
5.	Develop higher-order thinking, problem solving and self-direction skills through effective use of technologies and other resources
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities

PROGRAMME SPECIFIC OUTCOMES:

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO-1	Tell the importance of Red Ribbon Club for the Society.	PO-1, PO-6
PSO-2	Explain the structure of Blood and its Uses.	PO-3, PO-4
PSO-3	Demonstrate the microscopic examination of Blood Identification and Donation process.	PO-3, PO-5
PSO-4	Classify the Blood types, Donation process and HIV Awareness.	PO-2, PO-4
PSO-5	Estimate the vision of Red Ribbon Club and its role in the society.	PO-5, PO-6

RED RIBBON CLUB

Semester: I, II, III & IV **Hours: 120**

Code: 23STPRR01 **Credit: 1***

COURSE OUTCOMES

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the meaning and basic concepts of Red Ribbon Club	PSO -1, PSO-5	K1
CO - 2	Classify the services rendered by Red Ribbon Club	PSO -1, PSO -4	K2
CO - 3	Relate the vision and objectives of Red Ribbon Club with its services	PSO- 1, PSO-3	K3
CO - 4	Categorize the objectives, Blood identification and HIV Testing process	PSO -4, PSO-5	K4
CO - 5	Evaluate the awareness programmes against the communicable diseases	PSO -2, PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I, II, III & IV						**RED RIBBON CLUB**					**Hours: 120**
Code : 23STPRR01											**Credit: 1***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	3	4	5	5	3	4	2	5	3.27
CO - 2	4	5	3	5	2	4	5	4	2	5	3	3.54
CO - 3	5	3	4	3	4	5	5	3	5	4	2	3.72
CO - 4	2	5	5	3	4	4	4	2	3	5	5	3.36
CO - 5	3	4	2	5	5	4	3	5	2	3	5	3.27
Overall Mean Score												**3.43**

Result: The score for this course is **3.43** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Red Ribbon Club-Basic Concepts - Meaning -Vision - Objectives - Popular Colour - Symbol - Significance

UNIT II

Blood Identification - Blood composition - Blood types -Functions of Blood - Components of Blood Plasma -Blood Vessels - Microscopic examination -DNA analysis

UNIT III

Blood Donation - Procedure -Importance of Donating Blood -Steps taken to ensure the safety of transfused blood - Benefits - Donors - Blood Banks - Outdoor camps - Storage, Supply & Demand

UNIT IV

HIV Awareness**:** Definition -Signs &Symptoms - HIV Transmission-Risk factors-Diagnosis & Tests-Treatment methods - Prevention -Tamil Nadu AIDS Control Society (TANSACS) - Components

UNIT V

Blood Donation Camp - Practical and Field Work : Blood Identification Camp - HIV AIDS Awareness Programmes - Field visit to JeevanJothi - Aundipatti Government Hospital

COURSE BOOK:

- Book offered by Red Ribbon Club Committee Members

BOOKS FOR REFERENCE

1. Conor S, Kingman S. *The search for the virus, the scientific discovery of AIDS and the quest for a cure,*Penguin Books, 1988.
2. S. Kartikeyan, R.N. Bharmal, R.P. Tiwari and P.S. Bisen.*HIV and AIDS: Basic Elements and Priorities*. Springer Publications. 2007.
3. Narain, Jai P; AIDS in Asia: The Challenge Ahead, Sage Publications, New Delhi, 2004
4. Nath, LM; The Epidemic in India: An Overview, Mosaic Books, New Delhi, 2003.
5. Srivastava V.P., HIV/AIDS and Human Rights, Indian Publishers, Delhi, 2006.
6. Shalini Bharat, HIV/AIDS related Stigma, Discrimination and Denial, Best Practices, Key Material. UNAIDS Publications, 2001

SCHEME OF EVALUATION

1.	Summative Examination (1 hour)	:	25 marks
2.	Continuous Internal Assessment	:	75 marks
	Total	**:**	**100 marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	Field Visit	25 Marks
2.	Report	25 Marks
3.	Involvement	10 Marks
4.	Case Study	10 Marks
5.	Attendance	5 Marks
Total		***75 Marks***

Total the marks of I, II, III & IV will be converted to 75 marks

Question Pattern for Internal Examination

Total Marks:25 **Time : 1hour**

Section - A

Answer All Questions 5 x 1= 5 Marks

(Multiple Choice Questions)

Section - B

Answer All Questions 2 x 5= 10 Marks

(Either or Questions)

Section - C

Answer Any One Question 1 x 10 =10 Marks

(One Question Out of Three)

YOUTH RED CROSS

Semester: I-IV **Hours: 120**

Code : 23STPRC01 **Credit: 1***

PROGRAMME OUTCOMES:

PO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Formulate hypothesis, design experiments use appropriate tools and interpret the results.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
5.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities
6.	Increase self-awarness, set and pursue meaningful goals, and develop positive personal qualities.

PROGRAMME SPECIFIC OUTCOMES

PSO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO1	Get a basic understanding of the origin, growth and development of humanity.	PO1
PSO2	Acquire basic knowledge about social subjects	PO1, PO2
PSO3	Identify various social issues and problems	PO3, PO4
PSO4	Help build up a good career	PO1, PO4
PSO5	Gain awareness of social responsibilities	PO1, PO5

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Understand themselves in relation to their community	PSO- 1	K1
CO - 2	Identify the needs and problems of the community and involve them in problem solving.	PSO-2	K2
CO - 3	Gain skills in mobilizing community participation. Develop capacity to meet emergencies and social harmony	PSO-3	K3
CO - 4	Educate and empower children and youth in the spirit of the Red Cross through constructive trainings and effective leadership	PSO-4	K4
CO - 5	Provide opportunities for directing and harnessing their energies and idealism into worthwhile humanitarian activities	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I-IV				YOUTH RED CROSS							Hours: 120
Code : 23STPRC01											Credit: 1*
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	5	4	3	2	2	5	5	3	2	2	3.45
CO - 2	5	5	4	3	2	2	5	5	4	2	2	3.55
CO - 3	5	4	4	3	4	2	5	5	5	2	3	3.91
CO - 4	5	4	5	4	3	3	5	5	5	2	3	4.09
CO - 5	5	4	5	3	3	3	5	5	5	2	3	4.09
Overall Mean Score												3.82

Result: The score for this course is **3.82** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

BASICS OF YOUTH RED CROSS

Semester: I & II **Hours: 60**

Code: 23STPRC01 **Credit: 1***

UNIT I

History Of Red Cross - Henri Dunant's Early Life - The Battle of Solferino - The Man in White - The Birth of Red Cross - Charity in the Midst of Battle - Clara Barton: Pioneer of Disaster Relief - Death of Dunant.

UNIT II

Idea of the Red Cross Movement - Foundation of the Red Cross Movement - A Global Movement - The Emblems- History of the Emblems - Who can use the emblem in India? Misuse of the Emblem - Why respect the Emblem?

UNIT III

The Seven Fundamental Principles - International Humanitarian Law - Re Establishing Family Links

UNIT IV

Birth of the Indian Red Cross Society- Introduction to the programmes of the IRCS - Humanitarian Values - Disaster Management - Health and Care in the Community

UNIT V

Volunteering - Trainings

COURSE BOOK:

1. Rev. Sr. Dr. JesuRani, Dr. J. Arul Irudaya Jeyanthi, Dr. B. Amala Jasmine, Mrs. P. Selvarani, Mrs. K. Rani, Youth Red Cross (YRC), PCF Publications, Pandiyanadu Cultural Foundation, Madurai, 2021.

BOOKS FOR REFERENCE:

1. "The Story of the Red Cross", Krishna Satyanand, Reprint 2002, Published by the Director, National Book Trust, India.
2. "Basic about YRC", Indian Red Cross Society, National Headquarters.

YOUTH RED CROSS

Semester: III & IV **Hours: 60**

Code: 23STPRC01 **Credit: 1***

UNIT I

The International Committee of the Red Cross (ICRC) -Origin And History - International Status - ICRC - Legal Status - ICRC's Humanitarian Activities - Administration and Structure of ICRC - National Red Cross and Red Crescent Societies.

UNIT II

Interntional Federation of Red Cross and Red Crescent Societies - Mission - Strength - Global Network - International Red Cross and Red Crescent Movement - Geneva Conventions and their Additional Protocols - Protection and care - protection of persons - Protection of Civilian medical and religious personnel - Methods and means of warfare - Improper use of emblems - fundamental guarantees.

UNIT III

Indian Red Cross Society - Headquarters - Resources - Partnerships – Strategic Development plan - Indian Red Cross Society - Tamil Nadu Branch - Indian Red Cross Society, District Red Cross Branch and Sub Branch

UNIT IV

Youth Red Cross - Junior Red Cross

UNIT V

Field Visit

COURSE BOOK:

1. Rev. Sr. Dr. JesuRani, Dr. J. Arul Irudaya Jeyanthi, Dr. B. Amala Jasmine, Mrs. P. Selvarani, Mrs. K. Rani, Youth Red Cross (YRC), PCF Publications, Pandiyanadu Cultural Foundation, Madurai, 2021.

BOOKS FOR REFERENCE:

1. ''History of Red Cross'', Youth Red Cross, Indian Red Cross Society Tamil Nadu Branch.

SCHEME OF EVALUATION

1.	Summative Examination (1 hour)	:	25 marks
2.	Continuous Internal Assessment	:	75 marks
	Total	**:**	**100 marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	Field Visit	25 Marks
2.	Report	25 Marks
3.	Involvement	10 Marks
4.	Case Study	10 Marks
5.	Attendance	5 Marks
Total		***75 Marks***

Total the marks of I, II, III & IV will be converted to 75 marks

Question Pattern for Internal Examination

Total Marks:25 **Time : 1hour**

Section - A

Answer All Questions 5 x 1= 5 Marks

(Multiple Choice Questions)

Section - B

Answer All Questions 2 x 5= 10 Marks

(Either or Questions)

Section - C

Answer Any One Question 1 x 10 =10 Marks

(One Question Out of Three)

பொதுத்தமிழ் - 2

(பிறதுறை மாணவிகளுக்கு மட்டும்)

பருவம்: இரண்டு **நேரம்: 6**

குறியீடு: 23GT2GS02 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	பக்தி இலக்கியங்கள், சிற்றிலக்கியங்கள் கற்பதன் மூலம் பக்தி நெறியினையும், இலக்கியச் சுவையினையும் அறிவர்.	PSO-4	K1
CO - 2	தமிழ்ச் சமூகப் பண்பாட்டு வரலாற்றினை இலக்கியங்கள் வாயிலாகப் புரிந்து கொள்வர்.	PSO-3	K2
CO - 3	பக்தி, சிற்றிலக்கியங்களின் வழி சமய நல்லிணக்கத்தையும் பண்பாட்டு நெறிகளையும் தெரிந்து அவற்றைப் பின்பற்றப்படவேண்டிய அறிவினையும் பெறுவர்.	PSO-5	K3
CO - 4	பட்டப் படிப்பினைப் படிக்கும் போதே பெரும்பான்மையான தமிழ் இலக்கியங்கள், இலக்கணங்கள் குறித்த அறிவினைப் பெறும் திறன் பெறுவர்.	PSO-2	K4
CO - 5	போட்டித் தேர்வுகளில் வெற்றி பெறுவதற்குத் தமிழ்ப் பாடத்தின் முக்கியத்துவத்தை உணர்ந்து பயன்கொள்ளும் வகையில் ஏற்ற மொழித்திறன் பயிற்சி பெறுவர்.	PSO-1	K5

K1-நினைவு கூர்தல் K2-புரிதல், K3- பயன்படுத்துதல், K4 -பகுத்தல், K5 -மதிப்பீடு

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				பொதுத்தமிழ் - 2 (பிற துறை மாணவிகளுக்கு மட்டும்)							**Hours: 6**
Code : 23GT2GS02											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	2	4	3	3	4	3	2	5	4	3.55
CO - 2	4	4	5	4	4	4	4	4	5	4	4	4.18
CO - 3	3	3	3	5	4	4	3	4	3	3	5	3.64
CO- 4	3	4	3	4	5	5	4	5	3	3	4	3.91
CO - 5	3	5	3	3	2	2	5	2	3	3	3	3.09
Overall Mean Score												**3.68**

Result: The score for this course is **3.68** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

அலகு 1

திருநாவுக்கரசர் தேவாரம் - நாமார்க்கும் குடியல்லோம் எனத் தொடங்கும் பதிகம் (10 பாடல்கள்)

ஆண்டாள் திருப்பாவை - (முதல் 10 பாசுரங்கள்) **18 Hours**

அலகு 2

வள்ளலார்-அருள் விளக்கமாலை (முதல் 10பாடல்கள்)

எச்.ஏ.கிருட்டிணப்பிள்ளை - இரட்சணியமனோகரம் - பால்ய பிராத்தனை

குணங்குடி மஸ்தான் சாகிபு-பராபரக்கண்ணி (முதல்10 கண்ணி) **18 Hours**

அலகு 3

தமிழ்விடு தூது - (முதல் 20 கண்ணி)

திருக்குற்றாலக் குறவஞ்சி-குறத்தி மலைவளம் கூறுதல்

முக்கூடற்பள்ளு-நாட்டுவளம் **18 Hours**

அலகு 4

பக்தி இலக்கியம் சிற்றிலக்கியம் தொடர்பான இலக்கியவரலாறு (பல்லவர்காலம், நாயக்கர் காலம்) **18 Hours**

அலகு 5: மொழித்திறன் / போட்டித் தேர்வுத் திறன்

1. தொடர் வகைகள்,
2. மரபுத்தொடர்,
3. பழமொழிகள்,
4. பிறமொழிச் சொற்களைக் களைதல்,
5. வழுச் சொற்கள் நீக்குதல்,
6. இலக்கணக் குறிப்பு அறிதல். **18 Hours**

(குறிப்பு: அலகு4, 5ஆகியனபோட்டித் தேர்வுநோக்கில் நடத்தப்படவேண்டும்)

பாடநூல்கள்

1. தமிழ்த்துறைவெளியீடு (தொகுப்பு) - பொதுத்தமிழ் - 2
   ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி (தன்னாட்சி),பெரியகுளம்.
2. முனைவர்சி. பாலசுப்பிரமணியன் - தமிழ் இலக்கியவாலாறு,
   பாவைபப்ளிகேஷன்ஸ்,சென்னை- 60
   இரண்டாம் பதிப்பு-2016.

பார்வை நூல்கள்

1. புலவர் பி.ரா.நடராசன் (உ.ஆ) - திருநாவுக்கரசு சுவாமிகள் தேவாரம்,
உமா பதிப்பகம்,சென்னை - 600001,
முதல் பதிப்பு - ஏப்ரல் 2003.

2. எம்.நாராயணவேலுப் பிள்ளை - நாலாயிர திவ்யப் பிரபந்தம்,
(உ.ஆ) முல்லை நிலையம்,சென்னை - 600017,
முதல் பதிப்பு - செப்டம்பர்2000.

3. திருவருட்பிரகாசவள்ளலார் - திருவருட்பா,கலைஞன் பதிப்பகம்,
சென்னை - 600017, இரண்டாம் பதிப்பு - 1885.

4. சுந்தரராசன் (உ.ஆ) - இரட்சணியமனோகரம், முல்லை நிலையம்,
சென்னை-600017,முதல் பதிப்பு - 2001.

5. கவிக்கோ அப்துல் ரகுமான் - குணங்குடியார் பாடற்கோவை,
நேஷனல் பப்ளிஷர்ஸ்,சென்னை-600017,
முதல் பதிப்பு - டிசம்பர்2008.

6. பேரா. சே.இராதாகிருஷ்ணன் - தமிழ்விடு தூது,முல்லை நிலையம்,
சென்னை-600017, இரண்டாம் பதிப்பு - 2008.

7. புலியூர்க் கேசிகன் - திருக்குற்றாலக் குறவஞ்சி,
பாவை பப்ளிகேஷன்ஸ், சென்னை-600 014,
இரண்டாம் பதிப்பு - ஜூலை2014.

8. புலியூர்க் கேசிகன் - முக்கூடற் பள்ளு, பாரி நிலையம்,
சென்னை-16, ஐந்தாம் பதிப்பு - செப்டம்பர்1993.

9. முனைவர்கோ. பெரியண்ணன் - அடிப்படைஎளியதமிழ் இலக்கணம்,
வனிதா பதிப்பகம்,சென்னை - 600 017,
முதல் பதிப்பு - 2003.

10. தமிழ் வேந்தன் - பிழையின்றி தமிழ் எழுத பேச,
அருவி வெளியீடு, சென்னை - 600 078,
முதல் பதிப்பு ஏப்ரல், 2003.

NOVEL, ONE ACT PLAY AND GRAMMAR

Semester: II **Hours:5**

Code : 23GH2GS02 **Credit:3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Reproduce words both in speaking and writing Hindi.	PSO-1	K1
CO - 2	Acquire a comprehensive knowledge of vocabulary, syntax and grammar in Hindi	PSO-4	K2
CO - 3	Identify the competence in self-expression	PSO-2	K3
CO - 4	Focus on independent learning	PSO-3	K4
CO - 5	Develop proficiency in speaking, listening, reading, and writing Hindi.	PSO-5	K5

UNIT I **(15 Hours)**

Nirmala Summary - Bahu kee Vidha (Send - Off) - Grammar-Verb - Dowry is Cruel and Taking Dowry is a Big Sin.

UNIT II **(15 Hours)**

Nirmala-Thothaaraam, Kalyaani , Mansaraam , Udhayabhanulal - Rajpoothani ka Badla (Rajputani's Revrnge) - Grammar - Tense and Voice - Identify the Sentences in Hindi using Basic Grammar.

UNIT III **(15 Hours)**

Nirmala-Sudha, Balachandrasimha, Rangeelaa Bhayee, Siyaram - Andher Nagaree (Dark City) – Grammar- Preposition - Coming out of Darkness with the Wisdom of Knowledge.

UNIT IV **(15 Hours)**

Nirmala- Pandith Motaram, Jiyaram, Bhuvana Mohan Chimhaa - Reed Kee Haddi (Back Bone) - Grammar- Conjunction - Jagdishchandra Mathur Shows the Representative of the Entire Female Race.

UNIT V **(15 Hours)**

Nirmala - Rukmani, Nirmala, Krishnaa - Grammar - Interjection, Adverb - Nirmala- a critical analysis.

COURSE BOOKS:

1. Nirmala – Novel written by Munshi Premchand, published by Hamsa Prakashan Allahabad.
2. Aadarsh Ekanki, Published by Dakshina Bharath Hindi Prachar Sabha, Thyagaraya Nagar, Chennai – 600 017.

   The following Ekankies have been prescribed

   a) Rajpoothri Ka badla – Divjendralal Rai

   b) Andher Nagaree - Bharathendu Harichandra

   c) Reed Kee Haddi – Jagadeeshachandra Maathur

   d) Bahu kee Vidha – Shri vinodh Rasthogi

BOOK FOR REFERENCE:

1. Vyakaran Hindi – written by Ramdev, Published by Hindi Bhavan, 63 Tagore Nagar, Allahabad -2.

   The following topics have been prescribed

   a) Verb
   b) Tense and Voice
   c) Adverb
   d) Prepositions
   e) Conjunctions
   f) Interjunctions

COMMUNICATIVE ENGLISH – II

Semester: II **Hours: 4**

Code : 23GE2GS02 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify skills in both writing and speaking	PSO-1	K1
CO - 2	Explain the main idea of a text	PSO-3	K2
CO - 3	Utilize website resources to enhance their language skills	PSO-2	K3
CO - 4	Categorize the rhetorical strategies and techniques used in writing and speaking	PSO-5	K4
CO - 5	Criticize the texts after comprehending	PSO-4	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**COMMUNICATIVE ENGLISH – II**							**Hours: 4**
Code : 23GE2GS02											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	4	5	3	3	3	4	3.64
CO - 2	3	3	5	4	3	3	3	4	5	3	3	3.55
CO - 3	4	2	3	5	2	2	4	5	3	2	2	3.09
CO - 4	3	5	2	3	4	5	3	3	2	4	5	3.55
CO - 5	4	4	2	4	5	4	4	4	2	5	4	3.82
Overall Mean Score												**3.53**

Result: The score for this course is **3.53** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I **12 Hours**

1. Listening and Speaking
    a. Listening and responding to complaints (Formal situation)
    b. Listening to problems and offering solutions (Informal)
2. Reading and writing
    a. Reading aloud (Brief motivational anecdotes)
    b. Writing a paragraph on a proverbial expression/motivational idea.
3. Word Power/Vocabulary
    Synonyms & Antonyms

UNIT II **12 Hours**

1. Listening and Speaking
    a. Listening to famous speeches and poems
    b. Making short speeches- Formal: welcome speech and vote of thanks.
        Informal occasions- Farewell party, graduation speech
2. Reading and Writing
    a. Writing opinion pieces (On travel, food, film /book reviews or on any contemporary topic)
    b. Reading poetry
        i. Reading aloud: (Intonation and Voice Modulation)
        ii. Identifying and using figures of speech -simile, metaphor, personification etc.
3. Word Power
    a. Idioms & Phrases

UNIT III **12 Hours**

1. Listening and Speaking
    a. Listening to Ted talks
    b. Making short presentations – Formal presentation with PPT, analytical presentation of graphs and reports of multiple kinds
    c. Interactions during and after the presentations
2. Reading and writing
    a. Writing emails of complaint
    b. Reading aloud famous speeches
3. Word Power
    a. One Word Substitution

UNIT IV **12 Hours**

1. Listening and Speaking

   a. Informal interview for feature writing

   b. Listening and responding to questions at a formal interview

2. Reading and Writing

   a. Writing letters of application

   b. Readers' Theatre (Script Reading)

   c. Dramatizing everyday situations/social issues through skits.

   (writing scripts and performing)

3. Word Power

   Collocation

UNIT V **12 Hours**

Grammar in Context

1. Adverbs & Prepositions
2. Conjunctions & Interjections
3. Sentence Patterns
4. Working with Clauses

COURSE BOOKS:

- Communicative English (For Students of Arts and Science Colleges) Tamilnadu State Council for Higher Education (TANSCHE)
- Savarimuttu, Rohan J. S, and G. Petricia Alphine Nirmala, *English Grammar and Usage - An Ideal Companion for Advanced Learners*. New Century Book House (P) Ltd, 2016.

BOOKS FOR REFERENCE

1. Kumar, Manoj.*English Communication: Theory and Practice. Scholar*. Tech Press, 2018.
2. Nachmuthu, Cambridge. *Advanced Communication English.* Cambridge Publishers, 2011.

WEB RESOURCES

https://www.youtube.com/watch?v=xZbKHDPPrrc

https://www.youtube.com/watch?v=TRcIEMgppK8

https://youtube.com/playlist?list=PLZ-F4pjbka7EIKKAwh83RDqi7Vp0q_DQp

https://www.scripts.com/script/the_chronicles_of_narnia:_the_lion,_the_witch_and_the_wardrobe_5540

CHORDATA - I

Semester: II **Hours: 4**

Code : 23ZO2MC03 **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the distinct features of different classes of Chordates	PSO - 1	K1
CO - 2	Describe the structural and functional organisation of Chordates	PSO - 2	K2
CO - 3	Infer the affinities, economic importance and parental care strategies of Chordates	PSO - 5	K3
CO - 4	Explain the general characters of different classes of Chordates and features of key specimens	PSO - 4	K4
CO - 5	Evaluate the exceptional attributes of different classes of Chordates.	PSO - 3	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**CHORDATA - I**							**Hours: 4**
Code : 23ZO2MC03											**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	2	3	3	5	3	2	2	3	3.00
CO - 2	4	2	2	4	5	2	4	5	2	4	2	3.27
CO - 3	4	5	2	3	4	5	4	4	2	3	5	3.73
CO - 4	4	2	2	5	4	2	4	4	2	5	2	3.27
CO - 5	4	2	5	3	2	2	4	2	5	3	2	3.09
Overall Mean Score												**3.27**

Result: The score for this course is **3.27** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Prochordata: General characters and classification of chordata up to class with an example. Urochordata - General characters of Urochordata. Type study - Ascidian. General topics - Affinities of Urochordata, Retrogressive metamorphosis in Ascidia.

(12 Hours)

UNIT II

Prochordata: Cephalochordate - General characters of cephalochordate. Type study - Amphioxus. General topics - Affinities of Amphioxus, Affinities of Prochordata. **(12 Hours)**

UNIT III

Hemichordata: General characters of Hemichordate. Type study - Balanoglossus. General topics - Affinities of Hemichordates, Balanoglossus is an invertebrate. Agnatha - Salient features. Type study - Petromyzon. **(12 Hours)**

UNIT IV

Pisces: General characters of class Pisces, Outline classification of class Pisces up to order with an example. Type study - Scoliodon. General topics - Accessory respiratory organs in fishes, Migration of fishes, Parental care in fishes, Economic importance of fishes, Electric organ in Torpedo. **(12 Hours)**

UNIT V

Amphibia: General characters of class Amphibia. Outline classification of class Amphibia up to order with an example. Type study - Frog. General topics - Parental care in Amphibia. **(12 Hours)**

COURSE BOOK:

- Thangamani A, Prasannakumar, Narayanan LM, Arumugam N, A. (2019). Text Book of Chordates, Saras Publication, Nagercoil.

  Unit I: Chapter 1, 2.

  Unit II: Chapter 2.

  Unit III: Chapter 2.

  Unit IV: Chapter 4.

  Unit V: Chapter 5.

BOOKS FOR REFERENCE:

1. Arumugam, N. (2019). Animal Diversity, Volume 2 - Chordata, Saras Publication, Nagercoil.
2. Ekambaranatha Ayyar and T.N. Anandakrishnan. (2019). Manual of Zoology vol - II, Viswanathan Pvt. Ltd, Chennai.
3. Kotpal R.L. (2019). Modern Text Book of Zoology Vertebrates, 5th edition, Rastogi Publications, Meerut.
4. Young, J.Z. (2004). Life of vertebrates, Clarendon Press, Oxford UK.
5. Pouch Harvey F, Christine M. Janis and John B, Heiser (2002). Vertebrate Life, Pearson Education Inc, New Delhi.
6. Verma P.S. and Jordan, E. L. (2013). Chordate Zoology, S Chand Publishers, New Delhi.

CHORDATA - II

Semester: II **Hours: 5**

Code : 23ZO2MC04 **Credit: 5**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the distinct features of different classes of chordates.	PSO - 1	K1
CO - 2	Describe the structural and functional organizations of chordates.	PSO - 3	K2
CO - 3	Illustrate the adaptive features of chordates to various habitats.	PSO - 2	K3
CO - 4	Explain the general characters of different chordates and features of key specimens.	PSO - 4	K4
CO - 5	Assess the exceptional attributes of different classes of chordates.	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II						**CHORDATA - II**					**Hours: 5**
Code : 23ZO2MC04											**Credit: 5**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	4	3	4	2	5	4	4	3	2	3.45
CO - 2	4	2	5	3	4	2	4	4	5	3	2	3.45
CO - 3	4	2	4	3	5	2	4	5	4	3	2	3.45
CO - 4	4	2	3	5	4	2	4	4	3	5	2	3.45
CO - 5	3	5	2	4	3	5	3	3	2	4	5	3.55
Overall Mean Score												**3.47**

Result: The score for this course is **3.47** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Reptilia: General characters of class Reptilia, Outline classification of class Reptilia up to order with an example. Type study - Calotes (External characters, digestive system, respiratory system, circulatory system and urinogenital system). General topics - Identification of poisonous and non - poisonous snakes, poison apparatus, types of poison, Biting mechanism, Salient features of Chelonia, Crocodilus and Sphenodon. **(12 Hours)**

UNIT II

Aves: General characters of class Aves. Outline classification of class Aves up to order with an example. Type study - Pigeon ((External characters, digestive system, respiratory system, circulatory and urinogenital system). **(12 Hours**)

UNIT III

Aves: General topics - Flightless birds, Flight adaptation in birds, Feet and Beak modifications, Migration in birds, Birds are glorified reptiles. **(12 Hours)**

UNIT IV

Mammalia: General characters of class Mammalia. Outline classification of class Mammalia up to order with an example. Type study - Rabbit. (External characters, digestive system, respiratory system, circulatory system and urinogenital system **(12 Hours)**

UNIT V

Mammalia: General topics - Affinities of Prototheria, Adaptation of aquatic mammals, Dentition in Mammals, Adaptive radiation in Metatheria, Stomach in mammals, Migration in mammals. **(12 Hours)**

COURSE BOOK:

- Thangamani A, Prasannakumar, Narayanan L. M., Arumugam N. (2019). A Text Book of Chordates, Saras Publication, Nagercoil.

  Unit I: Chapter 6.

  Unit II: Chapter 7.

  Unit III: Chapter 7.

  Unit IV: Chapter 8.

  Unit V: Chapter 8.

BOOKS FOR REFERENCE:

1. Arumugam, N. (2019). Animal Diversity, volume 2 - Chordata, Saras Publication, Nagercoil.
2. Ekambaranatha Ayyar and T.N. Anandakrishnan. (2019). Manual of Zoology vol - II, Viswanathan Pvt. Ltd, Chennai.
3. Kotpal R. L. (2019). Modern Text Book of Zoology Vertebrates, 5th edition, Rastogi Publications, Meerut.
4. Young, J. Z. (2004). Life of vertebrates, Clarendon Press, Oxford UK.
5. Pouch Harvey F, Christine M. Janis and John B, Heiser (2002). Vertebrate Life, Pearson Education Inc, New Delhi.
6. Verma P.S. and Jordan, E. L. (2013). Chordate Zoology, S Chand Publishers, New Delhi.

INVERTEBRATA AND CHORDATA - LAB

Semester: II **Hours: 2**

Code : 23ZO2CP01 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify and compare the general biology of few chordates.	PSO - 2	K1
CO - 2	Examine the structure of placoid scales in shark.	PSO - 1	K2
CO - 3	Differentiate the beak and feet adaptation of birds.	PSO - 3	K3
CO - 4	Evaluate the feathers of any five birds.	PSO - 4	K4
CO - 5	Prepare a report on birds in campus.	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II							**INVERTEBRATA AND CHORDATA - LAB**					**Hours: 2**
Code : 23ZO2CP01												**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	2	3	3	5	2	4	5	3	3	2	3.27
CO - 2	5	2	4	3	4	2	5	4	4	3	2	3.45
CO - 3	4	2	5	3	4	2	4	4	5	3	2	3.45
CO - 4	4	2	3	5	4	2	4	4	3	5	2	3.45
CO - 5	3	5	3	4	2	5	3	2	3	4	5	3.55
Overall Mean Score												**3.43**

Result: The Score for this Course is **3.43** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

1. Mounting of placoid scales in shark.
2. Identification of local edible fishes - Anabas, *Catla catla*, Clarias, Tilapia, Cynoglossus.
3. Study of any five venomous and non-venomous snakes.
4. Feet and Beak adaptations of any five birds.
5. Collection and submission of feathers of any five birds.
6. Survey of campus birds - Report submission.
7. Field visit.

SPOTTERS:

Balanoglossus, Amphioxus, Ascidian, Scoliodon, Echenies (Sucker fish), Anguilia (Eel), Narcine, Hippocampus, Rana, Bufo, Rhacophorus, Salamander, Chameleon, Draco, Calotes, Parrot, Duck, Woodpecker, Kingfisher, Pelican, House Sparrow, Echidna, Macropus, Bat, Sperm whale and Hippopotamus.

ALLIED ZOOLOGY - II

Semester: II **Hours: 3**

Code : 23ZO2AC2A **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the distinct features of different classes of chordates.	PSO - 1	K1
CO - 2	Describe the structural and functional organizations of chordates.	PSO - 2	K2
CO - 3	Illustrate the adaptive features of chordates to various habitats.	PSO - 3	K3
CO - 4	Explain the general characters of different classes of chordates and features of key specimens.	PSO - 2, PSO - 5	K4
CO - 5	Evaluate the exceptional attributes of different classes of chordates.	PSO - 4	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**ALLIED ZOOLOGY - II**							**Hours: 3**
Code : 23ZO2AC2A											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	2	4	3	5	4	3	2	3	3.36
CO - 2	4	3	3	3	5	3	4	5	3	3	3	3.55
CO - 3	4	3	5	3	4	3	4	4	5	3	3	3.73
CO - 4	4	5	3	2	5	5	4	5	3	2	5	3.91
CO - 5	3	4	3	5	4	4	3	4	3	5	4	3.82
Overall Mean Score												**3.67**

Result: The score for this course is **3.67** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

PROTOCHORDATA AND PISCES: General characters and classification of chordates up toclasses with an example. Salient features of Ascidian, Amphioxus, Balanoglossus and Petromyzon. Affinities of Hemichordates. General characters of class Pisces. Salient features of Narcine, Eel and Scoliodon, Economic importance of fishes, Migration of fishes. **(9 Hours)**

UNIT II

AMPHIBIA: General characters with an example. Salient features of Frog, Bufo, Rhacophorus and Salamander. Metamorphosis of Amphibian, Limbless Amphibians, Parental care in Amphibia. **(9 Hours)**

UNIT-III

REPTILIA: General characters with an example. Salient features of Chelone, Draco, Chamaeleon and Crocodilus. Identification of Poisonous and non - poisonous snakes, Poison apparatus, Snake venom, Biting mechanism, First aid. **(9 Hours)**

UNIT IV

AVES: General characters with an example. Salient features of Parrot, Duck, Woodpecker, Kingfisher and Pelican. Flightless birds, Flight adaptations in birds, Migration of birds. **(9 Hours)**

UNIT V

MAMMALS: General characters with an example. Salient features of Echidna, Bat, Kangaroo and Scaly anteater. Egg laying mammals, Dentition in mammals, Aquatic mammals, Adaptations of aquatic mammals. **(9 Hours)**

. COURSE BOOK:

- Thangamani A, Prasannakumar, Narayanan LM, Arumugam N, A. (2019). Text Book of Chordates, Saras Publication, Nagercoil.

  Unit I: Chapter 2, 4.

  Unit II: Chapter 5.

  Unit III: Chapter 6.

  Unit IV: Chapter 7.

  Unit V: Chapter 8.

BOOKS FOR REFERENCE:

1. Arumugam, N. (2019). Animal Diversity - volume 2 - Chordata, Saras Publication, Nagercoil.
2. Ekambaranatha Ayyar and T.N. Anandakrishnan. (2019). Manual of Zoology vol - II, Viswanathan Pvt. Ltd, Chennai.
3. Kotpal R. L. (2019). Modern Text Book of Zoology Vertebrates, 5th edition, Rastogi Publications, Meerut.
4. Young, J. Z. (2004). Life of vertebrates, Clarendon Press, Oxford UK.
5. Pouch Harvey F, Christine M. Janis and John B, Heiser. (2002). Vertebrate Life, Pearson Education Inc, New Delhi.
6. Verma P. S. and Jordan, E. L. (2013). Chordate Zoology, S Chand Publishers, New Delhi.

GENERAL ZOOLOGY - II

Semester: II **Hours: 3**

Code : 23ZO2AC2B **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the process of digestion and working mechanism of heart.	PSO - 2	K1
CO - 2	Illustrate the transport of respiratory gases and urine formation.	PSO - 3	K2
CO - 3	Appraise the origin of life.	PSO - 1	K3
CO - 4	Assess the abiotic and biotic factors.	PSO - 5	K4
CO - 5	Formulate the events of gametogenesis.	PSO - 4	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**GENERAL ZOOLOGY - II**							**Hours: 3**
Code : 23ZO2AC2B											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	2	3	4	5	2	3	5	3	4	2	3.27
CO - 2	4	3	5	2	3	3	4	3	5	2	3	3.36
CO - 3	5	3	3	3	4	3	5	4	3	3	3	3.55
CO - 4	3	5	3	2	4	5	3	4	3	2	5	3.55
CO - 5	3	3	4	5	3	3	3	3	4	5	3	3.55
Overall Mean Score												**3.46**

Result: The Score for this Course is **3.46** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Food - Physiological role of carbohydrate, proteins and lipids- balanced diet. Malnutrition. Vitamins-sources and deficiency diseases. Human digestive tract, Functional anatomy of human heart, ECG. **(9 Hours)**

UNIT II

Respiratory pigments, Transport of respiratory gases, Structure of kidney and nephron, formation of urine, structure of neuron, Ultra structure of skeletal muscle.

(9 Hours)

UNIT III

Biochemical origin of life - Abiogenesis, Biogenesis, mimicry and coloration, Lamarckism-Principles, examples for use and disuse theory. Darwinism, Neo Lamarckism and Neo Darwinism - Experimental evidences, Speciation- sympatric and allopatric. **(9 Hours)**

UNIT IV

Abiotic and Biotic factors, Pond ecosystem, food chain and food web, nitrogen cycle, animal association-symbiotic commensalism, mutualism and parasitism. Pollution - types, causes, effects and prevention of air and water pollution. Wild life conservation.

(9 Hours)

UNIT V

Gametogenesis - Spermatogenesis and oogenesis, Structure of sperm and ovum, Types and functions of placenta in animals, Menstrual cycle, Pregnancy, Twin study - Identical twins, Fraternal twins, Siamese twins, Test tube baby, Invitro fertilization.

(9 Hours)

COURSE BOOK:

1. N. Arumugam, A. Mariakuttikan, (2019). Animal Physiology, 12th Edition, Saras publications Nagercoil.
   Unit I: Chapter 4, 5, 6, 9 - 30, 31, 40, 74, 173, 183.
   Unit II: Chapter 152, 153, 154, 197, 198, 206, 260, 278.
   Unit V: Chapter 324, 325.
2. Arumugam, N. and Meyyan, R. P. (2011). Genetics and Evolution, 5th Edition, Saras Publication, Nagercoil.
   Unit III: Chapter 1, 2, 3, 4, 5, 12, 17.
3. Arumugam, N. (2018). Concepts of Ecology Environmental Biology, 8th Edition, Saras Publication, Nagercoil.
   Unit IV: Chapter 2, 3, 11, 12, 13, 20, 37, 38, 39.
4. Arumugam, N. (2015). Developmental Zoology, 2nd Edition, Saras publications Nagercoil.
   Unit V: Chapter 2, 4, 5, 15, 34, 27, 28.

BOOKS FOR REFERENCE:

1. Mariakuttikan A. and Arumugam N., (2017). Animal Physiology. Saras Publication, Nagercoil.
2. Arumugam N., (1993) Embryology, Ecology and physiology. Saras publications, Nagercoil
3. Arumugam N., A Text book of Evolution. Saras publications Nagercoil.
4. Verma P. S. and Agarwal V. K. (2000). Environmental Biology: Principles of Ecology. S. Chand and Company Pvt. Ltd., New Delhi.
5. Verma P. S., Tyagi S. and Agarwal V. K. (2002). Animal Physiology. S. Chand and Company Pvt. Ltd., New Delhi.

ALLIED ZOOLOGY - II - LAB

Semester: II **Hours: 2**

Code : 23ZO2AP2A **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify and compare the general biology of few chordates.	PSO - 1	K1
CO - 2	Examine the structure of placoid scales in shark.	PSO - 4	K2
CO - 3	Differentiate the beak and feet adaptation of birds.	PSO - 2	K3
CO - 4	Evaluate the feathers of any five birds.	PSO - 3	K4
CO - 5	Prepare a report on birds in campus.	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II	ALLIED ZOOLOGY - II - LAB										Hours: 2
Code : 23ZO2AP2A											Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	2	2	3	3	5	3	2	2	3	3.00
CO - 2	3	3	2	5	3	3	3	3	2	5	3	3.18
CO - 3	3	3	2	2	5	3	3	5	2	2	3	3.00
CO - 4	3	3	5	3	4	3	3	4	5	3	3	3.55
CO - 5	4	5	3	3	3	5	4	3	3	3	5	3.73
Overall Mean Score												3.29

Result: The Score for this Course is **3.29** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

1. Mounting of placoid scales in shark.
2. Identification of any three local edible fishes.
3. Study of any three venomous and non-venomous snakes.
4. Feet and Beak adaptations of any three birds.
5. Collection and submission of feathers of any five birds.

SPOTTERS:

Balanoglossus, Amphioxus, Ascidian, Scoliodon, Echenies (Sucker fish), Anguilia (Eel), Narcine, Hippocampus, Rana, Bufo, Salamander, Chameleon, Draco, Calotes, Parrot, Duck, Woodpecker, Kingfisher, Echidna, Macropus, Bat and Sperm whale.

GENERAL ZOOLOGY - II - LAB

Semester: II **Hours: 2**

Code : 23ZO2AP2B **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Estimate the oxygen content in the water samples.	PSO - 4	K1
CO - 2	Calculate the consumption of oxygen in a fish.	PSO - 2	K2
CO - 3	Analyze blood groups and estimate hemoglobin content in blood.	PSO - 3	K3
CO - 4	Compare the variations in fingerprints.	PSO - 5	K4
CO - 5	Infer superficial resemblance of two or more organisms.	PSO - 1	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II	GENERAL ZOOLOGY - II - LAB										Hours: 2
Code : 23ZO2AP2B											Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	3	3	2	5	4	3	3	4	2	5	3	3.36
CO - 2	3	3	2	4	5	3	3	5	2	4	3	3.36
CO - 3	2	3	5	4	3	3	2	3	5	4	3	3.36
CO - 4	2	5	4	4	3	5	2	3	4	4	5	3.73
CO - 5	5	2	3	2	4	2	5	4	3	2	2	3.09
Overall Mean Score												**3.38**

Result: The Score for this Course is **3.38** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

1. Estimation of oxygen content in various water samples.
2. Oxygen consumption in fish.
3. Estimation of Hemoglobin in human blood.
4. Blood grouping in man.
5. Preparation of human blood smear.
6. Qualitative analysis of carbohydrates, protein and lipids.
7. Analysis of variation using fingerprints.

SPOTTERS

Haemometer

Cleavage - 2 cell stage, 4 cell stage

Blastula of frog

Gastrula of frog

Cotyledonary placenta

Shark and sucker fish

EVOLUTIONARY SIGNIFICANCE

Peripatus

Limulus

Leaf insect

Stick insect

Chamaeleon

ABILITY ENHANCEMENT COURSE (AEC -2)

SUSTAINABILITY LIFE SKILLS

PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Gain theoretical knowledge and apply the expertise in different fields.
2.	Acquire Industry specific skills and can emerge as entrepreneurs.
3.	Develop critical and rational thinking to solve societal issues.
4.	Explore the knowledge and acclimatize it in the ever changing work environment.
5.	Evolve theories and develop innovative discipline specific ideas.
6.	Comprehend the nuances and develop innovative, discipline-specific ideas.

PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Develop positive thinking that helps them to set and pursue for meaningful goals.	PO-1, 6
2.	Inculcate leadership qualities that lead them to inspire and guide people among peer groups and in workplaces.	PO-1, 2, 3, 6
3.	Assess the advantages and disadvantages of social media.	PO-2, 6
4.	Acquiring trade skills by developing social relationships effectively with trade experts.	PO-2,5,6
5.	Create a consciousness about Sustainable Development goals which is aimed to ensure dignity, peace and prosperity for people and the planet, now and in the future.	PO-3,6
4.	Acquiring trade skills by developing social relationships effectively with trade experts.	PO-2,5,6
5.	Create a consciousness about Sustainable Development goals which is aimed to ensure dignity, peace and prosperity for people and the planet, now and in the future.	PO-3,6

SUSTAINABILITY LIFE SKILLS

Semester: II **Hours: 2**

Code : 23AE2VE02 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	To make them realise the importance of physical health, emotional well-being, and stressmanagement.	PSO-1	K1
CO - 2	Apply the features of team work and strive to become good leaders.	PSO-2,4	K2
CO - 3	Enhance their awareness on social media and e- learning.	PSO-3	K3
CO - 4	Develop interactive skills in online trade, and become value based professionals.	PSO-4	K4
CO - 5	Imbibe awareness about Sustainable Development Goals and become better citizen of the world.	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**SUSTAINABILITY LIFE SKILLS**							**Hours: 2**
Code : 23AE2VE02											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	4	4	4	3	4	4	3	4	4	3.88
CO - 2	4	4	3	4	4	3	4	4	4	4	4	3.81
CO - 3	4	3	4	4	4	3	4	4	4	4	4	3.81
CO - 4	4	4	4	4	4	3	4	4	3	4	3	3.72
CO - 5	4	4	3	4	4	3	3	4	4	4	4	3.72
Overall Mean Score												**3.78**

Result: The score for this course is **3.78** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I **6 Hours**

Self - Awareness - Empathy - Sympathy - Self-management - Stress Management- Interpersonal Relationship-Accepting Criticism- Problem Solving.

UNIT II **6 Hours**

Lateral thinking-Reasoning-motivation and goal setting- Critical thinking- leadership qualities- Social Etiquettes- Positive attitude- Creativity and components of creativity.

UNIT III **6 Hours**

Entrepreneurial Skills- Money Management-Time Management-Communication- Digital Marketing, Questioning, Observing, Networking

UNIT IV **6 Hours**

Safe Usage of social media- Gender Sensitivity-Inclusiveness-Morphing - Cyber Bulling- some useful apps- mPassport Seva- mParivahan- epathshala -epariksh- Aarogya sethu- Indian Police at your call- mAadhaar- GST Rate Finder-Umang- Sarkari Naukri-SWAYAM.

UNIT V **6 Hours**

Sustainable Development Goals.

1.No Poverty, 2.Zero Hunger 3.Good Health and Well-being 4.Quality Education 5.Gender Equality 6.Clean Water and Sanitation 7.Affordable and Clean Energy 8.Decent Work and Economic Growth 9.Industry, Innovation and Infrastructure 10.Reduced Inequality 11.Sustainable Cities and Communities 12. Responsible Consumption and Production 13. Climate Action 14. Life Below Water 15. Life on Land 16. Peace, Justice and Strong Institutions 17. Partnerships for the Goal.

COURSE TEXT:

- Prepared by the members of Foundation Course.

BOOKS FOR REFERENCE:

1. Pearson, Mark. *Emotional Healing & Self-Esteem*, Australian Educational Research, 1998.
2. Kemp. Sid. *Project Management for Small Business Made Easy*, Entrepreneur Press, 2006.
3. Oxley, Alan. *Security Risks in Social Media Technologies. Safe Practices in Public Service Applications*, Chandos Publishing, 2013.
4. Bigg, Tom & Mohammed Valli Moosa, editors. *Survival for a Small Planet: The Sustainable Development Agenda,* Earthscan Publications Ltd, 2004.

WEB-SOURCES

https://www.skillsyouneed.com/rhubarb/core-life-skills.html

http://www.linkedin.com/pulse/what-makes-positive-attitude-10-components-gary

http://ifflab.org/how-to-prevent-cyber-bullying-anti-cyber-bullying-law- in- india/

http://www.sciencedaily .com/terms/morphing.htm#:text=Morphing%20is%special %effect,little%20 instruction%20 from%20the %20 user.

https://apps.gov.in/apps

https://sdgs.un.org/goals

https://www.indeed.com/career-advice/career-development/entrepreneurial-skills

EFFECTIVE ENGLISH

Semester: II **Hours: 2**

Code : 23SE2CE02 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify their abilities to become better speakers and communicators	PSO-1	K1
CO - 2	Relate their speaking ability in English both in terms of fluency and comprehensibility.	PSO-2	K2
CO - 3	Modify their vocabulary in the context for communication	PSO-4	K3
CO - 4	Analyze their formal and informal communications with better use of words in appropriate contexts	PSO-5	K4
CO - 5	Assess conversations and present their viewpoints and opinions	PSO-3	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**EFFECTIVE ENGLISH**							**Hours: 2**
Code : 23SE2CE02											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	3	3	5	3	3	3	3	3.36
CO - 2	4	3	3	5	3	3	4	5	3	3	3	3.55
CO - 3	4	2	2	2	5	2	4	2	2	5	2	2.91
CO - 4	4	5	3	3	3	5	4	3	3	3	5	3.73
CO - 5	4	3	5	3	3	3	4	3	5	3	3	3.55
Overall Mean Score												**3.42**

Result: The score for this course is **3.42** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: Easy Enacting **6 Hours**

Orator - Chamber 4 (Paper 1)

Introducing oneself (Unit 4, Lesson 2)

Student and Teacher (Unit 3 Lesson 3)

In a College Campus (Unit 4, Lesson 1)

Orator- Chamber 4 (Paper 2)

Introducing a Person (Unit 1, Lesson 3)

Inviting for a Birthday Party Unit 2, Lesson 1 & 2)

Ordering for Food (Unit 1, Lesson 4)

UNIT II: Perfecting Phrasal Verbs **6 Hours**

Orator- Chamber 3

Phrasal Verbs in Conversation

Phrasal Verbs for Situations (Describing Place, Time, Daily Routines, Feelings, Health and Socializing)

UNIT III: Captivating Collocation **6 Hours**

Orator- Chamber 4

Types of Collocation

Collocation for Situations

UNIT IV: Idiomatic Expression **6 Hours**

Orator- Chamber 5

Idioms for Conversation

Idioms for Situations

UNIT V: Grammar for Life **6 Hours**

Orator- Chamber 7

Articles, Prepositions, Pronouns, Tenses, Modals (Unit 1 to 5)

INTERNAL COMPONENTS

Test 1	40
Test 2	40
Situational Conversation	10
Designing Brochure/Invitation	5
Attendance	5
Total	**100**

பொதுத்தமிழ் - 3 (பிற துறை மாணவிகளுக்கு மட்டும்)

பருவம்: மூன்று **நேரம்: 6**

குறியீடு: 23GT3GS03 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	காப்பியங்களின் வழி வாழ்வியல் சிந்தனையை அறிவர்.	PSO-5	K1
CO - 2	காப்பியங்களில் தமிழ்மொழியின் உயர்வை உணர்வர்.	PSO-2	K2
CO - 3	சமகாலப் படைப்புகளின் சிறப்புக்கூறுகளைப் பயன்படுத்தும் ஆற்றலை அறிந்து கொள்வர்.	PSO-3	K3
CO - 4	காப்பியங்கள் மூலம் இலக்கியங்களின் முக்கியத்துவத்தைப் பகுத்தாராயும் திறனை அறிவர்.	PSO-4	K4
CO - 5	மாணவர்கள் படைப்புத்திறனை மதிப்பீடு செய்ய அறிந்து கொள்வர்.	PSO-1	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III							பொதுத்தமிழ் - 3 (பிற துறை மாணவிகளுக்கு மட்டும்)					**Hours: 6**
Code : 23GT3GS03												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	4	5	4	4	3	4	4	3	5	3.82
CO - 2	3	3	4	4	5	5	3	5	4	3	4	3.91
CO - 3	3	4	5	4	4	4	4	4	5	3	4	4.00
CO- 4	5	3	3	4	4	4	3	4	3	5	4	3.82
CO - 5	3	5	4	3	3	3	5	3	4	3	3	3.55
Overall Mean Score												**3.82**

Result: The score for this course is **3.82** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

அலகு 1: பெருங்காப்பியங்கள்

சிலப்பதிகாரம் - வழக்குரை காதை

மணிமேகலை - ஆதிரை பிச்சையிட்ட காதை

சீவகசிந்தாமணி - பூமகள் இலம்பகம் (பாடல் எண் 2327 - 2336)

"கண்ணாடி யன்ன.... " முதல் "தேம்பெய் கற்பகத்.. வரை

வளையாபதி - கற்பில் மகளிர் (பாடல் எண் -8,9,10,11)

"பள்ள முதுநீர்ப் ....."

"உண்டியுட் காப்புண் ....."

" எத்துணை யாற்று ...."

"தனிப்பெயற் றண்டுளி ....." **18 Hours**

அலகு 2: சமயக் காப்பியங்கள்

பெரியபுராணம் - பூசலார் நாயனார் புராணம்

கம்பராமாயணம் - மந்தரை சூழ்ச்சிப்படலம் (பாடல் எண் 1399 - 1428)

"ஆண்டை அந்நிலை ....." முதல் "ஏனைநீதி இணையன ...." வரை

வில்லிபாரதம் - மற்போர் சருக்கம்

சீறாப்புராணம் - புலிவசனித்த படலம் **18 Hours**

அலகு 3: புதினம்

வஞ்சிமாநகரம் (வரலாற்றுப் புதினம்) **18 Hours**

அலகு 4

பாடம் தழுவிய இலக்கிய வரலாறு **18 Hours**

அலகு 5

மொழித்திறன்

1. நூல் மதிப்புரை 2. கடிதம் வரைதல் **18 Hours**

பாடநூல்கள்

தமிழ்த்துறை வெளியீடு (தொகுப்பு) - பொதுத்தமிழ் - 3

ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி

(தன்னாட்சி), பெரியகுளம்.

முனைவர் சி. பாலசுப்பிரமணியன் - தமிழ் இலக்கிய வரலாறு

பாவை பப்ளிகேஷன்ஸ்,

சென்னை - 60. இரண்டாம் பதிப்பு - 2016.

நா. பார்த்தசாரதி - வஞ்சி மாநகரம் (வரலாற்றுப் புதினம்)

பாவை பப்ளிகேஷன்ஸ், சென்னை - 600 014

முதற்பதிப்பு ஏப்ரல் 2012

பார்வை நூல்கள்

ந.மு. வேங்கட சாமி நாட்டார் (உ.ஆ)	-	சிலப்பதிகாரம் மூலமும் உரையும், ராமையா பதிப்பகம், சென்னை - 14, 10 ஆம் பதிப்பு 2019.
ந.மு. வேங்கடசாமி நாட்டார், ஔவை சு.துரைசாமிப்பிள்ளை (உ.ஆ)	-	மணிமேகலை மூலமும் உரையும் சாரதா பதிப்பகம், சென்னை - 600014 ஏழாம் பதிப்பு 2019
உரை ஆசிரியர் குழு	-	சீவக சிந்தாமணி மூலமும் உரையும், சாரதா பதிப்பகம், சென்னை - 14 2 ஆம் பதிப்பு - 2020
புலமை வேங்கடாசலம்	-	வளையாபதி, பாவை பப்ளிகேஷன்ஸ் சென்னை - 14 முதல் பதிப்பு மே 2006
கவிஞர் வ.த.இராமசுப்பிரமணியம் எம்.ஏ (உ.ஆ)	-	பெரியபுராணம் மூலமும் தெளிவுரையும் இரண்டாம் காண்டம், வெங்கட் நாராயணா ரோடு, டி. நகர், சென்னை -17. முதற்பதிப்பு மார்ச்சு 2004
பேராசிரியர் அ.ச. ஞானசம்பந்தன் முதன்மைப் பதிப்பாசிரியர்	-	கம்பராமாயணம் அயோத்தியா காண்டம் 2 நியூ செஞ்சுரி புக்ஹவுஸ் (பி.லிட்) சென்னை - 98. முதல் பதிப்பு டிசம்பர் 2012.
எஸ்.விசுவநாதன் (பதிப்பாசிரியர்)	-	வில்லிபாரதம் இரண்டாம் பாகம் தம்பி செட்டி தெரு சென்னை -1 முதல் பதிப்பு 1959

Poetry and History of Hindi Literature, Technical Hindi

Semester: III **Hours: 5**

Code : 23GH3GS03 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Learn the reform work done by Saint Kabirdas and Saint Tulasidas	PSO-1	K1
CO - 2	Develop Official and General Knowledge.	PSO-4	K2
CO - 3	Know the Origin of Bhakthi Movement.	PSO-2	K3
CO - 4	Develop Analysis Skills .	PSO-3	K4
CO - 5	Creative Writing will be Developed.	PSO-5	K5

UNIT I **(15 Hours)**

- Sachche Devtha
- Kabir Ke Dohe - 5 numbers
- "Gyan Margi Shakha - Prominent Poets and their Poems" - Kabirdas in detailed.

UNIT II **(15 Hours)**

- Murjhaphool
- Tulasi Ke Dohe - 5 numbers
- "Ram Bhakthi Shakha - Prominent Poets and their Poems" -Tulasidas in detailed.

UNIT III **(15 Hours)**

- Vivashtha
- Deep Koyee Jal Raha Hai
- "Krishna Bhakthi Shakha - Prominent Poets and their Poems" - Surdas in detailed.

UNIT IV **(15 Hours)**

- Badhal
- "Prem Margi Shakha - Prominent Poets and their Poems" - Jayasi in detailed.
- Technical Hindi:

  Banking Terms : 50 only

  Name of the Ministries: 50 only

UNIT V **(15 Hours)**

- Vashand Aayaa
- Short Notes from Reethikal and Adunikkal: Chayavad , Mythili Sharan, Meera Bhaayi, Ameer Khusro.
- Technical Hindi: E-mail kaa Upayog

COURSE BOOKS:

1. Kavya Saurab Published by Dakshina Bhaaratha Hindi Prachar Sabha, T. Nagar, Chennai-600 017.

The following poems have been prescribed

- ❖ Sachche Devtha - Ayodhya Singh Upadhyay Harioudh
- ❖ Murjhaphool - Mahadevi Varma
- ❖ Vivashtha - Shivamangala Simh Suman
- ❖ Deep Koyee Jal Raha Hai - Ramnaresh Thiripati
- ❖ Badhal - Sumithranandhan panth
- ❖ Vashand Aayaa - Suryakanth Thripati Niraalaa
- ❖ Kabir ke Dohe
- ❖ Tulasi ke Dohe

2. Hindi Sahithiya kaa Sanchiptha Ithihaas - Published by Dakshina Bharath Hindi Prachar Sabha, Thyagaraya Nagar, Chennai - 600 017.

The following Bakthi kaal have been prescribed

- ❖ Gyan marg, Prem maarg, Rambakthi, Krishnabakthi
- ❖ Adunikkal & Reethikkal Notes: Chayavad , Mythili Sharan, Meera Bhaayi, Ameer Khusro.

BOOKS FOR REFERENCE:

1. Technical Hindi - Karyalaya Sahayika, Kendriya Sachivalaya Hindi Parishad New Delhi, Hindi Vathayan Dr.K.Chandra Mohan, Viswa Vidhyalaya Prakashan Varanashi.

The following topics have been prescribed

- ❖ Banking Terms - 50 only
- ❖ Name of the Ministries - 50 only
- ❖ E-mail kaa Upayog

COMMUNICATIVE ENGLISH - III

Semester: III **Hours: 4**

Code : 23GE3GS03 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify cultural diversity and divergence in perspectives.	PSO-3	K1
CO - 2	Interpret their skills and attitudes relevant to the emerging society.	PSO-2	K2
CO - 3	Produce grammatically and idiomatically correct language.	PSO-1	K3
CO - 4	Categorize the writing techniques to meet academic and professional needs.	PSO-4	K4
CO - 5	Plan for career oriented tests with sufficient practice in Grammar and Comprehension.	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**COMMUNICATIVE ENGLISH - III**							**Hours: 4**
Code : 23GE3GS03											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	5	2	2	3	3	2	5	2	3	3.0
CO - 2	3	2	2	5	2	2	3	5	2	2	2	2.73
CO - 3	5	3	3	2	2	3	5	2	3	2	3	3.0
CO - 4	3	3	2	3	5	3	3	3	2	5	3	3.18
CO - 5	2	5	2	2	4	5	2	2	2	4	5	3.18
Overall Mean Score												**3.02**

Result: The score for this course is **3.02** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: POETRY **12 Hours**

Mamang Dai	-	"The Voice of the Mountains"
Toru Dutt	-	"Sita"
Oodgeroo Noonuccal	-	"A Song of Hope"
Christina Rossetti	-	"In an Artist's Studio"

UNIT II: SCENES FROM SHAKESPEARE **12 Hours**

Romeo & Juliet	-	The Balcony Scene
Macbeth	-	The Banquet Scene
Julius Caesar	-	The Murder Scene

UNIT III: SPEECHES OF FAMOUS PERSONALITIES **12 Hours**

Jawaharlal Nehru	-	"A Tryst with Destiny"
Barack Obama	-	"Yes, We Can"
Steve Jobs	-	"You've Got to Find What You Love"

UNIT IV: GRAMMAR IN CONTEXT **12 Hours**

Articles, Determiners and Quantifiers

Linking Words/ Connectives

Compound Words

Direct and Reported Speech

UNIT V: LANGUAGE COMPETENCY

Writing letters and emails

Writing in Social media platforms

[Blogs, X, Instagram, Facebook]

Learning etiquette and Email Etiquette **12 Hours**

COURSE BOOKS:

- Course Materials will be provided by the Department of English.
- Savarimuttu, Rohan J. S, and G. Petricia Alphine Nirmala, *English Grammar and Usage - An Ideal Companion for Advanced Learners*. New Century Book House (P) Ltd, 2016.

BOOKS FOR REFERENCE

1. Stanley Wells, *The Shakespeare Book: Big Ideas Simply Explained*, DK Publishing, 2015.
2. Jeane Kelly Bernish, *Build a Professional Digital Profile.* Kindle Edition, Bernish Communications Associates, LLC; 1st edition, 2012.
3. Krysia M Yardley- Matwiejczuk, *Role Play-Theory and Practice.* SAGE publications ltd, 1997.

WEB SOURCES

https://www.scribd.com/document/558838656/The-Voice-of-the-Mountain-By-Mamang-Dai-Adivasi-Resurgence

http://www.wordslikethis.com.au/a-song-of-hope/

https://www.poetryfoundation.org/poems/146804/in-an-artist39s-studio

https://www.poetrynook.com/poem/s%E2%94%9C%C2%ABta

https://www.cam.ac.uk/files/a-tryst-with-destiny/index.html#:~:text=Jawaharlal%20Nehru%2C%20delivering%20his%20Tryst%20with%20Destiny%20speech.&text=%22Long%20years%20ago%20we%20made,awake%20to%20life%20and%20freedom.

CELL BIOLOGY AND MOLECULAR BIOLOGY

Semester: III **Hours: 5**
Code : 23ZO3MC05 **Credit: 5**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the key concepts about molecular structure and functional mechanism of cell organelles	PSO - 1	K1
CO - 2	Explain the transportation of materials, formation of cell components, cell communication and central Dogma of gene expression	PSO - 5	K2
CO - 3	Apply the knowledge of cell organelle, cellular signaling, manipulation in gene expression to improve organism's health	PSO - 3	K3
CO - 4	Assess cellular adaptability, nuclear coordination, tissue homeostasis, environmental factors and epigenetic modifications on gene expression	PSO - 2	K4
CO - 5	Examine the role of cell organization in evolution, dysregulated cell signaling, DNA repair in genomic stability	PSO - 4	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III	**CELL BIOLOGY AND MOLECULAR BIOLOGY**											**Hours: 5**
Code : 23ZO3MC05												**Credit: 5**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	4	2	4	2	5	4	4	2	2	3.27
CO - 2	3	5	4	2	4	5	3	4	4	2	5	3.73
CO - 3	2	3	5	2	4	3	2	4	5	2	3	3.18
CO - 4	3	3	3	3	5	3	3	5	3	3	3	3.36
CO - 5	2	2	4	5	3	2	2	3	4	5	2	3.09
Overall Mean Score												**3.33**

Result: The Score for this Course is **3.33** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Cellular organization: The cell theory, protoplasm theory, scope of cell and molecular biology, ultra-structure of prokaryotic and eukaryotic cells and their differences, plasma membrane models, chemical composition and function, structure and function of cell wall, centriole, cilia, flagella and cytoskeleton.

(15 Hours)

UNIT II

Cell organelles: Structure and function of Endoplasmic Reticulum, Golgi Apparatus, Mitochondria, Ribosomes, Lysosome, Microfilaments and Microtubules. **(15 Hours)**

UNIT III

Nucleus and cell division: Structure and function of nuclear membrane, chromatin, nuclear matrix, nucleolus, ultra-structure and types of chromosomes, giant chromosomes. Cell division - cell cycle, phases of mitosis and meiosis. Apoptosis. Cancer - characteristics, types, diagnosis and treatment. **(15 Hours)**

UNIT IV

Nucleic acids and DNA repair: Nature, chemical composition, salient features of DNA and RNA, Watson and Crick's model of DNA, different forms of DNA, structure and types of RNA, Mechanism of DNA replication, DNA repair mechanisms.

(15 Hours)

UNIT V

Gene expression and regulation: Gene concept, Genetic code, Central dogma. Transcription - mechanism, post-transcriptional processing of RNAs in prokaryotes and eukaryotes. Translation - post-translational modifications. Gene regulation in prokaryotes (lac operon), Gene silencing and Genetic imprinting, Transposons.

(15 Hours)

COURSE BOOKS:

1. Jacobs M, Cell and Molecular Biology, Volume I, CBS publishers and Distributors Pvt Ltd. New Delhi, 2016.
2. Rastogi S C Cell and Molecular Biology, New Age International Publishers, 2021.
3. De Robertis, E.D.P. and De Roberti's, Jr E.M.F. Cell and Molecular Biology. VIII Edition. Lippincott Williams and Wilkins, Philadelphia., 2020.

UNIT	BOOKS	CHAPTERS
I	1 2 3	1-4, 6, 9 2-5, 6, 7 1
II	1 2 3	5, 10 7, 14 1, 6, 8, 9, 10, 11
III	1 2 3	10 8,9,29 1,2,13,14,15,16
IV	1 2 3	10 13,15,16 13,14
V	1 2 3	10,11,12 17,18,19,22 19,20,21

BOOKS FOR REFERENCE:

1. De Robertis, E.D.P. Cell and Molecular Biology 8th edition. New York: Lippincott, 2011.
2. Ajoy Paul, Text Book of Cell and Molecular Biology. Books and Allied (P) Ltd. Kolkata,2007.
3. Kapoor, V.C. Practice of Animal Taxonomy 5th edition. Oxford and IBH Publishing Co. Pvt. Ltd New Delhi,2001.
4. Lodish, H. and Berk, A. Molecular Cell Biology,8th edition W.H. Freeman and Company Limited Publication, New York,2016.
5. Gupta, P.K. Cell and Molecular Biology,4th edition. Rastogi Publication, New Delhi, 2014.
6. Geoffrey M. Cooper and Robert E. Hausman. The cell: A Molecular Approach,6th edition Sinauer Associates Publication, Massachusetts, USA, 2013.
7. Alberts B., Johnson. A., Lewis, J., Raff, M., Roberts, K. and Watter, P. Molecular Biology of the Cell, 5th edition. Garland Science Publication, New York, 2008.

GENETICS

Semester: III **Hours: 3**

Code : 23ZO3MC06 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the basics of inheritance and interactions of genes.	PSO - 1	K1
CO - 2	Discuss the causes of genetic makeup and phenotypic changes in progeny.	PSO - 3	K2
CO - 3	Illustrate the genic interactions, central dogma and genetic defects.	PSO - 3, PSO - 4	K3
CO - 4	Analyze patterns of inheritance in complex genetic scenarios.	PSO - 2	K4
CO - 5	Compile the factors which contribute to changes in gene expression.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**GENETICS**							**Hours: 3**
Code : 23ZO3MC06											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	2	4	3	5	4	3	2	3	3.36
CO - 2	3	3	5	4	3	3	3	3	5	4	3	3.55
CO - 3	3	3	5	5	2	3	3	2	5	5	3	3.55
CO - 4	3	4	3	3	5	4	3	5	3	3	4	3.64
CO - 5	4	5	2	4	3	5	4	3	2	4	5	3.73
Overall Mean Score												**3.57**

Result: The Score for this Course is **3.57** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Mendelian Genetics: Genetic terminology - alleles, homozygote, heterozygote, hybrid, genotype, phenotype, back cross and test cross. Mendelian Laws of inheritance - Monohybrid and dihybrid experiment. Interaction of genes - complete dominance and incomplete dominance, Epistasis - dominant and recessive epistasis, lethal genes, pleiotropism, penetrance and expressivity.

(9 Hours)

UNIT II

Multiple alleles: ABO blood grouping. Multiple genes - Skin color in man, transgressive variations. Population genetics - Hardy -Weinberg equilibrium. Extra chromosomal inheritance - Inheritance of kappa particles and shell coiling in snail. **(9 Hours)**

UNIT III

Linkage and crossing over: Linkage - types of linkage, Cis arrangement and Trans arrangement, linkage groups, theories and factors affecting linkage. Crossing over - theories of crossing over, mechanism and significance of crossing over, factors affecting crossing over. Chromosome map - procedure for the chromosome mapping, Karyotyping - an overview. **(9 Hours)**

UNIT IV

Sex linked inheritance: Types, X-linked inheritance - colour blindness, haemophilia and Y - linked inheritance. Sex determination in man. Syndromes - Down's syndrome, Turner's syndrome and Klinefelter's syndrome. **(9 Hours)**

UNIT V

Mutation: Chromosomal mutation, Genomatic mutation and Gene mutation. Inborn errors of metabolism - phenylketonuria, alkaptonuria and albinism. Genetics and society - Pedigree analysis, twin study, eugenics, euthenics, euphenics and genetic counselling. Inbreeding and out breeding. **(9 Hours)**

COURSE BOOK:

1. Meyyan R.P. Genetics, Saras Publication, Nagercoil, 2010.

UNIT	BOOK	CHAPTERS
I	1	1, 2, 3, 9
II	1	4, 5, 38
III	1	6, 7, 8
IV	1	11, 13
V	1	19, 20, 21, 24, 44, 45

BOOKS FOR REFERENCE:

1. Verma P.S., Agarwal V. K and Norman S. Cohn, Principles of Genetics. S. Chand and company Ltd, Ram nagar, New Delhi, 1989.
2. Gardner, E.J., Michael J. Simmons, Peter Sunstad, D, Principles of Genetics. 8th edition, John Wiley and Sons, INC 1991.
3. Benjamin Lewin, Genes VIII. Pearson Prentice Hall, Pearson Education, Inc. 2004.
4. Strickberger M.W., Genetics. 3rd edition, Macmillan Publishing Co., New Delhi. 1985.
5. Daniel L. Haartl and Elizabeth W. Jones, Genetics. 5th edition, Jones and Bartlett Publishers, Sudbury. 2001.
6. Charlotte J. Avers. Genetics. D.Van Nostrand and Company, New York, 1980.
7. Gurbachans Miglani, Narosa Publishing, Daryaganj, New Delhi, 2015.
8. Benjamin Lewin, Genes VII. 7th edition, Oxford University Press Inc., New York. 2000.
9. Verma, P.S. and Agarwal, A.K., Genetics. 9th edition, Rajendra Ravindra Printer's Pvt. Ltd., New Delhi, 2012.
10. Gardner A. and Davies T. Human genetics. 2nd edition, Viva books private limited, Ansari Road, Daraganj. 2010.
11. Dipak Kumar Kar Sona Halder, Cell Biology, Genetics, Molecular Biology. New Central Book Agency (p) Ltd, Chintamoni Das Lane, 2009.
12. Alice Marcus, Genetics. HJP Publisher, Chennai, 2009.
13. Gupta P.K., Molecular Biology and Genetic Engineering. Rastogi Publications, Meerut. 2011.
14. Primrose SB, Twyman R. Principles of Gene manipulation and Genomics. John Wiley and Sons Strickberger MW, Genetics, Pearson publishers.

CELL BIOLOGY AND GENETICS - LAB

Semester: III **Hours: 2**

Code : 23ZO3CP02 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the principles and working mechanisms of microscope.	PSO - 1	K1
CO - 2	Interpret the different stages of mitosis and meiosis.	PSO - 4	K2
CO - 3	Apply principles of inheritance and validate the results.	PSO - 2, PSO - 4	K3
CO - 4	Analyze Mendelian traits among the students.	PSO - 3	K4
CO - 5	Assess the different types of blood cells.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**CELL BIOLOGY AND GENETICS - LAB**							**Hours: 2**
Code : 23ZO3CP02											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	3	3	3	5	3	4	3	3	3.55
CO - 2	3	4	3	5	2	4	3	2	3	5	4	3.45
CO - 3	4	3	3	5	5	3	4	5	3	5	3	3.91
CO - 4	3	3	5	4	2	3	3	2	5	4	3	3.36
CO - 5	3	5	4	3	3	5	3	3	4	3	5	3.73
Overall Mean Score												**3.60**

Result: The Score for this Course is **3.60** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

CELL BIOLOGY:

1. Compound Microscope.
2. Study of mitosis in Onion root tip cells.
3. Identification of various stages of meiosis in the testes of grasshopper.
4. Polytene Chromosome in Chironomus larva.
5. Preparation of Human buccal smear.
6. Preparation of Human blood smear.
7. Spotters: Mitochondria, Nucleus, Endoplasmic reticulum and Golgi apparatus.

GENETICS:

1. Verification of Mendel's Laws by using coins / beads.
    a. Monohybrid cross
    b. Monohybrid test cross.
    c. Dihybrid cross
    d. Dihybrid test cross.
2. Study of Mendelian traits among the students.
3. Determination of blood group of man
4. Identification of the following using charts.
    a. Down's syndrome
    b. Turner's syndrome
    c. Klinefelter's syndrome.
    d. Pedigree analysis

GENERAL BOTANY - I

Semester: III **Hours: 3**

Code : 23BO3AC3A **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Remember the plant anatomy and basic cell structure.	PSO - 1	K1
CO - 2	Understand the nature of various types of plant tissues and diseases.	PSO - 3	K2
CO - 3	Apply the knowledge of plant diseases and address the issues.	PSO - 2	K3
CO - 4	Analyze the of plant diversity based on anatomical structure.	PSO - 5	K4
CO - 5	Evaluate the economic importance and life cycle of algae, fungi and bryophytes.	PSO - 4	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				GENERAL BOTANY - I							Hours: 3
Code : 23BO3AC3A											Credit: 3
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	3	4	3	3	5	3	3	4	3	3.55
CO - 2	4	3	5	3	4	3	4	4	5	3	3	3.73
CO - 3	2	4	3	4	5	4	2	5	3	4	4	3.64
CO - 4	3	5	3	3	3	5	3	3	3	3	5	3.55
CO - 5	3	3	4	5	3	3	3	3	4	5	3	3.55
Overall Mean Score												3.60

Result: The Score for this Course is **3.60** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Histology: Ultra structure of a plant cell. Tissues - Meristematic tissues, theories on differentiation of meristems. Permanent tissues - Simple tissues - Parenchyma, Collenchyma and Sclerenchyma, Complex tissues - Xylem and Phloem. Internal structure of primary young dicot stem, root and leaf. Internal structure of monocot stem and root. **(9 Hours)**

UNIT II

Phycology: Introduction, salient features and economic importance of Algae. Chlorella - occurrence, structure, reproduction - asexual method, economic importance and life cycle. Sargassum - occurrence, thallus structure, internal structure of stipe, leaf and cryptoblasts, reproduction - vegetative and sexual method and life cycle. **(9 Hours)**

UNIT III

Mycology: Introduction, general characters and economic importance of Fungi. Rhizopus - occurrence, structure, reproduction - vegetative, asexual and sexual method, economic importance and life cycle. Saccharomyces (Yeast) - structure, nutrition, economic importance, reproduction - vegetative, asexual and sexual method, life cycle - haplobiontic, diplobiontic and haplo - diplontic. **(9 Hours)**

UNIT IV

Bryology: Introduction, general characters of Bryophytes. Funaria - occurrence, structure of gametophyte, internal structure of stem and leaf, reproduction - vegetative and sexual method, sporophyte - foot, seta and capsule, dehiscence of capsule, germination of spore and life cycle. **(9 Hours)**

UNIT V

Pathology: Introduction, immunity in plants, detailed study on the causal organisms, symptoms, dissemination and control measures of citrus canker, bunchy top of banana, tikka disease of groundnut, ring rot of potato and little leaf of brinjal. **(9 Hours)**

Books for study:

1. Anne Ragland, Kumaresan. V, Arumugam. N, A Textbook of Botany Volume - I and II. Saras Publication, Nagercoil, 2015.
2. Anne Ragland Plant Anatomy and Microtechniques, Saras Publication, Nagercoil, 2010.

UNIT	BOOK	PAGE NUMBERS
I	2	14-17, 190-211, 227-246
II	1	1-2, 4-6, 90-96, 206-225
III	1	284-285, 313-335, 452-467
IV	1	490-492, 503-529
V	1	658-667, 672-675, 695-699

BOOKS FOR REFERENCE:

1. Vashishta, B. R. Sinha A. K. and Singh, V.P. Botany for Degree students Algae. S. Chand and Company, Ltd, New Delhi, 2002.
2. Anne Ragland. Algae and Bryophytes. Saras Publication, Nagercoil, 2009.
3. Anne Ragland Plant Anatomy and Micro techniques. Saras Publication, Nagercoil. 2009.
4. Vashishta, B. R. and Sinha, A. K., Botany for Degree students Fungi. S. Chand and Company, Ltd, New Delhi, 2003.
5. Robert Edward Lee, Phycology. Cambridge University Press, 2009.
6. Vashishta B. R. Sinha A. K. and Sinha V. P. Bryophyta. S. Chand and Co. Ltd., New Delhi, 2006.
7. Pandey, B. P. Plant Pathology. S. Chand and Co. Ltd., New Delhi, 2007.

ETHNOBOTANY AND MEDICINAL BOTANY

Semester: III **Hours: 3**

Code : 23BO3AC3B **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Remember ethnobotanical specimens and their role.	PSO - 1	K1
CO - 2	Understand the principles and contributions of indigenous medicinal sciences.	PSO - 3	K2
CO - 3	Apply the concept of sharing of wealth in the protection of traditional knowledge.	PSO - 4	K3
CO - 4	Analyze the role of ethnobotany in the conservation of plant genetic resources.	PSO - 2	K4
CO - 5	Evaluate the ethical considerations related to biopiracy and intellectual property.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**ETHNOBOTANY AND MEDICINAL BOTANY**							**Hours: 3**
Code : 23BO3AC3B											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	4	4	3	5	4	3	4	3	3.73
CO - 2	3	4	5	3	4	4	3	4	5	3	4	3.82
CO - 3	4	4	3	5	3	4	4	3	3	5	4	3.82
CO - 4	3	3	4	3	5	3	3	5	4	3	3	3.55
CO - 5	4	5	4	3	3	5	4	3	4	3	5	3.91
Overall Mean Score												**3.77**

Result: The Score for this Course is **3.77** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Ethnobotany: Introduction, concept, scope and objectives. Ethnobotany as an interdisciplinary science. Major and minor ethnic groups or Tribals of India and their life styles. **(9 Hours)**

UNIT II

Role of ethnobotany in modern Medicine: Medico-ethnobotanical sources in India. Significance of the following plant in ethno botanical practices - *Vitex negundo*, *Cassia auriculata, Indigofera tinctoria, Senna auriculata and Phyllanthus niruri*. Role of ethnic groups in the conservation of plant genetic resources.

(9 Hours)

UNIT III

Ethnobotany as a tool to protect interests of ethnic groups: Sharing of wealth concept with few examples from India. Biopiracy, Intellectual Property Rights and traditional knowledge. **(9 Hours)**

UNIT IV

Indigenous Medicinal Sciences: Definition and scope, Ayurveda - History, origin, plants used in ayurvedic treatments. Siddha - origin of Siddha medicinal systems, basic of Siddha system, plants used in Siddha medicine. Unani - History, tumors treatments/therapy. **(9 Hours)**

UNIT V

Conservation of endangered and endemic medicinal plants: Definition: endemic and endangered medicinal plants. In situ conservation - Biosphere reserves, scared groves, National Parks. Ex situ conversation - Botanical Gardens.

(9 Hours)

COURSE BOOKS:

1. Roseline. A, Pharmacognosy. MJP Publishers, Chennai, 2011.

BOOKS FOR REFERENCE:

1. Jain S. K. Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
2. Jain S. K. Methods and approaches in Ethnobotany. Society of ethnobotanists, Lucknow, India, 1989.
3. Jain S. K. Contributions of Indian Ethnobotany. Scientific Publishers, Jodhpur, 1990.
4. Colton C. M. Ethnobotany - Principles and Applications. John Wiley and sons - Chichester, 1997.
5. Rama Ro, N. and Henry, A. N. The Ethnobotany of Eastern Ghats in Andhra Pradesh, India. Botanical Survey of India. Howrah, 1996.

GENERAL BOTANY - I - LAB

Semester: III **Hours: 2**
Code : 23BO3AP3A **Credit: 1**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Remember the structure of essential plant tissues	PSO - 1	K1
CO - 2	Understand the cellular structure and life cycle of algae, fungi, and bryophytes	PSO - 2	K2
CO - 3	Apply the sectioning and mounting techniques to study the anatomy	PSO - 4	K3
CO - 4	Analyze the impact of plant health on agricultural practices	PSO - 5	K4
CO - 5	Evaluate the ecological roles of algae, fungi, and bryophytes	PSO - 3	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				GENERAL BOTANY -I - LAB							Hours: 2
Code : 23BO3AP3A											Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)				Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	3	3	4	3	5	4	3	3	3	3.55
CO - 2	4	4	3	3	5	4	4	5	3	3	4	3.82
CO - 3	3	4	4	5	3	4	3	3	4	5	4	3.82
CO - 4	3	5	3	4	2	5	3	2	3	4	5	3.55
CO - 5	4	4	5	4	3	4	4	3	5	4	4	4.00
Overall Mean Score												3.75

Result: The Score for this Course is **3.75** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

SECTIONING AND MOUNTING

1. Dicot stem - *Tridax procumbens*
2. Monocot stem - *Asparagus racemosus*
3. Monocot root - *Canna indica*

SLIDES

1. **Plant Anatomy:** Parenchyma cell, Collenchyma cell and Sclerenchyma cell.
2. **Algae:** Chlorella cell, Sargassum - Male conceptacle and Female conceptacle.
3. **Fungi:** Cell structure of Yeast.
4. **Bryophytes:** Funaria - L. S. of Antheridial branch, L. S. of Archegonial branch and L. S. of Capsule.

SPOTTERS

1. Funaria - Habit
2. Sargassum - Habit
3. Citrus canker disease
4. Bunchy top of banana disease
5. Ring rot of potato disease
6. Little leaf of brinjal disease

CHARTS

1. Ultra structure of a plant cell
2. Dicot Root

ETHNOBOTANY AND MEDICINAL BOTANY - LAB

Semester: III **Hours : 2**

Code : 23BO3AP3B **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define ethnobotanical specimens and their role in understanding traditional medicine	PSO - 3	K1
CO - 2	Demonstrate the importance and utilization of ethno-medicine	PSO - 2	K2
CO - 3	Apply the ethical considerations and cultural sensitivity during field visits to local tribal areas	PSO - 5	K3
CO - 4	Analyze the morphological and anatomical characteristics of the various plant parts	PSO - 1	K4
CO - 5	Evaluate the diversity of ethnomedicinal plant	PSO - 4	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III			**ETHNOBOTANY AND MEDICINAL BOTANY - LAB**						**Hours: 2**			
Code : 23BO3AP3B												**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	4	5	3	3	4	3	3	5	3	4	3.64
CO - 2	4	3	3	4	5	3	4	5	3	4	3	3.73
CO - 3	3	5	3	4	4	5	3	4	3	4	5	3.91
CO - 4	5	4	4	3	3	4	5	3	4	3	4	3.82
CO - 5	4	3	4	5	3	3	4	3	4	5	3	3.73
Overall Mean Score												**3.77**

Result: The Score for this Course is **3.77** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

1. Ethnobotanical specimens as prescribed in the theory syllabus.
2. Detailed morphological and anatomical study of the medicinally important part(s) of locally available plants (minimum 8 plants) used in traditional medicine.
3. Field visits to identify and collect ethno medicinal plants used by local tribes/folklore.
4. Documentation of knowledge on common medicinal plants - report submission.

SEC -2: FERMENTED FOODS AND BEVERAGES

Semester: III **Hours: 1**

Code : 23SE3ZO03 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the types of fermentation and fermented food	PSO - 1	K1
CO - 2	Explain the role of microorganisms in fermentation	PSO - 2	K2
CO - 3	Apply the science and techniques in making new fermented products	PSO - 4	K3
CO - 4	Analyze the nutritional, culinary, safety and preservation aspects of fermented products	PSO - 3	K4
CO - 5	Determine the best production and preserving practices of fermented foods	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III			**SEC -2: FERMENTED FOOD AND BEVERAGES**								**Hour: 1**
Code : 23SE3ZO03											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	2	3	4	2	5	4	2	3	2	3.09
CO - 2	3	2	4	4	5	2	3	5	4	4	2	3.45
CO - 3	4	2	3	5	4	2	4	4	3	5	2	3.45
CO - 4	3	4	5	3	4	4	3	4	5	3	4	3.82
CO - 5	4	5	3	2	4	5	4	4	3	2	5	3.73
Overall Mean Score												**3.51**

Result: The Score for this Course is **3.51** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Introduction to Fermentation: History and types of fermentation, role of bacteria, yeast, molds and other factors in fermentation **(3 Hours)**

UNIT II

Fermented Dairy and Beverages: Production and health benefits of yogurt, kefir, cheese, buttermilk, beer, wine and kombucha. **(3 Hours)**

UNIT III

Fermented Vegetables: Production of sauerkraut, traditional kimchi, pickles, sourdough starter and maintenance. **(3 Hours)**

UNIT IV

Fermented Condiments and Sauces: Production of mayonnaise, soy sauce, hot sauces and miso development of umami and flavor. **(3 Hours)**

UNIT V

Health Benefits and Safety: Role and health benefits of probiotics. Food safety and preservation - salting, vacuum packing and freezing. **(3 Hours)**

Course Material:

To be prepared by the Department

GE - 1 GLOBAL ENVIRONMENTAL ISSUES

Semester: III **Hours: 2**

Code : 23ZO3GE01 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define key global environmental issues	PSO - 1	K1
CO - 2	Summarize the impact of human activities on ecosystems	PSO - 3	K2
CO - 3	Apply knowledge of environmental issues to real-world scenarios	PSO - 4	K3
CO - 4	Assess the effectiveness of existing environmental policies and international agreements	PSO - 5	K4
CO - 5	Develop a comprehensive understanding of the complex interactions between natural systems and human societies.	PSO - 2	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**GE 1 - GLOBAL ENVIRONMENTAL ISSUES**								**Hours: 2**
Code : 23ZO3GE01												**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	3	2	3	5	2	2	3	3	3.00
CO - 2	2	3	5	3	2	3	2	2	5	3	3	3.00
CO - 3	4	4	2	5	2	4	4	2	2	5	4	3.45
CO - 4	2	5	3	3	2	5	2	2	3	3	5	3.18
CO - 5	2	4	3	3	5	4	2	5	3	3	4	3.45
Overall Mean Score												**3.22**

Result: The Score for this Course is: **3.22** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Environment and Environmental problems: Basic concepts and issues, global environmental problems - drivers influencing global environmental problems - growth in population and consumption, increasing global energy consumption and habitat loss. **(6 Hours)**

UNIT II

Environmental pollution: Types of pollution, air, water and land pollution, sources of pollution, fate of pollutants in the environment, ocean acidification, bioconcentration, bio/demagnification, ozone depletion, greenhouse effect and acid rain due to anthropogenic activities, fisheries depletion, deforestation, eutrophication, their impact and biotechnological approaches for management. **(6 Hours)**

UNIT III

Climate change and sustainable development: Challenges due to climate change, catastrophic geological hazards, principles of disaster management, study of earthquake, floods, drought, wave and tsunami effects, climate resilient developmental mechanisms, green buildings, smart Cities, satellite towns and cities, green belts and agro - forestry. **(6 Hours)**

UNIT IV

Biodiversity and wildlife conservation: Importance of biodiversity and threats to biodiversity, biodiversity 'Hotspots', biodiversity loss, extinct, rare, endangered and threatened flora and fauna of India, national and global red data book and major environmental movements in world, Biodiversity conservation - *Insitu* and *Exsitu.* **(6 Hours)**

UNITV

Environmental Management: Concept of environmental laws, environmental acts and regulations for prevention of pollution. International environmental agreements, conventions and protocols, concept of environmental impact assessment (EIA) and guidelines, impact assessment methodologies and environmental impact statement (EIS). **(6 Hours)**

COURSE BOOKS:

1. Arumugam N, Concepts of Ecology, Saras Publication, Nagercoil, 2016
2. Arumugam N, V. Kumaresan, Environmental studies, Saras Publication, Nagercoil, 2017.

UNIT	BOOK	CHAPTER
I	1	1
II	1, 2	7, 38, 39, 41,
III	2	6
IV	2	4
V	2	8

BOOKS FOR REFERENCE:

1. Kevin T. Pickering, Lewis A. Owen. An Introduction to Global Environmental Issues. Routledge, London, 1997.
2. Mahesh, R. Environmental Issues in India: A Reader. Pearson-Longman, India. New Delhi, 2007.
3. Holmes Rolston III. A New Environmental Ethics: The Next Millennium for Life on Earth. Routledge, Newyork, 2011.
4. Frances Harris, Global Environmental Issues, Second Edition, John Wiley and Sons Ltd., England. Print ISBN: 9780470684702 |Online ISBN:9781119950981|DOI:10.1002/9781119950981, 2012.
5. Mridhula Ramesh. The climate solution India's climate change crisis and what we can do about it. Hachette Book publishing India Private Ltd., UK Company, 2018.
6. Satpute V. D., Patil M. B. and Tengse S. A. Environmental Challenges Today - Global Perspective. Notion Press Publishing, Chennai, 2020.

PART IV - NATIONAL CADET CORPS

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Formulate hypothesis, design experiments, use appropriate tools and interpret the results.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
5.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO. NO.	UPON COMPLETION OF THE COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1	Reinforce the aims, motto, vision and mission of the NCC through the academic curriculum.	PO-1, PO-3
2	Train the students, to be graduates with all round development, who apart from their own subject, can successfully compete in other fields such as defense/paramilitary/ police forces and civil services.	PO-1, PO-4
3	Perform in social service activities and creating awareness about social evils in society.	PO-1, PO-5, PO-6.
4	Explain the tri services organization, comprising the army, navy and air force, engaged in grooming the youth of the country into disciplined and patriotic citizens.	PO-2, PO-6
5	Demonstrate "B" and "C" certificate examination of NCC helps in getting jobs in different forces and also security related jobs.	PO-2, PO-5, PO-6

GE - 1: NATIONAL INTEGRATION AND PERSONALITY DEVELOPMENT

Semester: III **Hours: 2**
Code : 23GE3NC01 **Credit: 2**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Develop technical skill in Civil defense and self-defense in order to safeguard the society in case of need arises	PSO - 1,PSO - 2, PSO - 4	K1
CO - 2	Perceive the importance of Weapon training is to remove the fear of a weapon from the hearts of youth.	PSO - 1, PSO - 4	K2
CO - 3	Comprehend the motivation for positive attitude, character building and personality development.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K3
CO - 4	Analyze the different types of disasters under different circumstances.	PSO - 4, PSO - 5	K4
CO - 5	Achieve practical knowledge in community development and other social programmes.	PSO - 1, PSO - 2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**GE-1: NATIONAL INTEGRATION AND PERSONALITY DEVELOPMENT**							**Hours: 2**
Code : 23GE3NC01											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	2	2	4	5	4	3	3	5	3.55
CO - 2	5	4	4	2	3	4	5	4	4	4	5	4.00
CO - 3	5	5	4	2	2	3	3	5	3	3	4	4.00
CO - 4	5	4	3	2	2	4	4	5	4	4	5	3.82
CO - 5	5	4	4	2	3	3	5	4	2	5	4	3.73
Overall Mean Score												**3.82**

Result: The Score for this Course is **3.82** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

GE-1: NATIONAL INTEGRATION AND PERSONALITY DEVELOPMENT

2hrs/Week

UNIT I

National Integration **6 Hours**

Motto of National Integration - Importance of National Integration Culture and heritage of Tamil Nadu.

UNIT II

Civil Affairs **6 Hours**

Aim of aid to civil authority - Role of NCC Cadets during natural calamities - Types of disaster - Essential services during natural calamities

UNIT III

Civil Defence and Self Defence **6 Hours**

Civil Defence - Organization - Aims and services- Aid to Civil authorities in emergency- Self Defence -Aims of Self Defence - Women and Self Defence

UNI IV

Leadership And Personality Development **6 Hours**

Leadership - Types and traits - Man Management in NCC - Duties of a Good Citizen - Role of Youth in Nation Building - Morale - Factors which affect morale - Factors which develop high morale Personality Development - Factor influencing Personality-Time Management .

UNIT V

Soft Skills **6 Hours**

Soft skills - interview skill - influencing skill - social skill - communication skill - self motivation - self-esteem - body language.

INTERNAL QUESTION PATTERN (Fully Internal Papers) - UG (2023-2026)

Max. Marks - 40 **Duration - $1\frac{1}{2}$ Hours**

Section	Bloom's level	Course Outcome	Questions
A MCQs (10×1=10)	K1	CO1	1.
		CO1	2.
		CO1	3.
		CO1	4.
		CO1	5.
		CO1	6.
		CO1	7.
		CO1	8.
		CO1	9.
		CO1	10.
B Answer all the Questions (2×5=10)	K2	CO2	11. a) (or) 11. b)
	K3	CO3	12. a) (or) 12. b)
C Answer all the questions (2×10=20)	K4	CO4	13. a) (or) 13. b)
	K5	CO5	14. a) (or) 14. b)

CONTINUOUS INTERNAL ASSESSMENT COMPONENT (CIA) - 2023-2026

Component	Marks
Internal test I	40
Internal test II	40
Seminar/Assignment	10
Quiz	5
Attendance	5
Total	**100**

AEC-3 ENVIRONMENTAL STUDIES

Semester: III **Hours: 2**

Code : 23AE3ES03 **Credit: 2**

PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Endow with in-depth knowledge, analyze and apply the understanding of their discipline for the betterment of self and society
2.	Synthesize ideas from various disciplines, enhance the interdisciplinary knowledge and extend it for research
3.	Gain confidence and skills to communicate orally/ verbally in research platforms and state a clear research finding
4.	Develop problem-solving and computational skills and gain confidence to appear for the competitive examinations
5.	Enhance knowledge regarding research by accumulating practical knowledge in specific areas of research
6.	Achieve idealistic goals and enrich the values to tackle the societal challenges

PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Assess the scope and importance of environmental studies and the need for public awareness	PO-1
2.	Develop a deeper understanding in the classification of resources	PO - 2
3.	Analyze the concept of the ecosystem	PO-3
4.	Comprehend the definitions, causes and control measures of environmental pollutions	PO-4
5.	Participate in the environmental issues programmes from the unsustainable to sustainable development	PO - 5, PO-6

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Understand natural resources, ecosystems, environmental pollution and social issues	PSO-1	K1
CO - 2	Explain different types of natural resources, pollution, ecosystem and social issues	PSO-2	K2
CO - 3	Demonstrate the identification, utilization, ecosystems and the impact of environmental pollution on both the natural world and human communities and the conservation of natural resources	PSO-3	K3
CO - 4	Analyse social issues related to environmental sustainability	PSO-4	K4
CO - 5	Examine societal concerns within and surrounding the Theni District	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**AEC-3ENVIRONMENTAL STUDIES**							**Hours: 2**
Code : 23AE3ES03											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	3	3	5	3	3	3	3	3.36
CO - 2	3	5	4	4	3	3	3	5	4	4	3	3.73
CO - 3	3	3	5	3	4	4	3	3	5	3	4	3.64
CO - 4	3	3	3	5	4	4	3	3	3	5	4	3.64
CO - 5	3	3	3	4	5	5	3	3	3	4	5	3.73
Overall Mean Score												**3.62**

Result: The score for this course is **3.62** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: NATURAL RESOURCES

Multidisciplinary nature of environmental studies: Definition, scope and importance - need for public awareness - classification of resources: renewable and non - renewable resources - forest resources, water resources, mineral resources, food resources, energy resources, land resources - associated problems; role of an individual in conservation of natural resources - equitable use of sources for sustainable lifestyles.

(6 Hours)

UNIT II: ECOSYSTEMS

Concept, structure and function of an ecosystem - energy flow in the ecosystem - food chains, food webs and ecological pyramids - Types, characteristic features, structure and function of Forest, grassland, desert and aquatic ecosystems. **(6 Hours)**

UNIT III: ENVIRONMENTAL POLLUTION

Definition - causes - effects and control measures of air pollution, water pollution,soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards, solid waste management, the role of an individual in prevention of pollution. **(6 Hours)**

UNIT IV: SOCIAL ISSUES AND THE ENVIRONMENTS

From unsustainable to sustainable development - urban problems related to energy water conservation, rainwater harvesting, watershed management, resettlement and rehabilitation of people, its problem and concerns, case studies, environmental ethics, climate change, global warming, acid rain and ozone layer depletion, nuclear accidents and holocaust, case studies. wasteland reclamation. environmental protection act, air act, water act and wildlife protection. **(6 Hours)**

UNIT V: BIODIVERSITY IN THENI DISTRICT

Water resources, climate and soil types - Ecosystems: flora and fauna, the impact of human activities on the ecosystem - environmental pollution: identification of pollution sources and pollution control measures.

(6 Hours)

FIELDWORK

Visit to Kodaikanal for documentation of environmental assets- river/forest/ grassland/hill/mountain/cholas. **(6 Hours)**

COURSE BOOK:

- Murugeshan, R., (2007). Environmental Science and Engineering, Milleniumpublication, Madurai.

UNIT I : Section - 1.3 to 1.37

UNIT II : Section - 2.1 to 2.7 & 2.10 to 2.27

UNIT III : Section - 3.1 to 3.37

UNIT IV : Section - 4.1 to 4.17

UNIT V :

https://en.wikipedia.org/wiki/Theni_district

https://nwm.gov.in/sites/default/files/Notes%20on%20Theni%20District_.pdf

https://tnmines.tn.gov.in/pdf/dsr/23.pdf

Note:

(i) Tamil Version for Tamil Literature and History Tamil Medium Students

(ii) UNIT-V materials prepared by Staff

Continuous Internal Assessment Component (CIA)

Theory:

Component	**Marks**
Internal test I	40
Internal test II	40
Field Visit	10
Field Visit Report	5
Attendance	5
Total	**100**

Continuous Internal Assessment Component (CIA)

Passing Minimum: 40% out of 100

Internal Question Pattern

Part - A

10 Questions × 1Mark =10 Marks

Part - B

2 Questions × 5 Marks = 10 Marks (Internal Choice)

Part - C

2 Questions × 10 Marks = 20 Marks (2 Questions out of 3)

(Open Choice and at least one Question from

பொதுத் தமிழ் - 4

(பிற துறை மாணவிகளுக்கு மட்டும்)

பருவம்: நான்கு **நேரம்: 6**

குறியீடு: 23GT4GS04 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	சங்க இலக்கியத்தில் காணப் பெறும் வாழ்வியல் சிந்தனைகளை அறிந்து கொள்வர்.	PSO-2	K1
CO - 2	தமிழின் தொன்மையையும் செம்மொழித் தகுதியையும் அறிவர்.	PSO-1	K2
CO - 3	நாடக இலக்கியம் மூலம் நடிப்பாற்றலையும், கலைத் தன்மையையும், படைப்பாற்றலையும் வளர்த்தல்.	PSO-3	K3
CO - 4	தமிழிலிருந்து அலுவலகக் கடிதங்களை மொழிபெயர்க்கும் அறிவைப் பெறுவர்.	PSO-4	K4
CO - 5	மொழியறிவோடு வேலை வாய்ப்பினைப் பெறுதல்.	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				பொதுத்தமிழ் - 4 (பிற துறை மாணவிகளுக்கு மட்டும்)							**Hours: 6**
Code : 23GT4GS04											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	3	3	4	5	5	3	5	3	4	4	3.91
CO - 2	4	5	3	3	3	3	5	3	3	4	3	3.55
CO - 3	3	3	5	4	4	4	3	4	5	3	4	3.82
CO- 4	5	3	3	3	4	4	3	4	3	5	3	3.64
CO - 5	3	3	3	5	4	4	3	4	3	3	5	3.64
Overall Mean Score												**3.71**

Result: The score for this course is **3.71** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

அலகு 1: எட்டுத் தொகை

நற்றிணை - (10, 14, 16), குறுந்தொகை - (16, 17, 19, 20, 25, 29), கலித்தொகை - (38, 51), அகநானூறு - (15, 33, 55), புறநானூறு - (37, 86, 112), பரிபாடல் - வையை, இருபத்திரண்டாம் பாடல், ஒளிறுவாள் பொருப்பன் உடல் சமத் திறுத்த) **18 Hours**

அலகு 2: பத்துப் பாட்டு

நெடுநல்வாடை - நக்கீரர் **18 Hours**

அலகு 3: நாடகம்

சபாபதி - பம்மல் சம்பந்த முதலியார் **18 Hours**

அலகு 4: இலக்கிய வரலாறு

பாடம் தழுவிய இலக்கிய வரலாறு **18 Hours**

அலகு 5: மொழித்திறன்

மொழிபெயர்ப்பு / கலைச்சொற்கள்

கொடுக்கப்பட்டுள்ள ஆங்கிலப் பகுதியைத் தமிழில் மொழிபெயர்த்தல்.

அலுவலகக் கடிதம் - தமிழில் மொழிபெயர்த்தல். **18 Hours**

பாட நூல்கள்

1. தமிழ்த்துறை வெளியீடு (தொகுப்பு), - பொதுத்தமிழ் - 4, ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி (தன்னாட்சி), பெரியகுளம்.
2. சங்க இலக்கியம், எட்டுத்தொகை, - எம். நாராயண வேலுப்பிள்ளை, நர்மதா பதிப்பகம், முதற்பதிப்பு -2011.
3. பத்துப் பாட்டு, மூலமும் உரையும், - திருநெல்வேலி தென்னிந்திய சைவ சிந்தாந்த நூற்பதிப்புக் கழகம், சென்னை 18, முதற்பதிப்பு - 2007.
4. பம்மல் சம்பந்த முதலியார் அவர்களின் சபாபதி நாடகம், அருட்பெருஞ்சோதி அச்சகம், சென்னை -1.
5. சிற்பி. பாலசுப்பிரமணியன். - தமிழ் இலக்கிய வரலாறு,

பார்வை நூல்கள்

1. புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, தமிழண்ணல்.
2. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, எ.ஃப். பாக்கியமேரி.

General Essay, Translation and Letter Writing, Alankar

Semester: IV **Hours: 5**

Code : 23GH4GS04 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Learn the Development of Hindi Translation	PSO-1	K1
CO - 2	Learning to be United Across Religions.	PSO-4	K2
CO - 3	Improve Personal and Official letter writing skills.	PSO-2	K3
CO - 4	Analytical Creativity will be Developed.	PSO-3	K4
CO - 5	Ability to Beautiful words with Syllables and Phrases.	PSO-5	K5

UNIT I **(15 Hours)**

- ❖ Anushashan
- ❖ Anuvad Abyas - III (1-2 Lessons) English to Hindi, Hindi to English
- ❖ Avedan Patra

UNIT II **(15 Hours)**

- ❖ Pariksham Ka Mahatva
- ❖ Anuvad Abyas - III (3-4 Lessons) English to Hindi, Hindi to English
- ❖ Sampathak ke naam Patra

UNIT III **(15 Hours)**

- ❖ Paropakar
- ❖ Anuvad Abyas - III (5 Lessons) English to Hindi, Hindi to English
- ❖ Ras Short Notes -(Shringar, Hasya, Veer, Karun, Raudra)

UNIT IV **(15 Hours)**

- ❖ Bhavaathmak Ekta
- ❖ Paarivarik Patra
- ❖ Chand Short Notes - (Doha, Sorta, Geethika, Rola, Hari Geethika)

UNIT V **(15 Hours)**

- ❖ Nari Ka Karthavya Aur Adhikaar
- ❖ Thuranth Patra
- ❖ Alankar -(Anupras, Yamak, Vakrokthi, Upama, Virodabhas)

COURSE BOOKS:

1. Nibandh Praveshika, Dakshina Bhaaratha Hindi Prachar Sabha, T. Nagar, Chennai-600017.

The follo wing Sahityotar (General) essay have been prescribed

- ❖ Anushashan
- ❖ Pariksham Ka Mahatva
- ❖ Paropkar
- ❖ Bhavathmak Ekta
- ❖ Nari Ka Karthavya Aur Adhikaar

2. Translation: Anuvad Abyas -III(1-5 Lessons) English to Hindi, Hindi to English Published by Dakshina Bharath Hindi Prachar Sabha, Thyagaraya Nagar, Chennai - 600017.
3. Alankar: Kavya Shashthra Published by Dakshina Bharath Hindi Prachar Sabha, Thyagaraya Nagar, Chennai - 600 017.

The following Alankar have been prescribed

- ❖ Ras- Short Notes -(Shringar, Hasya, Veer, Karun, Raudra
- ❖ Alankar -(Anupras, Yamak, Vakrokthi, Upama, Virodabhas)
- ❖ Chand Short Notes - (Doha, Sorta, Geethika, Rola, Hari Geethika

BOOKS FOR REFERENCE:

1. Letter Writing: Pramanik Alekan Aur Tippan Prof Viraj M.A. Kashmirgate, Delhi - 110006

The following topics have been prescribed

- ❖ Paarivarik Patra
- ❖ Avedan Patra
- ❖ Sampathak ke naam Patra
- ❖ Thuranth Patra

COMMUNICATIVE ENGLISH - IV

Semester: IV **Hours: 4**

Code : 23GE4GS04 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognize the literary genres through various literary works	PSO-5	K1
CO - 2	Compare the social norms of other cultures	PSO-3	K2
CO - 3	Apply the language skills through literature	PSO-2	K3
CO - 4	Connect the ideas provided in the text	PSO-4	K4
CO - 5	Prioritize their communication skills along with literature	PSO-1	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**COMMUNICATIVE ENGLISH - IV**							**Hours: 4**
Code : 23GE4GS04											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	5	4	4	4	5	4	4	4	4	5	4.27
CO - 2	3	3	5	4	3	3	3	4	5	3	3	3.55
CO - 3	4	3	3	5	3	3	4	5	3	3	3	3.55
CO - 4	4	4	3	4	5	4	4	4	3	5	4	4.00
CO - 5	5	4	4	4	3	4	5	4	4	3	4	4.00
Overall Mean Score												**3.87**

Result: The score for this course is **3.87** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: POETRY **12 Hours**

Dahlia Ravikovitch - "Pride"

Maya Angelou - "Phenomenal Woman"

William Wordsworth - " The Tables Turned"

UNIT II: LIFE STORY **12 Hours**

Adeline Yen Mah - From *Chinese Cinderella*

George Orwell - "Why I Write"

UNIT III: SHORT STORY **12 Hours**

O Henry - "A Retrieved Reformation"

Extract from a play

The Quality of Mercy (Trial Scene from *The Merchant of Venice* -

Shakespeare: Act IV- Scene 1-(1 to 163 lines)

UNIT IV: GRAMMAR **12 Hours**

Types of Sentences

Question Tags

UNIT V: DRAFTING **12 Hours**

Reading Comprehension

Book Review

Product Review

Resume Writing

COURSE BOOKS

- Course Materials will be provided by the Department of English.
- Savarimuttu, Rohan J. S, and G. Petricia Alphine Nirmala, *English Grammar and Usage - An Ideal Companion for Advanced Learners*. New Century Book House (P) Ltd, 2016.

BOOKS FOR REFERENCE

1. Orwell, George. *Why I Write.* Gangrel-GB, London, 1946.
2. Green, David. *Contemporary English Grammar: Structures and Composition*. Macmillan India Limited, Chennai, 1981.
3. Shakespeare, William. *The Merchant of Venice*, Peacock. 2014.

WEB SOURCES:

1. https://www.google.co.in/books/edition/Chinese-Cinderella-and-the-Secret-Drag on/JUqCzR5GTdQC?hl=en&gbpv=1&pg=PT3&printsec=frontcover
2. https://orwell.ru/library/essays/wiw/english/e-wiw
3. https://srjcstaff.santarosa.edu/~mheydon/whywriteD.pdf(correct
4. http://www.blupete.com/Literature/Essays/Hazlitt/RoundTable/LoveLife.htm
5. https://www.poetryinternational.com/en/poets-poems/poems/poem/103-3359-PRIDE

ANIMAL PHYSIOLOGY

Semester: IV **Hours: 6**

Code : 23ZO4MC07 **Credit: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the principles and basic facts of Animal Physiology.	PSO - 1	K1
CO - 2	Explain the anatomical structures of different organs.	PSO - 2	K2
CO - 3	Illustrate the physiology of different organs and their disorders.	PSO - 3	K3
CO - 4	Analyze the application of physiological concepts in real life scenarios.	PSO - 4	K4
CO - 5	Evaluate the significance of specific organ functions in maintaining homeostasis and considering their role in health.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**ANIMAL PHYSIOLOGY**								**Hours: 6**
Code : 23ZO4MC07												**Credit: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	4	3	3	5	3	2	4	3	3.36
CO - 2	2	3	3	4	5	3	2	5	3	4	3	3.36
CO - 3	2	4	5	4	4	4	2	4	5	4	4	3.82
CO - 4	2	4	3	5	4	4	2	4	3	5	4	3.64
CO - 5	2	5	3	4	4	5	2	4	3	4	5	3.73
Overall Mean Score												**3.58**

Result: The Score for this Course is **3.58** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Nutrition and Respiration: Nutrition - types of nutrition found among organisms, kinds of digestion, structure of human digestive tract, digestion and absorption of carbohydrates, proteins and lipids, hormonal control of digestion. Respiration - kinds of respiration, structure of respiratory organ in man, respiratory pigments, transportation of respiratory gases, regulation of respiration, respiratory disorders - Bronchitis, Asthma, Hypoxia, Hypercapnia. **(18 Hours)**

UNIT II

Circulation and Excretion: Circulation - composition of blood, mechanism of clotting, types of hearts, structure of human heart, pace maker, cardiac cycle, blood pressure, ECG, bradycardia, tachycardia. Excretion - structure of kidney, nephron, mechanism of urine formation, excretory products, dialysis, nephritis and blood urea. **(18 Hours)**

UNIT III

Muscle and Nerve Physiology: Muscle - types, ultra structure of striated muscle, mechanism of muscle contraction, physico chemical changes during muscular contraction, tetanus, fatigue. Nerve - neuron structure and types, conduction of impulse through nerve fibre, synapse and neuromuscular junction, reflex action, Neural disorders - Epilepsy, Alzheimer's disease, Parkinson's disease. **(18 Hours)**

UNIT IV

Sense organs: Eye - structure of eye, physiology of vision, visual elements and pigments, photo chemistry of vision, eye defects - myopia, hyperopia, presbyopia, astigmatism, cataract, night blindness and colour blindness. Ear - structure of ear and mechanism of hearing, hearing impairements - deafness and labyrinthine disease. Olfactory, Gustatory and Lateral line sense organs. **(18 Hours)**

UNIT V

Endocrinology and Regulatory Physiology: Endocrine glands in man - hormones, action and disorders of pituitary, thyroid, adrenal, islets of langerhans, testis and ovary. Osmoregulation in fishes, mechanism of thermoregulation. **(18 Hours)**

COURSE BOOK:

1. Arumugam N and Mariakuttikan A, Animal Physiology, 12th edition, Saras Publication, Nagercoil, 2019.

UNIT	BOOK	CHAPTERS
I	1	10-30, 39, 73, 74, 81-87, 149, 152-154.
II	1	159, 162, 164, 167, 173, 176, 179, 180, 183, 184, 190, 197, 198, 203, 204, 206, 309.
III	1	260-267, 269, 277, 278, 280, 284, 286.
IV	1	271, 272, 275, 276.
V	1	210-222, 224-230, 233 - 239, 240 - 243, 244, 245, 246 - 248, 323, 325, 326, 328 - 333.

BOOKS FOR REFERENCE:

1. Eckert and Randall Animal Physiology Mechanism and Adaptations, 2nd edition, CBS Publishers and Distributors, New Delhi, 2000.
2. Rastogi S.C, Essentials of Animal Physiology, 4th Edition, New Age International (P) Limited, Publishers, New Delhi, 2007.
3. Nagabhushanam R., Kodarkar M. S and Sarojini R., Text Book of Animal physiology, 2nd edition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 2002.
4. Goyal Sastry, Animal physiology, 6th edition, Rakesh Kumar Rastogi for Rastogi Publications, Meerut, India, 2014.
5. Ladd Prosser C, Comparative Animal Physiology, 3rd edition, Satish Book Enterprise Book Sellers and Publishers, Agra, 1992.
6. Knut Schmidt-Nielson, Animal Physiology (Adaptation and environment), 5th edition, Cambridge university Press, New Delhi, 1997.
7. Sobit R.C., Animal physiology, Narosa Publishing house, New Delhi, 2008.
8. Dee Unglaub Silverthorn, Human physiology an integrated approach, 5th Edition, Published by Pearson Education, 2010.
9. Biswas P.K., Hand book of Animal Physiology, Agrotech Press, New Delhi, 2013.
10. Verma P.S, Tyagi B.S., Agarwal V.K., Animal Physiology. S. Chand & Company Ltd., New Delhi, 2002.

ANIMAL PHYSIOLOGY - LAB

Semester: IV **Hours: 3**

Code : 23ZO4CP03 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Examine the oxygen consumption in fish.	PSO - 2	K1
CO - 2	Identify the nitrogenous excretory products in animal and qualitatively analyze the albumin, bile salt, bile pigment, sugar and ketone bodies in urine.	PSO - 5	K2
CO - 3	Prepare haemin crystals.	PSO - 4	K3
CO - 4	Analyze the effect of temperature on opercular movement in fish.	PSO - 1	K4
CO - 5	Estimate the blood pressure and hemoglobin content in human.	PSO - 3	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**ANIMAL PHYSIOLOGY - LAB**							**Hours: 3**
Code : 23ZO4CP03											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	2	3	4	5	2	3	5	3	4	2	3.27
CO - 2	2	5	4	4	4	5	2	4	4	4	5	3.91
CO - 3	2	3	3	5	4	3	2	4	3	5	3	3.36
CO - 4	5	2	2	4	4	2	5	4	2	4	2	3.27
CO - 5	2	4	5	3	4	4	2	4	5	3	4	3.64
Overall Mean Score												**3.49**

Result: The Score for this Course is **3.49** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

1. Estimation of oxygen consumption in fish.
2. Identification of nitrogenous waste - ammonia, urea and uric acid.
3. Determination of opercular movement in fish in relation to temperature.
4. Estimation of blood pressure.
5. Preparation of haemin crystals.
6. Estimation of hemoglobin in human.
7. Qualitative analysis of albumin, bile salt, bile pigment, sugar and ketone bodies in the urine.

Spotters: Haemoglobinometer, Sphygmomanometer, Electrocardiogram, Striated muscle, non-striated muscle, cardiac muscle, neuron, nephron.

GENERAL BOTANY - II

Semester: IV **Hours: 3**

Code : 23BO4AC4A **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Remember the economic significance of various plants in agriculture and horticulture	PSO - 1	K1
CO - 2	Understand the plant physiology, morphology and classification systems	PSO - 2	K2
CO - 3	Apply the knowledge of taxonomy, physiology, horticulture and applied botany	PSO - 4	K3
CO - 4	Analyze the horticultural practices for economic improvement	PSO - 3	K4
CO - 5	Evaluate the practical skills in taxonomy, propagation and economically value of plants	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				GENERAL BOTANY - II							Hours: 3
Code : 23BO4AC4A											Credit: 3
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)				Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	4	2	3	3	4	5	3	2	3	4	3.45
CO - 2	4	3	3	4	5	3	4	5	3	4	3	3.73
CO - 3	4	4	4	5	3	4	4	3	4	5	4	4.00
CO - 4	3	3	5	3	2	3	3	2	5	3	3	3.18
CO - 5	2	5	4	3	3	5	2	3	4	3	5	3.55
Overall Mean Score												3.58

Result: The Score for this Course is **3.58** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Taxonomy: Introduction and scope of Plant Taxonomy. Outlines of Bentham and Hooker's system of classification, merits and demerits. distinguishing characters, distribution, vegetative characters and floral characters and one example of the following families with economic importance. Annonaceae - (*Annona squamosa)*, Rutaceae - (*Murraya koenigii)*, Asclepiadaceae - (*Calotropis gigantea)*, Euphorbiaceae - (*Euphorbia heterophylla)* and Poaceae - (*Oryza sativa)*. **(9 Hours)**

UNIT II

Plant Physiology: Transpiration - types of transpiration, structure and functions of stomata, mechanism of opening and closing, stomatal transpiration, transpiration as a necessary evil, factors affecting transpiration - internal and external factors, anti transpirants and significance of transpiration. Photosynthesis - light reaction. photoperiodism - short day plants, long day plants, day neutral plants and significance of photoperiodism. **(9 Hours)**

UNIT III

Horticulture: Introduction to horticulture, Propagation - definition, methods of vegetative propagation. Cuttage - root, stem, leaf and leaf bud cutting. Layerage - ground and air layering. Graftage - methods of grafting - approach, whip, cleft and top grafting. Planning and layout - orchards and kitchen garden. Indoor gardening - hanging baskets. Storage of fruits - methods of storage. **(9 Hours)**

UNIT IV

Economic Botany: Detailed study on the botanical name, morphology of the useful parts and uses of Cereal (Sorghum), Pulse (Black gram), Fruit (Pineapple), Beverage (Coffee seed), Fiber (Cotton), Latex (Rubber) and Essential oil (Castor seed). **(9 Hours)**

UNIT V

Applied Botany: Mushroom cultivation - nutritive value, importance, storage and cultivation of oyster mushroom. Biopesticides - Neem. Biodiesel - Jatropha. Taxonomy, morphology of useful parts, chemical composition and medicinal value of Acanthaceae (*Adhatoda vasica)*, Liliaceae (*Ocimum sanctum)*, Lamiaceae and Apocynaceae *(Vinca rosea).* **(9 Hours)**

COURSE BOOKS:

1. Anne Ragland, Kumaresan. V and Arumugam. N. A Textbook of Botany Volume - III, Saras Publication, Nagercoil, 2015.
2. Anne Ragland, A Text book of Botany 1st Edition, Saras Publication, Nagercoil, 2000.

UNIT	BOOK	PAGE NUMBERS
I	1	1, 91-106, 132-146, 163-168
II	2	26-38, 64-73, 139-147
III	2	305-347
IV	2	1-34
V	2	82-91, 190-197 & Weblink

BOOKS FOR REFERENCE:

1. Samuel, B.J. Taxonomy of Angiosperms, S. Chand & Co. Ltd, 2013.
2. Annie Ragland, Rajakumar. K, Jayakumar. M and Rajarathinam K. Plant Physiology. Saras Publication, Nagercoil, 2011.
3. Pandy, H. P. Plant Taxonomy, Silver line Publications. New Delhi, 2009.
4. Sathish Kumar Mehla, Biofuel plants cultivation practices and seed bank, Pointer Publishers, Jaipur, 2007.
5. Suresh Kumar, Economic Botany, Campus book, International, New Delhi, 2006.
6. Trivedi, P. C. Applied Botany, Aavishkar Publishers, Jaipur, 2005.

NURSERY, GARDENING AND FLORICULTURE

Semester: IV **Hours: 3**

Code : 23BO4AC4B **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Remember the fundamentals of nursery management, planning and seasonal activities	PSO - 1	K1
CO - 2	Understand the principles of gardening, landscape, home and park design	PSO - 2	K2
CO - 3	Apply the knowledge of horticulture and aspire for economic improvement	PSO - 4	K3
CO - 4	Analyze the diversity of floriculture and different types of gardens	PSO - 3	K4
CO - 5	Evaluate the use of technology in landscaping and horticultural practices	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV			**NURSERY, GARDENING AND FLORICULTURE**						**Hours: 3**			
Code : 23BO4AC4B												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	4	3	5	4	3	3	3	3.55
CO - 2	3	3	3	4	5	3	3	5	3	4	3	3.55
CO - 3	4	3	4	5	4	3	4	4	4	5	3	3.91
CO - 4	3	4	5	4	4	4	3	4	5	4	4	4.00
CO - 5	3	5	3	2	3	5	3	3	3	2	5	3.36
Overall Mean Score												**3.67**

Result: The Score for this Course is **3.67** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Nursery: Definition, objectives, scope and building up of infrastructure for nursery. Planning and seasonal activities - planning, direct seedling and transplants. Nursery management and routine garden operations. **(9 Hours)**

UNIT II

Gardening: Definition, objectives and scope - different types of gardening. Landscape and home gardening - parks and its components, plant materials and design. Computer applications in landscaping. Gardening operations - soil laying, manuring and watering. Some famous gardens of India. **(9 Hours)**

UNIT III

Horticulture: Special features, divisions**,** importance and scope of horticulture, classification of horticultural crops, fruits and vegetables. Use of plant growth regulators in horticulture. Induction of rooting, flowering, fruit set, fruit development and control of fruit crops. **(9 Hours)**

UNIT IV

Propagation Method: Sexual Propagation - Seed Propagation method. Vegetative Propagation - Cutting, layering, budding and grafting. Stock- Scion relationship in important horticultural crops. Micropropagation - Stages of micropropagation, callus, shoot and root formation, factors affecting and applications of micropropagation. **(9 Hours)**

UNIT V

Floriculture: A brief knowledge of annual, biennials and perennials with reference to ornamental gardens. Types of gardens - formal garden, informal garden, kitchen garden, water garden and terrace garden. Green house, Landscape, Terrarium, Rockery plants, Bonsai techniques and Hydroponics.

(9 Hours)

COURSE BOOK:

1. Anne Ragland, Kumaresan, V. Arumugam, N. A Textbook of Botany Volume - III Saras Publication, Nagercoil, 2015.

BOOKS FOR REFERENCE:

1. Bose, T. K and Mukherjee, D, Gardening in India, Oxford & IBH Publishing C. Ltd., New Delhi,1972.
2. Sandhu, M. K. Plant Propagation, Wile Eastern LTD., Bangalore, Madras, 1989.
3. Kumar, N. Introduction to Horticulture, Rajalakshmi Publications, Nagercoil, 1997.
4. Randhawa, G. S. & Mukhopadhyay, A. Floriculture in India. Allied Publishers, 1986.
5. Janick Jules. Horticultural Science. 3rd edition, W.H. Freeman and Co., San Francisco, USA, 1979.
6. Edmond Musser and Andres, Fundamentals of Horticulture, McGraw Hill Book Co., New Delhi.

GENERAL BOTANY - II - LAB

Semester: IV **Hours: 2**

Code : 23BO4AP4A **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Remember and name the floral parts of different plant species	PSO - 1	K1
CO - 2	Identify and classify plants based on specific characters	PSO - 5	K2
CO - 3	Explain the purposes and applications of different layerage and graftage method	PSO - 2	K3
CO - 4	Analyze the plant physiology and interpret the mechanism	PSO - 4	K4
CO - 5	Evaluate the herbarium prreparation of few medicinal plants and preserve plant specimens	PSO - 3	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				GENERAL BOTANY -II - LAB								Hours: 2
Code : 23BO4AP4A												Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	4	3	3	3	4	5	3	3	3	4	3.64
CO - 2	2	5	3	3	4	5	2	4	3	3	5	3.55
CO - 3	3	4	3	2	5	4	3	5	3	2	4	3.45
CO - 4	3	3	4	5	3	3	3	3	4	5	3	3.55
CO - 5	3	4	5	3	3	4	3	3	5	3	4	3.64
Overall Mean Score												3.57

Result: The Score for this Course is **3.57** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

SECTIONING AND MOUNTING THE FLORAL PARTS OF

- Asclepiadaceae - *Calotropis gigantea*
- Euphorbiaceae - *Euphorbia heterophylla*

DEMONSTRATION OF PHYSIOLOGICAL SETUP

- Evolution of oxygen during photosynthesis
- Transpiration - Ganong's photometer experiment
- Light Screen Experiment

SPOTTERS

- Sorghum
- Black gram
- Pineapple
- Coffee
- Cotton
- Rubber
- Castor Seed

CHARTS

- Layerage
    1. Simple layering
    2. Compound layering
    3. Mound layering
    4. Trench layering
    5. Air layering
- Graftage
    1. Whip or Tongue grafting
    2. Top grafting or Crown grafting
    3. Cleft grafting

Herbarium submission - 15 Medicinal plants

NURSERY, GARDENING AND FLORICULTURE - LAB

Semester: IV **Hours: 2**

Code : 23BO4AP4B **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Remember the essential elements for building plant nursery	PSO - 2	K1
CO - 2	Understand the principles of nursery management and routine garden operations	PSO - 4	K2
CO - 3	Apply the knowledge of plant habitat to enhance horticultural crop production	PSO - 1	K3
CO - 4	Analyze the success and challenges of designing and maintaining various garden	PSO - 3	K4
CO - 5	Evaluate the knowledge to develop new and improved propagation techniques	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV			**NURSERY, GARDENING AND FLORICULTURE - LAB**						**Hours: 2**			
Code : 23BO4AP4B												**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	3	3	5	4	4	5	3	3	4	3.82
CO - 2	4	3	2	5	4	3	4	4	2	5	3	3.55
CO - 3	5	4	3	4	2	4	5	2	3	4	4	3.64
CO - 4	3	4	5	4	3	4	3	3	5	4	4	3.82
CO - 5	3	5	4	3	3	5	3	3	4	3	5	3.73
Overall Mean Score												**3.71**

Result: The Score for this Course is **3.71** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

1. Tools, implements and containers used for propagation and nursery techniques.
2. Propagation by cutting and layering.
3. Identification and description of annuals, herbaceous perennials, climber, creepers, foliage and flowering shrubs, trees, palms, ferns, ornamental grasses, cacti and succulents.
4. Planning and designing of gardens.
5. Identification of commercially important flower crops and their varieties.
6. Visit the commercial nurseries and commercial tissue culture laboratory.

STREAM C - OFFICE FUNDAMENTALS

Semester: IV **Hours: 3**

Code : 23SE4OA4C **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Bridge the fundamental concepts of computers with the present level knowledge of the students	PSO-2	K1
CO - 2	Clue up on the use of options in Word, and use of PowerPoint options to prepare pages and slide shows	PSO-3	K2
CO - 3	Develop the analytical mind for critical and logical thinking to apply mathematical foundations in Excel sheets	PSO-1	K3
CO - 4	Realize the need of computer word option to write dissertation, projects, thesis and blogs	PSO-5	K4
CO - 5	Appraise the use of Online Communication and Collaboration	PSO-4	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**OFFICE FUNDAMENTALS**							**Hours: 3**
Code : 23SE4OA4C											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of Cos**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO-1	3	4	2	5	2	4	3	5	2	2	4	3.27
CO-2	3	4	5	2	2	4	3	2	5	2	4	3.27
CO-3	5	3	2	2	4	3	5	2	2	4	3	3.18
CO-4	4	5	2	2	4	5	4	2	2	4	5	3.55
CO-5	4	4	2	2	5	4	4	2	2	5	4	3.45
Overall Mean Score												**3.35**

Result: The score for this course is **3.35** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I **9 Hours**

Starting MS - Word, Text creation and manipulation

Page setup (Applying page numbers, Header and Footer, Orientation, Drop cap)

UNIT II **9 Hours**

Starting MS- Power point and creating a new presentation

Applying layouts to slides, transition and animations to slides

UNIT III **9 Hours**

Creating Excel sheet for students' marks

Sorting and filtering the data

Applying the statistical functions: maximum, minimum, result

Applying the mathematical functions: total, average, round

Creating the charts: Columns, Line, Pie, Bar

UNIT IV **9 Hours**

E-Mail

Mail merge

UNIT V **9 Hours**

Blog

Social Media (Face book, X, Instagram)

Google meet

Google Drive

BOOKS FOR REFERENCE:

1. ''Comdex 9-in-1 DTP Course Kit'', Vikas Gupta, Dreamtech Press, 2011.
2. ''Comdex 14- in -1 computer course Kit'':\ Vikas Gupta, Dreamtech Press, 2011.
3. Sinha, P.K. & Sinha, Priti, *Computer Fundamentals*. BPB, 2020.

GE 2 - FOOD, NUTRITION AND HEALTH

Semester: IV **Hours: 2**

Code : 23ZO4GE02 **Credit: 2**

COURSE OUTCOMES:

CO. NO	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define key terms related to food, nutrition, and health	PSO - 1	K1
CO - 2	Explain the relationship between dietary choices and overall health	PSO - 3	K2
CO - 3	Analyze a given diet plan for its nutritional content and recommend improvements	PSO - 2	K3
CO - 4	Assess the impact of cultural and social factors on dietary habits	PSO - 5	K4
CO - 5	Construct popular diets in terms of their effectiveness and potential health risks	PSO - 4	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV							**FOOD, NUTRITION AND HEALTH**					**Hours: 2**
Code : 23ZO4GE02												**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	4	3	3	2	5	3	4	3	2	3.27
CO - 2	4	2	5	3	4	2	4	4	5	3	2	3.45
CO - 3	4	3	4	2	5	3	4	5	4	2	3	3.55
CO - 4	4	5	3	4	2	5	4	2	3	4	5	3.73
CO - 5	4	2	4	5	3	2	4	3	4	5	2	3.45
Overall Mean Score												**3.49**

Result: The Score for this Course is **3.49** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Macronutrients and Micronutrients: Basic concepts of Food - components and nutrients. Macronutrients- definition, dietary source and functions of carbohydrates, lipids and proteins. Vitamins - sources and importance of water soluble and fat-soluble vitamins. Importance of water and minerals. **(6 Hours**)

UNIT II

Nutrition and dietary requirements: Concept of balanced diet, nutrient requirements and dietary pattern for different groups - pregnant and nursing mothers, infants, school children, adolescents and old age people. **(6 Hours)**

UNIT III

Malnutrition and nutrient deficiency diseases: Definition and concept of health, symptoms, treatment and prevention of common nutritional deficiency diseases - protein malnutrition (e.g., Kwashiorkor and Marasmus), vitamin A & D deficiency, iron deficiency and iodine deficiency**.** **(6 Hours)**

UNIT IV

Diseases and control measures: Life style dependent diseases- causes and prevention of anemia, hypertension, diabetes mellitus, obesity, stroke, heart attack and atherosclerosis. **(6 Hours)**

UNIT V

Food and waterborne diseases: Food borne infections - transmission, causative agent, sources of infection, symptoms and prevention of salmonellosis, shigella, botulism. Water-borne infections - transmission, causative agent, sources of infection, symptoms and prevention of typhoid, cholera, amoebiasis. **(6Hours)**

BOOKS FOR STUDY:

1. Santhi V and Jemima Florence Borgia V. Food and Nutrition, 2007.
2. Arumugam N, Animal Physiology. Saras Publications, ARP Camp Road, Kottar, Nagercoil, Kanyakumari Dt, 2005.

UNIT	BOOK	CHAPTER
I	2	4,6,9
II	2	31,38
III	2	10,13,40,41,42,59
IV	2	43,44,109
V	2	81,96

BOOKS FOR REFERENCE:

1. Arumugam N, Animal Physiology. Saras Publications, ARP Camp Road, Kottar, Nagercoil, Kanyakumari Dt, 2005
2. Gitanjali Chaterjee. Hand Book of Food and Nutrition. Rajat Publication, 2000
3. Jyoti S. Sharma., Applied Nutrition and Food Science. Akansha Publication, 2009
4. Shakuntala Mary N. and Shadaksharaswamy M., Food's facts and Principles. New Age International (P) Limited Publishers, 2000
5. Sri Lakshmi, Dietetics. New Age International (P) Limited publishers., 2005
6. Stryer, L. Biochemistry. W. H. Freeman and Company, New York, 1988

GE-2: ORGANIZATION AND HEALTH PROGRAMME IN NCC

Semester: IV **Hours: 2**

Code : 23GE4NC02 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the history, honors and awards of Indian Military.	PSO - 1,PSO - 2, PSO - 4	K1
CO - 2	Explain the map and weapon training to remove the fear of a weapon from the hearts of youth.	PSO - 1, PSO - 4	K2
CO - 3	Illustrate the different types of disasters under different circumstances.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K3
CO - 4	Analyze the practical knowledge in community development and other social programs.	PSO - 4, PSO - 5	K4
CO - 5	Assess the personality development and develop technical skill of first Aid.	PSO - 1, PSO - 2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				GE-2:ORGANIZATION AND HEALTH PROGRAMME IN NCC							Hours: 2
Code : 23GE4NC02											Credits: 2
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	4	4	2	2	2	4	5	3	3	5	3.55
CO - 2	4	4	4	2	3	2	4	4	4	4	5	3.64
CO - 3	5	4	3	2	2	3	3	3	5	3	2	3.18
CO - 4	5	5	4	3	2	3	5	5	4	5	3	4.00
CO - 5	4	3	3	3	2	2	4	4	5	5	4	3.55
Overall Mean Score												3.58

Result: The Score for this Course is **3.58** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

GE-2: ORGANIZATION AND HEALTH PROGRAMME IN NCC

2hrs/Week

UNIT I: Indian Military and NCC Organization **6 Hours**

History of Indian Military - Paramilitary forces -BSF- CRPF and CISF - NCC Organization and History- Aims and Objectives of NCC - Motto of NCC - DG's Four Cardinal Principles of NCC- NCC Song- Ranks in Army, Air force and Navy - Certificate Examination in NCC- Honors and Awards.

UNIT II: Map Reading **6 Hours**

Map and its features - kinds of north - Service protractor and Compass-bearing - Conversion of bearings - Conventional signs - Setting of map - Finding own position - Map to ground - Ground to map - Night March chart.

UNIT III: Hygiene and Sanitation **6 Hours**

Personal Hygiene - Sanitation - Methods of purification of drinking water -Latrine types - Urinal Types.

UNIT IV: Types Of Disease and Pollution **6 Hours**

Define Health - Types of Health - Communicable and Non communicable Disease - Pollution and its type.

UNIT V: First Aid **6 Hours**

Aims of First Aid - Principle of First Aid - Motto of First Aid - List of items in First aid Box - Types of Bandages - Types of Fracture -Dislocation - Types of Wounds - Burns and Scalds - Sprain - Strain - Asphyxia - Drowning - Poison - Shock - Snake bite - Sun and Heat Stroke - Insect bite - Dog bite - Hanging - Artificial Respiration - Haemorrhage.

BOOKS FOR REFERENCES:

- Mishra R.C., A Handbook of NCC, Kanti Prakashan, Etawah, 2000.

ABILITY ENHANCEMENT COURSE-4 (AEC-4)

CAPACITY BUILDING

Semester: IV **Hours: 1**

Code : 23AE4CB04 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the importance of capacity building	PSO-1	K1
CO - 2	Develop skills for life-long learning	PSO-2,4	K2
CO - 3	Asses the importance of organizational development	PSO-3	K3
CO - 4	Analyze the need of the community togetherness	PSO-4	K4
CO - 5	Evaluate tech-based learning experiences.	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**CAPACITY BUILDING**							**Hours: 1**
Code : 23AE4CB04											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of COs**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO -1	3	5	3	3	3	3	3	4	5	3	4	3.54
CO - 2	4	5	4	3	3	4	3	4	4	3	5	3.81
CO - 3	4	4	3	3	5	4	3	4	3	3	5	3.72
CO - 4	3	4	3	4	3	4	3	3	5	3	5	3.63
CO - 5	4	4	3	3	4	4	3	4	5	4	5	3.90
Overall Mean Score												**3.72**

Result: score for this course is **3.72** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Introduction to Capacity Building **(3 Hours)**

UNIT II

Skills Development -essential skills-communication-problem solving-life long learning **(3 Hours)**

UNIT III

Organizational Strengthening-strategic planning-Team Building-Case Studies **(3 Hours)**

UNIT IV

Community Empowerment- Grassroots Initiatives **(3 Hours)**

UNIT V

Technology and Innovation-tech enabled learning-Innovation in capacity Building-Future Trends **(3 Hours)**

BOOKS FOR REFERENCE:

1. Senge, Peter M.*The Fifth Discipline:The Art and Practice of the Learning Organisation.* Doubleday, 1990.
2. Gilley, Jerry W., and Ann Maycunich Gilley.*The Manager as Change Agent: A Practical Guide to Developing High-Performanca People and Organisations.* Jossey-Bass, 1985.
3. Kanter, Rosabeth Moss. *Leadership for Change : Enduring Skills for Change Masters.* Harvard Business Review Press, 2015.

Continuous Internal Assessment Component (CIA)

Component	Marks
Role Play	25
Collage	25
Poster Making	25
Team Activities	20
Attendance	5
Total	**100**

IMMUNOLOGY AND MICROBIOLOGY

Semester: V **Hours: 6**

Code : 23ZO5MC08 **Credit: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall history, scope and basic concepts of Immunology and Microbiology.	PSO - 1	K1
CO - 2	Describe the types and components of immune system, immunity and classify the microorganisms and characterize them.	PSO - 2	K2
CO - 3	Apply the knowledge of Immunology in diseases and health and techniques of Microbiology in further research.	PSO - 4	K3
CO - 4	Analyze the mechanism of immune responses, molecular Immunology and structural diversity of microorganisms	PSO - 3	K4
CO - 5	Summarize the process and techniques of Immunology and Microbiology and organization of microbes.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**IMMUNOLOGY AND MICROBIOLOGY**							**Hours: 6**
Code : 23ZO5MC08											**Credit: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	3	3	4	2	5	4	3	3	2	3.27
CO - 2	4	2	4	3	5	2	4	5	4	3	2	3.45
CO - 3	3	2	4	5	4	2	3	4	4	5	2	3.45
CO - 4	3	2	5	4	4	2	3	4	5	4	2	3.45
CO - 5	2	5	4	4	3	5	2	3	4	4	5	3.73
Overall Mean Score												**3.47**

Result: The Score for this Course is **3.47** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

History and fundamentals of Immunology: History and scope of immunology, contributions of Edward Jenner and Louis Pasteur. Types of immunity: innate - physical, mechanical, biochemical, cellular factors, genetic factors and acquired - passive and active, natural and artificial immunity. Over view of Immune response: Humoral - primary and secondary immune response and Cellular immune response. **Organs and cells of the immune system:** Primary lymphoid organs - thymus, bursa of Fabricius, bone marrow and secondary lymphoid organs - lymph node, spleen, MALT, Payer's patches and tonsils. Haematopoiesis - Fate of stem cells, lymphoid lineage - T cell and its types, B cell and its types and Null cell and its type. Myeloid lineage - eosinophils, basophils, neutrophls, mast cells, platelets, monocytes and macrophages. **(18 Hours)**

UNIT II

Immunochemistry and Immunotechnology: Antigen properties, epitopes, haptens, adjuvants, immunogenicity and antigenicity. Antibodies - structure, types, properties and functions. Antigen antibody interaction - properties, Detection of Ag - Ab reaction - precipitation and agglutination. Vaccines - types of vaccines and vaccination schedule. **(18 Hours)**

UNIT III

Molecular Immunology: Complement- properties, Major Histocompatibility Complex (MHC) - structure and functions of MHC, MHC antigens, HLA and H_2. Hypersensitivity - Type I, II, III and IV. Cytokines - properties and functions. Autoimmune disorders - characteristics, types - Myasthenia gravis, Lupus erythematosis and Hashimoto's thyroiditis. Immuno deficiency diseases - overview. **(18 Hours)**

UNIT IV

Introduction to Microbiology: Brief history of Microbiology, scope, contributions of Louis Pasteur and Robert Koch. Classification of microbes - Whittaker's five kingdom concepts. Basic techniques in Microbiology: sterilization and disinfection - dry heat, moist heat, filtration, incineration, radiation and chemical. Nutritional types of microorganisms. Culture of microbes - culture medium, culture techniques - batch, fed-batch, continuous culture, serial dilutions, spread plate, pour plate and streak plate. Staining techniques - simple, Gram and acid fast. **(18 Hours)**

UNIT V

Bacteria: Classification, size, shape, arrangement, ultra-structure of bacterial cell, bacterial reproduction and growth - phases of growth and growth curve, factors influencing bacterial growth. **Viruses:** Characteristics, structure, shape and classification of viruses., structure of Bacteriophage -Viriods and Prions -**Algae** - general characters, diverse habitat, thallus structure, economic importance - algae as food and fodder, algae in agriculture and pharmaceuticals. **Fungi** - definition, general characters, occurrence, thallus organization, biological and economic importance of fungi. **(18 Hours)**

COURSE BOOKS:

1. Dulsy Fatima and N. Arumugam, Immunology. Saras publication, Nagercoil, 2005.
2. Arumugam N, Microbiology, Saras publication, Nagercoil, 2005.

UNIT	BOOK	CHAPTER
I	1	1, 2, 3, 4, 5, 6, 9.10.11
II	1	7, 8,14, 21
III	1	15,16,17,19
IV	1	2, 4, 5, 36, 37, 38, 39, 48
V	1	7, 8, 11, 12, 19, 20, 24, 34

BOOKS FOR REFERENCE:

1. Rabindra Narain, Clinical Immunology, Wisdom press, New Delhi, India, 2012.
2. Rao C.V, Immunology, Narosa Publishing House, New Delhi, India, 2006.
3. Roitt J.M, Essential Immunology, Blackwell Scientific Oxford, 1984.
4. Kuby.T J. Kindt, R. A. Goldsby, B. A. Osborne, Immunology, 6th edition, W. H. Freeman and Company, New Delhi, 2007.
5. Kannan I, Immunology, MJP Publishers, Chennai, 2007.
6. Seemi Farhat Basir, Text book of Immunology, PHI Learning Private Limited, New Delhi, 2012.
7. Fathimunisha Begum, Immunology. PHI Learning Private Limited, New Delhi, 2014.
8. Mani A., Narayanan L.M., Dulsy Fatima A.M., Selvaraj and Arumugam N., Immunology and Microbiology. Saras Publications, Nagercoil, 2015.
9. Dubey and D.K. Maheswari, A Text Book of Microbiology, Revised edition, S. Chand and Company Ltd., New Delhi, 2013.
10. Cappuccino J.G and N. Sherman, Microbiology, A Laboratory Manual, 7th edition, Pearson Education and Dorling Kinderley Pvt. Ltd., New Delhi, 2005.
11. Jeffery C. Pommerville, Alcamo's Fundamentals of Microbiology, 10th edition, Jones and Bartlett India Pvt. Ltd., New Delhi, 2014.
12. George J Banwan, Basic Food Microbiology, 2nd edition, CBS Publishers and distributors, New Delhi, 2002.
13. Pelcezar M.J. Microbiology and Reid, Rc Graw Hill Book Company, Newyork, 1993.

BIOCHEMISTRY

Semester: V **Hours: 6**

Code : 23ZO5MC09 **Credit: 5**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the basic principles of biochemistry, and structure of biomolecules	PSO - 1	K1
CO - 2	Explain the biochemical processes occurring in living organisms.	PSO - 2	K2
CO - 3	Apply biochemistry concepts to solve problems in areas such as metabolism and molecular biology.	PSO - 4	K3
CO - 4	Analyze biochemical processes and its implications.	PSO - 5	K4
CO - 5	Critically assess the significance of micro and macronutrients for a healthy life.	PSO - 3	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**BIOCHEMISTRY**							**Hours: 6**
Code : 23ZO5MC09											**Credit: 5**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	4	3	3	5	3	2	4	3	3.36
CO - 2	3	3	3	4	5	3	3	5	3	4	3	3.55
CO - 3	2	3	3	5	4	3	2	4	3	5	3	3.36
CO - 4	2	5	3	4	4	5	2	4	3	4	5	3.73
CO - 5	2	3	5	4	3	3	2	3	5	4	3	3.36
Overall Mean Score												**3.47**

Result: The Score for this Course is **3.47** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Atoms and buffers: Atom - structure, chemical bonds - ionic bond, covalent bond, hydrogen bond. pH, Bronsted - Lowry concept of acids and bases, titration curve of acid and base, buffers, mechanism of buffer action, Henderson - Hasselbalch equation, acidosis and alkalosis, oxidation and reduction and isomerism.

(18 Hours)

UNIT II

Carbohydrates: Structure and classification of Monosaccharides, Disaccharides and Polysaccharides (with two examples each). Biological significance of carbohydrates. Glycolysis, Kreb's cycle, Glycogenolysis, Gluconeogenesis and HMP Shunt, Blood sugar level - Glycosuria, Diabetes mellitus. **(18 Hours)**

UNIT III

Protein: Amino acids - structure and classification. Chemical bonds involved in protein structure, structure of protein - Lindstrom - Lang's structure of protein, properties and biological significance of proteins. Metabolism - Deamination, Transamination, Decarboxylation, Transmethylation of amino acids, Urea cycle.

(18 Hours)

UNIT V

Lipids: Fatty acids - saturated fatty acids and unsaturated fatty acids. Lipid - structure and classification - simple, compound lipid - phospholipids (lecithin and cephalin), Glycolipids (sulfolipids) and derived lipids - steroids (cholesterol). Biological significance of lipids. Metabolism - Beta Oxidation of fat. Formation of ketone bodies. **(18 Hours)**

UNIT V

Enzymes and vitamins: Enzymes - properties, classification, mechanism of enzyme action, factors affecting enzyme activity, biological significance of enzymes, enzyme inhibition, co-enzymes and isozymes. Vitamins - sources and functions of water soluble and fat-soluble vitamins. **(18 Hours)**

COURSE BOOK:

1. Arumugam N, Dulsy Fatima, Narayanan L.M, Meyyan R.P, Nallasingam K. and Prasannakumar S., Biochemistry. Saras Publication, Nagercoil, 2019.

UNIT	BOOK	CHAPTER
I	1	4,8,9,10,13
II	1	14
III	1	59
IV	1	43
V	1	81,96

BOOKS FOR REFERENCE:

1. Jain, J.L., Sunjay Jain and Nitin Jain. Fundamentals of Biochemistry. S. Chand & Co. Ltd., New Delhi, 2014
2. Gupta, S. N, Biochemistry. Rastogi Publications, Meerut, 2011
3. Vasudevan, D. M., Sree Kumari, S. & Kannan Vaidyanathan. Text Book of Biochemistry for Medical Students 7th edition. Jaypee Brothers Medical Publishers Pvt. Limited, New Delhi,2013
4. Chatterjee, M.N. and Rana Shinde, Text Book of Medical Biochemistry 8th edition. Jaypee Brothers Medical Publishers Pvt. Limited, New Delhi,2012
5. Jeremy M. Berg, John L. Tymoczko & Lubert Stryer. Biochemistry 6th edition. Freeman & Co. Publishers, San Francisco,2006
6. Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students 7th edition. Published by Wolters Kluwer, India, 2012
7. Rodney F Boyer, Modern Experimental Biochemistry 3rd edition. Published by Darling Kindersley (India), Pvt., Ltd, South Asia,2009
8. David.L.Nelson and Michael.M.Cox. Lehninger's Principles of Biochemistry 4th edition. W.H. Freeman and CO., New York,2008
9. Veerakumari L,. Bio Instrumentation. MJP Publishers, Chennai,2006
10. Lehninger, A. L., Nelson, D. K., and Cox, M. M.. Principles of Biochemistry. CBS Publishers and distributors, New Delhi,1993
11. Stryer, L. Biochemistry. W. H. Freeman and Company, New York,1988

EVOLUTION

Semester: V **Hours: 5**

Code : 23ZO5MC10 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the basic concepts of Evolution and review the process of change in all forms of life over generations.	PSO -1	K1
CO - 2	Describe and provide examples of speciation events, understand the role of reproductive isolation and geographic factors in the formation of new species.	PSO - 4	K2
CO - 3	Apply the principles of natural selection with specific examples of evolution in various organisms.	PSO - 3	K3
CO - 4	Compare and contrast mechanisms such as natural selection, genetic drift and gene flow, and evaluate their roles in driving evolutionary processes.	PSO - 2	K4
CO - 5	Assess how evolutionary processes contribute to the diversity of life on Earth and analyze the consequences of human activities on evolution.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**EVOLUTION**							**Hours: 5**
Code : 23ZO5MC10											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	3	3	3	5	3	2	3	3	3.18
CO - 2	3	3	2	5	3	3	3	3	2	5	3	3.18
CO - 3	3	3	5	3	3	3	3	3	5	3	3	3.36
CO - 4	3	3	2	4	5	3	3	5	2	4	3	3.36
CO - 5	3	5	2	4	3	5	3	3	2	4	5	3.55
Overall Mean Score												**3.33**

Result: The Score for this Course is **3.33** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Evidences of Evolution: Origin of life - Abiogenesis, Biogenesis, Cosmic theory, Biochemical origin of life, Urey-Miller experiment. Evidences of evolution: morphological and anatomical, embryological, physiological, biochemical and paleontological evidences. **(15 Hours)**

UNIT II

Theories of Organic Evolution: Theories of Organic Evolution - Lamarckism, Neo Lamarckism, Darwinism, Neo Darwinism, Voyage of the HMS Beagle, Mutation theory and new version of mutation theory. Modern Synthetic theory of evolution. Natural selection - types. Convergent and Divergent evolution. **(15 Hours)**

UNIT III

Adaptation and Isolation: Adaptation - Coloration and Mimicry (types and significance), Non adaptive traits, Neoteny and significance. Isolation - mechanism and types. Hardy Weinberg Equilibrium and factors affecting Hardy Weinberg Equilibrium, Basic outlines of Molecular evolution. **(15 Hours)**

UNIT IV

Evolution of Higher forms: Evolution of Higher forms, Golden age of Reptiles - major types of Dinosaurs and reason for extinction, affinities of Archaeopteryx, Evolution of man - cultural evolution and future evolution. **(15 hours)**

UNIT V

Animal Distribution: Speciation - mechanism of speciation and patterns of speciation. Adaptive radiation. Fossil - Fossil formation, types of fossils, dating of fossils, incompleteness of fossil record, Indian fossils, living fossils and geological time scale. **(15 hours)**

COURSE BOOK:

1. Arumugam N. Organic Evolution. Saras Publication, Nagercoil.

UNIT	BOOK	CHAPTERS
I	1	2, 3
II	1	4, 5, 6, 7, 8, 9, 10
III	1	18, 21, 22, 25, 40
IV	1	3, 29, 31
V	1	32, 33, 34, 35, 41

BOOKS FOR REFERENCE:

1. Bell, G. The basics of selection. New York, Chapman and Hall, 1996.
2. Roger Lewin. Human evolution. An illustrated introduction. Wiley -Blackwell Publication, Oxford, 2004.
3. Kamshilor M.M. Evolution of the Biosphere. MIR Publishers, Moscow, 1974.
4. Edwin H Colbert, Evolution of the Vertebrates. V.R. Damodaran for Wiley Eastern Limited, Delhi, 1990.
5. Sanjib Chattopadhyay, Evolution, Adaptation & Ethology, Books and Allied (P) Ltd., Kolkata, 2012.
6. Mani M.S, Ecology & Evolution. Sathish Book Enterprise, Agra,1983
7. Williams, G.C., Natural Selection: Domains, Levels and Challenges. New York: Oxford Univ. Press, 1992.
8. Verma PS, and Agarwal VK Cell Biology, Genetics, Evolution and Ecology, S Chand Publishers, New Delhi, 2012.
9. Gupta P.K, Cytology, Genetics & Evolution, Rastogi Publications, Meerut.,2010
10. Barton N.H, Briggs DEG, Eisen JA, Goldstein DB and Patel NH, Evolution. Cold Spring, Harbour Laboratory Press.
11. Hall B.K and Hallgrimsson B, Evolution, Jones and Bartlett Publishers.

IMMUNOLOGY, MICROBIOLOGY, BIOCHEMISTRY AND EVOLUTION LAB

Semester: V **Hours: 5**

Code : 23ZO5CP04 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on lymphoid organs and bio instruments.	PSO - 2	K1
CO - 2	Understand the immunological techniques including Immunoelectophoresis, Haemagglutination and Immunodiffusion.	PSO - 1	K2
CO - 3	Analyze the culture methods, growth and staining of microbial organisms.	PSO - 3	K3
CO - 4	Apply comprehensive knowledge on the methodology for qualitative analysis of biomolecules.	PSO - 5	K4
CO - 5	Appraise the evolutionary significance of animals.	PSO - 4	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				IMMUNOLOGY, MICROBIOLOGY, BIOCHEMISTRY AND EVOLUTION LAB							Hours: 5
Code : 23ZO5CP04											Credit: 2
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	2	3	4	3	5	3	2	5	4	3	3	3.36
CO - 2	5	4	3	2	3	4	5	3	3	2	4	3.45
CO - 3	2	3	5	4	3	3	2	3	5	4	3	3.36
CO - 4	2	5	3	4	3	5	2	3	3	4	5	3.55
CO - 5	3	3	2	5	3	3	3	3	2	5	3	3.18
												3.38

Result: The Score for this Course is **3.38** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

IMMUNOLOGY

1. Dissection of Lymphoid organs in chick.
2. Histology of lymphoid organs (Slides/Charts).
3. Primary lymphoid organs - Thymus, Bone marrow.
4. Secondary lymphoid organs - Lymphnodes, spleen.
5. Preparation of antigen - BSA, bacterial, SRBC.
6. Production of antiserum.
7. Separation of lymphocytes from peripheral blood.
8. Immune electrophoresis - Demonstration.
9. Haemagglutination - Demonstration.

MICROBIOLOGY

1. Cleaning and sterilization of glassware's.
2. Preparation of culture media for microbes -
    a. Broth media, Agar media, Slant
3. Pure culture of bacteria
    a. Serial dilution b. Pour plate c. Spread plate technique
4. Staining of bacteria - Simple and Gram stain.
5. Study of microbial population - Methylene blue reduction test.
6. Spotters - Laminar Air flow, Autoclave, Hot air oven and Colony counter.

BIOCHEMISTRY

1. Qualitative analysis of Carbohydrate- Benedic'ts test, Fehling's test, Methylene blue test.
2. Qualitative analysis of Protein - Biuret test, Millon's test, Ninhydrin test.
3. Qualitative analysis of lipid - Emulsification test, Sudan III test, Formation of acrolein test.
4. Separation of amino acids by Paper Chromatography.
5. Instrument:
   Colorimeter
   pH Meter
   Centrifuge
   Chromatogram
   Electrophoresis

EVOLUTION

1. Homologous and Analogous organs, vestigial organs
2. Examples of Evolutionary significance.
    a. Peripatus
    b. Limulus
    c. Leaf insect
    d. Stick insect
    e. Chamaeleon
3. Adaptive radiation.
4. Dermatoglyphics.

DSE - 1 - BIOSTATISTICS AND RESEARCH METHODOLOGY

Semester: V **Hours: 4**

Code : 23ZO5DE1A **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	State the concepts of Biostatistics and principles of bio instruments.	PSO - 2	K1
CO - 2	Identify the type of data and find suitable statistical method for analysis and distinguish laboratory equipment's.	PSO - 4	K2
CO - 3	Construct tables, graphs, diagrams, calculate the measures of central tendency, dispersion, probability, test hypothesis and apply the instruments for related experiments.	PSO - 3	K3
CO - 4	Analyze data and infer the results and appraise the working mechanism of laboratory instruments.	PSO - 1, PSO - 4	K4
CO - 5	Assess the various measures of biostatistics and summarize the mechanism of microscopy, micrometry, cytological techniques, chromatography and electrophoresis.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V			**DSE - 1 - BIOSTATISTICS AND RESEARCH METHODOLOGY**						**Hours: 4**			
Code : 23ZO5DE1A												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	2	2	2	4	5	2	2	5	2	4	2	2.91
CO - 2	2	4	4	5	2	4	2	2	4	5	4	3.45
CO - 3	2	4	5	3	2	4	2	2	5	3	4	3.27
CO - 4	5	4	2	5	2	4	5	2	2	5	4	3.64
CO - 5	2	5	3	4	2	5	2	2	3	4	5	3.36
Overall Mean Score												**3.33**

Result: The score for this course is **3.33** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Introduction to Biostatistics: Population, data, samples and variables. Sampling methods - random and non- random sampling. Collection - primary and secondary data. Classification and presentation of data - tables, graphs, diagrams. Experimental design - principles, replication and randomization. **(12 Hours)**

UNIT II

Measures of central tendency and dispersion: Mean, median and mode for grouped and ungrouped data. Measures of dispersion - calculation of range, mean deviation, quartile deviation, percentiles, standard deviation, standard error, variance and coefficient of variation. **(12 Hours)**

UNIT III

Probability: Basic terms in probability, types - apriori and aposteriori, theorems - Addition and Multiplication, Binomial and normal distribution. Skewness and Kurtosis - definition and types. Hypothesis testing - Null hypothesis and alternative hypothesis, degrees of freedom, significance levels, parametric tests -paired and unpaired t-test, and non-parametric tests - Chi-square test. **(12 Hours)**

UNIT IV

Good Laboratory Practices (GLP), Microscopy - Light, Phase contrast, Florescence, Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM), Scanning and Transmission Electron Microscope (STEM), Micrometry, cytological techniques - fixation and sectioning, staining - mechanism of staining and vital staining. **(12 Hours)**

UNIT V

Measurement of pH - pH paper and pH meter, Rotary Vacuum Evaporator, Principle, instrumentation and applications of Colorimeter, Spectrophotometer, ultra-centrifuge, Paper chromatography, Gas Liquid Chromatography (GLC), column chromatography, Thin Layer chromatography, High Pressure Liquid chromatography, paper electrophoresis, Poly Acrylamide Gel Electrophoresis (PAGE). **(12 Hours)**

COURSE BOOKS:

1. Arumugam.N Gopi, A. Meena A, Sundaralingam, V, Kumaresan, Biostatistics, Saras Publication, Nagercoil, 2016.
2. Ramakrishnan P, Biostatistics, Saras Publication, Nagercoil,2004.
3. Arumugam. N, Cell Biology. Saras Publication, Nagercoil, 2019.
4. Arumugam. N, Biochemistry. Saras Publication, Nagercoil, 2022.

UNIT	BOOK	CHAPTERS
I	1	3, 4, 5, 6, 17, 18.19
II	2	42, 43, 44, 45, 46, 47, 50, 51, 53
III	1	81, 86, 87.88, 90, 91.92
IV	3	2, 3
V	4	142, 144, 145,146

BOOKS FOR REFERENCE:

1. Arumugam N, A. Gopi, A. Meena, Sundaralingam, V. Kumaresan, Biostatistics, Computer Application and Bioinformatics, Saras Publication, Nagercoil, 2016.
2. Daniel W, Biostatistics, 9th edition, John Wiley and Sons, New York, 2009.
3. Gupta S.P, Statistical Methods. 40th edition, S.S. Chand Publishers, New Delhi, 2014.
4. Palanichamy, Statistical Methods for Biologist. Palani Paramount Publications, 2002
5. Zar J.H., Statistical Analysis.4th Edition, Pearson Education, South Asia, 2011.
6. Gupta P.K., Elements of Biotechnology, Rastogi Publication, Meerut, 1997.
7. Verma B. L, and Shukla H.D., Biostaistics. Satish Kumar Jain for CBS Publishers and Distributors, 1993.
8. Shelke D.K, Biostatistical Techniques and designs. Updesh Purohit for Agrobios India, 2011.
9. Kothari C.R, Research Methodology, 2nd edition, New Age International Publishers, New Delhi. 2004.
10. Gurumani N. Research Methodology for Biological Sciences. Chennai: MJP Publishers, 2006.
11. Gurumani N, An Introduction to Biostatistics, MJP Publishers, Chennai, 2005.
12. Khan I and A. Khanum, Fundamentals of Biostatistics 3rd edition Hyderabad, Ukaaz Publications, 2014.
13. Banerjee P.K, Introduction to Biostatistics, New Delhi: S. Chand and Company Ltd, 2005.

DSE - 1 - HUMAN REPRODUCTIVE BIOLOGY

Semester: V **Hours: 4**
Code : 23ZO5DE1B **Credit: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the structure and functions of male and female reproductive system, reproductive diseases and technology.	PSO -1	K1
CO - 2	Describe the process of reproduction, reproductive disorders and ART.	PSO - 2	K2
CO - 3	Relate the knowledge of human reproductive health to human welfare.	PSO - 3	K3
CO - 4	Compare male and female reproduction, reproductive mechanism and anomalies.	PSO - 3, PSO - 4	K4
CO - 5	Appraise the physiology of reproduction, reproductive health and technology.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V	DSE - 1 - HUMAN REPRODUCTIVE BIOLOGY											Hours: 4
Code : 23ZO5DE1B												Credit: 3
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	4	3	4	3	5	4	4	3	3	3.73
CO - 2	3	3	4	3	5	3	3	5	4	3	3	3.55
CO - 3	3	3	5	4	3	3	3	3	5	4	3	3.55
CO - 4	3	3	5	5	3	3	3	3	5	5	3	3.73
CO - 5	3	5	3	4	3	5	3	3	3	4	5	3.73
Overall Mean Score												**3.66**

Result: The score for this course is **3.66** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Male reproductive system: Origin and migration of primordial germ cells, functional morphology and anatomy of male reproductive system- epididymis, vas deferens, seminal vesicles, ventral prostate, bulbourethral gland and preputial gland, physiology of male gametogenesis, fertility of individual, ultra-structure of spermatozoa, sperm maturation, hormonal control of male reproductive system, biochemistry of semen and capacitation**.** **(12 Hours)**

UNIT II

Female reproductive system: Structure and function of female reproductive system, puberty, formation of ova, physiology of ovulation, menstrual cycle, nutrition and stress influences on the ovulatory cycle, hormonal control of female reproductive system, effects of sexual hormones on maternal-infant bonding, stress, anorexia and effects of steroids. **(12Hours)**

UNIT III

Fertilization, foetal development and senescence: Process of fertilization, implantation and formation of the foetus and placenta, pregnancy, foetal development, labour and birth, lactation and neonatal life, reproductive aging and menopause. **(12 Hours)**

UNIT IV

Reproductive Health: Male reproductive diseases - sexual dysfunctions, Phimosis, Testicular Torsion, male infertility, erectile dysfunction, vasectomy, blood in semen. Female reproductive diseases- endometriosis, fibroids, endometritis, chronic infection of uterus, congenital uterine anomalies, ovarian cysts, Poly Cystic Ovary Syndrome (PCOS), HIV/AIDS and pelvic varicosities, cancers of the reproductive system, adenomyosis, gland like growth in myometrium. Sexually transmitted diseases- syphilis, gonorrhea and chlamydia. **(12 Hours)**

UNIT V

Reproductive Technology: Birth control measures, Intrauterine devices (IUD), Assisted Reproduction Technologies - IVF, ET, GIFT, ZIFT, FET, ICSI, IUI, surrogacy, ethical, legal and social impact of modern Assisted Reproductive Technologies.

(12 Hours)

COURSE BOOKS:

1. Arumugam.N, Developmental Biology, Saras Publication, Nagercoil, 2014.
2. Arumugam.N, Animal Physiology, Saras Publication, Nagercoil, 2014.

UNIT	BOOK	CHAPTERS
I	1	2, 4
II	2	28, 29
III	1	6, 8
IV	1 2	2 2, 28, 29
V	1	27, 29, 35

BOOKS FOR REFERENCE:

1. Austin C.R and R. V. Short, Reproduction in mammals (1), Germ cells and Fertilization (2) Embryonic and Foetal development (3) Hormones in Reproduction (4) Reproduction pattern (5) Artificial control of reproduction, Cambridge University press, London, 1972.
2. Arumugam N, Developmental Biology, Saras Publication, Nagercoil, 2014.
3. Barrington E.J.W, An introduction to general and comparative endocrinology, Oxford University press, London, 1976.
4. Moudgal N.R, K. Yoshinaga, A. J. Rao, P. R. Adiga, Perspectives in primate reproductive biology, Wiley Eastern Ltd., New Delhi, Bangalore, 1991.
5. Knobil E, and Neil J. D, The physiology of reproduction, Vol. I & II. Raven press, New York, 1994.
6. Raghavendra Puri, Mammalian endocrinology, Vol. I & II, Dominant Publishers and Distributors, New Delhi, 2003.
7. Muneeth Kainth, Chordate Embryology, Dominant Publishers and Distributors, New Delhi, 2005.
8. Paul Wassar man and D. Jimmy., Neill Knogbil and neill's physiology of reproductive, volume 1st and 2nd and 3rd edition, 2005.
9. Thomas W.S, Langman's Medical Embryology, 13th edition Lippincott, Williams and Wilkins, Baltimore, 2014.
10. Gary B.B Steven, R.B. Philip, H.F. Philippa, Larsen's Human Embryology 5th edition, Elsevier, 2014.

DSE - 1 - AQUATIC ZOOLOGY

Semester: V **Hours: 4**

Code : 23ZO5DE1C **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the history of marine biology, estuarine biology, limnology and aquatic pollution.	PSO - 2	K1
CO - 2	Understand the characteristics of aquatic ecosystem, adaptations of aquatic organisms and aquatic sustainability.	PSO -1	K2
CO - 3	Illustrate the components of aquatic ecosystem, physiology of aquatic organisms and conservation of aquatic habitats.	PSO - 3	K3
CO - 4	Analyze the attributes of marine, fresh water and estuarine ecosystem, relationship of aquatic organisms with their environment and impact of aquatic pollution.	PSO - 1, PSO - 4	K4
CO - 5	Compare the various types of aquatic ecosystem and life of aquatic organisms and predict the measures to control aquatic pollutions.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**DSE - 1 - AQUATIC ZOOLOGY**								**Hours: 4**
Code : 23ZO5DE1C												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	3	3	4	5	3	4	5	3	4	3	3.73
CO - 2	5	3	3	4	4	3	5	4	3	4	3	3.73
CO - 3	3	3	5	4	4	3	3	4	5	4	3	3.73
CO - 4	5	3	4	5	4	3	5	4	4	5	3	4.09
CO - 5	3	5	4	4	3	5	3	3	4	4	5	3.91
Overall Mean Score												**3.84**

Result: The score for this course is **3.84** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Overview of aquatic ecosystem: Introduction to Marine Biology, Oceanography, Estuarine Biology and Limnology. Water and water cycle. History and significance of Marine Biology and Limnology. Human cultural relations with water. Properties of water - water as a solvent and temperature stabilizer. Physical and chemical properties of water and seawater. **(12 Hours)**

UNIT II

Freshwater ecosystem: Characteristics of pond, lake, wetland, stream and river. Abiotic factors of fresh water - Light, temperature, thermal stratification, dissolved solids, carbonate, bicarbonates, phosphates, nitrates, turbidity, dissolved gases - oxygen and carbon dioxide. Origin and classification of lakes and streams - different stages of stream development. **Biotic factors:** components, producers, consumers, decomposers, transformers, productions rates, energy flow structure and ecological pyramids. Biological communities of lakes and rivers - Phytoplankton, periphyton, zooplankton, benthos, microphytes, insects, Mollusca, Amphibians, fish and birds. Benthic communities and detritus. Organic carbon cycling and ecosystem metabolism. **(12 Hours)**

UNIT III

Marine ecosystem: Characteristics of estuarine, intertidal, pelagic and marine benthic zone. Coral reef and continental shelf. Physico-chemical properties of marine ecosystem - Light, temperature, thermal stratification, dissolved solids, turbidity, dissolved gases, oxygen, carbon dioxide, salinity and density of sea water. **(12 Hours)**

UNIT IV

Physiology and adaptation: Feeding and respiration in aquatic organisms, osmoregulation in freshwater and marine organisms, sensory world of aquatic organisms, locomotion in water, adaptation of hill- stream fishes and adaptation of deep-sea organisms. **(12 Hours)**

UNIT V

Aquatic pollution: Causes of pollution - Agricultural, industrial, sewage, thermal and oil spills, eutrophication, management and conservation. Water pollution acts of India, sewage treatment and water quality assessment - BOD and COD. Environmental sustainability. Control of aquatic weeds, predatory and weed fish control. Feeds for cultivable species - natural, supplementary and artificial feeds. **(12 Hours)**

COURSE BOOK:

1. Arumugam N, Ecology. Saras publication, Nagercoil,2016

UNIT	BOOK	CHAPTERS
I	1	4, 17
II	1	4, 5, 6, 7, 14
III	1	6, 7, 11
IV	1	25
V	1	39, 40

BOOKS FOR REFERENCE:

1. Tonapi G.T, Freshwater animals of Indi, Oxford and IBH Publishing Company, New Delhi, India, 2014.
2. Blakey D.R and D.C. Hrusa, Inland Aquaculture development handbook, Fishing News Books Great Britain, 1989.
3. Jhingran V.J, Fish and Fisheries of Indian Hindustan Publishing Co, New Delhi, 1985.
4. Pillay T.V.R, Aquaculture Principles and Practices, Fishing News Books, Oxford, 1990.
5. Santha Kumar G and Selvaraj, Concepts of Aquaculture, Nagercoil: Meenam Publication, 2002.

DSE - 2 - CLINICAL LAB TECHNOLOGY

Semester: V **Hours: 4**

Code : 23ZO5DE2A **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the measures of Laboratory safety, Human health and principles of biomedical instrumentation	PSO -1	K1
CO - 2	Interpret medical terminologies and abbreviations	PSO - 2	K2
CO - 3	Construct the lab requirements and diagnostic methods for clinical laboratory workers	PSO - 4	K3
CO - 4	Connect the diverse knowledge on lab technology and Health care	PSO - 3	K4
CO - 5	Develop training skills to attain employment in hospitals and Laboratories.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**DSE - 2 - CLINICAL LAB TECHNOLOGY**							**Hours:4**
Code : 23ZO5DE2A											**Credit:3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	3	2	4	5	2	4	3	4	3.64
CO - 2	2	2	3	2	5	2	2	5	3	2	2	2.73
CO - 3	2	4	4	5	3	4	2	3	4	5	4	3.64
CO - 4	2	4	5	3	3	4	2	3	5	3	4	3.45
CO - 5	2	5	4	3	2	5	2	2	4	3	5	3.36
Overall Mean Score												**3.36**

Result: The Score for this Course is **3.36** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Laboratory Safety measures: Safety precautions against infection. Major causes of laboratory hazards, universal precautions for laboratories, maintenance and promotors of health. Specimen collection and processing of blood. urine, sputum and stool. **(12 Hours)**

UNIT II

Haematology: Composition of blood, collection and storage of blood, haemogram, cell study - counting of cells, differential count, total count), packed cell volume (PCV), erythrocytes sedimentation rate (ESR), haemoglobin concentration (Hb), bleeding time (BT), clotting time (CT), blood grouping and Rh - typing, blood cross matching, cell indices - mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC). Blood pressure (Sphygmomanometer) and reading of arterial pulsation. **(12 Hours)**

UNIT III

Analysis of urine and sputum - Physical properties of urine - colour, volume, specific gravity, odour and pH. Chemical composition of Urine - urine sugar, albumin, bile salts, bile pigments and ketone bodies, microscopic examination of organised sediments and unorganised sediments. Pregnancy test (detection of HCG). Analysis of sputum - macroscopic and microscopic examination of sputum. Gram stain and acid-fast Bacilli (AFB). **(12 Hours)**

UNIT IV

Clinical chemistry - Blood glucose, blood urea, blood uric acid, blood cholesterol and Blood Creatinine. WIDAL test for enteric and non-enteric fever, (VDRL) Venereal Disease Research Laboratory, virginity test. Analysis of seminal fluid - physical examination, chemical examination, Florence test, Barberio's test, microscopic examination - motility of sperm and precipitin test. **(12 Hours)**

UNIT V

Medical instrumentation - Computer tomography (CT scan), Magnetic Resonance imaging, flowcytometry, treadmill test, PET , Electrocardiogram (ECG), ultra-sonography, Electroencephalography (EEG). **(12 Hours)**

COURSE BOOKS:

1. Kanai L., Mukherjee, volume 1, Medical Laboratory Technology. A Procedure Manual for Medical Laboratory Technology. Routine diagnostic test, 2005.
2. Kanai L., Mukherjee, volume II, Medical Laboratory Technology. A Procedure Manual for Medical Laboratory Technology. Routine diagnostic test, 2005.
3. Ochei J, A.Kolhatkar, Medical laboratory Science, Tata McGraw Hill publishing company limited, New delhi, 2000.

UNIT	BOOK	CHAPTERS
I	1	1 ,2, 3
II	1	8, 9, 10, 11, 12
III	2	25
IV	2	23, 24, 27, 28
V	1 4	4 2, 3

BOOKS FOR REFERENCE:

1. Philip Evans. The family Medical Reference Book the essential Guide to Health and Medicine. Published by Little Brown under the Black cat imprint, London,1993.
2. Isidro Aquilar and Herminia Galbes, Encyclopedia of Health and
3. Education for the family. Education and Health Library, Published under the title of Encyclopedia familiarrida, Amor Y sexo, 1999.

DSE - 2 - LIVESTOCK MANAGEMENT AND ANIMAL HUSBANDRY

Semester: V **Hours: 4**
Code : 23ZO5DE2B **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the importance of livestock in the health and economy of rural and urban populations.	PSO - 1	KI
CO - 2	Understand the different characteristics of breeding stock and breeding systems in Livestock	PSO - 2	K2
CO - 3	Apply principles and methods of immunization against specific diseases and implement vaccination and deworming practices.	PSO - 3	K3
CO - 4	Relate the activities and government schemes on livestock management	PSO - 5	K4
CO - 5	Evaluate preventive measures and control strategies for infectious diseases in livestock	PSO - 4	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				DSE - 2 - LIVESTOCK MANAGEMENT AND ANIMAL HUSBANDRY								Hours: 4
Code : 23ZO5DE2B												Credit: 3
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	3	2	3	3	5	3	3	2	3	3.18
CO - 2	3	4	2	3	5	4	3	5	2	3	4	3.45
CO - 3	3	4	5	3	2	4	3	2	5	3	4	3.45
CO - 4	2	5	3	3	2	5	2	2	3	3	5	3.18
CO - 5	4	3	2	5	4	3	4	4	2	5	3	3.55
Overall Mean Score												3.36

Result: The Score for this Course is **3.36** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Dairy Farming: Introduction, importance of livestock in the health and economy of rural and urban population, Breeds of cattle: Gir and Sindhi. Fresian raising calf, Heifer management, care of pregnant cow and feeding of milch cows. Cattle feed formula and important fodder varieties. Housing, breeding - estrous cycle, artificial insemination of milch cows and parturition. Clean milk production and economic importance of dairy farming. **(12 Hours)**

UNIT II

Goat farming: Introduction, indigenous breeds - Jamunapari, Tellicherry and Barbari. Exotic breeds - Saanen and Toggenberg. Selection of breeding stock, reproduction and mating system. Nutrient requirement and stall-fed system of goat roaring. Management of goat farming and economic importance of goat farming. **(12 Hours)**

UNIT III

Sheep Farming: Introduction to sheep farming. Breeds: Indigenous breeds - Hissardale, chokla, malpura, Nellor and Mandya. Breeds of Tamil Nadu - Mecheri and Madras red. Exotic breeds - Merino and Dorset. Selection of breeding stock, breeding system, feeding nutrient requirements, management and economic importance of sheep farming. Dairy development schemes of India - Dairy entrepreneurship development schemes (DEDS). **(12 Hours)**

UNIT IV

Swine farming: Characteristic and their production, selection of breeds: large white -Yorkshire and Berkshire. Selection of breeding stocks, Nutrients requirements, weaning, feeding housing and reproduction. Care and management of pregnant sows, Economic importance of swine farming. Utility Advantages and disadvantages of pig farming. **(12 Hours)**

UNIT V

Animal Diseases and Preventive methods: Etiology, epidemiology pathogenesis, symptoms, postmortem lesions, diagnosis, and control measures of any three infectious diseases of cattle, sheep, goat and pigs. Diagnosis and treatment of non-specific conditions like impaction, Bloat, Diarrhea, Indigestion, dehydration, stroke, poisoning. Vaccination and deworming, Principles and methods of immunization of animals against specific diseases - herd immunity - disease free zones - 'zero' disease concept - chemoprophylaxis. Visit any one farm. **(12 Hours)**

COURSE BOOK:

1. Tarit Kumar Banerjee, Applied Zoology, New Central Book Agency Private Limited, London, 2016

UNIT	BOOK	CHAPTERS
I	1	9
II	1	11
III	1	13
IV	1	12
V	1	9.11.12.13

BOOKS FOR REFERENCE:

1. Shiv Prasad, A. Kumaresan, S. S. Lathwal Mukesh Bhakat, A. Manimaran New Paradigms in Livestock Production from traditional to commercial farming and beound New Delhi, 2013.
2. Andrew L. Winton and Kate Barber Winton. Milk and milk products Agrobios (India), Agro house, Chopasani Road, Jodhpur, 2012.
3. Behera U.K. A Text book of Farming systems. Agrotech publishing academy, 11A-Vinayak Complex-B, Durga nursery Road, Udaipur, 2014.
4. Banerjee G.C. A Text Book of Animal Husbandry. 7/e. Oxford & IBH Publ., New Delhi, 1992.

DSE - 2 - WILD LIFE CONSERVATION AND MANAGEMENT

Semester: V **Hours: 4**

Code : 23ZO5DE2C **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the terms employed in the conservation of wildlife.	PSO - 4	K1
CO - 2	Understand the key components of conservation policies and acts.	PSO - 2	K2
CO - 3	Analyse the characteristics of fauna and their adaptation to wildlife habitats	PSO - 1	K3
CO - 4	Apply regional and national approaches for biodiversity conservation to real-world scenarios.	PSO - 3	K4
CO - 5	Evaluate the effectiveness of wildlife trade legislation preventing illegal wildlife trade.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V			**WILD LIFE CONSERVATION AND MANAGEMENT**						**Hours:4**			
Code : 23ZO5DE2C												**Credit:3**
Course Outcomes	**Programme Outcomes(PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	2	5	3	4	4	3	2	5	4	3.64
CO - 2	3	4	2	4	5	4	3	5	2	4	4	3.64
CO - 3	5	4	2	3	4	4	5	4	2	3	4	3.64
CO - 4	2	4	5	3	2	4	2	2	5	3	4	3.27
CO - 5	3	5	2	3	3	5	3	3	2	3	5	3.36
Overall Mean Score												**3.51**

Result: The Score for this Course is **3.51** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Biodiversity Extinction and Conservation Approaches: Perspectives and Expressions. Identification and prioritization of Ecologically Sensitive Area (ESA). Coarse filter and fine filter approaches. Regional and National approaches for biodiversity conservation. **(12 Hours)**

UNIT II

Theory and Analysis of Conservation of Populations: Stochastic perturbations - Environmental, Demographic, spatial and genetic stochasticity. Population viability analysis-conceptual foundation, uses of PVA models. Management decisions for small populations using PVA models. Minimum viable populations and recovery strategies for threatened species. **(12 Hours)**

UNIT III

National and International Efforts for Conservation: International agreements for conserving marine life, Convention on wetlands of International Importance (Ramsar convention), Conservation of Natural Resources. Overview of conservation of Forest and Grassland resources. CITES, IUCN, CBD National Forest Policy, 1988, National Wildlife Action Plan 2017-2031, Wildlife Protection Act 1972, National and State Biodiversity Action Plans and other Forests and Environmental Acts. **(12 Hours)**

UNIT IV

Wildlife Conservation in India: Wildlife wealth of India and threatened wildlife, Reasons for wildlife depletion in India, Wildlife conservation approaches and limitations. Wild life habitat: Characteristics, fauna and adaptation with special reference to Tropical Forest. Protected Area concept: National Parks, Sanctuaries and Biosphere Reserves, cores and Buffers, Nodes and corridors. Community reserve and conservation reserves. **(12 Hours)**

UNIT V:

Management of Wildlife: Distribution, status. habitat utilization pattern, threats to survival of Slender Loris, Musk deer, Great Indian Bustard, Olive Ridley turtle. Wild life Trade and legislation, assessment, documentation, prevention of trade, wild life laws and ethics. **(12 Hours)**

COURSE BOOK:

1. Arumugam N, Concepts of Ecology, Saras Publication, Nagercoil, 2019.

UNIT	BOOK	CHAPTERS
I	1	36
II	1	32
III	1	36
IV	1	20
V	1	20, 21, 22

BOOKS FOR REFERENCE:

1. Ali, S. and Ripley, D.S. A compact Handbook of Birds of Indian subcontinent. OUP, Bombay, 1987.
2. Bookhout, T.A. Research and Management Techniques for Wildlife and Habitats (5th edition) The Wildlife Society, Allen Press, 1996.
3. Caughley, G., and Sinclair, A.R.E. Wildlife Ecology and Management. Blackwell Science, 1994.
4. Gee, E. P.The wildlife of India. Harper Collins Publication, 2000.
5. Hunter, M.L., Gibbs, J.B. and Sterling, E.J. Problem solving in conservation biology and wildlife management: Exercises for class, field, and laboratory, Blackwell Publishing, 2008.
6. John Wiley. Caughley and Gunn. Conservation Biology in Theory and Practice. Blackwell,1996
7. Magurran, A.E. Ecological diversity and its measurements. Croom - Helm Ltd, 1991.
8. Sutherland, W.J, The Conservation Handbook: Research, Management and Policy. Blackwell Sciences, 2001.
9. Wodroffe, G. Wildlife conservation and modern zoo. Saiga Publishing Co., England,1991
10. Woodroffe, R., Thirgood, S. and Rabinowitz, A. People and wildlife, conflict or co-existence, Cambridge University,2005

INTERNSHIP

Semester: V

Code : 23ZO5IN01 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Learn the fundamentals of an industrial set up.	PSO-1	K1
CO - 2	Explain the acquired knowledge and demonstrate.	PSO- 3	K2
CO - 3	Apply the principles involved in machineries and tools to the current scenario.	PSO - 4	K3
CO - 4	Develop their soft skills for their working environment in the near future.	PSO - 2	K4
CO - 5	Emerge as an Entrepreneurs.	PSO-5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**INTERNSHIP**							**Credit: 2**
Code : 23ZO5IN01											
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	3	3	3	2	5	3	3	3	2	3.09
CO - 2	4	3	5	3	3	3	4	3	5	3	3	3.54
CO - 3	3	3	4	5	2	3	3	2	4	5	3	3.36
CO - 4	3	4	2	3	5	4	3	5	2	3	4	3.45
CO - 5	3	5	3	4	3	5	3	3	3	4	5	3.72
Overall Mean Score												**3.43**

Result: The score for this course is **3.43** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

JACEP - EXTENSION

U.G. PROGRAMME OUTCOMES (2023 - 2026)

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Acquire comprehensive knowledge and evaluate analytically in their specific disciplines.
2.	Apply the acquired knowledge in professional and social life.
3.	Evolve new methodologies in the specific disciplines leading to innovation and employability.
4.	Develop critical thinking required to pursue research.
5.	Apply the computational and life skills to the challenging problems in life.
6.	Design and develop independent projects.

U.G. PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO. NO.	UPON COMPLETION OF THIS PROGRAM THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO - 1	Understand and identify the needs of the community and articulate viewpoints both practically and theoretically.	PO-1, PO-3
PSO - 2	Develop among themselves a sense of social and civic responsibility to be more culturally equipped.	PO-2, PO-3, PO- 4, PO- 6
PSO - 3	Apply their education in finding practical solutions to individual, community problems to exercise their rights properly.	PO - 1, PO- 3, PO- 4, PO- 6
PSO - 4	Acquire leadership qualities and a democratic attitude by carrying out their duties as effective citizens of the country.	PO- 2, PO- 3, PO- 5
PSO - 5	Develop the capacity to think clearly and cogently to meet emergencies and national disasters and practise national integration and social harmony.	PO- 3, PO- 4, PO- 5

JACEP - EXTENSION

Semester: V-VI **Hours: 60**

Code : 23SLPEX01 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Impart knowledge on education.	PSO-2, PSO-3	K1
CO - 2	Get awareness of environmental issues and solve the issues.	PSO-1, PSO-5	K2
CO - 3	Develop a concern for the voiceless and faceless and rectify it.	PSO- 1, PSO-2, PSO-5	K3
CO - 4	Analyse the reasons for health problems and impart knowledge on a balanced diet.	PSO-1, PSO- 3	K4
CO - 5	Apply different fields of knowledge to the society.	PSO-3, PSO- 4, PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V -VI				JACEP - EXTENSION								Hours: 60
Code : 23SLPEX01												Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	3	3	4	4	3	3	3	5	3	3	5	3.54
CO - 2	3	4	3	2	4	3	4	5	4	5	2	3.55
CO - 3	3	4	5	3	3	4	3	3	5	3	5	3.72
CO - 4	2	2	3	3	2	3	3	5	5	5	3	3.27
CO - 5	3	3	3	3	3	3	4	4	4	3	3	3.27
Overall Mean Score												**3.47**

Result: The Score for this Course is **3.47** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs = Total of Mean Scores / Total No. of COs

UNIT I: LITERACY GROUP:

Giving orientation for the students about JACEP - importance of education awareness of dropouts and counselling the parents to re-admit the school dropouts- organizing activities based on the disciplines - arranging competitions for school children - educating the school children about the positives and negatives of social media- Higher studies after +2.

UNIT II: HEALTH AND HYGIENE GROUP:

Doing a survey on health problems - organizing medical camps and talks - organizing basic medical check-ups, conducting health and hygiene talk by B. Voc students of JAC to the adopted villages- Balance diet, orientation about home nurse- rapport with Government and NGO's

UNIT III: LIAISON GROUP & PEOPLE ORGANIZATION GROUP:

Motivating workers to access government savings schemes with unorganised sectors- celebrating important days - Services offered in E- Sevai centres- organizing income generation skill training for self-help groups. organizing population education programmes - conducting awareness programmes on emerging social issues - rapport with non-governmental organizations and local bodies to ensure the development of the villages - organizing youth, farmers and self-help group to function democratically-

UNIT IV: ENVIRONMENTAL GROUP:

Tree and sapling plantation - promotion of Herbal Gardens - observing environmental-related days -awareness campaign to educate the villagers to protect the environment.

UNIT V: APPLICATION OF KNOWLEDGE:

Conducting Special Skill Training for self-employment based on discipline to the target group with the help of NGO's and government organizations - awareness on social media.

BOOKS FOR REFERENCE:

1. Higher studies after +2
2. Services offered in E- Sevai services
3. பிறப்பு முதல் இறப்பு வரை அரசு ஆவணங்கள்/ சேவைகள் வழிகாட்டு கையேடு
4. அரசு நலத்திட்ட உதவிகள் தகவல் கையேடு
5. வருவாய் மற்றும் பேரிடர் மேலாண்மை துறை மூலம் பொது மக்களுக்கு இ சேவை வழியாக இணையதள மின் சேவை

SCHEME OF EVALUATION

	Continuous Internal Assessment	
1.	Attendance (60 hours)	10 Marks
2.	Field Visit & Report	50 marks
3.	Assignment	40 Marks
	Total	**100 marks**

DEVELOPMENTAL BIOLOGY

Semester: VI **Hours: 6**

Code : 23ZO6MC11 **Credit: 5**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall facts and basic concepts related to developmental biology	PSO - 1	K1
CO - 2	Summarize key developmental processes and their molecular mechanisms	PSO - 2	K2
CO - 3	Apply knowledge of developmental biology to analyze and solve problems in reproductive health	PSO - 3	K3
CO - 4	Analyze and compare different developmental processes	PSO - 5	K4
CO - 5	Critically evaluate recent developments in developmental biology	PSO - 4	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**DEVELOPMENTAL BIOLOGY**							**Hours: 6**
Code : 23ZO6MC11											**Credit: 5**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	4	3	3	5	3	2	4	3	3.36
CO - 2	2	3	3	3	5	3	2	5	3	3	3	3.18
CO - 3	2	3	5	3	4	3	2	4	5	3	3	3.36
CO - 4	3	5	3	4	4	5	3	4	3	4	5	3.91
CO - 5	2	4	4	5	3	4	2	3	4	5	4	3.64
Overall Mean Score												**3.49**

Result: The Score for this Course is **3.49**(High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

History of Developmental Biology - Germ plasm theory, recapitulation theory, origin of primordial germ cells. Gametogenesis - spermatogenesis, oogenesis, structure of male and female gametes, ovulation, fertilization-sperm attraction, acrosome reaction, fusion of egg and sperm, theories of egg activation, types of fertilization, parthenogenesis. **(18 Hours)**

UNIT II

Cleavage - patterns, types, physiology and factors affecting cleavage, gastrulation. Morphogenetic movements, fate map, development of chick based on the hours of incubation - 24, 48, 72 and 96 hrs. Organogenesis - development of heart, eye, and brain in chick. **(18 Hours)**

UNIT III

Nucleo-cytoplasmic interaction, nuclear transplantation, gradients, embryonic induction, primary and secondary organizers, regeneration. Metamorphosis in insects and amphibians. **(18 Hours)**

UNIT IV

Human development - male and female reproductive organs, hormonal control of ovulation and pregnancy, menstrual cycle, biological diagnosis of pregnancy. Gestation period, physiological changes during pregnancy and foetal growth - placenta, child birth, parturition, lactation, mishaps of pregnancy - ectopic pregnancy, abortion and stillbirth, prenatal diagnosis. **(18 Hours)**

UNIT V

Medical implications of Developmental Biology - birth control measures, infertility, Erythroblastosis foetalis, Twins - types. Test tube baby, ART (Assisted Reproductive Technology), teratogenesis. Stem cells and therapeutic cloning. Embryo culture, amniocentesis. **(18 Hours)**

COURSE BOOKS:

1. Arumugam N. Developmental Biology, Saras Publications, Nagercoil, Kanyakumari District, 2014.
2. Arumugam N. Animal physiology, Saras Publications, Nagercoil, Kanyakumari District, 2005.

UNIT	BOOK	CHAPTER
I	1	1-3, 6
II	1	8
III	1	16-19
IV	2	320, 321, 323, 324, 325, 329
V	1	25, 28, 29, 31, 34, 35.

BOOKS FOR REFERENCE:

1. Verma P.S. and V. K., Agarwal. Chordate Embryology. Chand and company Ltd, New Delhi,2003
2. Balinsky B. I. An Introduction to Embryology. 2nd edition, East West Press (P) Ltd, Ansari Road, Dryagana, New Delhi,1981
3. Kanna. Text Book of Embryology. Discovery Publishing House, Prahlad Street, New Delhi.2004
4. Mohan P. Arora., Embryology. 4th Edition, Himalaya Publishing House, Mumbai, 2002.

GENETIC ENGINEERING AND BIOTECHNOLOGY

Semester: VI **Hours: 5**

Code : 23ZO6MC12 **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Rewrite the principle of tools and techniques used in Genetic Engineering.	PSO - 4	K1
CO - 2	Understand the steps involved the production of transgenic plants and animals.	PSO - 1	K2
CO - 3	Explore strategies in recombinant technology	PSO - 2	K3
CO - 4	Assess the role of microorganisms in the production of genetically modified products.	PSO - 5	K4
CO - 5	Comprehend the principles and applications behind the techniques in genetic engineering	PSO - 3	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**GENETIC ENGINEERING AND BIOTECHNOLOGY**							**Hours: 5**
Code : 23ZO6MC12											**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	2	4	3	5	3	4	2	3	3	5	4	3.45
CO - 2	5	4	2	4	3	4	5	3	2	4	4	3.64
CO - 3	2	4	4	3	5	4	2	5	4	3	4	3.64
CO - 4	2	5	3	3	2	5	2	2	3	3	5	3.18
CO - 5	2	3	5	4	3	3	2	3	5	4	3	3.36
Overall Mean Score												**3.45**

Result: The Score for this Course is **3.45** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Introduction to Genetic Engineering : Scope, aim and historical perspectives. Tools used in Genetic Engineering: Restriction endonuclease - types. DNA Ligase, Reverse Transcriptase, Gene Cloning vectors - Plasmid - types and properties, Bacteriophage vectors - Lambda Phage vector, M13 bacteriophage, Plant vector - Ti Plasmid, Viral vectors - SV40, CaMV, Shuttle vectors - Expression vectors and cosmids. **(15 Hours)**

UNIT II

Construction of *r* - DNA : Preparation of desired gene from natural source and m-RNA, isolation of DNA and plasmid, insertion of desired gene into the plasmid, introduction of r- DNA into host cell - Bacteria (Transformation), Plant cells (Electrophoration, Agrobacterium mediated gene transfer) Animal cells (Particle Bombardment method), Transfection, Microinjection, Liposome mediated gene transfer, chemical method - $Cacl_2$ precipitation. **(15 Hours)**

UNIT III

Selection of Recombinants: Direct selection, Insertional inactivation of antibiotic resistance gene, Insertional inactivation of Lac Z /gene, Immunochemical method, Colony hybridization, Blotting - Southern, Western, Northern - Dot Blot Technique - PCR. **(15 Hours)**

UNIT IV

Animal tissue culture: Animal cell culture media - types - Primary culture and secondary culture, maintenance of cell lines, steps involved in mammalian cell culture, Hela & WI38 cell lines, techniques and applications of organ culture. Animal cloning - Dolly. **(15 Hours)**

UNIT V

Applications of Biotechnology: Transgenic Animals - Fish, Mice, Sheep and Cow. Transgenic Plants: Herbicide and Insecticide resistant Plants, transgenic plants as bioreactors, transgenic plants with improved storage proteins, oil and fats, Genomic library, gene therapy, role of superbug in degrading oil pollution. Biogas production, Biohazards of rDNA technology. **(15 Hours)**

COURSE BOOKS:

1. Arumugam N, Narayanan L, Mani A., Molecular Biology and Genetic Engineering,6th edition, Saras Publication,2014
2. Satyanarayana U, Biotechnology, 12th edition, Uppala Publishers,2017

UNIT	BOOK	CHAPTERS
I	2	6
II	1	4, 12
III	1	13, 16
IV	2	33, 35
V	2	41

BOOKS FOR REFERENCE:

1. Arumugam N, L.M. Narayanan, Genetic Engineering, 4th edition, Saras Publications, 2017.
2. Dubey R.C, A text Book of Biotechnology, 2nd edition, S. Chand Publications, 2012. Brown T.A., Gene cloning - An Introduction, 3rd edition, UK: Stanley Thornes Pub. Ltd, 1995.
3. Das H.K., Text Book of Biotechnology, New Delhi: Wiley Dreamtech India Pvt. Ltd., 2004.
4. Watson, J.P., Gilman, M., Witowski. J and Zoller.M., Recombinant DNA, 2nd edition, New York: Freeman & Company
5. Walker J.M. and Rapley Molecular Biology and Biotechnology, 4th edition, New Delhi: Panima Publications 2003.

ECOLOGY

Semester: VI **Hours: 5**

Code : 23ZO6MC13 **Credit: 4**

COURSE OUTCOMES

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Explain key ecological concepts such as ecosystem, community, population and biodiversity and describe the interactions between biotic and abiotic components in ecosystems.	PSO - 1	K1
CO - 2	Distinguish environmental issues and evolve solutions for sustainable practices.	PSO - 2	K2
CO - 3	Apply ecological principles to address real-world environmental issues such as habitat destruction, pollution, and resource management.	PSO - 3	K3
CO - 4	Connect ecological principles to real-world problems in collaboration with professionals from other fields.	PSO - 5	K4
CO - 5	Evaluate existing environmental policies and regulations, considering their impact on ecosystems and biodiversity.	PSO - 4	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**ECOLOGY**							**Hours: 5**
Code : 23ZO6MC13											**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	4	2	3	5	2	2	4	3	3.18
CO - 2	2	4	3	3	5	4	2	5	3	3	4	3.45
CO - 3	2	3	5	4	3	3	2	3	5	4	3	3.36
CO - 4	3	5	2	4	3	5	3	3	2	4	5	3.55
CO - 5	3	4	2	5	2	4	3	2	2	5	4	3.27
Overall Mean Score												**3.36**

Result: The Score for this Course is **3.36** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Ecological components and Interactions: Abiotic factors and its ecological role - soil, light, temperature, water. Limiting factors. Biogeochemical cycles - Carbon, Sulphur, Nitrogen and Phosphorous. Animal relationships: - Mutualism, commensalism, parasitism, competition, predation **(15 Hours)**

UNIT II

Ecological concepts Concept of Ecosystem - structure and function. Population Ecology - Population dynamics and growth curves. Community Ecology. **(15 Hours)**

UNIT III

Habitat Ecology: Characteristic features, types and faunal adaptations in Freshwater (Lotic and lentic), Marine, estuarine, mangrove, tundra, Savanna, cave, forest and desert habitat. Significance and Conservation of wetlands. Ecological effects of dams, hydroelectric projects and Aquaculture. **(15 Hours)**

UNIT IV

Pollution: Types, causes, effects (with examples) and management of land, water, air, thermal and pesticide pollution. Nuclear Hazards - management of solid waste, plastic waste, medical waste and e-waste. **(15 Hours)**

UNIT V

Biodiversity Conservation and Disaster management: Biodiversity: Definition, characterization, levels, types and values. El - Nino effect, oil spills and westerly winds, Mega diversity countries, Diversity hotspot, IUCN categories of threatened species, biodiversity and sustainable development, gene banks, cryopreservation. Disaster management - definition, factors and significance, difference between hazard and disaster. Natural disasters - earthquakes, volcanic eruption, landslides, snow avalanches, floods and flash floods, cyclones, tsunami and droughts. Man made disasters - fires and forest fires, nuclear, biological and chemical disasters, road accident. **(15 Hours)**

COURSE BOOK:

1. Arumugam N, Concepts of Ecology, Saras Publication, Nagercoil,2019

UNIT	BOOK	CHAPTERS
I	1	5, 6, 7, 8, 9, 10, 11
IV	1	38, 39, 40, 41, 43, 44,4 5
II	1	11, 12, 13
III	1	14, 15, 16, 17, 18
V	1	36, 48

BOOKS FOR REFERENCE:

1. Eugene P. Odum, Murray Barrick, Gary W. Barret. Fundamentals of Ecology (5thedition. Brooks/Cole Publishers, UK, 2005.
2. Begon and Mortimer, Population Ecology. UBS Publishers, Delhi, 1992.
3. Kormondy, Edward, J. Concept of Ecology. Prentice Hall of India Pvt., Ltd., Delhi,1994
4. Sharma, P.D. Ecology and Environment. Rastogi Publications, Meerut, 1999.
5. Dash, M.L. Fundamentals of Ecology. Tata McGraw Hill Publishing Company Ltd., New Delhi, 1996.
6. Trivedi, P.C. and Sharma, K.C. Biodiversity Conservation. Avishek Publishers, Jaipur, 2003.
7. Trivedi, R.N, Textbook of Environmental Sciences. Anmol Publications Pvt. Ltd., New Delhi.1993
8. Shukla, S.K. and Srivastava, P.R. Water Pollution and Toxicology. Common - Wealth Publishers. New Delhi, 1992.
9. Subramanian, M.A. Toxicology: Principles and methods. MJP Publishers, Chennai, 2004.
10. Verma, P.S. and Agarwal V. K. Principles of Ecology. S. Chand and Co. Pvt. Ltd., New Delhi,1986

DEVELOPMENTAL BIOLOGY, BIOTECHNOLOGY AND ECOLOGY - LAB

Semester: VI **Hours: 4**

Code : 23ZO6CP05 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify the key components of aquatic and terrestrial eco system	PSO - 1	K1
CO - 2	Demonstrate a comprehensive understanding of the developmental processes in animals	PSO - 2	K2
CO - 3	Apply the biotechnological methods in the separation and analysis of biomolecules	PSO - 3	K3
CO - 4	Integrate the ecological principles in the conservation of ecosystem and biodiversity	PSO - 5	K4
CO - 5	Construct experiments to analyse the dynamics of food chains and food webs	PSO - 4	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**DEVELOPMENTAL BIOLOGY, BIOTECHNOLOGY AND ECOLOGY - LAB**							**Hours: 4**
Code : 23ZO6CP05											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	3	3	3	5	3	2	3	3	3.18
CO - 2	4	3	2	3	5	3	4	5	2	3	3	3.36
CO - 3	3	3	5	3	3	3	3	3	5	3	3	3.36
CO - 4	3	5	2	3	2	5	3	2	2	3	5	3.18
CO - 5	3	3	3	5	3	3	3	3	3	5	3	3.36
Overall Mean Score												**3.29**

Result: The Score for this Course is **3.29** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

DEVELOPMENTAL BIOLOGY:

1. Mounting of chick blastoderm
2. Study of 24, 48 and 72 hours chick embryo
3. Observation of developmental stages up to gastrula of frog
4. Placental types - Diffuse, Cotyledonary, Zonary and Discoidal.
5. Effect of Thyroxin in tadpoles (in batches)
6. Study of regeneration of tail in tadpoles (in batches)

BIOTECHNOLOGY

1. Isolation of DNA from Spleen
2. Isolation of DNA from Plant source
3. Isolation of plasmid DNA
4. Separation of protein using Polyacrylamide Gel Electrophoresis (PAGE).
5. Thin layer Chromatography (TLC)
6. Spotters: Western blotting, Southern blotting, Vector pBR 322

ECOLOGY:

1. Estimation of dissolved oxygen in various water samples - Winkler's method
2. Study of a pond ecosystem
3. Mounting of freshwater plankton
4. Sampling of plant population by quadrate method and line transect method in terrestrial habitat
5. Measurement of water turbidity using Secchi disc
6. Study of food chain and food web from fresh water and terrestrial environment.
7. Field visit - Pond and forest ecosystem

PROJECT

Semester: VI **Hours: 4**

Code : 23ZO6PR01 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify a problem in their respective field.	PSO - 1	K1
CO - 2	Understand the various steps involved in solving the problem.	PSO - 2	K2
CO - 3	Apply various skills to solve the problem.	PSO - 3	K3
CO - 4	Interpret their findings in the respective field.	PSO - 4	K4
CO - 5	Present the outcome of their project.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester:							**PROJECT**					**Hours: 4**
Code : 23ZO6PR01												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	4	3	4	2	5	4	4	3	2	3.45
CO - 2	4	2	4	3	5	2	4	5	4	3	2	3.45
CO - 3	4	2	5	4	4	2	4	4	5	4	2	3.64
CO - 4	4	2	4	5	4	2	4	4	4	5	2	3.64
CO - 5	2	5	3	4	3	5	2	3	3	4	5	3.55
Overall Mean Score												**3.55**

Result: The score for this course is **3.55** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

DSE - 3 - BIOINFORMATICS

Semester: VI **Hours: 3**

Code : 23ZO6DE3A **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on the fundamental concepts of databases in Bioinformatics	PSO - 1	K1
CO - 2	Understand the various types of sequencing methods used in genomics	PSO - 4	K2
CO - 3	Apply basic phylogenetic methods to construct phylogenetic trees from molecular sequence data.	PSO - 2	K3
CO - 4	Relate the different types of biological sequence alignments in computational biology	PSO - 5	K4
CO - 5	Analyses the properties of gene and protein sequences and deduce their structure and evolutionary relationships.	PSO - 3	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**DSE - 3 - BIOINFORMATICS**							**Hours:3**
Code : 23ZO6DE3A											**Credit:2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	2	3	5	2	3	3	3	3.18
CO - 2	2	3	3	5	2	3	2	2	3	5	3	3.00
CO - 3	2	3	3	3	5	3	2	5	3	3	3	3.18
CO - 4	2	5	3	4	2	5	2	2	3	4	5	3.36
CO - 5	2	4	5	3	3	4	2	3	5	3	4	3.45
Overall Mean Score												**3.23**

Result: The Score for this Course is **3.23** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Introduction to Bioinformatics: History, scope, Introduction to databases - classification and types, Biological databases, Nucleic acid sequence databases - NCBI, EMBL, GenBank, Protein sequence databases - Swiss Prot and TrEMBL, Literature Databases - Pubmed. **(9 Hours)**

UNIT II

Biological Sequence alignment: Local and Global alignment - Dot Matrix, pair wise alignment - FASTA, BLAST. Multiple sequence alignment- Clustal W -Uses of sequence analysis. **(9 Hours)**

UNIT III

Phylogenetic Analysis: Construction of Phylogenetic tree - Rooted vs Unrooted tree - Methods of constructing Phylogenetic tree, UPGMA, Neighbor joining method - Software's for Phylogenetic Analysis. **(9 Hours)**

UNIT IV

Genomics: Genome - Definition, Gene sequencing methods, Maxam and Gilbert method, Sanger's sequencing method - Tools used in Genomics, Human genome Project. **(9 Hours)**

UNIT V

Applications of Bioinformatics: Role of Bioinformatics in Agriculture, Pharmaceutical and Genetic disorders, SNP - Clinical informatics, Pharmacogenomics, Pharmacokinetics. **(9 Hours)**

COURSE BOOKS:

1. Gopi E. R, Meena, Biostatistics and Bioinformatics, 4th edition, Saras publications, 2019.
2. Srinivasa Rao D, Bioinformatics, 2nd edition, Biotech Pharma Publications, 2010.

UNIT	BOOK	CHAPTERS	SECTIONS
I	1	1, 14, 15, 16, 17, 18, 19	----------
II	1	19, 20, 21	----------
III	2	7	7.1-7.4, 7.14, 7.18, 7.23, 7.24
IV	2	11	11.1, 11.2, 11.27, 11.28
V	2	13, 15	13.2, 13.3, 13.4, 15.4, 15.7, 15.29

BOOKS FOR REFERENCE

1. Sushil kumar, Bioinformatics-Methods and Applications, 1st edition, Thomas Press, 2016.
2. Arthur M.Lesk, Introduction to Bioinformatics, 2nd edition, Oxford University press,2004
3. Subramanian C, A Textbook of Bioinformatics, 1st edition, Dominant Publishers, 2017.

DSE - 3 - ENTOMOLOGY

Semester: VI **Hours: 3**

Code : 23ZO6DE3B **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the taxonomy of insects with their key characteristics.	PSO - 1	K1
CO - 2	Understand the functional morphology of insects.	PSO - 2	K2
CO - 3	Assess the impact of beneficial insects in commercial industries.	PSO - 5	K3
CO - 4	Characterize the different types of insect pests.	PSO - 3	K4
CO - 5	Evaluate the different strategies for insect collection and preservation.	PSO - 4	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**DSE - 3 - ENTOMOLOGY**							**Hours: 3**
Code : 23ZO6DE3B											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	2	3	3	4	5	3	2	3	4	3.45
CO - 2	4	3	2	2	5	3	4	5	2	2	3	3.18
CO - 3	3	5	2	2	3	5	3	3	2	2	5	3.18
CO - 4	4	3	5	3	3	3	4	3	5	3	3	3.55
CO - 5	3	4	2	5	3	4	3	3	2	5	4	3.45
Overall Mean Score												**3.36**

Result: The Score for this Course is **3.36** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Insect Taxonomy: Definition, scope of Entomology, insect diversity, principles of insect classification, classification up to orders, insect collection and preservation.

(9 Hours)

UNIT II

Insect Morphology: Types of antennae, mouth parts and legs, thorax, wings venation, wings modification, spiracles - types, genitalia - structure and types.

(9 Hours)

UNIT III

Insect Physiology: Mouth parts of insects, feeding and digestion, respiration in insects, reproduction in insects - moulting and metamorphosis. **(9 Hours)**

UNIT IV

Pests of Economic importance: Biology, rearing and economic importance of silk worm, honey bees and lac insects, insects of medical and forensic importance. Internal feeders and external feeder. **(9 Hours)**

UNIT V

Insect Pests: Pest - Concept of insect pest- definition, Biology of pest, pest of Rice (The Rice stem borer), pest of Cotton (Aphids and Bollworms) pest of vegetables (Fruit borer) pest of paddy (Grain moth and red flour beetle), mode of action and control measures. **(9 Hours)**

COURSE BOOKS:

1. Nalina Sundari M.S, R. Santhi, Entomology, 1st edition, MJP Publishers, 2010.
2. Manju Yadav, Biology of Insects, 2 nd edition, Discovery Publishing House, 2000.

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UNIT	BOOK	CHAPTERS
I	1	1, 2
II	1	2, 3
III	2	1, 2, 5
IV	1	6, 7
V	1	27, 28, 29

BOOKS FOR REFERENCE:

1. Mathur, and Upadhyay, A textbook of Entemology, 1st edition,Rama publishing House, 2014.
2. Shanthi M, Dr. Senguttuvan T, Dr. Suresh K, Dr. Kavitha Z, Text Book on Fundamental Entemology, 1st edition, Agrobios Publishers,2022.

DSE - 3 - AGROCHEMICALS AND PEST MANAGEMENT

Semester: VI **Hours: 3**

Code : 23ZO6DE3C **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the concept of pests and its classification.	PSO - 1	K1
CO - 2	Understand the process of producing chemical fertilizers.	PSO - 2	K2
CO - 3	Examine the significance of biofertilizers in promoting environmental sustainability	PSO - 4	K3
CO - 4	Comprehend the significance of insect growth regulators in pest control.	PSO - 5	K4
CO - 5	Evaluate the efficacy of integrated pest management strategies.	PSO - 3	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI			**DSE - 3 - AGROCHEMICALS AND PEST MANAGEMENT**								**Hours: 3**
Code : 23ZO6DE3C											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**				**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**
CO - 1	5	4	2	3	2	4	5	2	2	3	4	3.27
CO - 2	2	4	3	3	5	4	2	5	3	3	4	3.45
CO - 3	2	4	3	5	3	4	2	3	3	5	4	3.45
CO - 4	3	5	3	4	3	5	3	3	3	4	5	3.73
CO - 5	3	4	5	3	2	4	3	2	5	3	4	3.45
Overall Mean Score											**3.47**

Result: The Score for this Course is **3.47** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Concept of pest: Definition, classification of pest. Plant pests - weeds, bacteria, fungi, viruses, nematodes, molluscs, arthropods, birds, mammals. Causes of outbreak of pest, growth and development. Classification based on nature of damage, public health pests, agricultural pests, domestic pests, animal husbandry pests and structural pests. **(9 Hours)**

UNIT II

Agrochemicals and Chemical Fertilizers: Agrochemicals - Definition, properties, introduction to chemical fertilizers, classification, Nitrogen fertilizers - characteristics, Phosphorous fertilizers - Phosphate Fertilizers - Normal super phosphate, Triple Super Phosphate, Ammonium Phosphate, Potassic fertilizers, Advantages and disadvantages of chemical fertilizers. **(9 Hours)**

UNIT III

Agrochemicals and Chemical pesticides: Pesticide - definition, history, classification of pesticides, chemical pesticides - physical and chemical properties, mode of action, degradation metabolism of organochlorine phosphate, organophosphate, carbamate and pyrethroids, formulation of chemical pesticides, impacts of chemical pesticides on environment. **(9 Hours)**

UNIT IV

Biofertilizers and Biopesticides: Introduction, types of Biofertilizers - Rhizobium, Azotobacter, Azospirillum, Azolla, VAM (Vesicular Arbuscular Mycorrhiza). Biopesticides - Definition, classification, *Bacillus Thurungiensis* , *Trichoderma sp, and Pseudomonas,* plant based biopesticides, insect growth regulators, pheromones, JHA, advantages of biopesticides. **(9 Hours)**

UNIT V

Methods of Pest Management: Methods of Pest control - physical, chemical, quarantine, mechanical, biological control methods, Integrated pest management, Appliances of pesticides - dusters and sprayers, Methods of Application - dusting, spraying, aerosol and aerial spraying **(9 Hours)**

COURSE BOOKS:

1. Supriti Sarkar, Gautam Kundu, Korak Chaki, Introduction to Economic Zoology, 2nd edition, New central Book agency, 2016.
2. Gupta H.C.L, A.U Siddiqui,Aruna Parihar Biopest management, 1st edition, Agrotech Publishing House, 2010.

UNIT	BOOK	CHAPTERS
I	1	1, 2
II	2	23, 27
III	2	24, 25
IV	2	9, 17, 21
V	1	1, 2, 3

BOOKS FOR REFERENCE

1. Hill, D.S. Agricultural insect pests of the tropics and their control- Cambridge Univ. Press, 1983.
2. Atwal, A. S. Agricultural pests of India and south East Asia, 1979.
3. Dent, D, Insect pest management 2nd edition CAB International, 2000.
4. Roberts, D.A, Fundamentals of Plant Pest Control.1978.
5. De Bach, P, Biological Control of Insect Pests and Weeds, Chapman & Hall, New York, 1964.
6. Koul, O. and Dhaliwal, G.S. Phytochemical Biopesticides, Harwood Academic Publishers, Amsterdam, 2003.
7. Pedigo, L.P, Entomology and Pest Management, Prentice Hall, N. Delhi, 1996.

SEC - 4 ORNAMENTAL FISH CULTURE

Semester: VI **Hours: 3**

Code : 23SE6ZO04 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Memorize common species of ornamental fish and their characteristics	PSO - 1	K1
CO - 2	Explain the life cycle of ornamental fish and their reproductive strategies	PSO - 2	K2
CO - 3	Design a suitable aquarium setup based on the specific requirements of ornamental fish	PSO - 5	K3
CO - 4	Assess disease symptoms in ornamental fish and propose appropriate treatment methods	PSO - 3	K4
CO - 5	Develop a comprehensive plan for a sustainable ornamental fish breeding program	PSO - 4	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**SEC - 4 ORNAMENTAL FISH CULTURE**							**Hours: 3**
Code : 23SE6ZO04											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	2	2	3	4	5	3	2	2	4	3.27
CO - 2	3	3	2	2	5	3	3	5	2	2	3	3.00
CO - 3	3	5	2	3	2	5	3	2	2	3	5	3.18
CO - 4	3	3	5	2	3	3	3	3	5	2	3	3.18
CO - 5	3	4	2	5	3	4	3	3	2	5	4	3.45
Overall Mean Score												**3.22**

Result: The Score for this Course is **3.22** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Introduction to ornamental fish keeping. Scope and importance of ornamental fish culture. Domestic and global scenario of ornamental fish trade and export potential. Commercially important ornamental fishes-Indigenous varieties - striped barb, rosy barb and exotic varieties - Gold fish, koi carp. **(9 Hours)**

UNIT II

Biology of egg layers and live bearers. Selecting a healthy fish - Egg laying fishes (Siamese fighting fish, Goldfish, Zebra fish and Angel fish) and Live bearing fishes (Molly, Guppy and Swordtail). **(9 Hours)**

UNIT III

Food and feeding in ornamental fishes. Formulated feed and Live feed; Live feed culture-Artemia culture. Breeding, hatchery and nursery management of egg layers (eg. Goldfish) and live bearers (eg. Guppy). **(9 Hours)**

UNIT IV

Aquarium design and construction; Accessories - aerators, filters and lighting. Aquarium plants and their propagation. Maintenance of aquarium and water quality management. **(9 Hours)**

UNIT V

Conditioning, packing, transport and quarantine methods. Economics, trade regulations, domestic and export marketing strategies. Ornamental fish diseases- white spot disease (protozoan), fin rot disease (bacteria), lymphocystis disease (virus), saprolegniasis (fungi) their prevention, control and treatment methods. **(9 Hours)**

STUDY MATERIAL:

1. GracyKutty T. I, Study material on 'Ornamental Fish Culture, 2012.
2. Jameson J. D and Santhanam R, Manual of Ornamental Fishes and Farming Technologies. Fisheries College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University, Tuticorin 1996.

Unit	Book	Chapters
I	2	4
II	2	4
III	2	8, 9,10, 11
IV	2	3
V	1	4

BOOKS FOR REFERENCE:

1. Dolakia, A. D. Ornamental fish culture and aquarium management. Daya Publishing House, Delhi, 2009.
2. Jameson J. D and Santhanam R. Manual of Ornamental Fishes and Farming Technologies. Fisheries College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University, Tuticorin, 1996.
3. Meenakshi Jindal., Yadava N. K and Gupta R.K., Fresh water ornamental fishes. Mangalam Publications, Delhi,2010

BIONOMICS

Semester: VI

Code : 23ZO6SS01 **Credit: 2***

COURSE OUTCOMES:

- Recall the fundamental ecological concepts such as ecosystems, population dynamics and community ecology.
- Describe the interrelationship between organisms and their environments.
- Apply ecological principles to analyze and solve environmental problems.
- Explain the relationship between abiotic and biotic factors in ecosystems.
- Evaluate the ecological implications of global issues and remedy measures.

UNIT I

Abiotic Factor: Introduction, scope, concept and branches in ecology - Autecology and synecology. Types of media and substratum: Water- Properties, forms of water, soft and hard water, air- composition and properties, soil - types, soil formation and soil profile.

UNIT II

Biosphere: Hydrosphere, lithosphere, atmosphere, temperature - Distribution of temperature, thermal stratification, temperature as a limiting factor and thermal adaptations. Light as a limiting factor. Ecosystem - characteristic features, components, types, food chain, food web, pyramids and tropic levels.

UNIT III

Biogeochemical cycles: Gaseous cycle (C, N_2 & S) and sedimentary cycle (phosphates). Animal association - Intra specific, inter specific - colony formation, social organization, predation, parasitism, commensalisms, mutualism and inter specific competition - Gause's principle (with one example each).

UNIT IV

Population: Definition, characteristics, natality, mortality, age distribution of population growth forms and population fluctuation. Community - Ecotone, edge effects and ecological succession. Conservation - Wild life management, preservation - laws enforced, sanctuaries and national parks. Natural resources management- renewable and non-renewable.

UNIT V

Environmental degradation: Deforestation, urbanization, population explosion and other environmental hazards. Environmental ethics and laws, role of governmental agencies for environmental sustainability and monitoring.

COURSE BOOK:

1. Arumugam N, Concepts of Ecology, Saras Publication, Nagercoil 2015.

UNIT	BOOK	CHAPTERS
I	1	1, 4, 5.
II	1	6, 7, 8, 11.
III	1	12, 13.
IV	1	9, 10, 20.
V	1	35

BOOKS FOR REFERENCE:

1. Kotpal. R.L, and N.P. Bali, Concepts of Ecology, Vishal Publications, New Delhi - 7. 1986.
2. Rastogi V.B, and M.S. Jayaraji, Animal Ecology and Distribution of animals, Kedar nath, Ram Nath Meerut - 250 001. 1988 - 1989
3. Clark, G.L., Elements of Eology, John Wiley & Sons Inc., New York, London. 1954.
4. Eugene P. Odum, Fundamentals of Ecology, Saunders International Student Edition, W.B. Saunders Company, Philadelphia London, Toronto. 1971.
5. Agarwal. V.S., Strategies in Environmental conservation. Kalyani Publishers, New Delhi. 2001.
6. Odum E.P., Fundamentals of Ecology. 5th edition, Natraj Publication, Gayathri Offest, New Delhi. 2017.
7. Saha T.K., Ecology and Environmental Biology. Books and Allied (P) Ltd., Kolkata. 2013.
8. Trivedi, Ecology APH Publishing Corporation, New Delhi. 2012.
9. Verma P.S. and Agarwal V. K., Principles of Ecology. S. Chand and company Pvt. Ltd., New Delhi. 1992.
10. https:/www.slideshare.net/HarioMMehta2/population-explosion-78242237

DIETETICS

Semester: VI

Code : 23ZO6SS02 **Credit: 2***

COURSE OUTCOMES:

- Describe the role of food and nutrients in health and disease.
- Classify the nutrient needs and demonstrate food choices for infants, children, adolescents and adults.
- Illustrate the changes in body during the aging process.
- Explain the principles of diet therapy, modification of normal diet for therapeutic purposes and the role of dietician.
- Predict and prepare appropriate diets for therapeutic conditions.

UNIT I

Menu Planning - Principles of planning menus, steps involved in planning a menu; calorific value of food, nutritional requirements for infants and adults, nutritional requirements during artificial feeding and weaning.

UNIT II

Nutritional requirements for pre-school children (1 - 6 years), nutritional related problems of pre-schoolers. Nutritional and food requirements for school children (6 - 12 years), Nutritional requirements during adolescence.

UNIT III

Nutritional requirements for expectant mothers, lactating women, old age, Nutrition related problems of old age, Nutritional anaemia - Prevalence, types, Iron deficiency anaemia, Megaloblastic Anaemia, prevention.

UNIT IV

Diet in obesity and underweight, Diet in diseases of the Cardiovascular System, Role of fat in the development of atherosclerosis, saturated fatty acids, Trans fatty acids, Dietary management and dietary modification.

UNIT V

Diet in Diabetes mellitus -Types, symptoms. Diet in Cancer - Nutritional requirements and role of food in the prevention of cancer.

COURSE BOOK:

1. Srilakshmi B., Dietetics, 5th edition, New Age International P. Ltd. Publishers, New Delhi, 2005.

UNIT	BOOK	CHAPTERS
I	1	1, 2, 3.
II	1	4, 5, 6.
III	1	7, 8, 9, 10.
IV	1	14, 15.
V	1	18, 22.

BOOKS FOR REFERENCE:

1. Park and Park M.S., Preventive and Social Medicine. Banarsidas, Banat Publishers.2003
2. Nutrition and Diet Therapy. Times mirror/Mosby College Publishers,1989
3. Shakuntala Mary M. and N. Shadaksharaswathy. Food (Foods and Principles) New Age International P. LTD. Publishers, 2009.

BIOINSTRUMENTATION

Semester: VI

Code : 23ZO6SS03 **Credit: 2***

COURSE OUTCOMES:

- Explicate the principles underlying various bioinstrumentation techniques.
- Summarize the functioning of common bio instruments.
- Demonstrate the use of bio instruments in practical scenarios.
- Compare and contrast different bioinstrumentation methods, identifying their strength, weakness and optimal applications.
- Assess the appropriateness of different bioinstrumentation methods for specific applications.

UNIT I

Laboratory Practices: Guide lines, laboratory symbols, cleaning and sterilization of labware and reagents, handling and care of laboratory animals, Laminar flow hood - types and use. concepts of molecular weight, atomic weight, preparation of solutions of a particular molarity and percentage, Buffers - Definition and preparation of buffers, pH meter, safety and ethical issues in laboratory settings.

UNIT II

Microscopy: Light microscope, SEM, TEM, Atomic force microscope, Cryopreservation - principle and procedure, Fluorescence activated cell sorting, X-ray crystallography.

UNIT III

Bioinstrumentation: Working principle and types of centrifugations, Spectrophotometry, Mass spectrometry, Chromatography - Principle and types of chromatography.

UNIT IV

Biomedical instrumentation: ESR measurement, haemoglobin measurement, blood pressure, blood flow, ECG, cardiac pacemakers, X-ray imaging, CT scan and NMR imaging, Ultrasound imaging, medical applications of laser, Biosensors - glucose biosensor, alcohol biosensor, artificial retina, environmental biosensors, cantilever-based biosensor, DNA biosensor.

UNIT V

Molecular Techniques: Isolation of DNA, RNA and proteins, Electrophoresis of DNA and proteins, polymerase chain reaction, ELISA, Immunofluorescence, Fluorescent in situ hybridization, Southern and Western blotting.

COURSE BOOK:

1. N. Arumugam and Kumaresan V., Biophysics and Bioinstrumentation. Saras Publication, Nagercoil, 2013.

UNIT	BOOK	CHAPTERS
I	1	2, 25, 29, 30
II	1	22.
III	1	16, 17, 18.
IV	1	14, 15.
V	1	26, 28

BOOKS FOR REFERENCE:

1. Veera Kumari, L. Bioinstrumentation, MJP Publishers, Chennai, 2007.
2. Boyer. R. Modern experimental Biochemistry 3rd Edition. USA: Addison Wesley Longman, Inc, 2000.
3. Mohanty, P. K. . Illustrated Dictionary of Biology. Kalyani Publishers, Ludhiana, 2000
4. Ludhiana Wilson, K. and Waljker, J Principles and techniques of Biochemistry and Molecular Biology (7th Edition). Cambridge University Press, UK, 2010
5. Van Holde, K. E. Johnson, W. C. and Ho, P. Principles of physical Biochemistry, 2nd Edition. Pearson Prentice Hall, New Jersey, 2006.
6. Sharma, V. K. Techniques in Microscopy and Cell Biology. Tata McGraw Hill Publishing Ltd., New Delhi, 1991.

MATERNAL CHILD HEALTH CARE

Semester: VI

Code : 23ZO6SS04 **Credit: 2***

COURSE OUTCOMES:

- Recall key terms, concepts related to maternal, and child healthcare.
- Summarize the physiological changes during pregnancy, labor and postpartum period.
- Apply the guidelines of care to assess the pre and postnatal health.
- Analyze the impact of socioeconomic factors on maternal and child health
- Assess the women's health issues throughout the life cycle, beyond the maternity period.

UNIT I

Antenatal care: Objectives of antenatal care, antenatal visits, antenatal check-up - History taking, physical examination - pullor, pulse, respiratory rate, blood pressure, weight and breast examination, fetal heart sounds, foetal movements, multiple pregnancy, assessment of gestation age, counselling, risk approach, maintenance of records and home visits.

UNIT II

Prenatal care: Prenatal advice - diet, personal hygiene, drugs, radiation, warning signs and child care. Specific health protection - anaemia, nutritional deficiencies, toxemias of pregnancy, tetanus, syphilis, German measles, Rh status, HIV infection, Hepatitis B infection, prenatal genetic screening, mental preparation and family planning.

UNIT III

Intranatal care: Labour, true pain, false pain, mechanism of normal labour, management of normal labour, domicillary care, institutional care, rooming -in.

UNIT IV

Postnatal care: Care of the mother, complications of the post partal period, restoration of mother to optimum health - physical examination, anaemia, nutrition and postnatal exercises, breast feeding, family planning and basic health education.

UNIT V

Neonatal care: Early neonatal care, flow chart of optimum newborn care, immediate care - clearing the airway, care of the card, care of the eyes, care of the skin, maintenance of body temperature and breast feeding, neonatal examination - first and second examination, measuring the baby - birth weight, birth height, length and head circumference, identification of "at-risk" infants, late neonatal care, causes of preterm birth.

COURSE BOOK:

1. Park, K., Park's Textbook of Preventive and Social Medicine. 26th Edition. M/s Banarsidas Bhanot Publishers, 1167, Prem Nagar, Jabalpur, Madhya Pradesh, India, 2021.

UNIT	BOOK	CHAPTERS
I	1	11
II	1	11
III	1	11
IV	1	11
V	1	11

BOOKS FOR REFERENCE:

1. Dutta, D. C. Textbook of obstetrics including Perinatology and Contraception. 7th Edition. New Central Book Agency (P) Ltd, London, 2013.
2. Davis, R. P *et al*. (1981). Pregnancy andalcohol Current Problems in Obst and Gynaecology 4 (6)2 - 48, Feb 1981.
3. Merdith Davis, J. B. Community health, Preventive medicine and social services, 5th ed., Bailliere Tindall, 1983.
4. Helsing, E. and King, F. S. Breast feeding in practice, Oxford University, New Delhi, 1984.

SKILL DEVELOPMENT PROGRAMME

MUSHROOM CULTURE

Code : 20ZO1SD01 **Hours: 60**

Credit: 2

COURSE OUTCOMES:

- Identify the types of mushrooms.
- Prepare culture media, produce mother culture and mushroom spawn.
- Select substrate, bed preparation, casting preparation and running of mushroom beds.
- Manage diseases, pests, nematodes, weed moulds of *Agaricus bisporus* and *Pleurotus ostreatus.*
- Analyse the post harvesting methods and value added product production.

UNIT I

Mushroom - Introduction - Types of mushrooms: Edible, non-edible mushrooms and medicinal mushrooms. Biology of mushrooms; importance and nutritive value of edible mushrooms.

UNIT II

Spawn Cultivation Technology: Sterilization, Preparation of culture media, production of mother spawn, multiplication of spawn, Inoculation Technique.

UNIT III

Mushroom Cultivation Technology, Substrates, composting technology, bed, polythene bag preparation, spawning, cropping, commercial cultivation of mushrooms casing; raw material used for casing, preparation of casing material; important sanitation during various stages of mushroom cultivation; factors influencing mushroom cultivation; cultivation of *Agaricus bisporus* and *Pleurotus ostreatus*.

UNIT IV

Mushroom Shed Problems in Cultivation - diseases, pests, nematodes, weed moulds of *Agaricus bisporus* and *Pleurotus ostreatus* and their management.

UNIT V

Post Harvest Technology - Preservation of mushrooms - freezing, dry freezing, drying, canning, quality assurance and entrepreneurship. Value added products of mushrooms & marketing.

PREPARED COURSE MATERIAL

BOOKS FOR REFERENCE:

1. Nita Bhal. (2002). Handbook on Mushrooms (4th ed.). Vijay Primlani for Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Tripathi. D.P. (2005) Mushroom Cultivation, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
3. V.N. Pathak, Nagendra Yadav and Maneesha Gaur, (2000) Mushroom Production and Processing Technology/Vedams E books Pvt., Ltd., New Delhi.

SKILL DEVELOPMENT PROGRAMME

MUSHROOM CULTURE

Code : 25ZO1SD01 **Hours: 60**

Credit: 2

COURSE OUTCOMES:

- Identify the types of mushrooms.
- Prepare culture media, produce mother culture and mushroom spawn.
- Select substrate, bed preparation, casting preparation and running of mushroom beds.
- Manage diseases, pests, nematodes, weed moulds of *Agaricus bisporus* and *Pleurotus ostreatus.*
- Analyse the post harvesting methods and value-added product production.

UNIT I

Mushroom - Introduction - Types of mushrooms: Edible, non-edible mushrooms and medicinal mushrooms. Biology of mushrooms; importance and nutritive value of edible mushrooms.

UNIT II

Spawn Cultivation Technology: Sterilization, Preparation of culture media, production of mother spawn, multiplication of spawn, Inoculation Technique.

UNIT III

Mushroom Cultivation Technology, Substrates, composting technology, bed, polythene bag preparation, spawning, cropping, commercial cultivation of mushrooms casing; raw material used for casing, preparation of casing material; important sanitation during various stages of mushroom cultivation; factors influencing mushroom cultivation; cultivation of *Agaricus bisporus* and *Pleurotus ostreatus*.

UNIT IV

Mushroom Shed Problems in Cultivation - diseases, pests, nematodes, weed moulds of *Agaricus bisporus* and *Pleurotus ostreatus* and their management.

UNIT V

Post Harvest Technology - Preservation of mushrooms - freezing, dry freezing, drying, canning, quality assurance and entrepreneurship. Value added products of mushrooms & marketing.

PREPARED COURSE MATERIAL

BOOKS FOR REFERENCE:

4. Nita Bhal.Handbook on Mushrooms (4th edition). Vijay Primlani for Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi,2002
5. Tripathi. D.P.Mushroom Cultivation, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, 2005.
6. V.N. Pathak, Nagendra Yadav and Maneesha Gaur Mushroom Production and Processing Technology/Vedams E books Pvt., Ltd., New Delhi,2000

SKILL DEVELOPMENT PROGRAMME

SERICULTURE

Hours: 60

Code: 25ZO1SD02 **Credit: 2**

COURSE OUTCOMES

- Restate the importance of mulberry in Sericulture
- Describe the anatomy and life cycle of silk worm
- Categorize the types of eggs in Silkworm
- Develop skill in rearing silk worm and aspire to be an entrepreneur
- Design methods to enhance the production of cocoon and improve the yield

UNIT: I

Importance of sericulture, sericulture industry in India, sericulture as cottage industry. Mulberry plants - Morphology and methods of propagation. Classification of silkworm, habit and habitats of silkworms, Glands of silkworm voltinism and races of silkworm.

UNIT: II

Mulberry silkworm - life cycle, structure of egg, larva, pupa and adult and sexual dimorphism., Non mulberry silkworm – Tasser, Muga, Eri. Silkworm diseases: Bacterial disease – Flacherie, Fungal disease – Muscardine, Viral disease – Infectious flacherie. Pests of silk worm.

UNIT: III

Rearing of silkworm: Rearing house, Rearing appliances, Rearing operation, Disinfection,Brushing, Maintenance of optimum condition, Feeding, bed cleaning and spacing. Rearing of young ones: Chawki rearing, rearing of late age larva: Shelf rearing, Floor rearing, Shoot rearing.

UNIT: IV

Cocoon marketing: Characteristics of cocoons, mounting, spinning and harvesting, defective cocoons, chemical composition of cocoons.

UNIT: V

Silk reeling: Cocoon stifling – types storage of stifled cocoons, sorting, cocoon boiling and deflossing, brushing. Process of reeling - Different methods, Silk waste and by products of silk reeling. Raw silk and marketing.

REFERENCE BOOKS:

1) R.K. Patnaik, Sericulture Manual, Biotech Publishing Books,2005
2) G. Ganga, S. Sulochana Chetty, An Introduction to Sericulture, II edition, Oxford and IBH Publishing House, NewDelhi,2008
3) Krishnasamy S. Sericulture manual I and II, 2009

SKILL DEVELOPMENT PROGRAMME
BEE KEEPING

Hours: 60

Code : 25ZO1SD03 **Credit: 2**

UNIT I

Introduction: Scope of Apiculture, classification, morphology and type of honey bees - *Apis dorsata, Apis florae, Apis cerana indica, Apis mellifera*. Bee colony - distinctive features and identification of queen, drones and workers, division of labour, activities of honey bees and life history of *Apis indica.* **(6 Hours)**

UNIT II

Beekeeping: Methods of bee keeping - primitive methods (wall or fixed hive and movable hive), drawbacks of primitive method, modern method - Newton hive, advantages of modern method and appliances used in apiaries, Bee Pasturage.

(6 Hours)

UNIT III

Food and products of honey bee: Food - bee bread, honey, pollen, royal jelly, Products - properties, nutritional value, medicinal value, extraction, preservation and storage of honey, bee wax, bee venom, pollen, propolis and royal jelly.

(6 Hours)

UNIT IV

Bee diseases and enemies: Prevention and control measures of American foulbrood, European foulbrood, sacbrood, nosema disease, Enemies of bees - greater wax moth, lesser wax moth, ants, wasps, bee lice, hive beetles and birds.

(6 Hours)

UNIT V

Swarming, absconding and queen rearing: Swarming and absconding - reasons, prevention and control measures, robbing and fighting - prevention and control, queen rearing - need, methods of queen rearing and introduction of queen.

(6 Hours)

STUDY MATERIAL:

- Dr. Gracy Kutty T. I and Sr. Iruthaya Kalai Selvam, Apiculture.2009

BOOKS FOR REFERENCE:

1. Fenemore P. G and Alka Prakash, Applied Entomology. New Age International (P) Ltd Publishers, New Delhi, 2000
2. Johnson J. Apiculture. Olympic Grafix, Marthandam,2005
3. Ravindranathan K.R. A text book of economic Zoology, Dominant Publishers and Distributors, New Delhi, 2005
4. Avinash Khanna. Applied Zoology and Biotechnology. Mangalam Publishers and Distributors, New Delhi.2007

SKILL DEVELOPMENT PROGRAMME (CERTIFICATE COURSE)

GANDHIAN THOUGHT

PAPER I: LIFE OF MAHATMA GANDHI

Code: CCHYGT01 **Hour: 1**

Credit: 1

COURSE OUTCOMES:

- Gain Knowledge on the Early Life of Mahatma Gandhi.
- Analyse the racial equality and Mahatma Gandhi's Experience in South Africa.
- Explain the role of Mahatma Gandhi in Indian Freedom Struggle.
- Assess the constructive works of Mahatma Gandhi in Indian Nationalism.
- Discuss the major Incidents from the Life of Mahatma Gandhi.

UNIT I

Family background and beginnings of the Mahatma - Birth and childhood - Education and family life - lessons learned - The London Experience.

UNIT II

Making of the Mahatma: Gandhi in South Africa - From a barrister to a people's leader - Towards racial equality - From family life to ashram life - Birth of Satyagraha and constructive work - experiments with truth.

UNIT III

Beginnings of Indian Freedom Struggle: Early resistances and 1857 Revolt - Birth of Indian National Congress: Moderates, Extremists and Terrorists - Gandhi leads the nation in a new direction - Early micro satyagrahas.

UNIT IV

Mahatma Gandhi leads the Freedom struggle to victory: Major satyagrahas - Constructive Work - Sabarmathi and Sevagram - Various currents of Indian Nationalism - Towards partition and freedom - The final martyrdom.

UNIT V

Video shows on Gandhi - Field and life experiences - Incidents from the life of Gandhi that inspired and shaped your life.

தாள் I - மகாத்மா காந்தியின் வாழ்வு - CCHYGT01

Code: CCHYGT01 **Hour: 1**

Credit: 1

COURSE OUTCOMES:

- Gain Knowledge on the Early Life of Mahatma Gandhi.
- Analyse the racial equality and Mahatma Gandhi's Experience in South Africa.
- Explain the role of Mahatma Gandhi in Indian Freedom Struggle.
- Assess the constructive works of Mahatma Gandhi in Indian Nationalism.
- Discuss the major Incidents from the Life of Mahatma Gandhi.

அலகு 1

குடும்ப பின்னணியும் மகாத்மாவின் தொடக்கமும் - பிறப்பும் குழந்தைப் பருவமும் - கல்வியும் குடும்ப வாழ்வும் - கற்ற பாடங்கள் - இலண்டன் அனுபவங்கள்.

அலகு 2

மகாத்மா உருவாகிறார் - தென்னாப்பிரிக்காவில் காந்தி - பாரிஸ்டரிலிருந்து மக்கள் தலைவராக - இன சமத்துவத்தை நோக்கி - குடும்ப வாழ்விலிருந்து ஆசிரம வாழ்வுக்கு - சத்தியாகிரகம் மற்றும் தீர்மானப்பணியின் தொடக்கம் - சத்திய பரிசோதனைகள்.

அலகு 3

இந்திய விடுதலைப் போராட்டத்தின் தொடக்கம் - ஆரம்ப கால எதிர்ப்புகளும் 1857 எழுச்சியும் - இந்திய தேசிய காங்கிரசின் தொடக்கம் - மிதவாதிகள், தீவிரவாதிகள் மற்றும் பயங்கரவாதிகள் - காந்தி நாட்டை புதிய திசையில் நடத்துகிறார் - ஆரம்ப வட்டார சத்தியாகிரங்கள்.

அலகு 4

மகாத்மா காந்தி இந்திய விடுதலைப் போராட்டத்தை தலைமையேற்று நடத்துகிறார் - தேசிய சத்தியாகிரங்கள் - நிர்மாணப் பணிகள் - சபர்மதியும் சேவாகிராமும் - இந்திய தேசியத்தின் பல்வேறு போக்குகள் - பிரிவினையும் விடுதலையும் - மகத்தான உயிர் தியாகம்.

அலகு 5

காந்தியைப் பற்றிய படங்கள் - கள மற்றும் வாழ்க்கை அனுபவங்கள் - உங்களது வாழ்வை பரவசப்படுத்திய, உருக்கிய மகாத்மா காந்தியின் வாழ்க்கை நிகழ்ச்சிகள்.

RECOMMENDED BOOKS

PAPER I

Mahatma Gandhi : An Autobiography சத்திய சோதனை

R. Nanda : Mahatma Gandhi - A Biography

Ravindra varma : Gandhi in Anecdotes, Navajivan Publishers, Ahmedabad, 2001

டி.டி. திருமலை : காந்தி

கல்கி : மாந்தருள் ஒரு தெய்வம் இவானதி பதிப்பகம் சென்னை 1991

திரு.வி.க. : காந்தியடிகளும் மனித வாழ்க்கையும்

ஜெயகாந்தன் : வாழ்விக்க வந்த காந்தி

J.B. Kriplani : Gandhi His Life and Thought

லூயி பிஷர் : மகாத்மா காந்தி

Louis Fischer : The Life of Mahatma Gandhi, Harper Collins Publishers, Uttarpradesh, 2017

பா. ஆனந்தி, மங்களவதி கேப்ரியல் ரூ : காந்திய சிந்தனை வினா-விடை

வி.ஏ. வித்யா : (Gandhian Thought Quiz)

சி. பெரிதாய் ரூ பா. ஆனந்தி : மகாத்மா காந்தியடிகளின் காலம்

COURSE BOOK:

- மகாத்மா காந்தியின் வாழ்வும் அறவியலும் - டாக்டர் பா. ஆனந்தி ரூ டாக்டர் ச. செயப்பிரகாசம்
- Life and Values of Mahatma Gandhi - Dr. B. Ananthi & Dr. S. Jeyapragasam

PAPER II: NON VIOLENCE AND SARVODAYA

Code: CCHYGT02 **Hour: 1**

Credit: 1

COURSE OUTCOMES:

- Gain Knowledge on Mahatma Gandhi's Non - violence
- Discuss the Policies of Mahatma Gandhi on Truth and Action
- Analyse Sarvodaya and Antyodaya
- Assess the values introduced through Brahmacharya and Aparigraha
- Relate violence and Truth in our day today life with the teachings of Gandhiji

UNIT I

Meaning of Nonviolence (*ahimsa*): Nonkilling and noninjuring - Love, service and forgiving - Nonviolent Action: Peaceful resolution of conflict, nonviolent life style & constructive work and Satyagraha - Nonviolent values and ethics

UNIT II

Truth: Absolute and Relative - Moving beyond falsehood, errors and mistakes - Truth and pluralism - Truth and action - Truth and Nonviolence

UNIT III

Sarvodaya (welfare of all at all levels) and Antyodaya (welfare of the last first) - Means and Ends - Removal of untouchability - Communal Harmony - Uplift of Women

UNIT IV

Removal of poverty: Full & total appropriate employment - Self-dependence, Self - reliance, Swaraj and Swadeshi (love thy neighbour) - Self-control and Sublimation (*brahmacharya*) - Simple and Ethical living - *Aparigraha* (nonpossession) and Trusteeship (stewardship) - Appropriate and Holistic Science and Technology.

UNIT V

Place of Nonviolence and truth in our day to-day life and ways to enhance them - learn and practice three skills which would enhance your self-reliance and ability to help (serve) others in need - Resolve conflicts peacefully - Experience inter-religious relationships, dialogue and prayers.

தாள் II - அகிம்சையும் சர்வோதயமும்

Code: CCHYGT02 **Hour: 1**

Credit: 1

COURSE OUTCOMES:

- Gain Knowledge on Mahatma Gandhi's Non - violence
- Discuss the Policies of Mahatma Gandhi on Truth and Action
- Analyse Sarvodaya and Antyodaya
- Assess the values introduced through Brahmacharya and Aparigraha
- Relate violence and Truth in our day today life with the teachings of Gandhiji

அலகு 1

அகிம்சையின் பொருள் - கொல்லாமையும் துன்பம் செய்யாமையும் - அன்பு, தொண்டு மற்றும் மன்னித்தல் - அகிம்சைச் செயல்- அமைதி வழியில் சிக்கல் தீர்வு, அகிம்சை வாழ்வியலும் நிர்மாணப்பணியும், சத்தியாகிரகம் - அகிம்சை அறவியலும் விழுமியங்களும்.

அலகு 2

உண்மை : பேருண்மையும் (முழுமை உண்மையும்) சார்பு உண்மையும்- பொய்மைகள், தவறுகள் மற்றும் குற்றங்களுக்கு அப்பால் செல்லுதல் - உண்மையும் பன்மியமம் - உண்மையும் செயலும் - உண்மையும் அகிம்சையும்.

அலகு 3

சர்வோதயமும் (அனைவரின் நலம் அனைத்து நிலைகளிலும்) அந்தியோதயமும் (கடையவர் நலன் முதலில்) - குறிக்கோளும் வழிமுறையும் - தீண்டாமை நீக்கம் - சமூக ஒற்றுமை - மகளிர் முன்னேற்றம்.

அலகு 4

வறுமை நீக்கம் : முழுமையான ஏற்புடைய வேலை வாய்ப்பு - தற்சார்பும் தன்னிறைவும், சுயராஜ்ஜியம் மற்றும் சுதேசி (அயலவரை நேசி) - புலனடக்கமும் மேன்மையாக்கமும் (பிரம்மச்சரியம்) - எளிய மற்றும் அறவியல் வாழ்வு உடைமையின்மையும், அறங்காவலர் நெறியும் - ஏற்புடைய மற்றும் முழுமை அறிவியலும் தொழில் நுட்பமும்.

அலகு 5

நமது அன்றாட வாழ்வில் அகிம்சையும் உண்மையும் பெறுமிடமும் அதனை மேம்படுத்தும் வழிகளும் - உங்களது தற்சார்பையும் தேவையில் பிறருக்கு உதவும் ஆற்றலையும் வளர்க்கும் ஏதாவது மூன்று திறன்களைக் (ளுமடைடள) கற்றல் - அமைதி வழியில் சிக்கல் தீர்வு அனுபவங்கள் - சர்வசமய நட்புறவு, உரையாடல் மற்றும் வழிபாட்டு அனுபவம் பெறல்.

RECOMMENDED BOOKS

PAPER II

M.K. Gandhi	: Sarvodaya
	: Nonviolence in Peace and War (2 Vols)
Richard B. Gregg	: Power of Nonviolence
மு. வசந்தா (பதி.)	: சர்வோதயம்
R.R. Diwakar	: The Saga of Satyagraha
ச. செயப்பிரகாசம்	: அகிம்சை, மதுரை, 2008

COURSE BOOK:

- மகாத்மா காந்தியின் வாழ்வும் அறவியலும் - டாக்டர் பா. ஆனந்தி ரூ டாக்டர் ச. செயப்பிரகாசம்
- Life and Values of Mahatma Gandhi - Dr. B. Ananthi & Dr. S. Jeyapragasam

SKILL DEVELOPMENT PROGRAMME (SDP)

LIBRARY AND INFORMATION SCIENCE

THEORY PAPER & PRACTICAL

PROGRAMME OUTCOMES (PO)

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Gain theoretical knowledge and apply the expertise in different fields.
2.	Acquire Industry specific skills and can emerge as entrepreneurs.
3.	Develop critical and rational thinking to solve societal issues.
4.	Explore the knowledge and acclimatize it in the ever changing work environment.
5.	Evolve theories and develop innovative discipline specific ideas.
6.	Comprehend the nuances and develop innovative, discipline-specific ideas.

THEORY PAPER & PRACTICAL

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Have knowledge about the Library Resources and Services.	PO-2, PO-5
2.	To get Equipped with capabilities required for placement in Libraries	PO-2, PO-5
3.	To Use maximum of resources available in the Library.	PO-1
4.	Get the basic practical approaches to use online resources.	PO-5, PO-6
5.	Familiarize with the Principles of Management in Library Services.	PO-4

OBJECTIVES:

- To familiarize the students with the methods of maintaining Library Resources and Services.
- To equip them with capabilities required for placement in Libraries.

TEACHING HOURS

The Certificate course will be conducted in 60 contact hours per year as follows

Theory = 30 Hours
Practical = 30 Hours

ELIGIBILITY

Any III U.G. and any P.G. Student

SYLLABUS
THEORY PAPER

Code: 23GL1SD01 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Have knowledge about the various types of Libraries.	PSO - 1	K1
CO - 2	Understand the various kinds of Reference sources available in the Library	PSO - 1	K2
CO - 3	Get the analytical approaches to classify and Arrange the reading materials in Library	PSO - 2	K4
CO - 4	Apply various methods to search the reading material and thereby get it at the earliest	PSO - 3	K3
CO - 5	To Acquire knowledge about the managerial principles and techniques in Libraries.	PSO - 5	K5

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Code: 23GL1SD01				THEORY PAPER							Hours: 2
											Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	3	4	4	4	4	4	3	4	4	4	4	3.82
CO - 2	4	4	4	4	4	4	4	4	4	4	4	4
CO - 3	3	3	4	4	4	3	3	4	4	3	3	3.45
CO - 4	4	4	4	4	4	4	4	4	4	4	4	4
CO - 5	4	4	4	3	3	3	3	3	4	4	4	3.55
Overall Mean Score												**3.76**

Result: The score for this course is **3.76** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I: LIBRARY AND SOCIETY

Five Laws of Library Science - Extension services - Types of Library - Orientation to Library Staff and Students

UNIT II: INFORMATION SOURCES & SERVICES

Information - Reference Service, Definition, Kinds - Kinds of Sources of Information - Standard Ready Reference Sources - Bibliography - Definition, Types - Abstract: APA style.

UNIT III: CLASSIFICATION THEORY

Library classification - Definition, need and purposes - Colon Classification 6th Edition and Dewey Decimal Classification 20th Edition : General features.

UNIT IV: CATALOGUING THEORY

Definition, objectives and functions of catalogue - Physical and inner forms of catalogue - OPAC

UNIT V: LIBRARY MANAGEMENT

Principles of Management - Library Rules - Library routines (Selection, Acquisition, Technical processing) - Circulation Systems(Charging & Discharging), Automated charging system - Preservation of reading materials

UNIT VI: INFORMATION TECHNOLOGY

Computer application to Library work - Internet: General features, Search engines -e-resources - E-Library / Digital Library - INFLIBNET N-List, SHODHSINDH

PRACTICAL PAPER

Code: 23GL1SDP1 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Apply colon classification scheme in classifying the reading materials.	PSO - 2	K3
CO - 2	Analyse the title according to Dewey Decimal Classification Scheme.	PSO - 2	K4
CO - 3	Synthesis code for the book title according to colon Classification.	PSO - 5	K6
CO - 4	Apply code for the book title according to Dewey Decimal Classification.	PSO - 2	K3
CO - 5	Get practical approaches to search and download online resources.	PSO- 2	K3

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

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Code: 23GL1SDP1				PRACTICAL PAPER							Hours: 2 / Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	3	3	4	4	4	4	3	4	4	4	3	3.64
CO - 2	4	3	4	4	4	4	4	4	3	4	4	3.82
CO - 3	4	4	4	4	4	3	3	4	4	3	3	3.64
CO - 4	3	4	4	4	4	4	4	4	4	4	4	3.91
CO - 5	3	4	4	3	3	3	3	3	4	4	4	3.45
Overall Mean Score												**3.69**

Result: The score for this course is **3.69** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of POs & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of COs

Colon Classification -6th edition, Main Classes

1. Dewey Decimal Classification 20th edition - I, II & III Summary
2. Computer - Internet searching and to download information
3. INFLIBNET N-List - Searching process

BOOKS FOR REFERENCE:

1. Library Organisation and Decision Making - J. B.Sharma - Pointer Publishers, Jaipur - 2008
2. Library and Information Science - C.K. Sharma, Akhil Kumar Singh and Rakesh Kumar- Atlantic publishers & distributors (P) Ltd. - 2008
3. Reference Service - Mr. Krishan Kumar
4. Basics of Library and Information Science - K.T.Dilli, Vikas Publishing.
5. Preservation of Library, Archival and Digital Documents - L.S.Ramaiah & G. Sujatha - ESS ESS Publications, New Delhi - 2008
6. E-Libraries in Computer age - C.Praveen S ingh - Alfa publications, New Delhi - 2008
7. Colon Classification - S.R.Ranganathan - 6th Edition - Asia publishing house, New Delhi - 1960
8. Dewey Decimal Classification - Edited by John P Comaromi etc. - 20th Edition - Forest press, New York - 1989

EVALUATION METHOD

Theory Paper Code : 23GL1SD01		Practical Paper Code : 23GL1SDP1	
Internal	25 Marks	Internal	40 Marks
External	75 Marks	External	60 Marks
Total	**100 Marks**	**Total**	**100 Marks**

CONTINUOUS INTERNAL ASSESSMENT COMPONENT (CIA) - 2023-2026 -UG

CIA components for Practical can be decided by the respective Departments.

Passing Minimum in the Continuous Internal Assessment is Compulsory for appearing the External Semester Examination

Theory:

Component	Marks	Marks
Internal test I	40	Converted to 25
Internal test II	40	
Quiz	10	
Assignment	5	
Attendance	5	
Total	**100**	**25**

PRACTICAL:

Continuous Internal Assessment (CIA) - 40 Marks

External Practical Exam - 60 Marks

PASSING MINIMUM FOR EXTERNAL SEMESTER EXAMINATION -UG

Semester Examination		
Theory	40% out of 75 Marks (i.e. 30 Marks)	40% out of 100 Marks (i.e. 40 Marks)
Practical	40% out of 60 Marks (i.e. 24 Marks)	

INTERNAL QUESTION PATTEREN (UG)

Class: **Time: 2 Hours**

Date: **Max.: 40 Marks**

Title of the Paper

Course Outcome	Bloom's K-level	Q. No	SECTION
			SECTION – A (10 x 1 = 10 marks) MCQs
			SECTION – B (2 × 5= 10 Marks) Answer ALL Questions. (Internal Choice)
			SECTION – C (2x 10 =20 Marks) Answer All Question. (Internal Choice)

EXTERNAL QUESTION PATTEREN

UG External Question Pattern for the courses carrying credits 5 and above

Class: **Time: 3 Hours**

Date: **Max.: 100 Marks**

Title of the Paper

Course Outcome	Bloom's K-level	Q. No	SECTION
			SECTION – A (15 x 1 = 15 marks) MCQs
			SECTION – B (5× 2= 10 Marks) Answer any FIVE Questions out of SEVEN
			SECTION – C (5x 5 =25 Marks) Answer All Question. (Internal Choice, one question from each Unit)
			SECTION – D (5x 10 =50 Marks) Answer All Question. (Internal Choice, one question from each Unit)

EXTERNAL QUESTION PATTEREN

UG External Question Pattern for the courses carrying credits below 5

Class: **Time: 2 ½ Hours**

Date: **Max.: 75 Marks**

Title of the Paper

Course Outcome	Bloom's K-level	Q. No	SECTION
			SECTION – A (15 x 1 = 15 marks) MCQs
			SECTION – B (5x 6 = 30 Marks) Answer All Question. (Internal Choice, one question from each Unit)
			SECTION – C (3x 10 =30 Marks) Answer All Question. (Internal Choice)

SKILL DEVELOPMENT PROGRAMME (SDP)

LIBRARY AND INFORMATION SCIENCE

PROGRAMME OUTCOMES (PO)

PO NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Gain theoretical knowledge and apply the expertise in different fields.
2.	Acquire Industry specific skills and can emerge as entrepreneurs.
3.	Develop critical and rational thinking to solve societal issues.
4.	Explore the knowledge and acclimatize it in the ever-changing work environment.
5.	Evolve theories and develop innovative discipline specific ideas.
6.	Comprehend the nuances and develop innovative, discipline-specific ideas.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Have knowledge about the Library Resources and Services.	PO-2, PO-5
2.	To get Equipped with capabilities required for placement in Libraries	PO-2, PO-3
3.	To Use maximum of resources available in the Library.	PO-1
4.	Get the basic practical approaches to use online resources.	PO-5, PO-6
5.	Familiarize with the Principles of Management in Library Services.	PO-4

OBJECTIVES:

- To familiarize the students with the methods of maintaining Library Resources and Services.
- To equip them with capabilities required for placement in Libraries.

TEACHING HOURS

The Certificate course will be conducted in 180 contact hours per year as follows

Theory - Paper I = 60 Hours

Theory - Paper II = 60 Hours

Practical Paper = 60 Hours

ELIGIBILITY

Plus Two passed / Any U.G. and P.G. Student

SYLLABUS

THEORY PAPER - 1: FUNDAMENTALS OF LIBRARY AND INFORMATION SCIENCE

Code: 24GL1SD01 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

- Have knowledge about the types, principles, classification, cataloguing and routine work of the Library
- Understand the types, principles, classification, cataloguing and routine work of the Library
- Apply the principles, classification, cataloguing and routine work of the Library
- Get the analytical approaches in the types, principles, classification, cataloguing and routine work of the Library
- Evaluate the types, principles, classification, cataloguing and routine work of the Library

UNIT I

Library concept and definitions; Types of libraries - Public, Academic and Special Libraries - Role of libraries in modern society.

UNIT II

Five Laws of Library Science and their implications. Principles of Management - Library Budget, Types

UNIT III

Library classification - Definition, need and purposes - Colon Classification 6th Edition and Dewey Decimal Classification: Main Classes

UNIT IV

Library Cataloguing - Definition, objectives and functions of catalogue - Physical and inner forms of catalogue - OPAC

UNIT V

Various sections in a Library- Routine work in Acquisition, Technical, Circulation, Maintenance, Reference, and Binding Sections

BOOKS FOR REFERENCE:

1. Library Organisation and Decision Making - J. B.Sharma - Pointer Publishers, Jaipur - 2008
2. Library and Information Science - C.K. Sharma, Akhil Kumar Singh and Rakesh Kumar- Atlantic publishers & distributors (P) Ltd. - 2008
3. Basics of Library and Information Science - K.T.Dilli, Vikas Publishing.
4. Colon Classification - S.R.Ranganathan - 6th Edition - Asia publishing house, New Delhi - 1960
5. Dewey Decimal Classification - Edited by John P Comaromi etc. - 20th Edition - Forest press, New York - 1989
6. Current Trends and Fundamentals in Library and Information Science - Sr. R. Fatima Mary **Sylvia**,Pavai Publications, Chennai - 2012

THEORY PAPER -2: INFORMATION SOURCES & SERVICES

Code: 24GL1SD02 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

- Have knowledge about the types and kinds of Information Sources and Services.
- Understand the types and kinds of Information Sources and Services.
- Apply the types and kinds of Information Sources and Services.
- Get the analytical approaches of the types and kinds of Information Sources and Services in the practical life situation.
- Evaluate the types and kinds of Information Sources and Services.

UNIT I

Sources of Information - Documentary - Non- Documentary - Types of Information Sources - Primary, Secondary, Tertiary Sources

UNIT II

Kinds of Sources of Information - Standard Ready Reference Sources and Long-Range Reference Sources

UNIT III

Information Services - Reference Service - Definition, Need and Types - Ready Reference Service - Long Range Reference Service - User Needs - User Education, Extension services.

UNIT IV

E-resources - Concept and evolution; Merits and demerits of e-resources

UNIT V

Library Automation and Digitization- Digital Library- Artificial Intelligence applications in Libraries

BOOKS FOR REFERENCE:

1. Reference Service - Mr. Krishan Kumar
2. Digital Libraries Tools & Techniques - C. Praveen Singh - Alfa Publications, New Delhi - 2008
3. Library and Information Science - C.K.Sharma, Akhil Kumar Singh and Rakesh Kumar - Vol.III - Atlantic Publishers & Distributors (P) Ltd. - 2008
4. Current Trends and Fundamentals in Library and Information Science - Sr. R. Fatima Mary **Sylvia**, Pavai Publications, Chennai - 2012

PRACTICAL PAPER

Code: 24GL1SDP1 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

- Acquire the knowledge of Colon Classification, Dewey Decimal Classification, ICT and INFLIBNET
- Understand the concept of Colon Classification, Dewey Decimal Classification, ICT and INFLIBNET
- Apply the knowledge of Colon Classification, Dewey Decimal Classification, ICT and INFLIBNET
- Analyse the practical knowledge of Colon Classification, Dewey Decimal Classification, ICT and INFLIBNET
- Synthesis the practical approaches of Colon Classification, Dewey Decimal Classification, ICT and INFLIBNET

Paper 3 - INFORMATION PROCESSING PRACTICE

Code: 24GL1SDP1 **Hours: 2**

Credit: 1

4. Classification: Colon Classification 6th edition, Main Classes
5. Classification: Dewey Decimal Classification 20th edition - I, II & III Summary
6. ICT - Internet Browsing; Downloading
7. E-Resources in INFLIBNET N-List - Browsing; Downloading

BOOKS FOR REFERENCE:

1. Digital Libraries Tools & Techniques - C. Praveen Singh - Alfa Publications, New Delhi - 2008
2. Colon Classification - S.R.Ranganathan - 6th Edition - Asia publishing house, New Delhi - 1960
3. Dewey Decimal Classification - Edited by John P Comaromi etc. - 20th Edition - Forest press, New York - 1989

EVALUATION METHOD

Theory Paper – 1 Fundamentals of Library and Information Science Code : 24GL1SD01		Theory Paper - 1 Information Sources & Services Code : 24GL1SD02		Practical Paper Code : 24GL1SDP1	
Internal	25 Marks	Internal	25 Marks	Internal I	50 Marks
External	75 Marks	External	75 Marks	Internal II	50 Marks
Total	**100 Marks**	**Total**	**100 Marks**	**Purely Internal, Total**	**100 Marks**

CONTINUOUS INTERNAL ASSESSMENT COMPONENT (CIA) - 2023-2026 -UG
CIA components for Practical can be decided by the respective Departments.

Passing Minimum in the Continuous Internal Assessment is Compulsory for appearing the External Semester Examination

Theory: Internal Component

Component	Marks	Marks
Internal test I	40	Converted to 25
Internal test II	40	
Assignment I	10	
Quiz	10	
Total	**100**	**25**

Question Patern					
SECTION	**Types of Question**	**Number of Qns.**	**Number of Qns. to be answered**	**Marks for each Qn.**	**Total**
A Q. No (1-15)	Multiple Choice	15	15	1	15
B Q. No (16-21)	either or type.	6	5	5	30
C Q. No (22-24)	either or type	3	3	10	30

YOGA FOR YOUTH EMPOWERMENT

Semester: Non semester **Hours: 2**

Code : 23YYSD01 **Credit: 2**

OBJECTIVES:

- Providing value education to improve the students' character.
- Understanding yogic life and physical health.
- Maintaining youthfulness.
- Measure and method in five aspects of life.

UNIT: 1

Physical Health: Manavalakalai (SKY) Yoga - Introduction - Education as a means for youth empowerment - Greatness of Education - Yoga for youth Empowerment.

Simplified Physical Exercises - Hand, Leg, Breathing. Eye exercises - Kapalabathi, Makarasana Part I, Makarasana Part II, Body Massage, Acu pressure, Relaxation exercises – Benefits. **Yogasanas I** - Pranamasana - Hastha Uttanasana - Pada asthasana – Aswa Sanjalana Asana - Thuvipatha asva Sanjalana asana - Astanga Namaskara –Bhujangasana. Altha Muktha Savasana, Aswa Sanjalana Asana – Pada Hasthasana - Hastha Uttanasana - Pranamasana. **Pranayama** - Naddi suddi - Clearance Practice- Benefts. Simplified Physical Exercise - Kayakalpa Pracices - Meditation Practices. **(6 Hours)**

UNIT II

Life force: Reasons or Diseases - Natural reasons (Genetic / imprints, Planetary Position, Natural calamities and climatic changes) - Unnatural reasons (Food habits, Thoughts, Deeds). **Philosophy of Kaya kalpa** - Physical body - Sexual vital fluid - Life force - Bio-Magnetism-Mind. **Maintaining youthfulness** - Postponing old age - Transformation of food into seven components - Importance of sexual vital fluid - Measure and method in five aspects of life - Controlling undue Passion. **Kayakalpa practice** - Aswini Mudra - Ojas breath - Benefts of Kaya Kalpa. **(6 Hours)**

UNIT III

Mental Health: Mental Frequencies - Beta, Apha, Theta and Delta wave - Agna Meditation explanation-benefits. **Shanti meditation** - Shanthi Meditation explanation – benefits. **Thuriya Meditation** - Thuriya Meditation explanation – benefits. **Benefits of Blessing** - Self blessing (Auto suggestion) - Family blessing - Blessing the others -World blessing - Divine protection. **(6 Hours)**

UNIT IV

Values: Human Values - Self-control - Self-confidence - Honesty Contentment- Humility Modesty Tolerance- Adjustment- Sacrifice- Forgiveness. Purity (Body, Dress, Environment) - Physical purity - Mental purity - Spiritual purity. **Social Values -** Nonviolence - Service Patriotism Equality. Respect for parents and elders - care and protection - Respect for teacher. Punctuality - Time Management.

(6 Hours)

UNIT V

Morality (virtues): Importance of introspection - I - Mine (Ego, Possessiveness) Six Evil Temperaments - Greed - Anger- Miserliness - Immoral sexual passion Inferiority and superiority Complex - Vengeance. Maneuvering of Six Temperaments - Contentment Tolerance - Charity Chastity - Equality – Pardon (Forgiveness). Five essential Qualities acquired through Meditation - Perspicacity- Magnanimity - Receptivity - Adaptability -Creativity (Improved Memory Power).

(6 Hours)

BOOKS FOR REFERENCE:

- Yoga for modern age - Thathuvagnani Vethathiri Maharishi.
- Simplified Physical Exercises- Thathuvagnani Vethathiri Maharishi.
- Kayakalpam - Thathuvagnani Vethathiri Maharishi.
- Thirukkural - Rev.Dr.G.U.Pope.
- Mind- Thathuvagnani Vethathiri Mahaishi.
- Sound Health through yoga- Dr.Chandrasekaran.
- Light on yoga –BKS Jyenger.
- Unavu murai - Thathuvagnani Vethathiri Maharishi.

EVALUATION

YOGA FOR YOUTH EMPOWERMENT

Internal	External	Total
25	75	**100**

CIA Components

Component		Marks
Test-I	:	40
Test - II	:	40
Assignment	:	05
Quiz/Seminar	:	10
Attendance	:	05
Total	**:**	**100**

The total internal marks obtained for 100 will be Converted into marks obtained for 25

YOGA FOR YOUTH EMPOWERMENT

(EXTERNAL – EVALUATION)

Time: 3 Hours **Max. Marks: 75**

Part	Types of questions	Number of Qns.	Number of Qns. to be answered	Marks for each qn.	Total
A Q. NO (1-20)	MCQ(Four questions from each Unit)	20	20	1	20
B Q. NO (21-25)	Either (or) type. (Two questions from each unit)	10	5	5	25
C Q. NO (25-30)	Open choice (One question from each unit)	5	3	10	30

PRACTICAL - YOGA FOR YOUTH EMPOWERMENT -23YYSD02

Semester: Non- Semester **Hours: 2**

Code : 23YYSD02 **Credit: 1**

1. **Simplified Physical Exercises** - Hand, Leg, Breathing. Eye exercises - Kapalabathi, Makarasana Part I, Makarasana Part II, Body Massage, Acu pressure, Relaxation exercises – Benefits.
2. **Yogasanas I** - Pranamasana - Hastha Uttanasana - Pada asthasana – Aswa Sanjalana Asana - Thuvipatha asva Sanjalana asana - Astanga Namaskara – Bhujangasana. Altha Muktha Savasana, Aswa Sanjalana Asana – Pada Hasthasana - Hastha Uttanasana - Pranamasana.
3. **Pranayama** - Naddi suddi - Clearance Practice- Benefts. Simplified Physical Exercise - Kayakalpa Pracices - Meditation Practices.

YOGA FOR YOUTH EMPOWERMENT – PRACTICAL -I (Internal Only)

CIA Components for Internal Assessment

Components		**Marks**
Component- I (**Physical Exercises)**	:	50
Component- II (**Yogasanas I)**	:	25
Component –III (**Pranayama)**	:	25
Total	**:**	**100**