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.

SYLLABUS 2020 - 2023

B. SC. ZOOLOGY

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.	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.

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.	PO - 1, PO - 5
2.	Explain how animals function and interact with respect to biological, Chemical and physical processes in natural and impacted environments.	PO - 2, PO - 5
3.	Survey the human life processes and demonstrate their ability to analyse the clinical samples and to diagnose the health ailments and aspire for healthy living.	PO - 1, PO - 2, PO - 3, PO - 4
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.	PO - 1, PO - 2, PO - 3
5.	Demonstrate subject related and transferable skills that are relevant to Zoology related job trades and employment opportunities.	PO - 1, PO - 2, PO - 4, PO - 5, PO - 6

UG COURSE PATTERN - 2020 - 2023 (UGC / TANSCHE/ MTU)

Sem.	Part	Code	Title of the Course	Hours	Credit
I	I	20GT1GS01/ 20GH1GS01/ 20GF1GS01	Tamil - I Hindi - I French - I	6	3
	II	20GE1GS01	English - I	6	3
	III	20ZO1MC01	Invertebrate Diversity	7	6
		20ZO1CP01	Invertebrate and Chordate Diversity - Lab	2	-
		20CH1AC01	Allied Chemistry - I	3	3
		20CH1AP01	Allied Chemistry - I - Lab	2	1
	IV	20ZO1AE01	**Ability Enhancement Compulsory Course (AECC)-1:** Professional English	2	2
		20SE1CE1D	**Skill Enhancement Compulsory Course (SECC)- 1:** Computer Education	2	2
	V	20STPNS01/ 20STPNC01/ 20STPPE01/ 20STPCC01/ 20STPRR01/ 20STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**20**
II	I	20GT2GS02 20GH2GS02 20GF2GS02	Tamil - II Hindi - II French - II	6	3
	II	20GE2GS02	English - II	6	3
	III	20ZO2MC02	Chordate Diversity	7	7
		20ZO2CP01	Invertebrate and Chordate Diversity - Lab	2	2
		20CH2AC02	Allied Chemistry - II	3	3
		20CH2AP02	Allied Chemistry - II - Lab	2	1
	IV	20AE2ES02	**Ability Enhancement Compulsory Course (AECC)-2:** Environmental Studies	2	2

Sem.	Part	Code	Title of the Course	Hours	Credit
II	IV	20SE2CB02	**Skill Enhancement Compulsory Course (SECC)- 2:** Capacity Building	2	2
	V	20STPNS01/ 20STPNC01/ 20STPPE01/ 20STPCC01/ 20STPRR01/ 20STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**23**
III	I	20GT3GS03 / 20GH3GS03 / 20GF3GS03	Tamil - III / Hindi - III / French - III	6	3
	II	20GE3GS03	English - III	6	3
	III	20ZO3MC03	Animal Physiology	7	7
		20ZO3CP02	Animal Physiology and Evolutionary Biology - Lab	2	1
		20BO3AC03	Allied Botany - I	3	3
		20BO3AP03	Allied Botany - I - Lab	2	1
		20ZO3DE1A/ 20ZO3DE1B/ 20ZO3DE1C	**Discipline Specific Elective - 1** Evolutionary Biology / Evolutionary Trends in Animals/ Animal Phylogeny	4	3
	V	20STPNS01/ 20STPNC01/ 20STPPE01/ 20STPCC01/ 20STPRR01/ 20STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**21**
IV	I	20GT4GS04/ 20GH4GS04/ 20GF4GS04	Tamil - IV / Hindi - IV / French - IV	6	3

Sem.	Part	Code	Title of the Course	Hours	Credit
IV	II	20GE4GS04	English - IV	6	3
	III	20ZO4MC04	Biochemistry	7	7
		20ZO4CP03	Biochemistry - Lab	2	1
		20BO4AC04	Allied Botany - II	3	3
		20BO4AP04	Allied Botany - II - Lab	2	1
		20ZO4DE2A/ 20ZO4DE2B/ 20ZO4DE2C	**Discipline Specific Elective - 2** Genetic Engineering/ Biotechnology/ Endocrinology	4	3
	V	20STPNS01/ 20STPNC01/ 20STPPE01/ 20STPCC01/ 20STPRR01/ 20STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	2*
		20SLPEX01	**Service Learning Programme -** Extension JACEP	-	-
			Total	**30**	**21+2***
V	III	20ZO5MC05	Cell Biology	6	6
		20ZO5MC06	Genetics	6	6
		20ZO5MC07	Biostatistics and Bioinformatics	6	6
		20ZO5CP04	Cell Biology, Genetics, Biostatistics and Reproductive Biology - Lab	4	2
		20ZO5DE3A/ 20ZO5DE3B/ 20ZO5DE3C	**Discipline Specific Elective - 3** Human reproductive Biology / Wild Life Conservation and Management / Aquatic Zoology	4	3
	IV	20ZO5GE01/ 20GE5NC01	**Generic Elective - 1 (NME)** Global Environmental Issues NCC - National Integration and Personality Development	2	2
		20SE5AB03	**Skill Enhancement Compulsory Course (SECC) - 3:** Aptitude Building - I	2	2
	V	20SLPEX01	**Service Learning Programme -** Extension JACEP	-	2*
			Total	**30**	**27+2***

Sem.	Part	Code	Title of the Course	Hours	Credit
VI	III	20ZO6MC08	Immunology	6	6
		20ZO6MC09	Microbiology	6	6
		20ZO6MC10	Clinical Lab Technology	6	6
		20ZO6CP05	Immunology, Microbiology and Clinical Lab Technology - Lab	4	3
		20ZO6DE4A/ 20ZO6DE4B/ 20ZO6DE4C	**Discipline Specific Elective - 4** Livestock Management and Animal Husbandry / Agrochemicals and Pest Management/ Entomology	4	3
	IV	20ZO6GE02/ 20GE6NC02	**Generic Elective - 2 (NME)** Food, Nutrition and Health/ NCC - Organization and Health Programme in NCC	2	2
		20SE6ZO04	**Skill Enhancement Compulsory Course (SECC) - 4:** Bee Keeping	2	2
	V	20ZO6SS01/ 20ZO6SS02/ 20ZO6SS03/ 20ZO6SS04/ 20ZO6SM01	**Self Study Course:** Bionomics/ Dietetics/ Bioinstrumentation/ Maternal Child Health Care/ MOOCs	-	2*
			Total	**30**	**28+2***
			Total	**180**	**140+6***

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

CERTIFICATE COURSE

Code	Title of the Course	Hours	Credit
20ZO1SD01	**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)

THEORY:

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)

Practical can be decided by the respective Dept.

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

EXTERNAL QUESTION PATTERN

Part - A

10 Questions × 1Mark = 10 Marks

(Two Questions from each Unit)

Part - B

5 Questions × 5 Marks = 25 Marks

(Internal Choice and one set of Question from each Unit**)**

Part - C

4 Questions × 10 Marks = 40 Marks (4 Questions out of 6)

(Open Choice and atleast one Question from each Unit)

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 allotted Units)

PART – I Tamil - இக்கால இலக்கியம்

பருவம்: ஒன்று **நேரம்: 6**

குறியீடு: 20GT1GS01 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	இக்கால இலக்கியக் கவிஞர்களைப் பற்றி அறிந்து கொள்வர்.	PSO - 1	ஆற்றல், புரிதல்
CO-2	இலக்கிய வரலாற்றை அறிந்து கொள்வர்	PSO - 1	புரிதல், பயன்படுத்துதல்
CO-3	வாழ்க்கையில் ஏற்படும் துன்பங்களை அகற்றி, வெற்றி பெறும் வழிமுறைகளைத் தெரிந்து கொள்வர்.	PSO - 5	ஆற்றல், மதிப்பீடு
CO-4	கட்டுரைகள் வழி பன்முகத் தகவல்களை அறிந்து கொள்வர்.	PSO - 1	பயன்படுத்துதல், அறிவு
CO-5	எழுத்து இலக்கணங்களை அறிந்து கொள்வர்.	PSO - 2	புரிதல், அறிவு

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

Semester: I			**PART - I Tamil - இக்கால இலக்கியம்**								**Hours: 6**
Code : 20GT1GS01											**Credits: 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	5	3	4	5	5	3	2	3.83
CO - 2	4	4	5	4	3	5	5	3	2	5	2	3.83
CO - 3	4	5	4	2	5	3	4	5	5	2	3	3.83
CO - 4	5	3	5	2	4	5	3	2	4	5	4	3.83
CO - 5	5	5	4	5	4	3	2	4	5	3	2	3.83
Overall Means Score												**3.83**

Result: The Score of this Course is **3.83** (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

அலகு1: மரபுக் கவிதைகள்

1. பாரதியார் - நிலாவும் வான்மீனும் காற்றும் (மனத்தை வாழ்த்துதல்)
2. பாரதிதாசன் - வள்ளுவர் வழங்கிய முத்துக்கள்
3. கவிமணி தேசிக விநாயகம் பிள்ளை - உடல்நலம் பேணல்
4. கவியரசு கண்ணதாசன் - அனுபவமே கடவுள்
5. முடியரசன் - யார் கவிஞன்?

அலகு2: புதுக்கவிதை

1. ந. பிச்சமூர்த்தி - ஆத்தூரான் மூட்டை
2. நா. காமராசன் - காகிதப்பூக்கள்
3. அப்துல் ரகுமான் - ஆறாவது அறிவு
4. கவிஞர் பாலா - வானம் வசப்படும்
5. நெல்லை ஜெயந்தா - தொப்புள் கொடி

அலகு3: சிறுகதை

வெ. இறையன்பு - அழகோ அழகு

அலகு4: கட்டுரைத் தொகுப்பு

சிவசூரியன் இ.ஆ.ப., - நிறைவாக வாழுங்கள்

அலகு5: இலக்கணம், இலக்கிய வரலாறு

1. இலக்கணம்: - எழுத்தும், சொல்லும்
   எழுத்து - முதலெழுத்து, சார்பெழுத்து
   சொல் - பெயர்ச்சொல், வினைச்சொல், இடைச்சொல், உரிச்சொல்
2. கி. இராஜா - தமிழ் இலக்கிய வரலாறு
   (இக்கால இலக்கியம், மரபுக்கவிதை, புதுக்கவிதை, உரைநடை தொடர்பான இலக்கிய வரலாறு)

பாடநூல்கள்:

1. தமிழ்த்துறை வெளியீடு - இக்கால இலக்கியம்
   ஜெயராஜ் அன்னபாக்கியம் மகளிர் தன்னாட்சிக் கல்லூரி
   பெரியகுளம்
2. வெ. இறையன்பு - அழகோ அழகு
   நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
   41-டீ சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,
   அம்பத்தூர், சென்னை – 98
   4ஆம் பதிப்பு – 2013.
3. சிவசூரியன் இ.ஆ.ப., - நிறைவாக வாழுங்கள்
   நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
   41-டீ சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,
   அம்பத்தூர், சென்னை – 98
   மு.பதிப்பு – 2017.
4. கி. இராஜா - தமிழ் இலக்கிய வரலாறு
   நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
   41-டீ சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,
   அம்பத்தூர், சென்னை – 98
   இரண்டாம் பதிப்பு – 2019.

ENGLISH FOR COMMUNICATION -I

Semester: I **Hours: 6**

Code : 20GE1GS01 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Develop a fair degree of competence in self-expression in both writing and speaking.	PSO-1	K, AP
CO - 2	Read and comprehend texts.	PSO-1, PSO-2	C, AP
CO - 3	Use academic resources.	PSO-3	AP
CO - 4	Engage in independent learning.	PSO-3	A, S, E
CO - 5	Obtain critical and analytical thinking.	PSO-5	AP, S, E

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

Semester : I				**ENGLISH FOR COMMUNICATION -I**							**Hours: 6**
Code : 20GE1GS01											**Credits: 3**
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	4	5	3	4	5	4	4	3	5	5	5	4.27
CO-2	3	5	4	4	5	5	3	3	4	4	5	4.09
CO-3	3	5	4	3	3	3	3	4	3	3	5	3.54
CO-4	3	5	3	4	3	3	3	4	4	3	5	3.63
CO-5	5	5	4	3	5	5	3	5	4	5	5	4.45
Overall Mean Score												**3.99**

Result: The score for this course is **3.99** (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 **20 Hours**

1. Listening and Speaking
   a. Introducing self and others
   b. Listening for specific 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, encyclopedias, thesaurus
4. Grammar in Context

   Naming and Describing
   - Nouns and Pronouns
   - Adjectives

UNIT II **20 Hours**

1. Listening and Speaking
   a. Listening with a Purpose
   b. Effective Listening
   c. Tonal Variation
   d. Listening for Information
   e. Asking for Information
   f. Giving Information
2. Reading and Writing
   a. Strategies of Reading:

      Skimming and scanning
   b. Types of Reading:

      Extensive and Intensive Reading
   c. Reading a Prose Passage
   d. Reading a Poem
   e. Reading a Short Story

2. 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
3. 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
4. Grammar in Context

    Involving Action- I
    a. Verbs
    b. Concord

UNIT III **16 Hours**

1. Listening and Speaking
    a. Giving and following instructions
    b. Asking for and giving directions
    c. Continuing discussions with connecting ideas

    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

    Grammar in Context

    Involving Action- II
    - Verbal- Gerund, Participle, Infinitive
    - Modals

UNIT IV **16 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

   Grammar in Context

   Tense

   - Present
   - Past
   - Future

UNIT V **18 Hours**

1. Listening and Speaking

   a. Participating in a Group discussion

2. Reading and writing

   a. Reading diagrammatic information - interpretations, maps, graphs and pie charts

   b. Writing short essays using the language of comparison and contrast

3. Grammar in Context: Voice (Show the relationship between Tense and Voice)

COURSE BOOK

- Communicative English (For Students of Arts and Science Colleges) Tamilnadu State Council for Higher Education (TANSCHE)

ENGLISH FOR COMMUNICATION I - 20GE1GS01

QUESTION PATTERN

Time: 3 Hours **Marks: 75**

PART - A

1. Match the expressions (Introduce self/ others) (Unit I) 5 × 1 = 5
2. Interpret the given Diagrammatic chart 1 × 5 = 5
3. Write a day's happenings as journal entry 1 × 5 = 5
4. Write a narrative essay of two to three paragraphs 1 × 5 = 5

   (From Unit III)

PART - B

Answer the following 5 × 5 = 25

5. Attempt a group discussion on the given topic

   (From Unit - V)

6. Write a conversation by giving opinions on the given topic

   (From Unit -IV)

7. Read the following passage and identify the point of view and perspective of the writer.

   (From Unit -III)

8. Take Notes for the given passage.

   (From Unit - IV)

9. Write any ONE paragraph on the following topics

   (From Unit - II)

PART - C

10. Identify the verbs in proverbs and terms in new media. 10 × 1 = 10

    (From Unit- II)

11. Fill up the blanks by using appropriate Noun & Pronoun/Adjective/ Verbs/ Concord/Gerund/ Participle/ Infinitive/ Modals/ Voice/ Tenses (all Units)

    20 × 1 = 20

INVERTEBRATE DIVERSITY

Semester: I **Hours: 7**

Code : 20ZO1MC01 **Credits: 6**

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, levels of structural organization, locomotion, spicules in poriferans and canal system in sponges.	PSO - 1, PSO - 5	K, C
CO - 2	Acquire clear knowledge on corals, coral reefs, polymorphism and parasitic adaptations of helminthes.	PSO - 1, PSO - 5	K, C, An
CO - 3	Discuss the common helminth parasites of human and domestic animals and economic importance of earthworms.	PSO - 1, PSO - 3, PSO - 5	K, C, An
CO - 4	Analyse the larval forms of crustaceans, insect metamorphosis and control of pest.	PSO - 1, PSO - 4, PSO - 5	K, C, An, Ap
CO - 5	Describe the oyster culture, pearl culture and water vascular system.	PSO - 1, PSO - 5	K, C, E

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

Semester: I				INVERTEBRATE DIVERSITY							Hours: 7
Code : 20ZO1MC01											Credits: 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	4	2	2	2	3	4	5	2	2	2	5	3.00
CO - 2	3	2	3	2	3	5	5	2	3	3	5	3.27
CO - 3	4	2	2	2	2	4	5	3	3	2	5	3.09
CO - 4	4	2	3	2	3	4	5	2	2	2	5	3.09
CO - 5	4	2	3	2	2	4	5	2	2	3	5	3.09
Overall Mean Score												3.11

Result: The Score for this Course is **3.11** (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

Principles of Taxonomy , Binomial Nomenclature, Classification of Animal Kingdom. **Levels of organization:** Grades of organization, symmetry and coelom. **Protozoa:** General characters and classification upto class with an example. Type study - *Paramecium*. Locomotion and Nutrition in Protozoa. **Porifera:** General characters and classification up to classes with an example. Type study - *Leucosolenia*. Canal system in sponges. **(21 Hours)**

UNIT II

Coelenterata: General characters and classification upto class with an example. Type study - *Obelia*. Corals, Coral reefs and their significance, Polymorphism in coelenterates. **Platyhelminthes:** General characters and classification upto class with an example. Type study - Liver fluke. Parasitic adaptations in Platyhelminthes. **(21 Hours)**

UNIT III

Aschelminthes: General characters and classification upto class with an example. Type study - Ascaris. **Annelida:** General characters and classification upto class with an example. Type study - Earthworm. Metamerism, Economic importance of earthworm. **(21 Hours)**

UNIT IV

Arthropoda: General characters and classification upto class with an example. Type study - Prawn (Penaeus): Cephalic, thoracic, abdominal appendages and larval forms. Beneficial insects - Honey bee and Silk worm. Arthropod vectors - Mosquito, Housefly, Pest of Paddy (*Leptocoryza varicornis*), Coconut (*Oryctes rhinocerus*), Cotton (*Earias fabia*) and Sugarcane (*Pyrilla perpusilla*), Mouth parts of insects. Metamorphosis in insect. **(21 Hours)**

UNIT V

Mollusca: General characters and classification upto class with an example. Type study - Pila - External morphology, Pallial complex, Digestive system, Sense organs, Reproductive system. Adaptations of foot in mollusc. Oyster culture and Pearl industry in India. **Echinodermata:** General characters and classification upto class with an example. Type study - Star fish - External morphology, Pedicellaria, Digestive system, Sense organs and Reproductive system. Larval forms of Echinoderms, Water vascular system in Echinoderms. **(21 Hours)**

COURSE BOOK:

- Nair, N.C., Leelavathy, S., Soundara Pandian, N., Murugan, T. & Arumugam, N. (2012). A Textbook of Invertebrates. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Jordan, E.L. & Verma, P.S. (2010). Invertebrate Zoology. S. Chand & Co. Ltd. New Delhi.
2. Kotpal, R.L. (2004). Modern Textbook of Zoology- Invertebrates (9th ed.). Rastogi Publications, Meerut.
3. Ayyar, E.K. & Ananthakrishnan, T.N. (1992). Manual of Zoology, Vol. I (Invertebrata), *Part I & II.* S. Viswanathan Printers and Publishers Pvt. Ltd. Madras.
4. Dhami, P.S. & Dhami, J.K. (1979). Invertebrate Zoology. Ram Nagar, S.Chand & Co. Ltd., New Delhi.
5. Hickman, C.P. Jr., Hickman, F.M. & Roberts, L.S. (1984). Integrated Principles of Zoology (7th ed.). St. Louis: Times Merror / Mosby College Publication.
6. Jain, A.P. (2002). Biology of Invertebrates (4th Ed.). Tata McGraw-Hill Publishing Company Ltd. New Delhi.

INVERTEBRATE AND CHORDATE DIVERSITY - LAB

Semester: I **Hours: 2**

Code : 20ZO1CP01 **Credits: -**

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 - 1, PSO - 3	K, C, An
CO - 2	Recognize the major groups of invertebrates.	PSO - 1, PSO-2, PSO-5	K, Ap, An
CO - 3	Locate the invertebrate animals in their specific taxonomic position.	PSO - 1, PSO - 5	An, Ap
CO - 4	Mount the body setae of earthworm.	PSO-1, PSO-4	K, Ap
CO - 5	Compare the mouth parts of honey bee and mosquito.	PSO-1,PSO-4	K, Ap

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

Semester: I				INVERTEBRATE AND CHORDATE DIVERSITY - LAB								Hours: 2
Code : 20ZO1CP01												Credits: -
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	2	2	2	3	5	3	2	4	4	3.00
CO - 2	4	2	2	2	2	4	5	2	2	3	5	3.00
CO - 3	4	2	3	2	2	3	5	3	2	4	5	3.18
CO - 4	4	2	3	2	2	4	5	2	2	3	4	3.00
CO - 5	4	2	3	2	2	5	5	2	2	2	5	3.09
Overall Mean Score												**3.05**

Result: The Score for this Course is **3.05** (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 = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

External Characters

Earthworm, Cockroach

Dissection:

Cockroach - Digestive system

- Nervous system

Mounting:

Body setae of Earthworm

Mouth Parts of Honey Bee, Cockroach and Mosquito

Sting of Honey Bee

Spotters:

Amoeba, Paramecium, Euglena, Tubipora, 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.

ALLIED CHEMISTRY - I (I B.Sc. ZOOLOGY)

Semester: I **Hours: 3**

Code : 20CH1AC01 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Explain the periodicity of elements and the fundamentals in chemistry	PSO-1	K
CO - 2	Describe about atomic structure and chemical bonding	PSO-2	C
CO - 3	Classify carbohydrates, proteins, amino acids and to illustrate its structure, properties and analyze vitamins deficiency diseases	PSO-1	K
CO - 4	Evaluate the empirical and molecular formula for the given organic compound	PSO-3	An, E
CO - 5	Categorize the types of polymers demonstrate the application of commercially available polymers	PSO-4	Ap

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

Semester: I											**Hours: 3**
Code : 20CH1AC01				**ALLIED CHEMISTRY - I**							**Credits: 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**	
CO1	4	4	3	4	3	4	4	4	3	4	3	3.64
CO2	4	4	4	4	3	4	3	4	3	4	4	3.73
CO3	4	4	4	3	4	3	4	4	4	4	3	3.73
CO4	4	3	4	4	3	3	4	4	3	4	3	3.54
CO5	4	3	4	3	4	3	4	4	3	4	4	3.64
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

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 - electro negativity **(9 Hours)**

UNIT II

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

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

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

AMINO ACIDS: Classification - properties: dipolar structure -Zwitter ion - uses

PROTEINS: Color reactions of proteins - structure of protein

VITAMINS: Classification - sources - deficiency diseases **(9 Hours)**

UNIT IV

DEDUCING MOLECULARFORMULA:

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:

Study material prepared by the Department of Chemistry

BOOKS FOR REFERENCE:

1. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th edition, 2007
2. P.L.Soni , Mohan Katyal, Text Book of Inorganic Chemistry, Sultan Chand and Sons, 20th edition, 2006
3. B.R. Puri, L.R. Sharma and S.Pathania, Physical Chemistry, Vishal Publishing Co, 41st edition,2004

ALLIED PRACTICAL I: VOLUMETRIC ANALYSIS

(Examination at the end of I Semester)

Semester: I **Hours: 2**

Code : 20CH1AP01 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain practical knowledge about various types of titrations and indicators	PSO-1	K
CO - 2	Apply the skills to do the volumetric titration in double burette method	PSO-3	Ap
CO - 3	Demonstrate the principles of titrimetry	PSO-2	C
CO - 4	Analyze titrimetric data systematically estimate the amount of substance in a given solution.	PSO-2,PSO-5	An
CO - 5	Adopt the safety rules and apply their skills in life	PSO-3	Ap

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

Semester: I				**ALLIED PRACTICAL I: VOLUMETRIC ANALYSIS**							**Hours: 2**
Code : 20CH1A P01											**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**	
CO1	4	4	4	4	3	2	4	4	4	3	3	3.54
CO2	4	4	4	4	3	2	4	4	4	3	3	3.54
CO3	4	4	4	4	3	2	4	4	4	3	3	3.54
CO4	4	4	4	4	3	2	4	4	4	3	3	3.54
CO5	4	4	4	4	3	2	4	4	4	3	3	3.54
Overall Mean Score												**3.54**

Result: The score for this course is **3.54** (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

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

I. ACIDIMETRY AND ALKALIMETRY:

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

II. PERMANGANIMETRY:

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

III. IODOMETRY:

1. Estimation of potassium dichromate (demonstration only)

BOOK FOR REFERENCE:

Practical guide prepared by the Chemistry Department

PROFESSIONAL ENGLISH

Semester: I **Hours: 2**

Code : 20ZO1AE01 **Credits: 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, PSO-4	C,AP, S
CO - 2	Use language for speaking with confidence in an intelligible and acceptable manner	PSO-1, PSO-4, PSO-3,PSO-5	C, AP, E
CO - 3	Read independently unfamiliar texts with comprehension	PSO-2, PSO-3, PSO-5	K,C,AP,E
CO - 4	Comprehend the importance of reading for life and writing in academic life.	PSO-1, PSO-3, PSO-4, PSO-5	C,AP, E
CO - 5	Write simple sentences without committing error of spelling or grammar	PSO-4	C,E

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

Semester : I				**PROFESSIONAL ENGLISH**							**Hours: 2**
Code : 20ZO1AE01											**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	4	4	4	4	4	4	4	3	4	4	4	3.90
CO-2	3	4	4	4	4	4	4	3	4	4	4	3.81
CO-3	4	3	3	3	4	4	4	4	3	3	4	3.63
CO-4	3	4	4	3	4	4	4	3	3	3	4	3.54
CO-5	3	4	3	3	3	3	3	4	4	4	4	3.45
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 = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

NB: All four skills are taught based on texts/passages.

UNIT I: COMMUNICATION

Listening: Listening to audio text and answering questions - Listening to Instructions

Speaking: Pair work and small group work.

Reading: Comprehension passages –Differentiate between facts and opinion

Writing: Developing a story with pictures**.**

Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT II: DESCRIPTION

Listening: Listening to process description.-Drawing a flow chart.

Speaking: Role play (formal context)

Reading: Skimming/Scanning-

Reading passages on products, equipment and gadgets.

Writing: Process Description –Compare and Contrast Paragraph-Sentence Definition and Extended definition-Free Writing.

Vocabulary: Register specific -Incorporated into the LSRW tasks.

UNIT III: NEGOTIATION STRATEGIES

Listening: Listening to interviews of specialists / Inventors in fields (Subject specific)

Speaking: Brainstorming.(Mind mapping). Small group discussions (Subject-Specific)

Reading: Longer Reading text.

Writing: Essay Writing (250 words)

Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT IV: PRESENTATION SKILLS

Listening: Listening to lectures.

Speaking: Short talks.

Reading: Reading Comprehension passages

Writing: Writing Recommendations

Interpreting Visuals inputs

Vocabulary: Register specific -Incorporated into the LSRW tasks

UNIT V: CRITICAL THINKING SKILLS

Listening: Listening comprehension- Listening for information.

Speaking: Making presentations (with PPT- practice).

Reading :Comprehension passages –Note making.
Comprehension: Motivational article on Professional Competence, Professional Ethics and Life Skills)

Writing: Problem and Solution essay– Creative writing –Summary writing

Vocabulary: Register specific - Incorporated into the LSRW tasks

COURSE BOOK:

- English For Life Sciences by Tamil Nadu State Council for Higher Education

INTERNAL ASSESSMENT	
COMPONENTS	**MARKS**
Test-I	30
Test-II	30
Listening Comprehension	10
Reading Comprehension	10
Language lab (Speaking skills)	10
Assignment	10
Total	**100**

PROFESSIONAL ENGLISH - 20ZO1AE01

QUESTION PATTERN

Time: 1 Hour **Max. Marks: 30**

I.	Match the following (or) True or False	10
II.	Writing Definition (or) Transcript of a passage	5
III.	Sketch mind maps for the following (or) Essay Writing	10
IV.	Comprehension on short talks (or) Writing Recommendations	5

STREAM - D
COMPUTER EDUCATION

Semester: I **Hours: 2**

Code : 20SE1CE1D **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	COGNITIVE LEVEL
CO - 1	Bridge the fundamental concepts of computers with the present level knowledge of the students.	K
CO - 2	Acquaint the use of options in Word, and use of PowerPoint options to prepare slide shows.	K
CO - 3	Develop the analytical mind, critical and logical thinking to apply mathematical foundations through Excel sheets.	K
CO - 4	Realize the need of computer word option to write dissertation, projects, thesis and blogs.	K
CO - 5	Acquaint the use of Online Communication and Collaboration.	K

UNIT I: MS – WORD& MS -POWERPOINT

1. Starting MS – Word and typing Text, Number and symbols.
2. Formatting a text (Bold, Italic, Underline, Alignment)
3. Page setup (Applying page numbers, Header and Footer, Orientation, Drop cap)
4. Starting MS- Power point and creating a new presentation
5. Applying layouts to slides, transition and animations to slides

UNIT II : MS – EXCEL

1. Starting MS Excel and entering data
2. Sorting and filtering the data
3. Applying the statistical functions: maximum, minimum, result
4. Applying the mathematical functions: total, average, round
5. Creating the charts
   a. Columns
   b. Line
   c. Pie
   d. Bar

UNIT III: COMMUNICATIONS AND COLLABORATION

1. Basics of electronic mail
2. Getting an e- mail account
3. Sending and receiving emails
4. Document collaboration
5. Google meet& Google Classroom

BOOKS FOR REFERENCE:

1. "Comdex 9-in-1 DTP Course Kit", Vikas Gupta, Dreamtech Press 2011 Edition.
2. "Comdex 14- in -1 computer course Kit:,\ Vikas Gupta, Dreamtech Press 2011 Edition.
3. Sinha, P.K. & Sinha, Prtri, Computer Fundamentals, BPB

Components for continuous Internal Assessment (CIA) Skill Enhancement

Compulsory Courses

QUESTION PATTERN

Components	Marks
Test - I (Practical)	30
Test –II (Practical)	30
Record	30
Attendance	10
Total	**100**

இடைக்கால இலக்கியமும் நாவலும்

பருவம்: இரண்டு **நேரம்: 6**

குறியீடு: 20GT2GS02 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	சைவ, வைணவ அடியார்களின் பக்தியைப் பற்றி அறிந்து கொள்வர்.	PSO - 4	புரிதல்
CO-2	அடியார்களின் வழி இறைவனின் அருள் தன்மையைப் புரிந்து கொள்வர்.	PSO - 4	அறிவு
CO-3	செய்யுள் எழுதும் முறையைக் கற்றுக் கொள்வர்.	PSO - 1	புரிதல்
CO-4	வெற்றிச் சிறப்பைப் போற்றும் முறையைத் தெரிந்து கொள்வர்.	PSO - 3	அறிவு
CO-5	செய்யுள் வழி உரைநடையையும், புதின மரபையும் கற்றுக் கொள்வர்.	PSO - 1	அறிவு, புரிதல்

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

Semester: II			இடைக்கால இலக்கியமும் நாவலும்								**Hours: 6**
Code : 20GT2GS02											**Credits: 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	5	3	4	5	5	4	3	4.25
CO - 2	4	4	5	4	3	5	5	3	2	5	3	4.19
CO - 3	4	5	4	2	5	3	4	5	5	2	3	3.83
CO - 4	5	3	5	2	4	5	3	2	4	5	4	3.83
CO - 5	5	5	4	5	4	3	2	4	5	3	2	3.83
Overall Means Score												**3.98**

Result: The Score of this Course is **3.98** (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

அலகு1: சைவம்

1. திருஞானசம்பந்தர் - திரு ஆலவாய் - 2 பாடல்கள்
    1. மந்திரமாவது நீறு...
    2. வேத்திலுள்ளது நீறு ...
2. திருநாவுக்கரசர் - தேவாரம் - 2 பாடல்கள்
    1. நாமார்க்கும் குடியல்லோம்...
    2. பாலனாய்க் கழிந்த ...
3. சுந்தரர் - தேவாரம் - 2 பாடல்கள்
    1. ஊனாய் உயிர் ஆனாய் ...
    2. மழுவாள் வலன் ஏந்தி மன்ற ...
4. மாணிக்கவாசகர் - சிவபுராணம் 15 வரிகள்

    நமச்சியவாய வாழ்க முதல்... சீரார் பெருந்துறை நம்தேவன் அடி போற்றி வரை

அலகு2: வைணவம்:

1. பேயாழ்வார் - திருக்கண்டேன்...
2. பூதத்தாழ்வார் - அன்பே தகளியா...
3. பொய்கையாழ்வார் - வையம் தகளியா...
4. ஆண்டாள் - திருப்பாவை முதல் 10 பாடல்கள்

அலகு3: சிற்றிலக்கியங்கள்

1. கலிங்கத்துப்பரணி - இந்திர சாலம்
2. நந்திக் கலம்பகம்
    1. மயில் கண்டால் மயிலுக்கே வருந்தியாங்கே - 25வது பாடல்
    2. ஓடரிக்கண் மடநல்லீர் ஆடாமோ ஊசல் - 29வது பாடல்
    3. அறம்பெருகும் தனிச்செங்கோன் மாயன் தொண்டை – 60வது பாடல்

அலகு4: குறுநாவல்

ரட்டை வால் குருவி – யாழ் எஸ். ராகவன்

அலகு5:

இலக்கணம்: யாப்பின் உறுப்புக்கள்

இலக்கிய வரலாறு - பக்தி இலக்கியம், சிற்றிலக்கியம் தொடர்பான பகுதிகள்
நாவலின் தோற்றமும் வளர்ச்சியும்.

பாடநூல்கள்:

1. தமிழ்த்துறை வெளியீடு - இடைக்கால இலக்கியம்,
   ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி,
   பெரியகுளம்
2. எம்.ஆர்.அடைக்கலசாமி - தமிழ் இலக்கிய வரலாறு, ராசி பதிப்பகம்,
   சென்னை - 73, 41ஆம் பதிப்பு.
3. யாழ் எஸ். ராகவன் - ரட்டை வால் குருவி,
   நியூசெஞ்சுரி புக் ஹவுஸ் (பி) லிமிடெட், சென்னை.
   மு.ப. 2020

ENGLISH FOR COMMUNICATION - II

Semester: II **Hours: 6**

Code : 20GE2GS02 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO -1	Develop a fair degree of competence in self-expression in both writing and speaking.	PSO-1, PSO-3, PSO-4	C, S
CO - 2	Read and comprehend texts.	PSO-2, PSO-4, PSO-5	K, AP
CO - 3	Use academic resources.	PSO-1, PSO-2, PSO-5	AP, A
CO - 4	Engage in independent learning.	PSO-1, PSO-4, PSO-5	C
CO - 5	Obtain critical and analytical thinking.	PSO-1, PSO-5	C, AP, A

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

Semester : II				**ENGLISH FOR COMMUNICATION - II**							**Hours: 6**
Code : 20GE2GS02											**Credits: 3**
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: The 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 **18 Hours**

1. Speaking and listening

   a. Participating in group discussions

   Reading and writing

   a. Reading short fictional pieces
      i. Reading aloud
      ii. Identifying mood, tone, point of view
      iii. Working with diction
   b. Writing short argumentative essays of two to three paragraphs
   c. Writing a resume

   Grammar in Context

   a. Subject Verb Agreement
   b. Active and passive voice

UNIT II **18 Hours**

1. Speaking and Listening
   a. Making short presentations
   b. Interactions during and after the presentations

   Reading and Writing

   a. Writing opinion pieces (could be on travel, food, film / book reviews or on any contemporary topic)
   b. Writing a cover letter
   c. Reading poetry
      i. Reading aloud: (Intonation and Voice Modulation)
      ii. Identifying and using simile, metaphor, personification etc.

   Grammar in Context

   a. Idioms and phrasal verbs
   b. Second and third conditional

UNIT III **18 Hours**

1. Speaking and Listening
   a. Note making

   Reading and writing

   a. Writing emails of complaint
   b. Reading longer fictional / non-fictional pieces in which all the reading skills can be brought into play
   c. Preparing outlines for short assignments

3. Grammar in Context
   a. Working with clauses
   b. Direct and indirect speech

UNIT IV **18 Hours**

1. Speaking and Listening
   a. Listening to understand different accents

   Reading and Writing
   a. Reading visual texts - advertisements
   b. Preparing first drafts of short assignments
   c. Writing cover letter

UNIT V **18 Hours**

1. Speaking and listening
   a. Taking leave

   Reading and Writing
   a. Peer-reviewing
   b. Preparing final draft using peer review comments
   c. Writing letters of application
   d. Readers' Theatre: (Reading aloud a given script - Scripts by Aaron Shepherd available on the internet)
   e. Dramatizing everyday situations/social issues through skits. (writing scripts and performing)

COURSE BOOK:

- Communicative English (For Students of Arts and Science Colleges) Tamilnadu State Council for Higher Education (TANSCHE)

ENGLISH FOR COMMUNICATION – II 20GE2GS02

Question Pattern

Time: 3 Hours **Marks: 75**

1.	Fill in the blanks with suitable answers	20 × 1 = 20
2.	Write a resume for job application (unit- I)	1 × 5 = 5
3.	Writing on contemporary topics (unit-II)	1 × 5 = 5
4.	Letter Writing (unit - II, V)	1 × 10 = 10
5.	Business Letter/ email Writing (unit-III)	1 × 10 = 10
6.	Note Making (unit- III)	1 × 10 = 10
7.	Writing short essays (unit- I)	1 × 10 = 10
8.	Writing Advertisement (unit-IV)	1 × 5 = 5

CHORDATE DIVERSITY

Semester: II **Hours: 7**

Code : 20ZO2MC02 **Credits: 7**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Comprehend the structural and functional organization of chordates.	PSO – 1, PSO - 2	C, K, An
CO - 2	Elucidate the parental care in Amphibians and migration in fishes.	PSO - 2, PSO - 3	K, An
CO - 3	Identify poisonous and non-poisonous snakes and acquire knowledge of first aid for snake bite.	PSO - 2, PSO - 5	K, S, E
CO - 4	Appreciate the flight adaptation in birds.	PSO - 4, PSO - 5	K, An
CO - 5	Explicate the aquatic mammals.	PSO - 1, PSO - 2	K, Ap

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

Semester: II				**CHORDATE DIVERSITY**							**Hours: 7**
Code : 20ZO2MC02											**Credits: 7**
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	2	2	4	5	4	2	3	4	3.18
CO - 2	5	2	2	2	3	4	5	4	2	2	4	3.18
CO - 3	4	2	2	2	2	4	5	4	2	3	4	3.09
CO - 4	5	2	2	2	2	4	5	5	2	2	4	3.18
CO - 5	4	2	2	2	2	4	5	5	2	3	4	3.18
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 = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

Prochordata: General characters and outline classification of chordate up to orders. Prochordata: General characters and classification of prochordata up to orders, Type study: *Balanoglossus* - External characters, digestive system, respiratory system, reproductive system. General characters of Ascidian and Amphioxus. General Topics - Retrogressive metamorphosis of Ascidian tadpole larva. **(21 Hours)**

UNIT II

Pisces and Amphibia: Pisces: General characters and classification of Pisces upto orders. Type study: Scoliodon - External characters, Digestive systems, Respiratory system, Circulatory system, Lateral line receptors. Amphibia: General characters and classification of Amphibia up to orders. Type study: *Rana tigrina* - External characters, respiratory system, circulatory system, urinogenital system. General topics - Migration of fishes, Parental care in Amphibia.

(21 Hours)

UNIT III

Reptilia: General characters and classification of Reptilia up to orders. Type study: *Calotes versicolor* - External characters, digestive system, respiratory system, circulatory system and urinogenital system. General Topics - Identification of poisonous and non - poisonous snakes, Snake Venom and anti - venom, Biting mechanism, Golden age of reptiles. **(21 Hours)**

UNIT IV

Aves: General characters and classification of Aves up to orders. Type study: Pigeon - *Columba livia* - External characters, digestive system, respiratory system, circulatory and urinogenital system. General Topics - Flight adaptation, Migration in birds, Flightless birds. **(21 Hours)**

UNIT V

Mammalia: General characters and classification of Mammalia upto orders. Type Study: Rabbit - External characters, digestive system, respiratory system, circulatory system and urinogenital system. General Topics - Aquatic mammals, Dentition in mammals, Stomach in mammals, skeletal system in mammals (Axial and Appendicular), Placentation in mammals. **(21 Hours)**

COURSE BOOK:

- Arumugam, N., Thangamani, A., Prasanna Kumar, S., and Narayanan, L.M. (2013), A text book of Chordates, Saras publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Ekambaranatha Ayyar, M. (1971). A manual of zoology. part-II (Chordate) S. Viswanathan Printers and Publishers Pvt. Ltd.,Chennai.
2. Ekambaranatha Ayyar, M. and T.N. Anathakirshnan.(1985). A manual of zoology. Vol-II (Chordate)Viswanathan Printers and Publishers Pvt. Ltd., Chennai.
3. Jordan, K.L. and P.S. Verma.(1998). Chordate of zoology (11th Edition).S. Chand and Company Ltd, New Delhi.
4. Kardong, K, (2002). Vertebrates: Comparative Anatomy, Function and Evolution. Tata McGraw Hill Publishing Company Ltd, Chennai.
5. Kotpal, R.L. (2005). Morden text book of zoology-Vertebrates. Rastogi Publications, Meerut.
6. Dhami P.S and Dhami J.K. (1972). Chordate of Zoology R. Chand and Company Ltd, New Delhi.

INVERTEBRATE AND CHORDATE DIVERSITY - LAB

Semester: II **Hours: 2**

Code : 20ZO2CP01 **Credits: 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 - 1, PSO - 3	K, An
CO - 2	Describe the structure of placoid scales in shark.	PSO - 1, PSO - 2	C, E
CO - 3	Report on beak and feet adaptation of birds.	PSO - 4, PSO - 5	K, Ap, An
CO - 4	Collect and submit feathers of any five birds.	PSO - 3, PSO - 5	K, Ap, C
CO - 5	Identify the birds in the college campus and submit the report.	PSO - 4, PSO - 5	K, Ap

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

Semester: II				**INVERTEBRATE AND CHORDATE DIVERSITY - LAB**							**Hours: 2**
Code : 20ZO2CP01											**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	2	2	2	2	5	5	5	2	3	4	3.36
CO - 2	4	2	2	2	2	4	5	3	2	2	3	2.82
CO - 3	5	2	2	2	2	4	5	4	2	3	4	3.18
CO - 4	5	2	3	2	3	4	5	3	2	3	4	3.27
CO - 5	5	2	2	2	2	4	5	4	2	3	3	3.09
Overall Mean Score												**3.14**

Result: The Score for this Course is 3.14 (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. Mounting of placoid scales in shark.
2. Identification of any five local edible fishes.
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.

SPOTTERS:

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

ALLIED CHEMISTRY - II

Semester: II **Hours: 3**
Code : 20CH2AC02 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the role of chemistry and usage of some important compounds	PSO-2	K, C
CO - 2	Gain knowledge on the principles of catalysis and surface chemistry	PSO-1	K
CO - 3	Appreciate the chromatographic techniques a	PSO-2	K
CO - 4	Recognize the role of chemistry in agriculture	PSO-2	An, Ap
CO - 5	Explain some terms of electrochemistry and corrosion	PSO-3	Ap

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

Semester: II				**ALLIED CHEMISTRY - II**							**Hours: 3**
Code : 20CH2AC02											**Credits: 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**	
CO1	4	3	4	3	3	3	4	3	3	4	3	3.36
CO2	3	4	4	4	3	2	4	4	3	4	3	3.45
CO3	3	4	4	3	3	3	3	4	3	4	3	3.36
CO4	3	4	3	4	3	3	3	4	4	3	3	3.36
CO5	3	4	3	4	4	3	3	4	3	4	3	3.45
Overall Mean Score												**3.40**

Result: The score for this course is **3.54**

Note:

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

CHEMISTRY IN THE SERVICE OF MANKIND:

Antibiotics: definition - classification based on specificity and their gram staining methods-uses of penicillins, chloramphenicol, tetracyclines and streptomycin- **antipyretics:** definition - preparation and uses of aspirin and paracetamol - **analgesics:** definition, types and examples - **antiseptics and disinfectants:** definition, uses and examples **(9 Hours)**

UNIT II

SURFACE CHEMISTRY:

Adsorption - definition - difference between adsorption and absorption - types of adsorption - difference between physisorption and chemisorption - Freundlich adsorption isotherm - applications of adsorption

CATALYSIS:

General characteristics of a catalyst - types of catalysis - homogeneous catalysis, heterogeneous catalysis, acid-base catalysis, enzyme catalysis, auto catalysis - definitions and examples - catalytic poisoning - promoters - industrial applications of catalyst **(9 Hours)**

UNIT III

CHROMATOGRAPHY:

Definition - classification - applications of chromatography- thin layer chromatography (TLC): principle, choice of adsorbent and solvents, developing of chromatoplates, applications- Column chromatography(CG): Principle, choice of adsorbent and solvents, packing and developing of column, applications-paper chromatography: Principle, choice of adsorbent and solvents, application of sample, development of chromatogram:ascending, decending, radial techniques-R_f value-Applications **(9 Hours)**

UNIT IV

FERTILIZERS:

Definition - nutrients for plants - role of various elements in plant growth - natural and chemical fertilizers - classification of chemical fertilizers - manufacture of urea- mixed fertilizers - organic farming

INSECTICIDES AND PESTICIDES

Definition- preparation and uses of DDT and BHC **(9 Hours)**

UNIT V

ELECTROCHEMISTRY AND CORROSION:

Electrolytes, electrochemical cells-pH scale-definition - simple calculation - buffer solution: definition, types, example - corrosion-definition - disadvantages-Types-methods of prevention : galvanizing, tinning, cathodic protection, lacquers- and paints - inhibitors: Anodic and cathodic inhibitors **(9 Hours)**

COURSE BOOK:

Study material prepared by Department of Chemistry

BOOKS FOR REFERENCE:

1. B.R. Puri, L.R. Sharma and S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 41st edition, 2004
2. P.L. Soni and H.M Chawla, Text book of Organic Chemistry, Sultan Chand and Sons, 29th edition,2007
3. P.L. Soni and Mohan Katyal, Text book of Inorganic Chemistry, Sultan Chand and Sons, 20th edition, 2006

ALLIED PRACTICAL II: ORGANIC ANALYSIS

(Examination at the end of II Semester)

Semester: II **Hours: 2**

Code : 20CH2AP02 **Credits: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Realize the chemistry of fundamental organic reactions	PSO-2	An
CO - 2	deduce the aromatic/non aromatic and saturated/unsaturated nature of the organic substance	PSO-2	K, An
CO - 3	Identify the special element nitrogen and functional groups	PSO-1	E
CO - 4	Appreciate the characteristics of qualitative analysis	PSO-3	An
CO - 5	Adopt safety measures in handling chemicals	PSO-3	Ap

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

Semester: II			**ALLIED PRACTICAL II: ORGANIC ANALYSIS**						**Hours: 2**			
Code : 20CH2AP02												**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**	
CO1	4	5	3	4	4	3	3	4	3	3	3	3.55
CO2	4	4	4	3	3	3	4	4	3	4	3	3.55
CO3	4	2	3	3	3	2	3	4	3	3	3	3
CO4	5	3	4	3	4	3	3	4	4	3	3	3.55
CO5	4	4	4	3	3	3	4	5	3	3	3	3.55
Overall Mean Score												**3.44**

Result: The score for this course is **3.44**

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

FUNCTIONAL GROUPS:

Primary amines, Amides, Aldehydes, Ketones, Carbohydrates, Esters, Acids and Phenols (Preparation of solid derivative not required) Report should contain the following

1. Aliphatic / Aromatic
2. Saturated / unsaturated
3. Presence / absence of special element nitrogen
4. Functional group

REFERENCE:

Practical guide prepared by the Chemistry Department

QUESTION PATTERN

B.Sc. Chemistry and Chemistry Allied for I B.Sc. Zoology (R & SF)

Blue print of question paper (Internal and External)

Continuous Internal Assessment Component (CIA)

Theory:

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

INTERNAL QUESTION PATTERN

(Max: 40Marks)

Part - A

10 Questions(MCQ) × 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 atleast one Question from allotted Units)

EXTERNAL QUESTION PATTERN

(Max: 75Marks)

Part - A

10 Questions × 1Mark = 10 Marks

(Two Questions from each Unit)

Part - B

5 Questions × 5 Marks = 25 Marks

(Internal Choice and one set of Question from each Unit**)**

Part - C

4 Questions × 10 Marks = 40 Marks (4 Questions out of 6)

(Open Choice and atleast one Question from each Unit)

PRACTICAL:

Continuous Internal Assessment Component (CIA) - 40 Marks

External Practical Exam - 60 Marks

Passing Minimum

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

ENVIRONMENTAL STUDIES

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 need for public awareness	PO1,2,3
2.	Develop deeper understanding in classification of resources	PO 1,2,5
3.	Analyse the concept of an eco system	PO1,2,4,6
4.	Comprehend the definitions, causes and control measures of environmental pollutions	P O 1 ,5
5.	Participate in the environmental issues programmes from the unsustainable to sustainable development	PO 1 , 4,5,6

ENVIRONMENTAL STUDIES

Semester: II **Hours: 2**

Code : 20AE2ES02 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the components of our planet earth.	PSO 1,2,4	K, A ,S
CO - 2	Elucidate the importance of the natural resources.	PSO 2,3,5	K, An, E
CO - 3	Summarise the energy status of the environment.	PSO1,2,5	K,A,An
CO - 4	Acquire knowledge on the conservation of our environment.	PSO1,4,5	K,AP,S
CO - 5	Analyse the significance of water and climate towards sustainable development.	PSO 2,3,5	K,An, Ap, S,E

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

Semester: II				**ENVIRONMENTAL STUDIES**							**Hours: 2**
Code : 20AE2ES02											**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	4	4	3	4	3	4	5	4	5	4	5	4.09
CO - 2	3	4	3	4	3	4	5	4	4	4	4	3.81
CO - 3	3	4	3	4	3	4	5	4	4	4	4	3.81
CO - 4	3	4	3	4	3	3	5	4	5	5	4	3.90
CO - 5	4	4	3	4	3	4	5	4	4	4	5	4.00
Overall Mean Score for COs												**3.92**

Result: The Score for this Course is **3.92** (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: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance - Need for public awareness **(2 Hours)**

UNIT II: NATURAL RESOURCES

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 life styles. **(8 Hours)**

UNIT III: ECOSYSTEMS

Concept of an ecosystem - Structure and function of an ecosystem - producers, consumers and decomposers - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids - Introduction, types, characteristic features, structure and function of the following Eco system: Forest, grass land, desert and aquatic. **(6 Hours)**

UNIT IV: 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, Role of an individual in prevention of pollution. **(8 Hours)**

UNIT V: SOCIAL ISSUES AND THE ENVIRONMENTS

From unsustainable to sustainable development - Urban problems related to energy Water conservation, rain water harvesting, water shed 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. Waste land reclamation. Environmental protection act, air act, water act, wild life protection act. **(6 Hours)**

FIELD WORK

Visit to local area to document environmental assets- river/forest/ grassland/hill/ mountain.

COURSE BOOK:

Murugeshan, R., (2007). Environmental science and Engineering, Millenium publication, Madurai.

UNIT I : Section - 1.1 & 1.2

UNIT II : Section - 1.3 to 1.37

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

UNIT IV : Section - 3.1 to 3.37

UNIT V : Section - 4.1 to 4.17

Note: Tamil Version for Tamil Literature and History Tamil Medium Students.

Continuous Internal Assessment Component (CIA)

Theory:

Component	Marks
Internal test I	40
Internal test II	40
Quiz	10
Assignment	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 atleast one Question from allotted Units)

SKILL ENHANCEMENT COMPULSORY COURSE (SECC -2)
CAPACITY BUILDING

PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Fix healthy attitudes and standards to face the outside world.
2.	Develop healthy interpersonal, intrapersonal and social relationships.
3.	Analyze the portrayal of social issues depicted in films that help them aware of the issues and figure out ways to eliminate them.
4.	Identify the role of social media in the present scenario and adopt the positive changes.
5.	Build up qualities like team work, leadership and problem solving
6.	Improve perspectives on positive thinking, team work, and creativity

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.	Develop 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.	Understand the portrayal of social causes in films	PO-3

CAPACITY BUILDING

Semester: II **Hours: 2**

Code : 20SE2CB02 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Realised the importance of physical health, emotional well-being, and stress management.	PSO-1	K
CO - 2	Apply the features of team work and strive to become good leaders.	PSO-2,4	Ap
CO - 3	Enhance their awareness on social media and e- learning.	PSO-3	Sy
CO - 4	Develop interactive skills in online trade, and become value based professionals.	PSO-4	Ap
CO - 5	Acquire film making skills.	PSO-5	Ap

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

Semester : II				**CAPACITY BUILDING**							**Hours: 2**
Code : 20SE2CB02											**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	4	4	4	4	4	5	4	4	5	4	4	4.18
CO-2	4	4	5	4	4	4	4	4	4	4	4	4.09
CO-3	4	3	4	4	4	3	4	4	4	4	4	3.81
CO-4	5	4	4	4	4	3	4	4	5	4	3	4
CO-5	4	4	5	4	4	4	3	4	4	4	4	4
Overall Mean Score												**4.01**

Result: The score for this course is **4.01** (Very 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

Positive thinking-Seven steps in dealing with doubts. Traits of positive thinking. Goal setting-techniques of positive thinking to achieve the goals-creativity and components of creativity **(6 Hours)**

UNIT II

Leadership - Types of Leadership - Team work and public speaking - Importance of maintaining good interpersonal relationship with Team - Motivation - Self confidence - Attitude - Working in Group - Time Management - Effective Planning. **(6 Hours)**

UNIT III

Skilful usage of Social media (Whatsapp, Twitter, Facebook, Instagram, other app). Cyber bulling, photo, video morphing & editing, fake news. Useful study apps, e learning apps, Health, Police, Lawyer help app, Social issues complaint app. **(6 Hours)**

UNIT IV

Online interaction with Experts - Mushroom Cultivation - Mrs. Arthi (Batlagundu) -Apiculture -Mrs. Josephine (Madurai), Garment making - Mr. Alagusundaram (Tirupur) - Terrace Garden - Mrs. Megala - (Madurai) - Spirulina Cultivation - D. Aarthi (Madurai) - Antenna Foundation, (Madurai) **(6 Hours)**

UNIT V

Film Review: Thani Oruvan , Peranmai, Dhangal, 36 Vayadhinile, Kaatrin Mozhi, Ratchasi, English Vinglish - Short Film Making-Submission of Short Flim. **(6 Hours)**

BOOKS FOR REFERENCE:

1. Power of positive thinking, Mile, D.J. Rohan Book Company Delhi, 2004.
2. Dolmans 1922, A Handbook Public Speaking 1922, New York, Harcourt Breaee and company.

1. http://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/positive-thinking/art-20043950.
2. http://mayoclinic.org/healthy-lifestyle/stress-management/in-depth/3-simple-strategies-to-help-you-focus-and-de-stress/art-20390057.
3. http://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/3-ways-to-become-more-stress-resilient/art-20267213
4. http://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/3-ways-to-learn-patience-and-amp-up-your-well-being/art-20390072
5. http://www.mayoclinic.org/4-proven-ways-you-can-feel-happier/art-20390079

6. http://mayoclinic.org/healthy-lifestyle/adult-health/in-depth/anger-management/art-20048149
7. http://www.gaiam.com/blogs/discover/positive-thinking-strategies-to-help-you-achieve-yourgoals#:-text=Focus%20on%20what's20%20of20old%20failures.
8. http://www.linkedin.com/pulse/what-makes-positive-attitude-10-components-gary
9. http://ifflab.org/how-to-prevent-cyber-bullying -anti-cyber-bullying-law-in- india/
10. http://www.sciencedaily .com/terms/morphing.htm#:text=Morphing%20 is %special %effect,little%20 instruction%20 from%20the %20 user.
11. http://www.educationalappstore.com/
12. http:// www.mobihealthnews.com/37340/38-more-health-and-wellness-apps-that-connect-to-apples-healthkit
13. http://www.youtube.com/watch?v=skfqt9mm7j4
14. http://www.youtube .com/watch?v-rvy44i-ciE
15. https://www.youtube.com.com/watch?v=rINOELMCiqc
16. http:// www.youtube.com/watch?v=N5R-KCWPzr0&list=PLHw83Z MxtQ9 NdRd5yAxYrxkRsxqcvw iae@index=3
17. http://www.youtube.com/watch?v=PUzaLjSjERE
18. http:// www.youtube.com/watch?v=QkVue8XmVr8
19. http:// www.youtube.com/watch?v=XcRs4JBN43o
20. http:// www.youtube.com/watch?v=dzvpQG-2xC4

Continuous Internal Assessment Component (CIA)

Theory:

Component	Marks
Internal test I	40
Internal test II	40
Quiz	10
Assignment	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 atleast one Question from allotted Units)

பொதுத்தமிழ் - காப்பிய இலக்கியம்

பருவம்: மூன்று **நேரம்: 6**

குறியீடு: 20GT3GS03 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	காப்பிய இலக்கியங்களின் சிறப்புக்களை அறிந்து கொள்வர்.	PSO - 1, PSO - 2	புரிதல், அறிவு
CO - 2	ஐம்பெரும் காப்பியங்கள், பிறகாப்பியங்களின் பக்திச்சிறப்புக்களை உணர்ந்து கொள்வர்.	PSO - 1, PSO - 2	புரிதல்
CO - 3	அகப்புற இலக்கியச் செய்திகளை அறிந்து கொள்வர்.	PSO - 1, PSO - 2	அறிவு
CO - 4	வணிகச் செய்திகளைத் தெரிந்து கொள்வர்.	PSO - 2	புரிதல், பயன்படுத்துதல்
CO - 5	தமிழிலக்கியத்தில் காணலாகும் அறவியல், அறிவியல் செய்திகளைத் தெரிந்து கொள்வர்.	PSO - 2	அறிவு

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

Semester: III			பொதுத்தமிழ் - காப்பிய இலக்கியம்									**Hours: 6**
Code : 20GT3GS03												**Credits: 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	3	4	3	3	3	3	2	5	3	3.18
CO - 2	3	3	3	3	3	4	3	3	2	5	3	3.18
CO - 3	3	3	3	3	3	4	3	3	3	3	4	3.18
CO- 4	3	2	3	3	3	3	5	2	2	3	3	3.27
CO - 5	3	3	3	3	3	3	3	5	2	2	3	3
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

அலகு 1

சிலப்பதிகாரம் - புகார்க்காண்டம் - வேனில் காதை

மணிமேகலை - சிறைக்கோட்டம் அறக்கோட்டம் ஆக்கிய காதை

வளையாபதி - 3 முதல் 12 பாடல்கள்

அலகு 2

தேம்பாவணி - எசித்து சேர்படலம் - முதல் 15 பாடல்கள் மட்டும்

சீறாப்புராணம் - சாபீர் கடன்றீர்த்த படலம் - (23 பாடல்கள்)

அலகு 3

பொருளிலக்கணம் - அகத்திணை, புறத்திணை

இலக்கிய வரலாறு - காப்பியம் தொடர்பான இலக்கிய வரலாறு

அலகு 4

வணிகத் தமிழ் - சங்க இலக்கியங்கள் உணர்த்தும் வணிகச் செய்திகள்
பக். 75 - 84

வணிகக் கலைச் சொல்லாக்கம் - 50 சொற்கள்

அலகு 5

அறிவியல் தமிழ் - தமிழில் அறிவியல் - பக். 27 - 40

பாட நூல்கள்

1. தமிழ்த்துறை வெளியீடு - ஜெயராஜ் அன்னபாக்கியம் மகளிர் தன்னாட்சிக் கல்லூரி, பெரியகுளம்.
2. கி. இராசா - தமிழ் இலக்கிய வரலாறு
   நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
   அம்பத்தூர், சென்னை - 98
   இரண்டாம் பதிப்பு - 2019.

பார்வை நூல்கள்

1. பா. சரவணன் - **சிலப்பதிகாரம்,** சந்தியா பதிப்பகம், சென்னை. 8
   2 ஆம் பதிப்பு - ஜனவரி - 1997.
2. இராம - லட்சுமணன் - **மணிமேகலை,** உமா பதிப்பகம், சென்னை 1
   2 - ஆம் பதிப்பு - 1998.
3. முனைவர் கமலாமுருகன் - **வளையாபதி குண்டலகேசி மூலமும் உரையும்**
   சாரதா பதிப்பகம்,
   சென்னை - 600 014.
4. போரா ந.ம.மரிய அருட்பிரகாசம் (தொ.ஆ) - **தேம்பாவணி**
   மாவிகா அச்சகம், கே. புதூர்,
   மதுரை.
5. செய்குதம்பி பாவலர் - **சீறாப்புராணம்,** யூனிவர்சல் பிரிண்டர்ஸ்,
   வடக்கு உஸ்மான்சாலை, சென்னை
   டிசம்பர் - 2014
6. முனைவர் ச. திருஞான சம்பந்தம் - **யாப்பருங்கலக்காரிகை,** கதிர் பதிப்பகம்,
   திருவையாறு, முதற் பதிப்பு - 2007

7. எம். ஆர். அடைக்கலசாமி - **இலக்கிய வரலாறு,** ராசி பதிப்பகம், சென்னை. முதற்பதிப்பு. 1960

8. மணவை முஸ்தபா - **காலம் தேடும் தமிழ்,** மீரா பதிப்பகம், சென்னை - 40. 1993

9. முனைவர். பொ. மா. பழனிச்சாமி - **இலக்கியக் கதிர்** நியூ செஞ்சுரி புக்ஹவுஸ் சென்னை - 40. முதற்பதிப்பு - 2010

10. நாராயண வேலுப் பிள்ளை - **உரைநடைத் தமிழ், ஐம்பெருங் காப்பியங்கள்,** நர்மதா பதிப்பகம், சென்னை - 108. ஆறாம் பதிப்பு - 2003

ANIMAL PHYSIOLOGY

Semester: III **Hours: 7**

Code : 20ZO3MC03 **Credits: 7**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Comprehend the process of digestion and working mechanism of heart.	PSO - 1, PSO -2, PSO - 5	K, C, An
CO - 2	Elucidate the transport of respiratory gases and urine formation.	PSO - 2, PSO -3, PSO - 4, PSO -5	K, An, E
CO - 3	Explain the mechanism of muscle contraction, conduction of nerve impulse and receptors.	PSO - 2, PSO - 5	K, S, Ap
CO - 4	Explicate the function of endocrine glands and formation of gametes.	PSO - 2, PSO - 3, PSO - 5	K, An, Ap
CO - 5	Analyze the physiological processes in animals.	PSO - 1, PSO -2, PSO - 4, PSO - 5	K, An, E

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

Semester: III				**ANIMAL PHYSIOLOGY**							**Hours: 7**
Code : 20ZO3MC03											**Credits: 7**
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 = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

Digestion and circulation: Digestion - Intracellular digestion, extracellular digestion, structure of human digestive tract, role of enzymes in carbohydrate, protein and fat digestion, absorption of digested food in man and digestion in invertebrates. Circulation - Circulatory media found in animals, composition of blood, coagulation of blood, kinds of heart, functional anatomy of human heart, origin and conduction of heart beat, cardiac cycle, cardiac output, electrocardiogram and blood pressure. **(21 Hours)**

UNIT II

Respiration and excretion: Respiration - Kinds of respiration (aerobic and anaerobic), respiratory organs, respiratory pigments, transport of respiratory gases, regulation of respiration, respiratory quotient and anaerobiosis. Excretion - Excretory organs in invertebrates, structure of kidney, nephron, mechanism and regulation of urine formation in man, countercurrent mechanism, kinds of excretory products, dialysis, nephritis and blood urea. **(21 Hours)**

UNIT III

Muscular system and nervous system: Muscular system - Ultra structure of skeletal muscle, smooth muscles and cardiac muscles, mechanism of muscle contraction, physico chemical changes during muscular contraction. Nervous system - Neuron structure, types, conduction of impulse through non-myelinated neuron, myelinated fibres, synapse and neuromuscular junction, reflex action.

(21 Hours)

UNIT IV

Receptors and endocrine system: Sensory system - Classification of sense organs, structure and mechanism of chemoreceptors, tangoreceptors, phonoreceptors and photoreceptors in man. Endocrine system- Structure and functions of pituitary, thyroid, adrenal, islets of langerhans, testis and ovary. Invertebrate neuroendocrine systems - Annelida, Crustacea and Insecta.

(21 Hours)

UNIT V

Osmoregulation, thermoregulation, bioluminescence and chronobiology: Osmoregulation - Mechanism of osmoregulation, osmoregulation in fresh water, marine and terrestrial animals. Thermoregulation - Poikilotherms, Homeotherms, and Heterotherms, mechanism and regulation of temperature in terrestrial animals. Bioluminescence - Types of bioluminescence, significance of bioluminescence. Chronobiology: Biological rhythms - circadian rhythm, lunar rhythm, circannual rhythm and biological clock. Animal Behaviour - Tropism, kinesis, taxis, instinctive behaviour, learned behaviour. **(21 Hours)**

COURSE BOOK:

- Mariakuttiken A. and Arumugam N., (2017). Animal Physiology. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

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

ANIMAL PHYSIOLOGY AND EVOLUTIONARY BIOLOGY - LAB

Semester: III **Hours: 2**

Code : 20ZO3CP02 **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 consumption and Q_{10} in fish.	PSO - 1, PSO -2, PSO - 4	K, An, Ap,
CO - 2	Identify the nitrogenous excretory products in animal.	PSO - 1, PSO - 4	K, An, C
CO - 3	Prepare human blood smear.	PSO - 2, PSO -3, PSO 4, PSO - 5	K, S, Ap
CO - 4	Analyse the variation in fingerprints.	PSO - 4, PSO - 5	K, An, E
CO - 5	Attain knowledge on evolutionary significance of animals.	PSO - 1, PSO - 2	K, Ap, S, E

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

Semester: III				ANIMAL PHYSIOLOGY AND EVOLUTIONARY BIOLOGY - LAB							Hours: 2
Code : 20ZO3CP02											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	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 = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

ANIMAL PHYSIOLOGY:

1. Estimation of oxygen consumption in fish.
2. Examination of excretory products of fish, bird and mammals for detection of ammonia, urea and uric acid.
3. Preparation of haemin crystals.
4. Preparations of human blood smear.
5. Effect of temperature on salivary amylase activity.
6. Determination of opercular movement in fish in relation to temperature.
7. Spotters: Electrocardiogram, Encephalogram, Striated muscle, Non-striated muscle, Cardiac muscle and neuron.

EVOLUTIONARY BIOLOGY:

1. Variation in Finger prints.
2. Homologous and Analogous organs, vestigial organs, fossils.
3. Examples of Evolutionary significance.
    a. Peripatus
    b. Limulus
    c. Leaf insect
    d. Stick insect
    e. Chamaeleon
4. Adaptive radiation.

ALLIED BOTANY - I

Semester: III **Hours: 3**
Code : 20BO3AC03 **Credits: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Discuss the structure and functions of plant cells.	PSO - 1, PSO - 2	K, C
CO - 2	Evaluate the economic importance of algae.	PSO - 2, PSO - 3	C, E
CO - 3	Develop technical skill in identifying the fungal distribution in the soil/environment.	PSO - 1, PSO - 2, PSO - 5	K, C, An
CO - 4	Identify bryophytes sample collected from the field.	PSO - 3, PSO - 5	C, Ap
CO - 5	Analyse the symptoms, diagnosis, control measures of different plant diseases and their impact on agriculture.	PSO - 2, PSO - 3, PSO - 5	C, E, Ap

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

Semester: III				ALLIED BOTANY - I							Hours: 3
Code : 20BO3AC03											Credits: 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	2	2	4	2	3	4	3	3	3	2.81
CO - 2	4	3	4	4	3	2	3	4	3	4	5	3.54
CO - 3	4	3	3	5	5	4	4	4	4	4	5	4.09
CO - 4	2	3	4	2	4	3	5	4	4	4	4	3.54
CO - 5	4	3	4	3	4	3	4	3	4	4	5	3.72
Overall Mean Score												3.54

Result: The Score for this Course is 3.54 (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

Histology: Ultra structure of a plant cell, Tissues - meristematic tissues, theories on differentiation of meristems, Permanent tissues: simple permanent tissues - parenchyma, collenchyma and sclerenchyma, compound permanent 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 applications of algae. Volvox - occurrence, structure, reproduction - asexual and sexual 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, reproduction - vegetative, asexual and sexual method, life cycle - haplobiontic, diplobiontic and haplo - diplontic and economic importance.

(9 Hours)

UNIT IV

Bryophytes: Introduction, general characters of bryophytes. Funaria - occurrence, structure of gametophyte, internal structure - 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

Plant pathology: Introduction, immunity in plants, detailed study of causative 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)**

COURSE BOOK:

- Anne Ragland, Kumaresan, V. Arumugam, V. (2015). A Textbook of Botany Volume - I & II. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Vashishta, B. R. Sinha A. K. & Singh, V.P. (2002). Botany for Degree students Algae. S. Chand and Company, Ltd, New Delhi.
2. Vashishta, B. R. & Sinha, A. K. (2003). Botany for Degree students Fungi. S. Chand and Company, Ltd, New Delhi.
3. Robert Edward Lee, (2009). Phycology. Cambridge University Press.
4. Vashishta B. R. Sinha A. K. and Sinha V. P. (2006). Bryophyta. S. Chand and Co. Ltd., New Delhi.
5. Pandey, B. P. (2007). Plant Pathology. S. Chand and Co. Ltd., New Delhi.

ALLIED BOTANY - I - LAB

Semester: III **Hours: 2**

Code : 20BO3AP03 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Perceive the importance of mineral nutrients in plants.	PSO - 2, PSO - 3	K, An
CO - 2	Achieve practical skills in processing, preservation and culture of marine algae.	PSO - 4, PSO - 5	Ap, An
CO - 3	Comprehend the characteristic features of lower plant groups.	PSO - 1, PSO - 2	K, C
CO - 4	Differentiate the external and internal structure of plants.	PSO - 1, PSO - 2	An, E
CO - 5	Aanlyse the basic principles related to plant disease.	PSO - 3, PSO - 4	K, C

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

Semester: III				**ALLIED BOTANY - I - LAB**							**Hours: 2**
Code : 20BO3AP03											**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	3	4	3	2	4	4	3	3	5	3.27
CO - 2	4	4	3	5	4	3	4	3	3	3	5	3.72
CO - 3	2	3	3	3	2	4	3	3	2	4	4	3.00
CO - 4	2	2	3	3	3	4	4	4	3	4	4	3.27
CO - 5	3	2	3	4	4	4	5	3	3	4	4	3.54
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

1. Sectioning and Mounting
    A. Dicot stem - *Tridox procumbens*
    B. Monocot stem - *Asparagus recemosus*
    C. Monocot root - *Canna indica*
2. Observation of slides
    A. Parenchyma
    B. Collenchyma
    C. Sclerenchyma
    D. Volvox - daughter colony
    E. Sargassum - male conceptacle
    F. Sargassum - female conceptacle
    G. Yeast - structure
    H. Funaria - antheridial branch
    I. Funaria - archegonial branch
    J. Funaria - capsule
3. Chart
    A. plant cell
    B. Dicot root
4. Spotters in bottles
    A. Citrus canker
    B. Bunchy top of banana
    C. Ring rot of potato
    D. Little leaf of brinjal
    E. Funaria - Habit
    F. Sargassum - Habit

EVOLUTIONARY BIOLOGY

Semester: III **Hours: 4**

Code : 20ZO3DE1A **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Appraise the origin of life.	PSO - 2, PSO - 3	K
CO - 2	Interpret historical background of Evolution of organisms.	PSO - 3, PSO - 5	C, An
CO - 3	Analyse the natural selection.	PSO - 3, PSO - 5	C, Ap
CO - 4	Compare the patterns of evolution.	PSO - 2, PSO - 4	K, Ap, S
CO - 5	Analyse the fossils and human evolution.	PSO - 3, PSO - 5	An, K, C

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

Semester: III				**EVOLUTIONARY BIOLOGY**								**Hours: 4**
Code : 20ZO3DE1A												**Credits: 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	2	2	5	5	4	3	3	5	3.82
CO - 2	5	3	4	2	2	4	5	5	2	4	4	3.64
CO - 3	5	3	4	2	2	5	5	4	2	3	5	3.64
CO - 4	5	2	3	2	2	4	5	4	2	3	4	3.27
CO - 5	5	2	4	2	2	5	5	5	2	3	5	3.64
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 = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

Origin and evidences of evolution: Abiogenesis, Biogenesis - cosmozoic theory, theory of eternity, theory of catastrophism, theory of special creation, theories of organic evolution, origin of life and organic evolution, biochemical origin of evolution, spontaneous evolution, stages of evolution.Evidences of evolution - evidences from morphology and comparative anatomy. Homologous structures, analogous structures, vestigial organs, parallel, convergent, atavism, connecting links, embryological, physiological and biochemical evidences.Taxonomic evidences, palaeontological evidences, geographical evidences, genetical evidences. **(12 Hours)**

UNIT II

Lamarckism and Darwinism: Lamarckism - Internal urge, environment, use and disuse theory, inheritance of acquired characters and criticism. Neo Lamarckism - Experimental evidences. Darwinism - Principles of Darwinism, criticism, Supplementary theories of Darwin, Neo -Darwinism - experimental support and germplasm theory. **(12 Hours)**

UNIT III

Hardy - Weinberg equilibrium: Hardy - Weinberg Law, Hardy - Weinberg equilibrium, significance, gene pool, frequency and factors affecting Hardy - Weinberg equilibrium, Natural selection - Stabilizing, directional and disruptive selection. Inbreeding and out breeding. Variation - types, sources, gene mutation, chromosomal aberration, recombination, hybridization, genetic drift and gene flow. **(12 Hours)**

UNIT IV

Isolation and Speciation: Isolating mechanisms, Speciation - types, mechanism, patterns and factors influencing speciation, Allopatric speciation, Sympatric speciation, Parapatric speciation, Peripatric speciation, modern synthetic theory of evolution. **(12 Hours)**

UNIT V

Adaptive radiation,Mimicry and colouration, Fossil formation, types of fossils dating of fossils, incompleteness of fossil record, Indian fossils, living fossils and geological time scale. **(12 Hours)**

COURSE BOOK:

- Arumugam N., (2019). Organic Evolution. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Bell, G. (1996). The basics of selection. New York, Chapman and Hall.
2. Roger Lewin. (2004). Human evolution. An illustrated introduction. Wiley - Blackwell Publication, Oxford.
3. Kamshilor M.M. (1974). Evolution of the Biosphere. MIR Publishers, Moscow.
4. Edwin H Colbert, (1990). Evolution of the Vertebrates. V.R. Damodaran for Wiley Eastern Limited, Delhi.
5. Sanjib Chattopadhyay, (2012). Evolution, Adaptation & Ethology, Books and Allied (P) Ltd., Kolkata.
6. Mani M.S. (1983). Ecology & Evolution. Sathish Book Enterprise, Agra.
7. Williams, G.C. (1992). Natural Selection: Domains, Levels and Challenges. New York: Oxford Univ.Press.

EVOLUTIONARY TRENDS IN ANIMALS

Semester: III **Hours: 4**

Code : 20ZO3DE1B **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Trace the origin of life.	PSO - 2, PSO - 3	K
CO - 2	Interpret general evolutionary relationships among and between different animal groups.	PSO - 3, PSO - 5	C, An
CO - 3	Explain evolution of horse.	PSO - 3, PSO - 5	C, Ap
CO - 4	Describe the fundamental processes of evolutionary change in elephant and human.	PSO - 2, PSO - 4	K, Ap, S
CO - 5	Explain causes and role of extinction in evolution.	PSO - 3, PSO - 5	An, K, C

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

Semester: III				EVOLUTIONARY TRENDS IN ANIMALS							Hours: 4
Code : 20ZO3DE1B											Credits: 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	4	3	2	5	3	4	2	4	3	3.36
CO - 2	5	3	3	3	2	4	3	5	2	4	4	3.45
CO - 3	4	3	4	3	2	5	2	4	2	4	4	3.36
CO - 4	5	2	3	3	2	4	2	4	2	5	4	3.27
CO - 5	5	2	4	3	2	5	3	5	2	5	3	3.55
Overall Mean Score												3.40

Result: The Score for this Course is **3.40** (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

Origin and evidences of evolution: Abiogenesis, Biogenesis - cosmozoic theory, theory of eternity, theory of catastrophism, theory of special creation, theories of organic evolution, origin of life and organic evolution, biochemical origin of life. Evidences of evolution - evidences from morphology and comparative anatomy. Homologous structures, analogous structures, vestigial organs, parallel, convergent, atavism, connecting links, embryological, physiological and biochemical evidences, taxonomic evidences, palaeontological evidences, geographical evidences, genetical evidences. **(12 Hours)**

UNIT II

Patternsof Evolution: Sequential evolution - Salient features, examples for Sequential evolution and field study of Scarlet tiger moth. Divergent evolution - Causes, working mechanism, same ancestor, homologous structures, embryological development, examples for divergent evolution, salient features andbiodiversity is the result of divergent evolution.Microevolution - Elemental forces of microevolution, salient features of microevolution, mechanism of microevolution and examples for microevolution evolution. Macroevolution - Salient features, mechanism and examples. Megaevolution - Salient features. Coevolution - Plants and herbivores, predator and prey, host and parasite, mimic and model. Quantum evolution. **(12 Hours)**

UNIT III

Origin of higher categories: Monophyletic origin, polyphyletic origin, cladogenesis, anagenesis, stasigenesis, mechanism of the origin of higher categories, trends in evolution, rates of evolution.Orthogenesis - Mechanism of orthogenesis, results of orthogenesis, examples of orthogenesis, over specialization and criticism of orthogenesis. Evolution of horse - Place of origin, time of origin, evolutionary trends, evolutionary sequence of horses, fossil horses. **(12 Hours)**

UNIT IV

Evolution of elephantand man: Evolution of elephant - Salient features of elephants, place of origin, time of origin, evolutionary trends, evolution of elephant as seen in the fossil record, theories of elephant evolution. Evolution of man - Place of human evolution, time of human evolution, ancestor of man, salient features of Apes,salient features of man, causes of human evolution, trends in human evolution, evolution of brain as the moving force of human evolution, evolution of man as seen in the fossil record, important fossils of human evolution.Cultural evolution of man, milestones of cultural evolution, future evolution of man. **(12 Hours)**

UNIT V

Fossils: Types of fossil, significance of fossil, fossil formation, dating of fossils, incompleteness of fossil record, Indian fossils, living fossils. Extinction- Types, rate of extinction, causes of extinction, significance of extinction, mass extinction, coextinction and geological time scale. **(12 Hours)**

COURSE BOOK:

- Arumugam N., (2019). Organic Evolution. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Bell, G. (1996). The basics of selection. Chapman and Hall, New York.
2. Roger Lewin., (2004). Human evolution. An illustrated introduction. Wiley - Blackwell Publication, Oxford.
3. Kamshilor M.M. (1974). Evolution of the Biosphere. MIR Publishers, Moscow.
4. Edwin H Colbert, (1990). Evolution of the Vertebrates. V.R. Damodaran for Wiley Eastern Limited, Delhi.
5. Sanjib Chattopadhyay, (2012). Evolution, Adaptation & Ethology, Books and Allied (P) Ltd., Kolkata.
6. Mani M.S. (1983). Ecology & Evolution. Sathish Book Enterprise, Agra.
7. Williams, G.C. (1992). Natural Selection: Domains, Levels and Challenges. New York: Oxford Univ.Press.

ANIMAL PHYLOGENY

Semester: III **Hours: 4**

Code : 20ZO3DE1C **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Get a concrete idea of the evolution, hierarchy and classification of invertebrate phyla.	PSO - 1, PSO -2	K, C, An
CO - 2	Correlate the theories with the evidences.	PSO - 2, PSO - 4	K, An, E
CO - 3	Acquire knowledge on the taxonomic status of various chordate animals.	PSO - 1, PSO - 4	K, S, Ap
CO - 4	Awareof Paleontology i.e.,fossils and its significance.	PSO - 2, PSO - 5	K, An, Ap
CO - 5	Understand the origin and development of animals and the geological time scale	PSO -2, PSO - 4, PSO - 5	K, An, E

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

Semester: III				**ANIMAL PHYLOGENY**							**Hours: 4**
Code : 20ZO3DE1C											**Credits: 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	2	4	5	4	1	3	5	3.45
CO - 2	5	2	3	3	3	4	5	4	1	4	5	3.55
CO - 3	5	2	3	3	2	3	4	4	1	3	5	3.18
CO - 4	5	3	3	3	4	4	4	4	1	4	5	3.64
CO - 5	5	4	3	3	4	3	5	4	1	4	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

Invertebrate Phylogeny-I: Orgin of Metazoa - Orgin of multicellular group of animals, theories on the origin of Metazoa,Colonialprotozoans - ancestors of Metazoa, reasons for flagellate ancestry of Metazoa, theories on the origin of Bilateria. Origin and phylogeny of Annelida - Theories on the origin of Annelida,phylogeny of Annelida. Origin and phylogeny of Arthropoda -Theories on the origin of Arthropoda, changes involved during arthropodan evolution, phylogeny of Arthropods. **(12 Hours)**

UNIT II

Invertebrate Phylogeny-II: Origin and phylogeny of Mollusca, metameric ancestry, non-metameric ancestry, phylogeny of Mollusca, nautilus. Echinoderm Phylogeny - Eleutherozoaand Pelmatozoa, origin of Echinodermata, theories on the origin of echinoderms, phylogeny of echinoderms. **(12 Hours)**

UNIT III

Chordate Phylogeny-I: Origin of chordates, time of origin, place of origin, theories on the origin of Chordates.Origin of Vertebrates: Ancestors of Ostracoderms, Urochordata and origin of vertebrates, evolutionary significance of Ostractoderms and Placoderms, evolutionary significance of placodeerms, ancestry of higher fishes. Origin ofAmphibia - reasons for the transformation of fishes into amphibians,ancestors of amphibians, morphological evidences for the origin of Amphibia, terrestrialisation. **(12 Hours)**

UNIT IV

Chordate Phylogeny-II: Origin of reptiles,Fossil evidences - Cotylosauria and Seymouria, land egg and its importance in the origin of reptiles, main evolutionary trends in the reptilian evolution.**Origin of birds and origin of flight in birds:**Reptiles the ancestors of birds - Anatomical features, embryological features, physiological features, palaeontological features, Archaeopteryx, Origin of birds - Pterosauria and origin of birds, Dinosaurs and Archaeopteryx lineage, Origin of flight in birds. **(12 Hours)**

UNIT V

Chordate phylogeny-III: Origin of Mammals -Reptiles the ancestors of mammals - Morphological evidences, Paleontological evidences, Jurassic mammals, Living groups of mammals, Geological periods, Importance of the study of the geological time scale. **(12 Hours)**

COURSE BOOK:

- Renganathan, T. K. and Muthukrishnan R. (1988). Animal Phylogeny. St. Mary's Industrial School Press, Tuticorin -8.

BOOKS FOR REFERENCE:

1. Mayr, Ernst, (1973). Animal species and Evolution. The Belknap Press of Harvard University, Cambridge.
2. Dobzansky, T. (1976). Genetics and the origin of species. Oxford and IBH Publishing Co., New Delhi.
3. Alessandro Minelli, (2008). Perspectives in Animal Phylogeny and Evolution. OUP Oxford; Illustrated edition.
4. Matthew J. James, (2017). Collecting Evolution: The Galapagos Expedition that Vindicated Darwin. OUP Oxford; Illustrated edition.
5. Jan Pechenik, (2014). The Readable Darwin The Origin of Species as Edited for Modern Readers. OUP Oxford; Illustrated edition.
6. Rob Desalle, Bernd Schierwater (Editors), (2010). Key transitions in Animal evolution. CRC press, Science Publishers, Florida.

பொதுத்தமிழ் - பழந்தமிழ் இலக்கியம்

பருவம்: நான்கு **நேரம்: 6**

குறியீடு: 20GT 4GS04 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	பழந்தமிழ் இலக்கிய வளங்களை அறிந்து கொள்வர்.	PSO - 2	அறிவு
CO - 2	பழந்தமிழ் இலக்கியங்களின் சமூகநிலையைப் புரிந்து கொள்வர்.	PSO - 2	புரிதல், அறிவு
CO - 3	பழந்தமிழ் இலக்கியத்தின் தனித்தன்மையை அறிந்து கொள்வர்.	PSO - 2	அறிவு
CO - 4	பழந்தமிழ் இலக்கியத்தில் காணப்படும் நயங்களைத் தெரிந்து கொள்வர்.	PSO - 2	புரிதல்
CO - 5	பழந்தமிழ் இலக்கிய ஆசிரியர்களை அடையாளம் காண்பர்.	PSO - 2	பயன்படுத்துதல்

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

Semester: IV												**Hours: 6**
Code : 20GT 4GS04							பொதுத்தமிழ் - பழந்தமிழ் இலக்கியம்					**Credits: 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	3	3	3	4	3	3	3	3	3	3.09
CO - 2	3	3	3	4	3	4	4	3	3	4	2	3.27
CO - 3	3	3	3	3	3	3	3	3	3	3	4	3.09
CO- 4	3	4	3	3	3	3	3	3	3	3	3	3.09
CO - 5	3	3	3	3	3	3	3	3	3	3	3	3.00
Overall Mean Score												**3.10**

Result: The score for this course is **3.10** (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: சங்க இலக்கியங்கள் - எட்டுத்தொகை

1. **நற்றிணை (2 பாடல்கள்)**

"கேளாய், எல்ல தோழி..." (குறிஞ்சி: பாடல் - 61)

"பிரசம் கலந்த வெண் சுவைத் தீம்பால்..." (பாலை: பாடல் - 110)

2. **குறுந்தொகை (5 பாடல்கள்)**

"நெய்கனி குறும்பூழ்க்....." (குறிஞ்சி: பாடல் - 389)

"ஊருண் கேணி....." (மருதம்: பாடல் - 399)

"நசைபெரி துடையர்....." (பாலை: பாடல் - 37)

"பூவிடைப் படினும் யாண்டு....." (நெய்தல்: பாடல் - 57)

"மழைவிளை யாடும் ....." (முல்லை: பாடல் - 108)

3. **கலித்தொகை (1 பாடல்)**

"உண்கடன் வழிமொழிந்து இரங்குங்கால்....." - பாலைக்கலி - தோழிக்கூற்று

4. **அகநானூறு (2 பாடல்கள்)**

"வான் கடற் பரப்பில் தூவற்கு எதிரிய....." (நெய்தல்: பாடல் - 10)

"யாயே கண்ணினும் கடுங் காதலே! ....." (குறிஞ்சி: பாடல் - 12)

5. **புறநானூறு (2 பாடல்கள்)**

"அரிமயிர்த் திரள் முன்கை....." (பாடல்: 11)

"பாணர் தாமரை மலையவும், புலவர்....." (பாடல்: 12)

அலகு 2: பத்துப்பாட்டு

நெடுநல்வாடை முழுவதும்

அலகு 3: நீதி நூல்கள்

1. **திருக்குறள்** : **அறத்துப்பால்** - செய்நன்றி அறிதல் - ஈகை

2. **நாலடியார் : பொருட்பால்**

கல்வி - "குஞ்சி யழகும்..." முதல் "அலகுசால் கற்பின் ---" வரை (10 பாடல்கள்)

அறிவுடைமை - "பகைவர் பணிவிடம்..." முதல் "கருமமு முட்படா --" வரை (10 பாடல்கள்)

அலகு 4: இலக்கணம்

வல்லெழுத்து மிகும் இடம், மிகா இடம்

அலகு 5: இலக்கிய வரலாறு

சங்க காலம், சங்கம் மருவிய காலம் தொடர்பான இலக்கிய வரலாறு.

பாடநூல் :

1. தமிழ்த்துறை வெளியீடு - ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி. பெரியகுளம்.

2. கி. இராசா - தமிழ் இலக்கிய வரலாறு
நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
அம்பத்தூர், சென்னை - 98
இரண்டாம் பதிப்பு - 2019.

பார்வை நூல்கள்:

1. வ.த. இராமசுப்பிரமணியம் (உ.ஆ) - **நற்றிணை**
   திருமகள் நிலையம்,
   முதற் பதிப்பு - 2009.

2. புலவர் துரை இராசாராம் (உ.ஆ) - **குறுந்தொகை**
   திருமகள் நிலையம்,
   சென்னை. முதற் பதிப்பு 2008

3. முனைவர்.அ.விசுவநாதன் (உ.ஆ) - **கலித்தொகை**
   பாவைபிரிண்டர்ஸ்,
   சென்னை - 2007.

4. வ.த.இராமசுப்பிரமணியம் (உ.ஆ) - **அகநானூறு**
   திருமகள் நிலையம், சென்னை
   முதற் பதிப்பு 2009.

5. வ.த.இராமசுப்பிரமணியம் (உ.ஆ) - **புறநானூறு**
   திருமகள் நிலையம, சென்னை.
   முதற் பதிப்பு 2008.

6. முனைவர்.இரா.மோகன் (உ.ஆ) - **பத்துப்பாட்டு (பகுதி - 2)**
   நியூ செஞ்சுரி புக் ஹவுஸ்,
   சென்னை - 98,
   முதற் பதிப்பு - 2007.

7. எஸ். கௌமாரீஸ்வரி (பதி.ஆ) - **திருக்குறள் பரிமேலழகர் உரை**
   சாரதா பதிப்பகம், சென்னை - 600 014,
   முதற்பதிப்பு - 2002.

8. எஸ். கௌமாரீஸ்வரி (பதி.ஆ) - **பதினெண்கீழ்க்கணக்கு நூல்கள்**
   சாரதா பதிப்பகம், சென்னை - 14,
   முதற்பதிப்பு - மார்ச் - 2009.

BIOCHEMISTRY

Semester: IV **Hours: 7**

Code : 20ZO4MC04 **Credits: 7**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Attain practical knowledge on instruments used in biochemistry.	PSO - 4, PSO - 5	K, An, E
CO - 2	Comprehend the structure, classification and metabolism of carbohydrates.	PSO - 2, PSO -4, PSO - 5	K, C
CO - 3	Illustrate the configuration and metabolism of protein.	PSO - 2, PSO - 4	K, S, C
CO - 4	Depict the biosynthesis of fatty acids and nucleic acids.	PSO - 2, PSO -4, PSO - 5	K, An
CO - 5	Acquire knowledge on enzyme action and perceive the significance of vitamins.	PSO - 1, PSO - 3, PSO - 4	An, K, Ap, E

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

Semester: IV				**BIOCHEMISTRY**							**Hours: 7**
Code : 20ZO4MC04											**Credits: 7**
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	5	2	2	4	2	3	5	5	5	3.91
CO - 2	5	4	3	2	2	3	3	4	4	3	3	3.27
CO - 3	5	4	3	2	2	3	4	4	4	4	4	3.55
CO - 4	5	3	3	2	2	3	4	4	4	3	4	3.36
CO - 5	5	4	5	2	2	4	4	4	5	5	5	4.09
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 = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

Atoms, buffers and biochemical techniques: Atoms - 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. Biochemical techniques: Principle and applications - P^H meter, colorimeter, centrifuge, chromatography and electrophoresis. **(21 Hours)**

UNIT II

Carbohydrates: Structure and classification - monosaccharide, disaccharide, polysaccharide (with two examples each) and biological significance of carbohydrates. Metabolism - glycolysis, Kreb's cycle, hexose monophosphate shunt pathway, glycogenesis, glycogenolysis, Cori Cycle, blood sugar level, oral glucose tolerance test (GTT) and hormonal control of carbohydrate metabolism. **(21 Hours)**

UNIT III

Amino acids and proteins: Amino acids - types, structure and classification, chemical bonds involved in protein structure, configuration of protein - Linderstrom - Lang's structure of protein, properties of protein and biological significance of proteins. Metabolism - oxidative deamination, transamination, decarboxylation, transmethylation of amino acids, urea cycle, inborn errors of amino acid metabolism - phenylketonuria, alkaptonuria, tyrosinemia and albinism and hormonal regulation of protein metabolism. **(21 Hours)**

UNIT IV

Lipids and nucleic acids: Fatty acids - saturated fatty acids and unsaturated fatty acids. Lipid: structure and classification - simple lipids, compound lipids: phospholipids - lecithin and cephalin, glycolipids - sulfolipids, derived lipids - steroids - cholesterol, properties and biological significance of lipids. Biosynthesis of fatty acid - Palmitic acid, metabolism - oxidation of palmitic acid and formation of ketone bodies. Nucleic acids - synthesis of purine and pyrimidines. **(21 Hours)**

UNIT V

Enzymes and vitamins: Enzymes - classification, properties of enzyme, mechanism of enzyme action, factors influencing enzyme action, biological significance of enzymes, enzyme inhibition, isozymes, ribozyme and coenzymes - NAD, FAD and Coenzyme A. Vitamins - sources and functions of water soluble and fat soluble vitamins. **(21 Hours)**

COURSE BOOK:

- Arumugam N, Dulsy Fatima, Narayanan L.M, Meyyan R.P, Nallasingam K. and Prasannakumar S., (2018). Biochemistry. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Jain, J.L., Sunjay Jain and Nitin Jain. (2014). Fundamentals of Biochemistry. S. Chand & Co. Ltd., New Delhi.
2. Gupta, S. N. (2011). Biochemistry. Rastogi Publications, Meerut.
3. Vasudevan, D. M., Sree Kumari, S. & Kannan Vaidyanathan (2013). Text Book of Biochemistry for Medical Students (7^{th} ed.). Jaypee Brothers Medical Publishers Pvt. Limited, New Delhi.
4. Chatterjee**,** M.N. & Rana Shinde (2012). Text Book of Medical Biochemistry **(**8^{th} ed.). Jaypee Brothers Medical Publishers Pvt. Limited, New Delhi.
5. Jeremy M. Berg, John L. Tymoczko & Lubert Stryer (2006). Biochemistry (6^{th} ed.). Freeman & Co. Publishers, San Francisco.
6. Ambika Shanmugam (2012). Fundamentals of Biochemistry for Medical Students (7^{th} ed.). Published by Wolters Kluwer, India.
7. Rodney F Boyer., (2009). Modern Experimental Biochemistry (3^{rd} ed.). Published by Darling Kindersley (India), Pvt., Ltd, South Asia.
8. David.L.Nelson and Michael.M.Cox (2008). Lehninger's Principles of Biochemistry (4^{th} ed.). W.H. Freeman and CO., New York.
9. Veerakumari L., (2006). Bio Instrumentation. MJP Publishers, Chennai.
10. Lehninger, A. L., Nelson, D. K., and Cox, M. M. (1993). Principles of Biochemistry. CBS Publishers and distributors, New Delhi.
11. Stryer, L. (1988). Biochemistry. W. H. Freeman and Company, New York.

BIOCHEMISTRY - LAB

Semester: IV **Hours: 2**

Code : 20ZO4CP03 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Impart comprehensive knowledge on the methodology for qualitative analysis of biomolecules.	PSO - 1, PSO -3, PSO - 4, PSO - 5	K, C, An
CO - 2	Perceive knowledge on Beer-Lambert's law.	PSO - 3, PSO -4, PSO - 5	K, An, E
CO - 3	Analyse the salivary amylase activity in relation to substrate concentration.	PSO - 3, PSO - 4	K, S, C
CO - 4	Measure the pH of various samples using pH meter.	PSO - 2, PSO - 3, PSO - 5	K, An, Ap
CO - 5	Gain knowledge on working principles and applications of biochemical instruments.	PSO - 3, PSO -4, PSO - 5	K, An, E

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

Semester: IV				**BIOCHEMISTRY - LAB**							**Hours: 2**
Code : 20ZO4CP03											**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	5	3	2	4	3	2	5	5	5	4.00
CO - 2	5	5	5	4	2	4	3	4	5	4	4	4.09
CO - 3	5	4	5	3	2	3	4	4	5	5	4	4.00
CO - 4	5	5	5	3	2	3	4	3	5	4	4	3.91
CO - 5	5	5	5	4	2	4	2	3	5	5	5	4.09
Overall Mean Score												**4.02**

Result: The Score for this Course is **4.02** (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 = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

1. Qualitative analysis of Carbohydrate - Benedict's 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. Determination of salivary amylase activity in relation to different substrate concentration.
5. Verification of Beer-Lambert's law - Demonstration.
6. pH measurement of various samples using pH paper and pH meter.
7. Separation of amino acids by Paper Chromatography.
8. Instrument:
    a. Colorimeter
    b. pH Meter
    c. Centrifuge
    d. Chromatogram
    e. Electrophoresis.

ALLIED BOTANY - II

Semester: IV **Hours: 3**

Code : 20BO4AC04 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Comprehend the taxonomy of different families.	PSO - 1, PSO - 3	Ap, K
CO - 2	Imbibe the underlying principles of various physiological processes of plants.	PSO - 1, PSO - 2	C, K
CO - 3	Establish vegetable and ornamental garden.	PSO - 3, PSO - 5	K, Ap
CO - 4	Highlight the economic importance of botany.	PSO - 5	Ap, K
CO - 5	Acquire knowledge on the importance of medicinal plants for human welfare.	PSO - 1, PSO - 3	K, C

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

Semester: IV				**ALLIED BOTANY - II**							**Hours: 3**
Code : 20BO4AC04											**Credits: 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	3	3	4	3	4	4	5	4	5	3.72
CO - 2	2	2	3	3	3	2	4	3	3	4	4	3.00
CO - 3	4	3	3	5	4	4	4	3	3	3	5	3.72
CO - 4	3	4	3	3	3	3	3	2	3	4	5	3.27
CO - 5	3	3	3	4	4	4	4	3	4	3	5	3.63
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

Taxonomy: Introduction and scope of taxonomy, morphology of plant parts, Bentham and Hooker's system of classification, merits and demerits. Distinguishing characters, vegetative and floral characters of the following families with economic importance: Annanaceae - *Annona squamosa*, Rutaceae - *Murraya koenigii*, Asclepidaceae - *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 stomatal transpiration, mechanism of opening and closing stomata, significance of transpiration, guttation, factors affecting transpiration - internal and external factors. Photosynthesis - light reaction, Photoperiodism - short day plants, long day plants, day neutral plants and significance. **(9 Hours)**

UNIT III

Horticulture: Introduction, divisions and importance. Propagation - methods of vegetative propagation, cuttage - root, stem, leaf and leaf bud, layerage - ground layering, air layering and budding, graftage - methods of grafting - approach, whip, cleft and top. Planning and layout of orchards and kitchen garden, indoor gardening - hanging basket and 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: cereal - sorghum, pulse - black gram, fruit - pineapple, beverage - coffee, fibre - cotton, latex - rubber and essential oil - castor oil.

(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: *Adhatoda vasica* - Acanthaceae, *Aloe vera* - Liliaceae, *Ocimum sanctum* - Lamiaceae and *Vinca rosea* - Apocynaceae. **(9 Hours)**

COURSE BOOK:

- Anne Ragland, Kumaresan, V. Arumugam, V. (2015). A Textbook of Botany Volume - III & IV. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Suresh Kumar, (2006). Economic Botany, Campus book, International, New Delhi.
2. Sathish Kumar Mehla, Dr. (2007). Biofuel plants cultivation practices and seed bank, Pointer Publishers, Jaipur.
3. Pandy, H. P. (2009). Plant Taxonomy, Silver line Publications.
4. Trivedi, P. C. (2005). Applied Botany, Aavishkar Publishers, Jaipur.
5. Samuel, B.J. (2013). Taxonomy of Angiosperms, S. Chand & Co. Ltd., New Delhi.

ALLIED BOTANY - II - LAB

Semester: IV **Hours: 2**

Code : 20BO4AP04 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Explain the floristic features of families in technical terms.	PSO - 1, PSO - 2	K, C
CO - 2	Demonstrate the physiological activities in plants.	PSO - 3	K, C
CO - 3	Apply the methods for propagation of horticultural techniques.	PSO - 2, PSO - 5	K, Ap
CO - 4	Learn the methods for cultivation of mushroom.	PSO - 1, PSO - 4	C, An
CO - 5	Evaluate the marketing opportunities of medicinal plants.	PSO - 3, PSO - 5	K, Ap

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

Semester: IV				**ALLIED BOTANY - II - LAB**							**Hours: 2**
Code : 20BO4AP04											**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	3	3	3	4	3	3	3	4	3.36
CO - 2	2	3	4	3	3	3	4	4	3	3	4	3.27
CO - 3	4	3	3	4	3	4	3	3	3	4	5	3.54
CO - 4	4	3	3	3	3	3	3	3	4	4	4	3.36
CO - 5	3	4	3	3	2	2	3	3	3	3	5	3.09
Overall Mean Score												**3.32**

Result: The Score for this Course is **3.32** (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. Sectioning and mounting - Floral parts
    A. Asclepidaceae - *Calotropis gigantea*
    B. Euphorbiaceae - *Euphorbia heterophylla*
2. Demonstration - physiological setup
    A. Evolution of O_2 during Photosyhthesis
    B. Evolution of CO_2 during Respiration
    C. Ganong's Photometer
    D. Light Screen Experiment
3. Chart
    A. Layerage - simple, compound, air
    B. Graftage - top, cleft, tongue
4. Spotters
    A. Sorghum
    B. Black gram
    C. Pineapple
    D. Coffee
    E. Cotton
    F. Rubber
    G. Castor oil
5. Submission
    A. Herbarium - 15 Medicinal plants

GENETIC ENGINEERING

Semester: IV **Hours: 4**

Code : 20ZO4DE2A **Credits: 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 tools and vectors in Genetic engineering.	PSO - 2, PSO - 4	Ap, K
CO - 2	Analyse the construction and identification of rDNA.	PSO - 3, PSO - 5	C, An
CO - 3	Comprehend the construction of rDNA.	PSO - 3, PSO - 4	An, K, Ap
CO - 4	Explicate the introduction of rDNA into host cells.	PSO - 2, PSO - 4	An, Ap, S
CO - 5	Highlight the applications of genetic engineering.	PSO -1, PSO - 3, PSO - 5	An, K, C

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

Semester: IV				**GENETIC ENGINEERING**							**Hours: 4**
Code : 20ZO4DE2A											**Credits: 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	4	4	3	4	3	3	5	3.82
CO - 2	5	5	4	3	3	4	2	4	3	4	4	3.73
CO - 3	5	5	4	3	3	4	3	4	3	3	3	3.64
CO - 4	5	4	3	3	4	4	3	4	2	3	3	3.45
CO - 5	5	4	4	3	4	4	2	4	2	3	3	3.45
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 = 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: Introduction and scope of genetic engineering. Tools in genetic Engineering - Restriction enzymes, DNA ligases, Coupling tools - linkers, adaptors, Gene cloning vectors - Requirements of cloning vectors. Plasmid vector - Properties, types, artificial plasmid vectors - PBR-322, Natural plasmid vector - Ti plasmid. **(12 Hours)**

UNIT II

Bacteriophage vector: Lambda phage and M13, Animal vector - SV- 40, Bovine papilloma virus, Adeno viruses, Retro viruses. Plant vector - CaM, TM. Shuttle vectors, Expression vector, Cosmids. **(12 Hours)**

UNIT III

Construction of rDNA: Steps involved in construction of rDNA - Preparation of desired gene, isolation of the vector DNA, linking of desired gene with vector DNA, applications of rDNA. **(12 Hours)**

UNIT IV

Introduction of rDNA into host cells: Bacteria - transformation; plant cell - electroporation, shot gun method, microinjection, direct gene transfer through Ti plasmid; animal cell - chemical treatment, microinjection, liposome - mediated fusion. Identification of recombinants - insertional inactivation, immunochemical method, colony hybridization. **(12 Hours)**

UNIT V

Applications of genetic engineering:Transgenic animals - transgenic mice, transgenic rabbit, transgenic cattle, transgenic goat, transgenic sheep, transgenic pigs, transgenic fishes and transgenic drosophila. Applications of transgenic animals and their uses, gene therapy and pollution control. Genomic Library, Biohazards of rDNA technology. **(12 Hours)**

COURSE BOOK:

- Narayanan L. M., Mani A., Selva Raj., Arumugam A., Padmalatha Singh., (2014). Molecular Biology and Genetic Engineering, Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Gardner E. J., Simmons M. J., Peter Snustad D. (1991). Principles of Genetics. John wiley and sons, INC, New York.
2. Joshi P. (2004). Genetic Engineering and its applications. 2nd edition, Agrobios (India), Jodhpur.
3. Lewin B. (2000). Genes VII. Oxford University Press, Oxford.
4. Gardener E., J., Simmons M.J., Peter Snustad D. (1991). Principles of Genetics, John wiley and sons, INC, New York.
5. Lewin B. (2000). Genes VII. Oxford University Press, Oxford.

BIOTECHNOLOGY

Semester: IV **Hours: 4**

Code : 20ZO4DE2B **Credits: 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 Animal and plant Biotechnology.	PSO - 2, PSO - 4	Ap, K
CO - 2	Explicate bioreactor design, parts and their functions.	PSO - 2, PSO - 5	C, An
CO - 3	Highlight the applications of bioprocess technology.	PSO - 3, PSO - 5	An, K, Ap
CO - 4	Explicate the Environmental Biotechnology.	PSO - 2, PSO - 4	An, Ap, S
CO - 5	Comprehend the Biotechnology and Society.	PSO -1, PSO - 3, PSO - 5	An, K, C

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

Semester: IV				**BIOTECHNOLOGY**							**Hours: 4**
Code : 20ZO4DE2B											**Credits: 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	4	4	4	2	4	3	3	3	3.64
CO - 2	5	5	4	3	4	3	2	5	3	4	4	3.82
CO - 3	5	5	4	3	3	4	2	4	3	4	3	3.64
CO - 4	5	4	3	3	4	4	2	4	3	4	3	3.55
CO - 5	5	4	4	3	4	3	2	5	3	3	3	3.55
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 = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

Animal and plant Biotechnology: Introduction, history and scope of biotechnology. Transgenic plants - herbicide resistant plants, insect resistant plants, resistant to fungi and bacteria, transgenic plants with improved storage protein, stress, cold and drought tolerant transgenic plants. Transgenic animals - transgenic mice, transgenic rabbit, transgenic cattle, transgenic goat, transgenic sheep, transgenic pigs, transgenic fishes and transgenic drosophila. Applications of transgenic animals and their uses. **(12 Hours)**

UNIT II

Bioreactors: Bioreactor design, parts and their functions. Bioprocess control and monitoring variables such as temperature, agitation, pressure and pH. Introduction to large scale production of recombinant proteins (insulin, biopolymer) using bioreactors. Microbial based environmental applications of biotechnology.Genomic library and gene therapy. **(12 Hours)**

UNIT III

Applications of Bioprocess technology: Concepts of downstream processing, Production of microbial biomass - SCP (Spirulina, yeast), extracellular enzymes, primary and secondary metabolites including vitamins (riboflavin production), amino acids (glutamate production), other commercial products (Lascorbate, llactate, vinegar) and antibiotic production (penicillin and bacterial toxoids).

(12 Hours)

UNIT IV

Environmental Biotechnology: Biodegradation and Bioremediation, Biosensors, Biofuels and Biofertilizers. Role of Biotechnology in pollution control. **(12 Hours)**

UNIT V

Biotechnology and Society: Human embryonic stem cell research, animal rights and welfare. Human cloning. Biotechnology and Intellectual property: Intellectual property rights and patenting biological material. **(12 Hours)**

COURSE BOOK:

- Kumaresan., (2013). Biotechnology, Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Sathiyanarayana U. (2005). Biotechnology. Book and Allied (P) Ltd, Kolkata.
2. Gupta P.K. (1997). Elements of Biotechnology. Rastogi Publication, Meerrut.
3. Singh B.D. (2006). Biotechnology. Kalyani Publication, Chennai.
4. Murray Moo Young, (1985). Elsevier Science Comprehensive Biotechnology - Vol. 1, 2, 3 and 4.
5. Paul Prave, Uwe Faust, Wolfgang sitting, (1987). Fundamentals of Biotechnology VCH publishing.
6. Stephen J. Hall, Peter Stanbury and Allan Whittakker, (1999). Principles of fermentation technology 2nd ed. Butterworth - Heinemann Publication.

ENDOCRINOLOGY

Semester: IV **Hours: 4**

Code : 20ZO4DE2C **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Comprehend the endocrine glands in crustaceans and insects.	PSO - 1, PSO - 5	K, An
CO - 2	Enlist the different endocrine glands and their disorders.	PSO - 1, PSO - 5	K, An, C
CO - 3	Discuss the importance and mechanism of hormones.	PSO - 2, PSO - 5	K, S, Ap
CO - 4	Acquire knowledge on coordination of hormones in the biological systems.	PSO - 2, PSO - 3, PSO - 5	K, An, C
CO - 5	Illustrate the hormonal control of reproduction in vertebrates.	PSO - 2, PSO - 3, PSO - 4	Ap, S, E

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

Semester: IV				**ENDOCRINOLOGY**							**Hours: 4**
Code : 20ZO4DE2C											**Credits: 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	4	3	3	4	4	3	3	4	3.63
CO - 2	4	3	4	4	3	3	4	3	4	2	3	3.54
CO - 3	4	4	3	3	4	3	5	3	3	3	4	3.54
CO - 4	5	3	2	4	3	3	4	3	3	4	3	3.36
CO - 5	4	3	4	3	4	3	3	4	4	3	3	3.45
Overall Mean Score												**3.50**

Result: The Score for this Course is **3.50** (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: Objectives and scope of endocrinology. Modern concepts and problems in endocrinology, endocrine glands in crustaceans and insects. Definition and classification of hormones. Chemical messengers - endocrine, neurocrine, paracrine, autocrine, pheromones and chalones. **(12 Hours)**

UNIT II

Hypophysial axis: Structure of pineal gland, secretions and their functions in biological rhythms and reproduction, Structure of hypothalamus, hypothalamic nuclei and their functions, regulation of neuroendocrine glands, feedback mechanisms, structure of pituitary gland, hormones and their functions, hypothalamo - hypophysial portal system and disorders of pituitary gland.

(12 Hours)

UNIT III

Mechanism of hormones: Structure, functions and regulation of thyroid gland, parathyroid and adrenal glands, pancreas, ovary and testis, hormones in homeostasis, disorders of endocrine glands. Mechanism of hormone action - receptors (membrane and cytosolic) - second messengers, signal transduction and termination of hormone activity. Endocrine disorders due to receptor number and function, metabolic disorders - Diabetes mellitus and osteoporosis.

(12 Hours)

UNIT IV

Hormone action at cellular level: Hormone receptors, transduction and regulation of hormone action at molecular level, molecular mediators, genetic control of hormone action. Endocrine integration - diffuse effect of hormones, reproductive cycle and migration, behavior and hibernation, neoplastic growth, colour change in vertebrates. **(12 Hours)**

UNIT V

Hormonal control of reproduction in human: Structure of mammalian testis and ovary - male and female sex accessory organs - hormones of testis and ovary - estrous and menstrual cycle - hormones of pregnancy - parturition - hormonal control of lactation. Hormonal control of metamorphosis in an anuran amphibian.

(12 Hours)

BOOKS FOR REFERENCE:

1. Turner, C. D. (1971). General Endocrinology, Pub- Saunders Toppan.
2. Nussey, S.S. and Whitehead, S.A. (2001). Endocrinology: An Integrated Approach, Oxford: BIOS Scientific Publishers.
3. Hadley, M.E. and Levine J.E. (2007). Endocrinology (6th edition) Pearson Prentice-Hall, New Jersey.
4. Barrington, E.J.W. (1985). An introduction to general and comparative endocrinology Claredon Press Oxford.
5. Bentley, P.J. (1985). Comparative vertebrate endocrinology, Second Edition, Cambridge University Press. Cambridge.
6. Haris, G.W. and. Donovan, B.T (1968). The Pituitary Gland. S. Chand and Co.
7. Ingleton, P.M. and Bangara, J.T. (1986). Fundamentals of comparative vertebrate endocrinology, Kluwer Academic Publishers.
8. Mac Hadley. (1992). Endocrinology, 3 rd Edition. Prentice - Hall Inc. A Simon & Schuster Company, Englewood Cliffs, New Jersey. USA.
9. Turner, C.D. and Bangara,J.T. (1986).General endocrinology. Saunders International Student edition. Toppan Company Limited. Tokyo.

CELL BIOLOGY

Semester: V **Hours: 6**

Code : 20ZO5MC05 **Credits: 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 techniques of cellular biology.	PSO - 1, PSO - 4, PSO - 5	K, C
CO - 2	Describe different types of cells, structural and functional similarities between prokaryotes and eukaryotes.	PSO - 1, PSO - 4, PSO - 5	K, E, An
CO - 3	Develop an understanding of structure and functions of cell organelles.	PSO - 1, PSO - 3, PSO - 5	K, C, Ap
CO - 4	Comprehend the cell growth and cell cycle.	PSO -1, PSO - 5	K, An, S, C
CO - 5	Acquire the knowledge on cell signaling and cancer biology.	PSO - 1, PSO -2, PSO - 5	E, An, Ap

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

Semester: V				**CELL BIOLOGY**								**Hours: 6**
Code : 20ZO5MC05												**Credits: 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	4	2	3	2	3	3	4	5	3	3	3	3.09
CO - 2	4	4	3	3	3	3	3	5	2	3	3	3.27
CO - 3	3	4	4	2	2	3	2	5	2	4	3	3.09
CO - 4	3	3	4	3	3	4	2	4	3	4	4	3.36
CO - 5	4	3	4	2	3	3	2	4	1	4	3	3.00
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

Introduction to Cell Biology: History of cell biology, scope in modern perspective, cell theory and its modern version and interpretation, protoplasm theory and organismal theory. General structures, similarities and differences of prokaryotes and eukaryotes. Diversity of cell - shape and size, ultra structure of animal cell, cell types - epithelial cells, endothelial cells, structure and functions of cell wall - bacterial cell wall and fungal cell wall, plasma membrane structure, chemical composition, specialized structures and functions. **(18 Hours)**

UNIT II

Structure and functions of Cell organelles: Composition and functions of microtubules and microfilaments. MT vs Actin - their organization, association with membrane. Extra nuclear cell organelles - Structure, types and functions of mitochondria, ribosome, endoplasmic reticulum, Golgi apparatus, lysosome, nucleus, chromosome, microbodies (peroxysomes and glyoxysomes), vacuoles, centriole, Cilia and Flagella. **(18 Hours)**

UNIT III

Cell cycle and Cancer biology: Eukaryotic cell cycle - phases of cell cycle, regulation of cell cycle, phases and significance of mitosis and meiosis, nucleo-cytoplasmic interactions. Cancer Biology - characteristics, types, causes, diagnosis, treatment and oncogenes. Stem cells and maintenance of adult tissues, embryonic stem cells and therapeutic cloning. Aging - subcellular changes due to aging, causes of aging, regulation of form and size of cell and programmed death.

(18 Hours)

UNIT IV

Cell regulation and Cell signaling: Types of cell signaling signal molecules, Surface membrane and cytoplasmic receptors. Cell communication, intracellular signaling, cell interactions, extra cellular matrix (ECM), cell adhesion, cell migration, cell junctions, signal amplification, receptor types, quorum sensing and regulation of signaling pathways. **(18 Hours)**

UNIT V

Tools of Cell Biology: Principle, working mechanism and applications of compound, phase contrast, fluorescent, electron (Transmission and Scanning) microscopy, micrometry, sub cellular fractionation, ultra centrifuge, cytological techniques - fixation and sectioning, staining - mechanism of staining and vital staining. **(18 Hours)**

COURSE BOOKS:

- Power, C.B. 2009. Cell Biology. Himalayan Publishing House, New Delhi.
- Verma P.S. and Agarwal V.K. (2016) Cell Biology (Cytology, Biomolecules, Molecular Biology), Paperback, S. Chand and Company Ltd.

BOOKS FOR REFERENCE:

1. Paul, A. (2009). Cell and Molecular Biology. Books and Allied (P) ltd, India.
2. Thiagarajar College, Madurai. - 39th ACM - Dept. of Zoo. & MB. - Syllabus2020 J -20- References:
3. Alberts, B. *et al*., (1994). Molecular Biology of the Cell (3rd edition). Garland Publishing, Inc., New York.
4. Cooper, GM and Hawman RE. (2013). Cell a Molecular Approach (6^{th} Edition). Sinauer Associates, Inc.
5. De Roberties E.D. P and E.M.F.De Roberties. (2011). Cell and Molecular Biology. 8th edition. B.I. Publicatons Pvt. Ltd., India.
6. Karp G. (2013). Cell and Molecular Biology Concepts and Experiments. John Wiley & Sons, Inc.
7. Lodish *et al*., (2008). Molecular Cell Biology.6th Ed., W.H. Freeman & Co.USA.

GENETICS

Semester: V **Hours: 6**

Code : 20ZO5MC06 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain Knowledge on Mendelian inheritance and interactions of genes.	PSO -1, PSO - 4	K, C
CO - 2	Express the concepts of linkage and multiple alleles.	PSO - 3, PSO - 5	C, An
CO - 3	Describe the basics of gene mapping and crossing over.	PSO - 4, PSO - 5	Ap, S
CO - 4	Emphasize the central dogma of genes, its expression and regulation.	PSO - 2, PSO - 3	C, K
CO - 5	Evaluate the genetic defects, mutation and syndromes.	PSO -1, PSO - 5	Ap, K

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

Semester: V				**GENETICS**							**Hours: 6**
Code : 20ZO5MC06											**Credits: 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	4	5	4	2	4	5	4	5	3	5	4	4.09
CO - 2	5	4	4	3	5	4	4	3	4	4	5	4.09
CO - 3	4	4	5	2	4	3	3	4	4	5	4	3.82
CO - 4	4	3	4	2	5	5	4	5	4	4	4	4.00
CO - 5	5	4	4	2	4	5	3	4	4	4	4	3.91
Overall Mean Score												**3.98**

Result: The Score for this Course is **3.98** (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

Mendelism and Genic interaction: Genetic terminology - alleles, homozygote, heterozygote, hybrid, genotype, phenotype, back cross, test cross and reciprocal cross. Monohybrid experiment - Law of dominance, law of segregation, dihybrid experiment - law of independent assortment. Interaction of genes - complete dominance, incomplete dominance, co-dominance, complementary genes, supplementary genes, duplicate genes. Epistasis - dominant epistasis, recessive epistasis and biochemical basis of epistasis, lethal genes, pleiotropism, penetrance and expressivity. **(18 Hours)**

UNIT II

Multiple alleles and Linkage: Multiple alleles - ABO blood group and Rh blood group, coat colour in rabbits. Multiple genes - eye colour in drosophila, skin colour in man and transgressive variation. Linkage - linkage in Drosophila, types of linkage, coupling and repulsion, Cis arrangement and Trans arrangement, linkage groups, theories of linkage and factors affecting linkage. **(18 Hours)**

UNIT III

Crossing over and Chromosome map: Crossing over - theories of crossing over, significance and mechanism of crossing over, factors affecting crossing over, crossing over in Drosophila. Chromosome map - procedure for the chromosome mapping, construction of map in Drosophila, factors affecting the mapping. Sex determination in man and Drosophila, cytoplasmic inheritance.

(18 Hours)

UNIT IV

Sex linked inheritance: Types, X-linked inheritance - colour blindness, haemophilia and Y - linked inheritance. Extra chromosomal inheritance. Human chromosomes - karyotype, preparation of karyotype and application of karyotyping, pedigree analysis, twin study, eugenics, euthenics, euphenics and genetic counseling, and management of genetic disorders. Inborn errors of metabolism - phenylketonuria, alkaptonuria and albinism, thalassemia and sickle cell anemia. **(18 Hours)**

UNIT V

Mutation: Chromosomal mutation - deletion, duplication, inversion, translocation. Genomatic mutation - aneuploidy and euploidy. Syndromes - Down's syndrome, Turner's syndrome and Klinefelter's syndrome. Gene mutation - spontaneous mutation, induced mutation, point mutation, missense mutation, nonsense mutation, silent mutation, transversion, transition, base analogue mutation, frame shift mutation, back mutation, molecular basis of mutation, hot spot and detection of mutation - CIB method. Population genetics: Hardy - Weinberg law and equilibrium. **(18 Hours)**

COURSE BOOK:

- Meyyan R.P., (2010). Genetics, Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

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

BIOSTATISTICS AND BIOINFORMATICS

Semester: V **Hours: 6**

Code : 20ZO5MC07 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Comprehend the basic concepts of statistics.	PSO - 3, PSO - 4	K, C
CO - 2	Apply statistics in Biology.	PSO - 3, PSO - 4	K, C, An, Ap
CO - 3	Analyse the basic concepts of probability.	PSO - 3, PSO - 4	K, C, Ap
CO - 4	Acquire knowledge on databases of proteins.	PSO - 3, PSO - 4	K, Ap
CO - 5	Evaluate the tools of bioinformatics and employ statistical software to solve biological problems.	PSO - 3, PSO - 4	K, Ap

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

Semester: V				**BIOSTATISTICS AND BIOINFORMATICS**							**Hours: 6**
Code : 20ZO5MC07											**Credits: 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	4	5	4	3	3	3	3	3	4	4	3	3.54
CO - 2	4	5	4	3	3	3	3	3	3	4	3	3.45
CO - 3	4	5	4	3	4	3	3	3	2	3	4	3.45
CO - 4	4	3	4	3	4	4	3	3	3	3	4	3.45
CO - 5	3	4	3	4	3	4	3	4	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 = 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 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. **(18 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. **(18 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. **(18 Hours)**

UNIT IV

Bioinformatics: Introduction, scope, biological database, primary database - gene bank, EMBL, Swiss protein, secondary database - Motif, domain, virological, world biodiversity and model organism databases - *E. coli*, Drosophila and human databases. Biological sequence alignment and uses of sequence analysis.

(18 Hours)

UNIT V

Genomics and proteomics: Definition, genome sequencing - short gun sequencing and clone contig. Proteomics - definition, tools used in proteomics and genomics. Human genome project and its applications. Proteomics methods - X- ray crystallography and NMR. Applications of bioinformatics - clinical informatics, cheminformatics and pharmacoinformatics. **(18 Hours)**

COURSE BOOKS:

- Arumugam N., Gopi A., Meena A., Sundaralingam, Kumaresan V., (2016). Biostatistics, Computer Application and Bioinformatics. Saras Publication, Nagercoil.
- Ramakrishnan P., (2004). Bio Statistics. Saras Publication, Nagercoil.
- Irfan A. Khan., Atiya Khanum, (2000). Recent Advances in Bioinformatics. Ukaaz Publications, Hyderabad.
- Arthur M. Lesk, (2005). Introduction to Bioinformatics. (Indian Edition), Oxford University, USA.

BOOKS FOR REFERENCE:

1. Daniel W.W., (2009). Biostatistics. 9th edition, John Wiley and Sons, New York.
2. Gupta S.P., (2014). Statistical Methods. 40th edition, S.S. Chand Publishers, New Delhi.
3. Kothari C.R., (2004). Research Methodology. 2nd edition, New Age International Publishers, New Delhi.
4. Palanichamy, (2002). Statistical Methods for Biologist. Palani Paramount Publications.
5. Zar J.H., (2011). Statistical Analysis.4th Edition, Pearson Education, South Asia.
6. Ruchi singh and Richa Sharma, (2010). Bioinformatics - Basics, Algorithms and applications. University Press (India) Private Limited.
7. Gupta P.K., (1997). Elements of Biotechnology. Rastogi Publication, Meerut.
8. Singh S.K. and Pandey K.K., (2007). Bioinformatics and gene technology. Ansari Road, Darya Ganj, New Delhi.
9. Verma B. L, and Shukla H.D., (1993). Biostaistics. Satish Kumar Jain for CBS Publishers & Distributors.
10. Shelke D.K., (2011). Biostatistical Techniques and designs. Updesh Purohit for Agrobios (India).
11. Rastogi S.C., Namita Mendiratta., Parag Rastogi., (2006). Bioinformatics. CBS Publishers & Distributors.

CELL BIOLOGY, GENETICS, BIOSTATISTICS AND REPRODUCTIVE BIOLOGY - LAB

Semester: V **Hours: 4**

Code : 20ZO5CP04 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Explain the principles and working mechanisms of microscope.	PSO - 4, PSO - 5	K, Ap
CO - 2	Illustrate different stages of mitosis.	PSO - 4, PSO - 5	C, Ap
CO - 3	Describe the different methods of genetic testing.	PSO - 2, PSO - 4, PSO - 5	K, An
CO - 4	Define the basic concepts of biostatistics.	PSO - 2, PSO -4, PSO - 5	K, C
CO - 5	Attain the knowledge on reproductive biology.	PSO - 1, PSO -4, PSO - 5	K, Ap, E

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

Semester: V				**CELL BIOLOGY, GENETICS, BIOSTATISTICS AND REPRODUCTIVE BIOLOGY - LAB**							**Hours: 4**
Code : 20ZO5CP04											**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	4	2	4	2	2	2	2	2	5	4	4	3.00
CO - 2	5	3	4	2	2	2	3	3	2	4	4	3.09
CO - 3	4	3	3	2	2	2	2	3	3	4	4	2.9
CO - 4	4	5	5	4	4	3	2	2	2	4	4	3.55
CO - 5	4	4	2	4	3	4	2	3	3	2	5	3.27
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

CELL BIOLOGY:

1. Compound Microscope.
2. Study of mitosis in Onion root tip cells.
3. Polytene Chromosome in Chironomous larva.
4. Human buccal smear.
5. Fish - blood smear.
6. Spotters: Mitochondria, Nucleus, Endoplasmic reticulum and Golgi apparatus.

GENETICS:

1. Verification of Mendel's Laws by using coins / beads.
    a. Monohybrid cross and Monohybrid test cross.
    b. Dihybrid cross and Dihybrid test cross.
2. Study of Mendelian traits among the students.
3. Identification of the following using charts and models:
    a. DNA structure
    b. DNA replication
    c. Down's syndrome
    d. Turner's syndrome
    e. Klinefelter's syndrome.

BIOSTATISTICS:

1. Study of Probability with "Two coin tossing" experiments.
2. Calculation of mean, median, mode, variance, standard deviation and standard error using 25 neem leaves.
3. Calculation of mean, median, mode, variance, standard deviation and standard error of height and weight of class students.

REPRODUCTIVE BIOLOGY:

1. Study of stages of estrus cycle through permanent slides.
2. Observation of sperm motility.
3. Study of modern contraceptive devices.
4. Examination from photomicrographs/ permanent slides of Sections of ovary, fallopian tube, uterus (proliferative and secretary stages), and Male and female reproductive systems.
5. Case study - Population explosion in any one animal.

HUMAN REPRODUCTIVE BIOLOGY

Semester: V **Hours: 4**
Code : 20ZO5DE3A **Credits: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Comprehend the process of spermatogenesis and hormonal control of reproduction in males.	PSO - 1, PSO - 4, PSO - 5	K, C
CO - 2	Explain the process of oogenesis and physiology of menstrual cycle.	PSO - 1, PSO -4, PSO - 5	K, E, An
CO - 3	Distinguish between the main stages of embryonic, foetal and neonatal development.	PSO - 1, PSO -3, PSO - 5	C, Ap
CO - 4	Evaluate the origin of reproductive mechanism and its regulation.	PSO - 1, PSO - 5	K, An
CO - 5	Identify sexually transmitted diseases and have knowledge on Assisted reproductive technologies.	PSO - 1, PSO - 2, PSO - 5	E, An, Ap

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

Semester: V				**HUMAN REPRODUCTIVE BIOLOGY**								**Hours: 4**
Code : 20ZO5DE3A												**Credits: 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	2	3	3	3	4	5	2	2	4	5	3.36
CO - 2	4	2	3	3	3	4	5	2	2	4	5	3.36
CO - 3	4	2	4	3	2	4	5	2	2	3	5	3.27
CO - 4	3	2	2	3	3	4	5	2	2	2	5	3.00
CO - 5	4	2	4	3	2	4	5	4	2	4	5	3.55
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

Male reproductive system: Functional morphology of male reproductive system, physiology of male gametogenesis, fertility of individual, ultra structure of spermatozoa - sperm maturation - morphological and biochemical events, hormonal control of male accessory organs - epididymis, vas deferens, seminal vesicles, ventral prostate, bulbourethral gland and preputial gland, biochemistry of semen and capacitation. **(12 Hours)**

UNIT II

Female reproductive system: Origin and migration of primordial germ cells, genetic and hormonal control of differentiation of gonads and gonadial ducts, structure and function of female reproductive system, puberty, formation of ova, physiology of ovulation, menstrual cycle, nutrition and stress influences on the ovulatory cycle. **(12 Hours)**

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

Evolution of reproductive mechanism and regulation: Evolution of human reproductive strategy, evolutionary impact on behavior, effects of sexual hormones on maternal-infant bonding, stress, anorexia and effects of steroids.

(12 Hours)

UNIT V

Reproductive Health: Sexual dysfunctions, sexually transmitted diseases-syphilis, gonorrhea and chlamydia. Cancers of the reproductive system, Adenomyosis: gland like growth in myometrium, birth control measures, Assisted Reproduction Technologies, Intrauterine devices (IUD), endometriosis, fibroids, endometriti, chronic infection of uterus, congenital uterine anomalies, ovarian cysts and pelvic varicosities. **(12 Hours)**

BOOKS FOR REFERENCE:

1. Austin, C. R and Short R. V. (eds) (1972). 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.
2. Barrington, E. J. W. (1976). An introduction to general and comparative endocrinology, Oxford University press, London
3. Moudgal, N. R. Yoshinaga K Rao, A. J. and Adiga P. R. (1991). Perspectives in primate reproductive biology. Wiley Eastern Ltd., New Delhi, Bangalore.
4. Knobil, E and Neil J. D (1994). The physiology of reproduction, Vol. I & II. Raven press, New York.
5. Raghavendra Puri (2003). Mammalian endocrinology Vol. I & II, Dominant Publishers and Distributors, New Delhi.
6. Muneeth Kainth (2005). Chordate Embryology, Dominant Publishers and Distributors, New Delhi.
7. Paul Wassar man and Jimmy D. Neill (2005). Knogbil and neill's physiology of reproductive volume 1st and 2nd and 3rd edition
8. Thomas W.S. (2014). Langman's Medical Embryology (13th edition) Lippincott, Williams and Wilkins, Baltimore.
9. Gary C.S., Steven B.B., Philip R.B. and Philippa H.F. (2014). Larsen's Human Embryology (5th edition) Elsevier.
10. Gilbert, S.F. (2016). Developmental Biology (11th edition) Sinauer.

WILD LIFE CONSERVATION AND MANAGEMENT

Semester: V **Hours: 4**

Code : 20ZO5DE3B **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain Knowledge on value of wildlife conservation.	PSO -1, PSO - 4	K, C
CO - 2	Discuss the prey - predator dynamics.	PSO - 3, PSO - 5	C, An
CO - 3	Understand the different habitats of wildlife.	PSO - 2, PSO - 4	Ap, K
CO - 4	Discuss the role of wildlife management.	PSO - 2, PSO - 3	C, K
CO - 5	Understand the wildlife species management.	PSO - 2, PSO - 5	Ap, C

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

Semester: V				WILD LIFE CONSERVATION AND MANAGEMENT								Hours: 4
Code : 20ZO5DE3B												Credits: 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	3	2	4	3	4	4	2	3	5	3.45
CO - 2	4	3	4	2	3	4	3	3	2	2	4	3.09
CO - 3	3	4	3	3	4	3	4	4	2	3	4	3.36
CO - 4	4	3	3	2	3	4	4	4	3	2	5	3.36
CO - 5	4	5	4	2	4	3	3	4	2	2	5	3.45
Overall Mean Score												3.34

Result: The Score for this Course is **3.34** (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

Value of wildlife and need for its conservation: Definition, value and importance of wildlife, types of ecosystems, causes of depletion of wildlife, inventory and classification of wetland and animal inhabitants. Population vulnerability analysis and its components, factors responsible for the extinction of animals, wildlife sanctuaries and national parks in India, theories of population dispersal, animal movement, concept of home range and territory, tracking movement by remote sensing and GIS. **(12 Hours)**

UNIT II

Population and prey - predator dynamics: Wildlife conservation, ethics and importance of conservation, impact of habitat destruction and fragmentation on wildlife, biological parameters such as food, cover, forage and their impact on wildlife, population attributes, concepts of exponential and logistic growth rates of wildlife, impact of introduced species on preexisting flora and fauna of wildlife, identification and estimation of wild animals by fecal sample analysis, hair identification, pug marks and census methods. Predator - prey models and impact of predation. **(12 Hours)**

UNIT III

Wildlife conservation: Wildlife conservation objectives - strategies and issues, captive breeding techniques and translocation and reintroduction, inviolate area and critical habitats and their impact on wildlife different terrestrial habitats of wildlife in India, restoration of degraded habitat, damage caused by wildlife in India and its mitigation, sick animal refuges in protected areas. **(12 Hours)**

UNIT IV

Rehabilitation and management: Type of wildlife management-manipulative, custodial, Management of over abundant wild animal populations causing damages to nearby inhabitants, Tools and techniques to control the menace of wild animals, man wildlife conflict resolution and mitigation, Management of exotic and invasive wetland species in India. Habitat manipulation- control and regulation of grazing. Weed eradication, Major diseases of domestic and wild animals and their control and impact of wild life tourism. **(12 Hours)**

UNIT V

Wildlife species management: Management of wildlife health studies. Evaluation of animal health a condition through direct observations of free - living animals, physical examination of animals and collection, baseline data on health parameters. Examination of dead animals in the field and necropsy procedure collection and preservation of tissue samples for analysis. Chemical capture techniques. Applications bio - telemetry in wildlife studies. Introduction to bio - loggers and hydrophones and their application. General assessment of damage caused by wildlife in India and its mitigation in a case specific manner. **(12 Hours)**

COURSE BOOK:

- Rajesh, G. (1989). Fundamentals of wildlife management. Justice Home, Allahabad.

BOOKS FOR REFERENCE:

1. Ali, S. and Ripley, D.S. 1987. A compact Handbook of Birds of Indian subcontinent. OUP, Bombay.
2. Bookhout, T.A. (1996) Research and Management Techniques for Wildlife and Habitats (5th edition) The Wildlife Society, Allen Press.
3. Caughley, G., and Sinclair, A.R.E. (1994) Wildlife Ecology and Management. Blackwell Science.
4. Gee, E. P. (2000). The wildlife of India. Harper Collins Publication.
5. Hunter, M.L., Gibbs, J.B. and Sterling, E.J. (2008). Problem solving in conservation biology and wildlife management: Exercises for class, field, and laboratory, Blackwell Publishing.
6. John Wiley. Caughley and Gunn (1996). Conservation Biology in Theory and Practice. Blackwell.
7. Magurran, A.E. (1991). Ecological diversity and its measurements. Croom - Helm Ltd.
8. Sutherland, W.J. (2000). The Conservation Handbook: Research, Management and Policy. Blackwell Sciences
9. Wodroffe, G. 1981. Wildlife conservation and modern zoo. Saiga Publishing Co., England.
10. Woodroffe, R., Thirgood, S. and Rabinowitz, A. (2005). People and wildlife, conflict or co-existence, Cambridge University.

.

AQUATIC ZOOLOGY

Semester: V **Hours: 4**

Code : 20ZO5DE3C **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Explain the abiotic factors of freshwater ecosystems in aquatic biology.	PSO - 1, PSO - 5	K, C, An
CO - 2	Analyse the biotic factors of aquatic biology.	PSO - 1, PSO - 5	K, An
CO - 3	Obtain knowledge on marine ecosystem.	PSO - 2, PSO - 5	K, S, C
CO - 4	Analyse the dynamics of ecosystem.	PSO - 3, PSO - 5	K, An, Ap
CO - 5	Attain knowledge on management of Aquatic Resources.	PSO - 2, PSO - 3, PSO - 4	Ap, S, E

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

Semester: V				**AQUATIC ZOOLOGY**							**Hours: 4**
Code : 20ZO5DE3C											**Credits: 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	3	5	4	3	4	4	3	3	4	3.72
CO - 2	4	3	4	4	3	4	4	3	2	3	3	3.36
CO - 3	4	4	3	4	4	3	4	4	3	3	4	3.63
CO - 4	4	3	2	3	4	4	4	5	3	3	3	3.45
CO - 5	4	3	4	4	4	3	3	4	4	4	4	3.72
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

UNIT I

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. **(12 Hours)**

UNIT II

Biotic factors: The 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 - 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 in aquatic organisms, 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. **(12 Hours)**

COURSE BOOK:

- Arumugam N. (2005). Aquaculture. Saras publication, Nagercoil.
- Pandy and Shukla (2010). Fish and Fisheries. Rostgi Publication, Meerut.

BOOKS FOR REFERENCE:

1. Tonapi, G.T. (1980). Freshwater animals of India. Oxford and IBH Publishing Company, New Delhi, India.
2. Blakey, D.R. and Hrusa, D.C. (1989). Inland Aquaculture development handbook. Fishing News Books Great Britain.
3. Jhingran.V.G. (1985). Fish and Fisheries of Indian Hindustan Publishing Co, New
4. Pillay, T.V.R. (1990): Aquaculture Principles and Practices, Fishing News Books, Oxford.
5. Santhan Kumar, G. and Selvaraj. (2002). Concepts of Aquaculture. Nagrcoil: Meenam Publication.

GLOBAL ENVIRONMENTAL ISSUES

Semester: V **Hours: 2**

Code : 20ZO5GE01 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Categorize the major global environmental changes and the upstream drivers behind these changes.	PSO - 1, PSO - 2	K, C
CO - 2	Relate natural earth systems and human impacts on the environment.	PSO - 1, PSO -2, PSO - 5	Ap, E, An
CO - 3	Identify the risks of climate variability, changes and the sources of vulnerability.	PSO - 1, PSO -2, PSO - 3	C, An
CO - 4	Appreciate the need of biodiversity conservation in the context of various developmental pathways.	PSO - 1, PSO - 2, PSO - 4	K, An, E
CO - 5	Enumerate key issues in monitoring, evaluating, and implementing policies and programs.	PSO - 2, PSO - 5	E, Ap

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

Semester: V				**GLOBAL ENVIRONMENTAL ISSUES**							**Hours: 2**
Code : 20Z05GE01											**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	4	2	2	4	3	4	2	3	1	4	5	3.09
CO - 2	4	4	4	4	3	4	4	4	2	4	5	3.82
CO - 3	4	3	3	4	2	4	4	4	2	4	5	3.55
CO - 4	4	4	4	4	3	4	4	4	1	4	5	3.73
CO - 5	4	2	2	4	4	4	2	4	1	2	5	3.09
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 = 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/geomagnification, 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. **(6 Hours)**

UNIT V

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)**

BOOKS FOR REFERENCE:

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

GENERIC ELECTIVE (NME)

NATIONAL CADET CORPS

PROGRAMME OUTCOMES (PO)

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-1, PO-2, PO-5,PO-5, PO-6

GENERIC ELECTIVE (NME)

Sem.	Part	Code	Title of Paper	Hours	Credits
V	IV	20GE5NC01	NCC - National Integration and Personality Development	2	2
VI	IV	20GE6NC02	NCC- Organization and Health Programme in NCC	2	2

INTERNAL COMPONENTS

Internal - I	:	30 marks
Internal - II	:	30 marks
Component - I	:	10 marks
Component - II	:	10 marks
Component - III	:	10 marks
Component - IV	:	10 marks
Total	**:**	**100 marks**

NATIONAL INTEGRATION AND PERSONALITY DEVELOPMENT

Semester: V **Hours: 2**

Code : 20GE5NC01 **Credits: 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	K, An, Ap,
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	K, An, C
CO - 3	Comprehend the motivation for positive attitude, character building and personality development.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K, S, Ap
CO - 4	Analyze the different types of disasters under different circumstances.	PSO - 4, PSO - 5	K, An, E
CO - 5	Achieve practical knowledge in community development and other social programmes.	PSO - 1, PSO - 2	K, Ap, S, E

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

Semester: V				**NATIONAL INTEGRATION AND PERSONALITY DEVELOPMENT**							**Hours: 2**
Code : 20GE5NC01											**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	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 = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I: NATIONAL INTEGRATION

Motto of National Integration - Importance of National Integration Culture and heritage of Tamil Nadu. **(6 Hours)**

UNIT II: CIVIL AFFAIRS

Aim of aid to civil authority - Role of NCC Cadets during natural calamities - Types of disaster - Essential services during natural calamities **(6 Hours)**

UNIT III: CIVIL DEFENCE AND SELF DEFENCE

Civil Defence - Organization - Aims and services - Aid to Civil authorities in emergency - Self Defence -Aims of Self Defence - Women and Self Defence **(6 Hours)**

UNI IV: LEADERSHIP AND PERSONALITY DEVELOPMENT

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 . **(6 Hours)**

UNIT V: SOFT SKILLS

Soft skills - interview skill - influencing skill - social skill - communication skill - self motivation - self esteem - body language. **(6 Hours)**

BOOK FOR REFERENCE:

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

INTERNAL QUESTION PATTERN

Time: 2 hours **Marks: 30**

PART - A

Answer Any 4 out of five $4 \times 2 = 8$

PART- B

Two either or questions (one from each) $2 \times 4 = 8$

PART - C

Two either or questions (one from each $2 \times 7 = 14$

SKILL ENHANCEMENT COMPULSORY COURSE
APTITUDE BUILDING - I

Semester: V **Hours: 2**

Code : 20SE5AB03 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain knowledge about operations on numbers and develop skills in problem solving	PSO - 3	K, A, E
CO - 2	Enhance their reasoning capacity	PSO - 3	K, A, E
CO - 3	Improve their reading, writing and speaking skills	PSO - 5	K, A, E
CO - 4	Recognize the importance of computer literacy	PSO - 5	K, A, E
CO - 5	Appear for competitive exams	PSO - 5	K, A, E

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

Semester: V				**APTITUDE BUILDING - I**							**Hours: 2**
Code : 20SE5AB03											**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	5	5	5	5	3	2	3	3	2	5	3.90
CO-2	5	5	5	5	5	3	2	3	3	2	5	3.90
CO-3	5	5	5	5	5	3	2	3	3	2	5	3.90
CO-4	5	5	5	5	5	3	2	3	3	2	5	3.90
CO-5	5	5	5	5	5	3	2	3	3	2	5	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

Numerical Ability: Numbers - Highest common factor & Least common multiple of numbers - average - problems on numbers - percentages - problems on ages - percentage - profit and loss - ratio and proportion - time & work

UNIT II

Reasoning: Series completion - analogy - coding & decoding - puzzle test - direction sense test - alphabet test - alpha - numeric sequence puzzle - arithmetic reasoning - inserting missing character - logical sequence of words.

UNIT III

English Language: Spotting errors - Articles - Tenses - Nouns - Pronouns - Adjectives - adverbs - Prepositions - Selecting the most suitable word - Synonyms - Antonyms - Spell check - Double blanks in a sentence.

UNIT IV

General Knowledge: Computer awareness - Classification - Elements of computing process - Programming languages - Computer memory - Software & Hardware - Operating systems - banking awareness - Banking Regulation Act - Reserve Bank of India - Commercial banks - e-banking, Currency system - Money market - Banking and Finance - Indian Monetary Policy.

UNIT V

Current Affairs: National & International Current Affairs - Economy - Sports - Science & Technology - Polity.

COURSE BOOK:

- I. Maria Jesili, Aptitude Building-I A book for Competitive examination, Vol.1, ACCA, Press, J.A. College, Periyakulam.

SKILL ENHANCEMENT COMPULSORY COURSE - APTITUDE BUILDING - I

COMPONENTS OF CIA

Continuous Internal Assessment Component (CIA)

Theory:

Component	Marks
Internal test I	40
Internal test II	40
Mock Interview	15
Attendance	5
Total	**100**

Component	Marks
Logical Reasoning	10
Numerical Aptitude	10
English Language	10
General Knowledge	10
Total	**40**

APTITUE BUILDING I - 20SE5AB03

QUESTION PATTERN

[Internal Examination Only]

MAXIMUM: 80 MARKS **TIME: 1 ½ HOURS**

Section	Type of Question	No. of Questions	No. of Questions to be answered	Marks for each question	Total
A Q.No. (1- 20)	MCQ Questions from Numerical Aptitude	20	20	1	20
B Q.No.(21- 40)	MCQ Questions from Reasoning	20	20	1	20
C Q.No. (41- 60)	MCQ Questions from English Language	20	20	1	20
D Q.No. (61- 80)	General knowledge & Current Affairs	20	20	1	20
Total					**80**

* **OMR** Sheet shall be provided for the examination.

IMMUNOLOGY

Semester: VI **Hours: 6**

Code : 20ZO6MC08 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Conceptualize the innate and adaptive immune response coordination to fight invading pathogens.	PSO -1, PSO - 2	K, C
CO - 2	Comprehend the organs and cells of the immune system.	PSO - 1, PSO - 2	K, C
CO - 3	Categorize the antigens and antibodies to exemplify their interactions.	PSO - 2, PSO -3, PSO - 5	An, K,
CO - 4	Evaluate the immunological response to analyse the cellular and molecular basis of immune responsiveness.	PSO - 2, PSO - 4, PSO - 5	E, An, S
CO - 5	Apply the acquired knowledge on immune response and immunotherapy.	PSO - 3, PSO -4, PSO - 5	K, An, Ap, S

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

Semester: VI				**IMMUNOLOGY**							**Hours: 6**
Code : 20ZO6MC08											**Credits: 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	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 = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	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, Louis Pasteur and Elie Metchnikoff. Types of immunity: innate - physical, mechanical, biochemical, cellular factors, genetic factors and acquired - passive and active, natural and artificial immunity. Immune response: Humoral - primary and secondary immune response, immunological memory and Cell mediated immune response. **(18 Hours)**

UNIT II

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 III

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, agglutination, cytolysis, complement fixation, flocculation, opsonisation, Immunofluorescence, ELISA and Western blotting. **(18 Hours)**

UNIT IV

Molecular Immunology: Complement- properties, classical and alternative pathways. Major Histocompatability Complex (MHC) - structure and functions of MHC, MHC antigens, HLA and H_2. Hypersensitivity - Type I, II, III and IV. Cytokines - properties and functions. **(18 Hours)**

UNIT V

Clinical Immunology: Transplantation Immunology - classification of grafts, immunology of graft rejection, clinical transplantation - cornea, kidney, heart, liver, bone marrow transplant and immune suppression. Tumour immunology - tumour antigen and immune response to tumour immuno therapy. Autoimmune disorders - characteristics, types - myasthenia gravis, lupus erythematosis and hashimoto's thyroiditis. Vaccines - types of vaccines - attenuated vaccines, recombinant vector vaccines and vaccination schedule. Immuno deficiency diseases - overview. **(18 Hours)**

COURSE BOOK:

- Mani A., Narayanan L.M., Dulsy Fatima A. M., Selvaraj and Arumugam N. (2013). Immunology and Microbiology. Saras Publications, Nagercoil.

BOOKS FOR REFERENCE:

1. Rabindra Narain. (20120. Clinical Immunology, Wisdom press, New Delhi, India.
2. Raj Khanna. (2011). Immunology, Narosa Publishing House, New Delhi, India.
3. Rao, C. V. (2006). Immunology. Narosa Publishing House, New Delhi, India.
4. Kuby, Kindt T. J., Goldsby R. A and Osborne B. A (2007). Immunology, 6th edition, W. H. Freeman and Company, New Delhi.
5. Roitt J. M., (1984). Essential Immunology. Blackwell Scientific Oxford.
6. John I. (2010). Immunology. MJP Publishers, Chennai.
7. Seemi Farhat Basir, (2012). Text book of Immunology. PHI Learning Private Limited, New Delhi.
8. Fathimunisha Begum, (2014). Immunology. PHI Learning Private Limited, New Delhi.
9. Kannan I. (2007). Immunology. MJP Publishers, Chennai.
10. Hannigan B. M. (2008). Immunology. Viva Books Private Limited, New Delhi.
11. Arun Ingale, (2010). Basic Immunology. New Central Book Agency (P) Ltd., London.
12. Rajasekara Pandian M. Senthil Kumar B. (2007). Immunology and Immunotechnology. Panima Publishing Corporation, Bangalore, New Delhi.
13. John Playfair and Gregory Bancroft (2008). Infection and Immunity. 3rd edition. Oxford University Press, Oxford.
14. Sudha Gangal and Shubhangi Sontakke (2013). Course Book of Basic and Clinical Immunology. University Press Private Ltd., Hyderabad, India.

MICROBIOLOGY

Semester: VI **Hours: 6**

Code : 20ZO6MC09 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Perform experimental procedures of microbial techniques to get a job in laboratories.	PSO - 1, PSO - 3, PSO - 5	K, An, Ap
CO - 2	Describe the structure, function and pathogenesis of bacteria.	PSO - 1, PSO - 3	K, C
CO - 3	Evaluate the structure, function and pathogenesis of virus.	PSO - 1, PSO - 2	K, Ap, C
CO - 4	Explicate applications and economic importance of algae and fungi.	PSO - 1, PSO - 4, PSO - 5	K, Ap, An
CO - 5	Accomplish the techniques related to industrial, soil and environmental microbiology.	PSO - 1, PSO - 2, PSO - 5	Ap, S, E

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

Semester: VI				**MICROBIOLOGY**								**Hours: 6**
Code : 20ZO6MC09												**Credits: 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	4	4	4	3	3	4	4	3	4	4	4	3.72
CO - 2	4	4	3	3	4	3	4	3	4	3	3	3.45
CO - 3	4	4	3	3	4	3	4	3	4	3	3	3.45
CO - 4	4	4	4	3	4	4	4	4	3	3	4	3.72
CO - 5	4	4	4	4	4	4	4	4	4	4	4	4.00
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 = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

Introduction to Microbiology: Brief history of microbiology - germ theory of disease, scope, definition of microbiology. Contributions of Louis Pasteur, Robert Koch and Beijerinck. 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 II

Bacteria: Classification, size, shape, arrangement, ultra structure of bacterial cell - cell wall, cell membrane, flagella, pili and capsule. Bacterial reproduction and growth - phases of growth and growth curve, factors affecting growth, measurement of bacterial growth - cell mass and number. Bacterial diseases - *Streptococcus pneumoniae, Salmonella typhi* and *Vibrio cholera.* Bacteria used as biofertilizer - *Rhizobium, Bacillus thuringiensis* - isolation, identification, inoculum production and field application. **(18 Hours)**

UNIT III

Viruses: Basic concepts of virology, Discovery, Characteristics, structure, shape and classification of viruses. Differences between bacteria and virus, viroids, prions, Tabacco Mosaic Viruses, Adeno virus, Bacteriophage. Multiplication of Bacteriophages - Life cycle of Phages, Transmission of viruses - Transmission for plants, animals and man. Causes, symptoms, transmission and prevention of Covid 19, chikungunya, dengue fever and adenovirus. **(18 Hours)**

UNIT IV

Algae and Fungi: Algae - General characters, classification - F.E.Fritsch and Smith, diverse habitat, range of thallus structure, photosynthetic pigments and food reserves, reproduction - vegetative, asexual and sexual, economic importance - algae as food and fodder, algae in agriculture and pharmaceuticals, culture of Cyanobacteria and *Azolla.* Fungi - Definition, general characters, classification of fungi - Saccardo and Ainsworth's, occurrence, thallus organization, asexual and sexual reproduction, biological and economic importance of fungi, life cycle of rhizopus, penicillium and yeast, fungal diseases - ringworm infection, aspergillosis and candidiasis. **(18 Hours)**

UNIT V

Recent advances in microbiology: Industrial fermenters, commercial production of microorganisms -single-cell protein, bioconversions - biomining, bioleaching, bio-gas and bio-diesel. Methods of purification of portable water, microorganisms in agricultural waste water treatment, Production of organic acid - Vinegar, aminoacid - glutamic acid, antibiotics - streptomycin, enzyme - amylase. Bioremediation and phytoremediation. Role of microbes in soil fertility and nitrogen fixation. Fermented food products - Yoghurt (milk), sauerkraut (vegetables). Microbial spoilage of meat, milk, and canned food, food infection (amoebiasis), food poisoning (botulism), factors influencing microbial growth in food, food Preservation - physical and chemical methods. **(18 Hours)**

COURSE BOOK:

- Mani A., Narayanan L.M., Dulsy Fatima A.M., Selvaraj and Arumugam N., (2015). Immunology and Microbiology. Saras Publications, Nagercoil.

BOOKS FOR REFERENCE:

1. Cappuccino J.G and Sherman N., (2005). Microbiology. A Laboratory Manual. 7 tedition. Pearson Education and Dorling Kinderley Pvt. Ltd., New Delhi.
2. Dubey and Maheswari D.K., (2013). A TEXT BOOK of Microbiology. Revised edition. S. Chand and Company Ltd., New Delhi.
3. George J Banwan, (2002). Basic Food Microbiology. 2nd edition. CBS Publishers and distributors, New Delhi.
4. Green Wood D., Slack R.C.B and Peutherery J.F., (2002). Medical Microbiology. 16th edition. Churchill Livingstone an Imprint if Elsevier's Science Ltd.
5. Jeffery C. Pommerville, (2014). Alcamo's Fundamentals of Microbiology. 10th edition. Jones and Bartlett India Pvt. Ltd., New Delhi.
6. Patel A.H., (2012). Industrial Microbiology. 2nd edition. Macmillan Publishers India Ltd., New Delhi.
7. Pelcezar M. J., (1993). Microbiology and Reid. Rc Graw Hill Book Company, New York.
8. Schelgel H. G., (1993). General microbiology. Cambridge University Press U.K.
9. Somnath Ditta, (2009). Medical Microbiology, Adhyayan Publishers and Distributors, New Delhi.
10. Sugandhar Babu R. P., (2008). Food Microbiology. Adhyayan Publishers and Distributors, New Delhi.

CLINICAL LAB TECHNOLOGY

Semester: VI **Hours: 6**

Code : 20ZO6MC10 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Comprehend the composition of blood and analyse the routine blood test.	PSO -1, PSO - 5	K, Ap, An
CO - 2	Develop lab skills to handle urine sample.	PSO -1, PSO - 5	K, An, Ap
CO - 3	Explicate the clinical chemistry.	PSO -1, PSO -3, PSO - 5	K, S, An
CO - 4	Analyse the sample stool, sputum and seminal fluid.	PSO -1, PSO - 5	K, An
CO - 5	Analyse and understand the causative organisms, mode of transmission, clinical symptoms and laboratory diagnosis of bacterial and viral diseases.	PSO -1, PSO - 3, PSO - 5	K, An, S

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

Semester: VI				**CLINICAL LAB TECHNOLOGY**							**Hours: 6**
Code : 20ZO6MC10											**Credits: 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	4	4	3	4	5	5	4	3	3	5	4.09
CO - 2	5	3	4	4	4	4	5	5	4	4	4	4.18
CO - 3	5	3	4	4	4	5	5	4	3	3	5	4.09
CO - 4	5	4	3	3	3	4	5	4	3	3	4	3.72
CO - 5	5	4	4	4	3	5	5	5	4	3	5	4.27
Overall Mean Score												**4.07**

Result: The Score for this Course is **4.07** (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

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. Safety measures in laboratory. **(18 Hours)**

UNIT II

Analysis of urine - Physical properties of urine - Colour, volume, specific gravity, odour and pH. Chemicalcomposition of Urine - urine sugar, albumin, bile salts, bile pigments and ketone bodies, microscopic examination of organised sediments - epithelial cells, renal cells, white blood cells, red blood cells, mucus, eosinophil, hyaline cast, waxy cast, granular cast, red cell cast, white cell cast and unorganised sediments - oxalate crystal, uric acid crystal, struvite crystal, calcium oxalate crystal, cystine, tyrosine, leucine, amorphous crystal, calcium sulphate and alkaline crystals . Pregnancy test (detection of HCG). **(18 Hours)**

UNIT III

Analysis of stools - Macroscopic examination of stool - Colour, odour, pH and volume. Chemical examination - Guaiac test for occult blood and steatorrhea for fat content. Microscopic examination of ova and cyst - Wet mount smear and iodine smear, Protozoa: Cysts and trophozoite - *Entamoeba histolytica*, *Giardia lamblia* and *Balantidium coli*. Helminths: Ova, egg - *Schistosoma mansoni*, Taenia worms, *Ascaris lumbricoides*, Hook worms*, Trichuris trichuria* and *Enterobius vermicularis*. Analysis of sputum - Macroscopic and microscopic examination of sputum. Gram stain and acid fast Bacilli (AFB). **(18 Hours)**

UNIT IV

Clinical chemistry - Blood glucose, blood urea, blood uric acid, blood cholesterol and Blood Creatinine. WIDAL test for enteric and nonentericfever, (VDRL) venereal disease research raboratory testvirginity test**.** Analysis of seminal fluid - physical examination, chemical examination - Florence test, Barberio's test, Acid phosphatase test and creatine phosphokinase test. Microscopic examination - motility of spermandprecipitintest. **(18 Hours)**

UNIT V

Laboratory diagnosis - Causative organisms, mode of transmission, clinical symptoms and laboratory diagnosis of bacterial diseases - Tuberculosis, typhoid, cholera and tetanus. Viral Diseases - Jaundice, Dengue,Covid - 19 and Acquired Immuno Deficiency Syndrome. Venereal disease - Syphillis and gonorrhea.

(18 Hours)

BOOKS FOR REFERENCE:

1. Kanai L., Mukherjee, volume 1 (2005), Volume 2 (2005), Volume 3 (2008). Medical Laboratory Technology. A Procedure Manual for Medical Laboratory Technology. Routine diagnostic test.
2. Philip Evans., (1993). The family Medical Reference Book the essential Guide to Health and Medicine. Published by Little Brown under the Black cat imprint, London.
3. Isidro Aquilar and Herminia Galbes., (1999). Encyclopedia of Health and Education for the family. Education and Health Library, Published under the title of Encyclopedia familiarrida, Amor Y sexo.

IMMUNOLOGY, MICROBIOLOGY AND CLINICAL LAB TECHNOLOGY - LAB

Semester: VI **Hours: 4**

Code : 20ZO6CP05 **Credits: 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 lymphoid organs.	PSO - 2, PSO - 3	K
CO - 2	Analyse the immunological techniques including Immuno electophoresis, Haemagglutination and Immunodiffusion.	PSO - 3, PSO - 5	C, An
CO - 3	Acquire knowledge on microbial techniques.	PSO - 3, PSO - 5	K, Ap
CO - 4	Investigate the haemogram test and blood grouping.	PSO - 2, PSO - 4	Ap, S
CO - 5	Analyze the urine sample for biochemical and microscopic examination.	PSO - 3, PSO - 5	An, K, C

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

Semester: VI				**IMMUNOLOGY, MICROBIOLOGY AND CLINICAL LAB TECHNOLOGY - LAB**							**Hours: 4**
Code : 20ZO6CP05											**Credits: 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	3	5	5	4	3	3	5	4. 00
CO - 2	5	3	4	3	3	4	5	5	3	4	4	3.90
CO - 3	5	3	4	3	4	5	5	4	3	3	5	4.00
CO - 4	4	2	3	4	3	4	5	4	3	3	4	3.54
CO - 5	5	3	4	3	3	5	5	5	3	3	5	4.00
Overall Mean Score												**3.88**

Result: The Score for this Course is **3.88** (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

IMMUNOLOGY:

1. Dissection of Lymphoid organs in chick.
2. Histology of lymphoid organs (Slides/ Charts).
    i. Primary lymphoid organs - Thymus, Bone marrow.
    ii. Secondary lymphoid organs - Lymphnodes, spleen.
3. Preparation of antigen - BSA, bacterial, SRBC.
4. Production of antiserum.
5. Separation of lymphocytes from peripheral blood.
6. Immuno electrophoresis - Demonstration.
7. Haemagglutination - Demonstration.
8. Immunodiffusion: Mancini and Ochterlony - Demonstration.

MICROBIOLOGY:

1. Cleaning and sterilization of glasswares.
2. Preparation of culture media for microbes.
    a. Broth media b. Agar media c. 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 - Methelene blue reduction test.
6. Spotters - Laminar Air flow, Autoclave, Hot air oven and Colony counter.

CLINICAL LAB TECHNOLOGY LAB

1. Bleeding time.
2. Clotting time.
3. Estimation of heamoglobin concentration.
4. Estimation of Erythrocyte Sedimentation rate.
5. Differential count.
6. Total count.
7. Blood grouping and Rh typing.
8. Urine analysis: Urine sugar, albumin, bile salt and bile pigment.
9. Microscopic examination of crystals and cast.
10. Pregnancy Test.

LIVESTOCK MANAGEMENT AND ANIMAL HUSBANDRY

Semester: VI **Hours: 4**

Code : 20ZO6DE4A **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Manage the dairy farming.	PSO - 1, PSO - 5	K, C, An
CO - 2	Highlight the types of breeds and advantages of goat.	PSO - 1, PSO - 5	K, An
CO - 3	Enlist the activities and government schemes.	PSO - 2, PSO - 5	K, S, C
CO - 4	Gain knowledge on types and management of swine.	PSO - 2, PSO - 3, PSO - 5	K, An, Ap
CO - 5	Analyze and understand the diagnosis and control measures of infectious diseases of livestock.	PSO - 2, PSO - 3, PSO - 4	Ap, E

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

Semester: VI				LIVESTOCK MANAGEMENT AND ANIMAL HUSBANDRY								Hours: 4
Code : 20ZO6DE4A												Credits: 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	3	4	4	3	4	4	3	3	4	3.64
CO - 2	4	3	4	4	3	3	4	3	3	2	3	3.27
CO - 3	4	4	3	3	4	3	4	4	3	3	4	3.55
CO - 4	4	3	2	3	4	3	4	5	3	3	3	3.36
CO - 5	4	3	4	4	4	3	3	4	4	4	4	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

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)**

BOOKS FOR REFERENCE:

1. Shiv Prasad, A. Kumaresan, S. S. Lathwal Mukesh Bhakat, A. Manimaran (2013). New Paradigms in Livestock Production from traditional to commercial farming and beoundNew Delhi.
2. Andrew L. Winton and Kate Barber Winton (2012). Milk and milk products Agrobios (India), Agro house, Chopasani Road, Jodhpur.
3. U. K. Behera (2014). A Textbook of Farming systems. Agrotech publishing academy, 11A-Vinayak Complex-B, Durga nursery Road, Udaipur.
4. G.C. Banerjee (1992). A Text Book of Animal Husbandry. 7/e. Oxford & IBH Publ., New Delhi.

AGROCHEMICALS AND PEST MANAGEMENT

Semester: VI **Hours: 4**

Code : 20ZO6DE4B **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognize the concept of agropest.	PSO - 1, PSO - 2, PSO - 5	K, An
CO - 2	Acquire knowledge on Agrochemicals for increasing the health of plants.	PSO - 1, PSO - 3, PSO - 5	K, An
CO - 3	Aware on proper use of chemical fertilizers.	PSO - 2, PSO - 5	K, S, C
CO - 4	Analyse the factors involved in calibrating equipment for pesticide applications.	PSO - 2, PSO - 5	K, An
CO - 5	Imbibe knowledge on biopesticides.	PSO - 2, PSO - 3, PSO - 4	A, S

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

Semester: VI				AGROCHEMICALS AND PEST MANAGEMENT								Hours: 4
Code : 20ZO6DE4B												Credits: 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	4	3	4	3	3	4	4	3	4	3.64
CO - 2	4	4	4	3	3	3	3	2	3	4	3	3.27
CO - 3	3	4	4	3	3	4	4	4	3	3	4	3.55
CO - 4	2	3	4	4	3	3	5	3	4	3	3	3.36
CO - 5	3	3	4	4	4	4	4	3	4	4	4	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 = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	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. **(12 Hours)**

UNIT II

Agrochemicals and plant health: Manures- types, composition and value, sources of manures, Different composting technologies, Green manures - Oil cakes, Sewage sludge - Biogas plant slurry. Microbes and crop production, crop response, field applications. Biofertilizers - classification and value of *Rhizobium*, *Azatobactor*, *Azolla*, Blue Green Algae, VAM (Vesicular Arbuscular Mycorrhiza). Harmful role of microorganisms. **(12 Hours)**

UNIT III

Chemical fertilizers: Classification and value, N- fertilizers - Manufacturing of ammonium sulphate, ammonium chloride, ammonium nitrate and urea, P - fertilizers - sources, processing rock phosphate, bone meal preparation, K-fertilizers - sources, potassium chloride, potassium sulphate and potassium nitrate. **(12 Hours)**

UNIT IV

Agrochemicals: Pesticides based on target species - Acaricides, fungicides, rodenticides, nematicides, molluscicides, fumigants and repellents. Structure, chemical name, physical and chemical properties of organophosphates, organochlorines and carbamates. Degradation metabolism, mode of action, uses and toxicity, application of pesticides and dose for field application (one example from each). **(12 Hours)**

UNIT V

Biopesticides: Potential pesticidal plants, Plant extracts and bioorganisms, azadirachtin and its role in pest control, other biopesticides - pyrethrins, pyrethroids, rotenone, nicotine and nicotinoids. Growth inhibitors or physiological antagonists, chemo-sterilants, pheromones and attractants, Insect growth regulators, juvenile hormones, moulting hormones and chitin synthesis inhibitors. **(12 Hours)**

BOOKS FOR REFERENCE:

1. Hill, D.S. (1983) Agricultural insect pests of the tropics and their control- Cambridge Univ. Press.
2. Atwal, A. S. (1979) Agricultural pests of India and south East Asia.
3. Dent, D. (2000) Insect pest management (2nd edition) CAB International.
4. Roberts, D.A. (1978) Fundamentals of Plant Pest Control.
5. De Bach, P. (1964) Biological Control of Insect Pests and Weeds, Chapman & Hall, New York.
6. Koul, O. and Dhaliwal, G.S. (2003) Phytochemical Biopesticides, Harwood Academic Publishers, Amsterdam.
7. Pedigo, L.P. (1996) Entomology and pest management, Prentice Hall, N. Delhi.

ENTOMOLOGY

Semester: VI **Hours: 4**

Code : 20ZO6DE4C **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify the insects using taxonomic keys.	PSO - 1, PSO - 5	K, C, An
CO - 2	Understand the external morphology of the insect body and their appendages and functions.	PSO - 1, PSO - 2	K, An, E
CO - 3	Explain the physiology and their modifications in insects.	PSO - 2, PSO - 4	K, C
CO - 4	Realize the nature of damage, biology and seasonal incidence of insect pests that cause loss to major field crops.	PSO - 3, PSO - 5	K, An, Ap
CO - 5	Learn the structure and mode of action of important insecticides belonging to different groups.	PSO -2, PSO - 4, PSO - 5	K, An, E

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

Semester: VI				**ENTOMOLOGY**							**Hours: 4**
Code : 20ZO6DE4C											**Credits: 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	4	4	4	5	4	1	3	4	3.64
CO - 2	5	4	4	3	3	3	5	4	2	4	5	3.82
CO - 3	5	3	3	2	3	3	3	5	2	3	4	3.27
CO - 4	5	3	3	3	4	4	4	5	1	4	5	3.73
CO - 5	5	4	4	4	4	4	3	4	4	5	4	4.09
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 = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

Insect Taxonomy: Principals of Insect classification, classification upto orders, Insect collection and preservation. **(12 Hours)**

UNIT II

Insect Morphology: Types of antennae, mouth parts and legs, thorax, wings venation, wings modification, spiracles - types, Genetalia - structure and types. **(12 Hours)**

UNIT III

Insect Physiology: Mouth parts of insects, respiration in insects, reproduction in insects, Development of insects - Moulting and metamorphosis. **(12 Hours)**

UNIT IV

Pests of Economic importance: Any four important pests of Rice, Sugarcane, Ground nut, Coconut, Green gram, Black gram, Pests of stored products, internal feeders, external feeders, Insects associated with human beings - Mosquitoes and House fly. (**12 Hours)**

UNIT V

Principles and methods of Pest control: Physical, Chemical, mechanical, biological, legislative methods, recent integrated control methods, Classification of insecticides based on mode of action and chemical nature, Appliances of pesticides - dusters and sprayers, Methods of Application - dusting, spraying, aerosol and aerial spraying, Information regarding safe use of pesticides and antidotesforpesticidepoisoning. **(12 Hours)**

COURSE BOOK:

- Nalina Sundari, M. S. and R. Santhi. (2006). Entomology, MJP Publishers, Chennai.

BOOKS FOR REFERENCE:

1. Vasantharaj David T and Kumarasamy B. (1996). Elements of Economic Entomology, Popular Book depot, Saidapet, Chennai.
2. Krishnan N. T. (1993). Economic entomology, J. J. Publication, Madurai.
3. Wigglesworth, V. B. (1994). Insect Physiology. Chapman and Hall, London.
4. Abishek Shukla, (2008). Entomology. Daya Publishing House, New Delhi.
5. Sandhya Agarwal. (2009). Applied Entomology. Oxford Book Company, Jaipur, India.
6. Ravichandran K. R. (2013). A text Book of Economic Zoology, Wisdom Presss, New Delhi.

FOOD, NUTRITION AND HEALTH

Semester: VI **Hours: 2**

Code : 20ZO6GE02 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Create awareness regarding the food requirements.	PSO - 2, PSO - 3	K, C, An
CO - 2	Comprehend the mechanism of digestion.	PSO - 2, PSO - 3	K, Ap
CO - 3	Highlight the importance of food on health.	PSO - 2, PSO - 3	K, Ap
CO - 4	Analyse the nutritive value of food.	PSO - 2, PSO - 3	K, C, Ap
CO - 5	Illustrate the nutritive related disorder and its prevention.	PSO - 2, PSO - 3	K, C, E

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

Semester: VI				**FOOD, NUTRITION AND HEALTH**							**Hours: 2**
Code : 20ZO6GE02											**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	3	3	3	3	4	3	3	3	4	3	3	3.18
CO - 2	3	3	3	3	4	3	3	3	3	3	3	3.09
CO - 3	4	3	3	3	3	3	3	3	4	3	3	3.18
CO - 4	3	3	3	3	4	3	4	4	4	3	3	3.36
CO - 5	4	3	3	4	3	4	3	3	4	3	3	3.36
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

Definition of food and nutrition. Components of food - carbohydrate, protein and lipid (sources and biological significances in brief). PEM- marasmus, kwashiorkor. Vitamins and minerals - Sources, functions and deficiency diseases in brief. Water - requirement and dehydration. **(6 Hours)**

UNIT II

Digestion - human digestion, absorption and assimilation. Balanced diet, BMI and BMR - definition and calculation. Role of enzymes and hormones in digestion and absorption. **(6 Hours)**

UNIT III

Nutritional requirements of different age groups - Preschoolers - schoolers - adolescents and aged people. Diet chart for adolescents and aged people.

(6 Hours)

UNIT IV

Food and nutrient requirements - pregnancy and lactation, the factors that contribute to successful breast feeding. Recommended dietary allowances for moderate worker. Nutritional significance of cereals, pulses, milk, meat, fish, vegetable, egg, nuts, oils, sugar. **(6 Hours)**

UNIT V

Nutrition related disorders - Deficiency diseases, Adult chronic disease - diet, prevention and control measures of obesity, hypertension, diabetic and peptic ulcer. Food adulteration - any 10 adulterants. Causes of food spoilage and its prevention. **(6 Hours)**

STUDY MATERIAL:

- Santhi V and Jemima Florence Borgia V., (2007). Food and Nutrition.

BOOKS FOR REFERENCE:

1. Arumugam N., (2005). Animal Physiology. Saras Publications, ARP Camp Road, Kottar, Nagercoil, Kanyakumari Dt.
2. Gitanjali Chaterjee. (2000). Hand Book of Food and Nutrition. Rajat Publication.
3. Jyoti S. Sharma. (2009). Applied Nutrition and Food Science. Akansha Publication
4. Shakuntala Mary N. and Shadaksharaswamy M., (2000). Foods facts and Principles. New Age International (P) Limited Publishers.
5. Srilakshmi, (2005). Dietetics. New Age International (P) Limited publishers.
6. Stryer, L. (1988). Biochemistry. W. H. Freeman and Company, New York.

ORGANIZATION AND HEALTH PROGRAMME IN NCC

Semester: VI **Hours: 2**

Code : 20GE6NC02 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Attain knowledge on History, honors and awards of Indian Military	PSO - 1,PSO - 2, PSO - 4	K, An, Ap,
CO - 2	Perceive knowledge on read the maps, so that they are able to locate themselves when need arises.	PSO - 1, PSO - 4	K, An, C
CO - 3	Explain the medical knowledge which consists of anatomy and physiology of human body.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K, S, Ap
CO - 4	Analyse the personal hygiene and sanitation.	PSO - 4, PSO - 5	K, An, E
CO - 5	Develop technical skill of first Aid and how to effectively deal with minor injuries.	PSO - 1, PSO - 2	K, Ap, S, E

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

Semester: IV				**ORGANIZATION AND HEALTH**					**Hours: 2**			
Code : 20GE6NC02				**PROGRAMME IN NCC**					**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 = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

UNIT I: INDIAN MILITARY AND NCC ORGANIZATION

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- Honours and Awards. **(6 Hours)**

UNIT II: MAP READING

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. **(6 Hours)**

UNIT III: HYGIENE AND SANITATION

Personal Hygiene - Sanitation - Methods of purification of drinking water -Latrine types - Urinal Types. **(6 Hours)**

UNIT IV: TYPES OF DISEASE AND POLLUTION

Define Health - Types of Health - Communicable and Non communicable Disease - Pollution and its type. **(6 Hours)**

UNIT V: FIRST AID

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. **(6 Hours)**

BOOK FOR REFERENCE:

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

INTERNAL QUESTION PATTERN

Time: 2 hours **Marks: 30**

PART - A

Answer Any 4 out of five $4 \times 2 = 8$

PART- B

Two either or questions (one from each) $2 \times 4 = 8$

PART - C

Two either or questions (one from each $2 \times 7 = 14$

BEE KEEPING

Semester: VI **Hours: 2**

Code : 20SE6ZO04 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Comprehend the morphology, types and life cycle of the honey bee.	PSO - 1, PSO - 5	K, C, An
CO - 2	Handle bee keeping system and equipments.	PSO - 4, PSO - 5	K, S, An
CO - 3	Highlight the honey bee products.	PSO - 4, PSO - 5	K, S, C,
CO - 4	Categorize the enemies of honey bees and their control.	PSO - 2, PSO - 5	K, An, Ap
CO - 5	Acquire knowledge on sustainable bee keeping.	PSO - 2, PSO - 4, PSO - 5	An, S, E

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

Semester: VI				**BEE KEEPING**							**Hours: 2**
Code : 20SE6ZO04											**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	3	3	4	5	4	3	5	5	4.09
CO - 2	5	5	4	3	4	5	3	3	2	4	5	3.91
CO - 3	5	3	2	2	3	4	4	4	2	5	5	3.55
CO - 4	5	3	2	3	3	4	4	5	2	4	5	3.64
CO - 5	5	4	4	3	3	4	4	5	2	4	5	3.91
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

UNIT I

Introduction: Scope of Apiculture, classification, morphology and type of honey bees - *Apis dorsata, Apis florae, Tetragonula iridipennis, Apis andreniformis, Apis cerana indica, Apis laboriosa, 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. **(6 Hours)**

UNIT III

Food and products of honey bee: Food - bee milk, bee bread, honey, pollen, royal jelly, artificial feeding. Products - properties, nutritional value, medicinal value, extraction, processing, 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, chalkbrood, 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., (2009). Apiculture.

BOOKS FOR REFERENCE:

1. Fenemore P. G and Alka Prakash., (2000). Applied Entomology. New Age International (P) Ltd Publishers, New Delhi.
2. Johnson J., (2005). Apiculture. Olympic Grafix, Marthandam.
3. Ravindranathan K.R. (2005). A text book of economic Zoology, Dominant Publishers and Distributors, New Delhi.
4. Avinash Khanna. (2007). Applied zoology and Biotechnology. Mangalam Publishers and Distributors, New Delhi.
5. Kotpal. (1981). Arthropoda. Rastogi Publishers.

BIONOMICS

Semester: VI

Code : 20ZO6SS01 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Realize the scope and concept of environmental biology.	PSO - 1, PSO - 5	K, C, An
CO - 2	Monitor and understand the structure and functions of biosphere.	PSO - 1, PSO - 5	K, An
CO - 3	Elucidate biogeochemical cycles and animal association.	PSO - 2, PSO - 4	K, S, C
CO - 4	Obtain knowledge on population, community and conservation of ecosystem.	PSO - 1, PSO - 2, PSO - 4	K, An, Ap
CO - 5	Analyse the environmental degradation and remedy measures.	PSO - 1, PSO - 3, PSO - 4	Ap, S, E

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

Semester: VI				**BIONOMICS**							**Credits:2***
Code : 20ZO6SS01											
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	4	3	4	4	3	3	3	3.45
CO - 2	4	4	3	3	4	3	4	4	3	3	3	3.45
CO - 3	4	4	3	4	4	3	4	4	3	3	3	3.54
CO - 4	4	4	3	4	3	3	4	3	3	3	3	3.36
CO - 5	4	3	4	4	4	4	4	4	3	3	3	3.63
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

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 - concept, components, types, structure and functions.

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:

- Arumugam N., (2015). Concepts of Ecology. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Kotpal. R.L, and N.P. Bali, 1986. Concepts of Ecology, Vishal Publications, New Delhi - 7.
2. Rastogi V.B, and M.S. Jayaraji, 1988 - 1989 Animal Ecology and Distribution of animals, Kedar nath, Ram Nath Meerut - 250 001.
3. Clark, G.L. 1954, Elements of Eology, John wiley & Sons Inc., New York, London.
4. Eugene P. Odum, 1971. Fundamentals of ecology, Saunders International Student Edition, W.B. Saunders Company, Philadelphia London, Toronto.
5. Agarwal. V.S., (2001). Strategies in Environmental conservation. Kalyani Publishers, New Delhi.
6. Odum E.P., (2017). Fundamentals of Ecology. 5th edition, Natraj Publication, Gayathri Offest, New Delhi.
7. Saha T.K., (2013). Ecology and Environment Biology. Books and Allied (P) Ltd., Kolkata.
8. Trivedi, (2012). Ecology APH Publishing Corporation, New Delhi.
9. Verma P.S. and Agarwal V. K., (1992). Principles of Ecology. S. Chand and company Pvt. Ltd., New Delhi.

DIETETICS

Semester: VI

Code : 20ZO6SS02 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Understand the role of food and nutrients in health and disease.	PSO - 2, PSO - 3	K, C, An
CO - 2	Understand nutrient needs and demonstrate food choices for school going children and adolescents.	PSO - 2, PSO - 4	K, An,Ap
CO - 3	Learn the changes in a body taking place during the ageing period of life.	PSO - 1, PSO - 3	K, S, C
CO - 4	understand principles of diet therapy, modification of normal diet for therapeutic purposes and the role of dietitian.	PSO - 2, PSO - 4	K, An, Ap
CO - 5	Plan and prepare appropriate diets for therapeutic conditions.	PSO - 4, PSO - 5	Ap, An, E

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

Semester: VI				**DIETETICS**								**Credits: 2***
Code : 20ZO6SS02												
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	4	5	2	4	4	4	4	3.82
CO - 2	4	4	4	4	4	5	2	4	4	3	4	4.18
CO - 3	4	4	4	4	4	5	2	4	4	4	4	3.91
CO - 4	5	4	3	4	3	5	2	4	5	4	4	3.91
CO - 5	5	5	4	4	4	5	2	4	5	4	4	4.18
Overall Mean Score												**4.00**

Result: The Score for this Course is **4.00** (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 = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNITI

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:

- Srilakshmi B., (2005). Dietetics - New Age International P. Ltd. Publishers, New Delhi.

BOOKS FOR REFERENCE:

1. Park and Park M.S. (2003). Preventive and Social Medicines. Banarsidas, Banat Publishers.
2. Nutrition and Diet Therapy (1989). Times mirror/Mosby College Publishers.
3. Shakuntala Mary M. and N. Shadaksharaswathy. (2009). Food (Foods and Principles) New Age International P. LTD. Publishers.

BIOINSTRUMENTATION

Semester: VI

Code : 20ZO6SS03 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Explain the concepts of microscopy and handle microscopes for biological studies.	PSO - 3, PSO - 4	K, C, An
CO - 2	Understand theprinciples of centrifuge and concepts of acids, and bases.	PSO - 2, PSO - 5	Ap, An
CO - 3	Isolate compounds using Chromatography and electrophoresis.	PSO - 3, PSO - 5	K, S, E
CO - 4	Obtain knowledge on spectrophotometry in analytical determination and characterization of biomolecules.	PSO - 2, PSO - 4 PSO - 5	K, An, Ap
CO - 5	Apply the principles of radiochemistry to analytical determination of biomolecules and life processes.	PSO - 1, PSO - 3, PSO - 5	Ap, S, E

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

Semester: VI				**BIOINSTRUMENTATION**							**Credits: 2***
Code : 20ZO6SS03											
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	3	3	4	1	4	4	3	4	3.45
CO - 2	4	4	4	3	3	4	1	4	4	4	4	3.55
CO - 3	4	5	4	4	3	4	1	4	4	4	4	3.73
CO - 4	5	5	4	4	3	4	1	4	4	4	4	3.82
CO - 5	5	5	4	4	3	4	4	4	4	4	4	4.09
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

Units of measurements - Metric system, conversion of units. Cell size measurement - micrometry. Microscopy - principles and types (Dark field,Phase contrast microscope, Polarising and electron microscope).

UNIT II

Centrifuge - principles and types (Clinical and UltraCentrifuge). pH - Sorenson's pH scale, pH meter - Principle and applications. Manometry - Principle and applications of Warburg manometer, Autoclave.

UNIT III

Chromatography - Principle, types and applications of paper, thin layer, column chromatography. Electrophoresis - Principle and applications of agarose and SDS - PAGE.

UNIT IV

Colorimeter and spectrophotometer - Principles, verification of Beer Lambert's law and applications of colorimeter and spectrophotometer. Biochemical applications of radio isotopes.

UNIT V

Autoradiography - Principle and applications, Biochemical applications of radio isotopes, Radiation measuring devices - Geiger MullerCounter and Scintillation counter.

COURSE BOOK:

- N. Arumugam and Kumaresan V., (2012). Biophysics and Bioinstrumentation. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Boyer. R. (2000). Modern experimental Biochemistry (3rd Edition). USA:Addison Wesley Longman, Inc.
2. Mohanty, P. K. (2000). Illustrated Dictionary of Biology. Kalyani Publishers, Ludhiana.
3. Ludhiana Wilson, K. and Waljker, J. (2010). Principles and techniques of Biochemistry and Molecular Biology (7th Edition). Cambridge University Press,UK.
4. Van Holde, K. E. Johnson, W. C. and Ho, P. S. (2006). Principles of physical Biochemistry, 2nd Edition. Pearson Prentice Hall, New Jersey.
5. Sharma, V. K. (1991). Techniques in Microscopy and Cell Biology. Tata McGraw Hill Publishing Ltd., New Delhi.

MATERNAL CHILD HEALTH CARE

Semester: VI

Code : 20ZO6SS04 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Comprehend the objectives of antenatal care, antenatal visits, antenatal check-up.	PSO -1, PSO - 3	K, An, Ap
CO - 2	Explicate prenatal advice and mental preparation.	PSO - 2, PSO - 3	C, An
CO - 3	Illustrate intranatal care and mechanism of normal labour.	PSO - 3, PSO - 5	C, Ap
CO - 4	Elucidate postnatal care and health education.	PSO - 2, PSO - 4	K, Ap, S
CO - 5	Analyseneonatal care and identification of ‘‘at-risk’’ infants, late neonatal care, causes of preterm birth.	PSO - 3, PSO - 5	An, K, C

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

Semester: VI				**MATERNAL CHILD HEALTH CARE**							**Credits: 2***
Code : 20ZO6SS04											
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	4	4	5	1	4	4	3	4	3.55
CO - 2	5	2	2	4	3	4	1	3	3	4	4	3.18
CO - 3	5	2	3	4	4	5	1	4	5	3	3	3.55
CO - 4	5	2	3	4	3	4	1	4	4	3	4	3.36
CO - 5	5	2	2	4	4	5	1	3	3	3	4	3.27
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 = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

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, foetal 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 theeyes, 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.

BOOKS FOR REFERENCE:

1. Park, K. (2015). Park's Textbook of Preventive and Social Medicine. 23rd Edition. M/s Banarsidas Bhanot Publishers, 1167, Prem Nagar, Jabalpur, 482001 (M.P.) India.
2. Dutta, D. C. (2013). Textbook of obstetrics including Perinatology and Contraception. 7th Edition. New Central Book Agency (P) Ltd, London.
3. Davis, R. P *et al*. (1981). Pregnancy andalcohol Current Problems in Obst and Gynaecology 4 (6)2 - 48, Feb 1981.
4. Merdith Davis, J. B. (1983). Community health, Preventive medicine and social services, 5th ed., Bailliere Tindall.
5. Helsing, E. and King, F. S. (1984). Breast feeding in practice, Oxford University, New Delhi.

SELF STUDY COURSE

QUESTION PATTERN

PART - A

6 Questions × 4 Marks = 24 Marks (6 Questions out of 10)

(Open Choice and Two Questions from each unit)

PART - B

4 Questions × 10 Marks = 40 Marks (4 Questions out of 6)

(Open Choice and at least One Question from each unit)

PART - C

3 Questions × 12 Marks = 36 Marks (3 Questions out of 5)

(Open Choice and One Question from each unit)

STUDENT TRAINING PROGRAMME
NATIONAL CADET CORPS

U.G. PROGRAMME OUTCOMES (2020 - 2023)

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 : 20STPNC01 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Attain knowledge on History, honors and awards of Indian Military.	PSO - 1,PSO - 2, PSO - 4	K, An, Ap,
CO - 2	Perceive knowledge on read the maps and Weapon training is to remove the fear of a weapon from the hearts of youth.	PSO - 1, PSO - 4	K, An, C
CO - 3	Analyze the different types of disasters under different circumstances.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K, S, Ap
CO - 4	Achieve practical knowledge in community development and other social programmes.	PSO - 4, PSO - 5	K, An, E
CO - 5	Comprehend the personality development and develop technical skill of first Aid .	PSO - 1, PSO - 2	K, Ap, S, E

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

Semester: I - IV				**NATIONAL CADET CORPS**							**Hours: 240**
Code : 20STPNC01											**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	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 = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

NATIONAL CADET CORPS

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

Code : 20STPNC01 **Credits: 2***

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 REFERENCE

- 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: 40 **Time: 2 hours**

Section - A

Answer All Questions 5 × 1 = 5 Marks
(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)

NATIONAL SERVICE SCHEME

U.G. PROGRAMME OUTCOMES (2020 - 2023)

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
PSO - 1	Understand and identify the needs of the community	PO1, PO3
PSO - 2	Develop among themselves a sense of social and civic responsibility.	PO2, PO3, PO4, PO6
PSO - 3	Apply their education in finding practical solution to individual and community problems.	PO1, PO3, PO4, PO6
PSO - 4	Acquire leadership qualities and democratic attitude.	PO2, PO3, PO5
PSO - 5	Develop capacity to meet emergencies and national disasters and practice national integration and social harmony	PO3, PO4, PO5

NATIONAL SERVICE SCHEME

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

Code : 20STPNS01 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Attain a Citizen with Social Concern and Social Analysis	PSO - 1, PSO - 2, PSO - 5	An
CO - 2	Flourish physical and mental health through Yoga	PSO - 2, PSO - 4	Ap
CO - 3	Practice to have healthy Food	PSO - 3, PSO - 5	S, Ap
CO - 4	Preserve Environment	PSO - 2, PSO - 3, PSO - 4	C, K, Ap
CO - 5	Understand and Challenge problems of Women.	PSO - 1, PSO - 2, PSO - 5	An, Ap, K

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

Semester: I - IV				NATIONAL SERVICE SCHEME							Hours: 240
Code : 20STPNS01											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	3	3	5	4	3	3	3	5	3	3	5	3.64
CO - 2	3	4	3	2	4	3	4	5	4	5	2	3.55
CO - 3	3	3	4	3	3	4	3	3	5	3	5	3.55
CO - 4	2	2	3	3	2	3	3	5	5	5	3	3.27
CO - 5	3	3	5	3	3	4	5	5	3	3	5	3.82
Overall Mean Score												3.56

Result: The score for this course is **3.56** (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 - Objectives - NSS Motto - NSS Symbol - NSS Badge - NSS Day - Composition of NSS Unit - NSS Regular Activities & Special Camp - Village Survey & Volunteers Diary - Campus Work - National and International Important days - NSS Awards.

UNIT II: CITIZENSHIP

Duties of a citizen - Social Service - Social Problems - Need for Social Service - Leadership - Social Service & Leadership quality- Personnel and Social Values.

UNIT III: YOUTH

Introduction - Education & Social Concern - Youth & Family - Youth & Society - Capability of youth - Problems of Youth - Drug Abuse - Hero Worship - Addict to Social Media - Violence - Sexual Problems - Suicide.

UNIT IV: HEALTH & HYGIENE

Introduction - Health & Hygiene - Food Hygiene - Personal Hygiene - Health Maintenance: Care of Skin, Hair, Teeth, Eyes - Health Assessment of Fitness - Approaches for keeping Fit.

UNIT V: FOOD AND NUTRITION

Food - Nutrients - Components of Food: Carbohydrate, Protein, Lipid, Minerals, Vitamins and Water - Balanced Diet: Food Selection and Meal Planning - Caloric value of Fruits, Vegetables, Nuts and Sprouted Seeds.

UNIT VI: ENVIRONMENT AND ECOLOGY

Ecology - Components of Ecology - Environment - Pollution - Water Pollution - Air Pollution - Soil Pollution - Noise Pollution - Pollution Control & Environment Preservation.

UNIT VII: WOMEN EMPOWERMENT

Women - Women & Family - Women & Society - Women & Education - Women Leaders - Women Problem - Women Empowerment to overcome problems.

UNIT VIII: FIRST AID

Principles of First Aid - First aid for burns and scalds - First aid for fractures - First aid for insect bite - First aid for dog bite - First aid for electric shock - First aid for drowning - First aid for haemorrhage - Important things kept in the first aid box.

UNIT IX: YOGA

Origin of Yoga and its development - Human Body & Mind - Benefits of Yoga - Classification of Yoga - Pranayama - Types of Pranayama - Utkatasana (Chair Pose) - Trikonasana (Triangle Pose).

UNIT X: PRACTICAL KNOWLEDGE

Entrepreneurial Training: Phenol, Soap Powder, Soap, Candle and Ornaments Making - Gardening - Solid Waste Management - Special Camp: 7 Days

BOOKS FOR REFERENCE:

1. C.S.C. Herve Morrissette, Youth aware, Holy cross fathers, Bangalore, 1977, Seema Yadav, Food Hazards and Hygiene, Anmol Publications Pvt. Ltd, New Delhi, Ist edition, 1997
2. Gitanjali Chatterjee, Hand Book of Food and Nutrition, Rajat Publications Pvt. Ltd, 2000,
3. Archana Sharma, Environment: Ecology, Climate change, Global warming, Biology Biodiversity, Conservation, Face the Challenge Academy, 2018,
4. Jaimon Varghese, Women Empowerment Through Literacy Campaign, Concept Publishing Company Pvt. Ltd, 2012.
5. Rajeev Sharma, First Aid, Lotus Press, New Delhi-2, 2009.
6. Amresh Kumar, Yoga for Healthy body, Khel Sahitya Kendra, New Delhi-2, 2009.

Scheme of Evaluation	
Summative Examination (2 hours)	40 Marks
Continuous Internal Assessment	60 Marks
Total	**100 Marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	Attendance - 240 hours	10 Marks
2.	Special Camp	40 Marks
3.	Case Study	10 Marks
Total		**60 Marks**

Question Pattern for Summative Examination

Total Marks: 40 **Time: 2 hours**

Section - A

Answer All Questions 10 × 1=10 Marks
(Multiple Choice Questions)

Section - B

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

Section - C

Answer Any Two Questions 2 × 10=20 Marks
(Two Questions Out of Three)

PHYSICAL EDUCATION

U.G. PROGRAMME OUTCOMES (2020 - 2023)

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	Elucidate basic knowledge and professional experience in Yoga	PO-1, PO-3
2	Equip with the profound knowledge of Sports and Games	PO-1, PO-4
3	Intake balanced nutrition and practice hygiene.	PO-1, PO-5, PO-6.
4	Enlighten the peoples with the principles of first aids	PO-2, PO-6
5	Expound the concepts and demonstrate Aerobics and Pyramids	PO-1, PO-2, PO-5,PO-5, PO-6

PHYSICAL EDUCATION - COURSE PATTERN (2017 - 2020)

Sem.	Code	Title of the Paper	Hours	Credits
I & II	20STPPE01	Yoga and Rhythmic Activities	120	-
III & IV		Fundamentals of Physical Education	120	2*
		Total	**240**	**2***

YOGA AND RHYTHMIC ACTIVITIES

Semester: I & II **Hours: 120**

Code : 20STPPE01

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the principle of Asnas	PSO - 1,PSO - 3, PSO - 4	K, An, Ap,
CO - 2	Classify Pranayama for different needs	PSO - 1, PSO - 4	K, An, C
CO - 3	Appraise the application and effects of Suryanamaskar for human wellness	PSO - 2,PSO - 3, PSO 4, PSO - 5	K, S, Ap
CO - 4	Execute the techniques in Free Hand Exercise	PSO - 4, PSO - 5	K, An, E
CO - 5	Construct Pyramids based on the underlying principles	PSO - 1, PSO - 2	K, Ap, S, E

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

Semester: I - II				**PAPER I – YOGA AND RYTHEMIC ACTIVITIES**							**Hours: 120**
Code : 20STPPE01											
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 = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I: ASNAS

Sitting Postures - Standing Posture - Prone Posture - Supine Postures.

(24 hours)

UNIT II: PRANAYAMA

Pranayama - Suga Pranayama - Chandra bethana - Nadi Sudhi - Ujjayee - Seethali - Seethakari - Brahmari. **(24 hours)**

UNIT III: SURYANAMASKAR

Suryanamaskar: 12 Postures - 12 Postures & Breathe consioius - 12 Postures With manthra - Relaxation Techiniques. **(24 hours)**

UNIT IV: CALLISTHENICS (FREE HAND EXERCISE)

Standing series - Bending series - Sitting series - Twisting series - Dumb - bells - Indian Clubs - Lezium - Hoops. **(24 hours)**

UNIT V: AEROBICS & PYRAMIDS

Aerobics: Aerobic Basics - Aerobic Movements - Aerobic With Rhythm - Aerobic Programme Pyramids: Basics of Pyramids - Types of Pyramids. **(24 hours)**

BOOKS FOR REFERENCE:

1. Wuest Jeborah,A and Charles A. Bucher (1987), 'Foundation of Physical Education, B.I Publication Pvt.Ltd., New Delhi.
2. Elangovan.R, (2002), 'Utarkalvi Oru Arimugam', Ashwin Publication, Triunelveli.
3. Chandrasekaran.K, (1999), 'Sound Health through Yoga, Prem Kalyan Publication, Sedapatti.
4. Iyengar, B.K.S,'Lights on Yoga', Unwin Hyman Company, London

FUNDAMENTALS OF PHYSICAL EDUCATION

Semester: III & IV **Hours: 120**

Code : 20STPPE01 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
1.	Familiarize the fundamentals of Physical Education	PSO - 1, PSO - 3, PSO - 4	K, An, Ap,
2.	Illustrate different rules for different games and athletic events	PSO - 1, PSO - 4	K, An, C
3.	Examines the need for good nutrition	PSO - 2, PSO - 3, PSO 4, PSO - 5	K, S, Ap
4.	Synthesis the relation between hygiene and health	PSO - 4, PSO - 5	K, An, E
5.	Apply the first aid techniques	PSO - 1, PSO - 2	K, Ap, S, E

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

Semester: III - IV				PAPER II - FUNDAMENTALS OF PHYSICAL EDUCATION							Hours: 120
Code : 20STPPE01											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	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 = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I: PHYSICAL EDUCATION

Definition, need, scope, aims and objectives of physical education. **(24 hours)**

UNIT II: GAMES AND ATHLETEIC EVENTS

History of Games: Basketball, Volley Ball, Kho-Kho, Kabaddi, Badminton and Ball Badminton - Rules and regulation of the Games and Athletic Events. **(24 hours)**

UNIT III: NUTRITION

Balanced Diet, Daily Energy Requirement, Nutrient Balance, Nutrition Intake, Diet and Competition, Nutritional Tips, Your Ideal Weight. **(24 hours)**

UNIT IV: HEALTH EDUCATION

Meaning of health education, Definition of health education, Personal Hygiene, Communicable Diseases **(24 hours)**

UNIT V: FIRST AID

First Aid: Injuries to bones and Muscles, Sprain, Strain, Muscle Cramp and joints Dislocation and Fractures Snake-bite, Dog bite Poisoning, Artificial Respiration, (Drowning) **(24 hours)**

BOOKS FOR REFERENCE:

1. Sathyanesan, R.C., 'Hand Broken Physical Education, 'Gheena Publishers, Madurai.
2. Thirunarayanan,C and Hariharan,s, 'Analytical History of physical Education 'South India Press, Karaikudi.
3. St. 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.

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 AWARENESS

PROGRAMME OUTCOMES (PO)

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.	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-awareness, set and pursue meaningful goals, and develop positive personal qualities.

PROGRAM SPECIFIC OUTCOME (PSO)

PSO	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO - 1	Aware of Consumer's rights, responsibilities and Consumer Protection 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

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Aware of the Nature, Rights and Responsibilities of Consumer.	PO - 1	K
CO-2	Familiar with Food Trade Mark and Certification.	PO - 1, PO - 4, PO - 6	AN
CO-3	Identify Misleading Advertisement, Consumer Court and Consumer Redressal.	PO - 3, PO - 6	AP
CO-4	Acquire Knowledge in Food Adulteration and Eco friendly products.	PO - 3, PO - 4, PO - 6	K
CO-5	Attain Practical Experience through Field Visit and Interact with Experts.	PO - 4, PO - 5, PO - 6	S

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

Semester: I - IV				**CONSUMER AWARENESS - I & II**							**Hours:120**
Code : 20STPCC01											**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	5	4	5	4	3	3	4	5	4	5	4.27
CO-2	4	4	5	4	5	3	5	5	4	5	3	4.27
CO-3	5	5	4	5	4	5	3	4	5	4	5	4.45
CO-4	4	4	5	4	5	3	5	5	4	5	3	4.27
CO-5	5	4	5	4	5	3	5	4	5	4	5	4.45
Overall Mean Score												**4.34**

Result: The score for this course is **4.34** (Very 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

CONSUMER AWARENESS - I

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

Code : 20STPCC01

UNIT I

Consumer - Meaning - Consumerism - Nature of Consumerism, Rights and Responsibilities of Consumer - Right of Consumers under Consumer Protection Act 1986 - Do's and Dont's of Consumer.

UNIT II

Trade Mark - Definition - Meaning - Objectives -Types of Trademark in India - Process and functions of Registrar of Trade marks - Trade and Merchandise rules - Food Label Symbol, ISI, ISO, Agmark, Silkmark Certification.

UNIT III

Advertisement meaning - Features of Advertisement - Misleading Advertisement - circumstances of misleading advertisements -Reasons for Festival offer and discount.

UNIT IV

Food Adulteration - Meaning - Types of Food Adulteration - Method of Food Adulteration - How can Adulteration be prevented - How to Identify fake and Duplicate Beauty Products - Sub Standard Products.

UNIT V

Practical Session: Interacting with Experts, Field Visit

COURSE BOOK:

Material prepared by the Consumer Club

BOOKS FOR REFERENCE:

1. Dr. L. Natarajan, Business Legislation, Merit India Publication, 2017.

CONSUMER AWARENESS - II

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

Code : 20STPCC01 **Credit: 2***

UNIT I

Guarantee Vs. Warrantee - Standards of Weight - Meaning - Importance of Standards - Responsible to Certify the Accuracy of Weight and Measures - Food Quality Control Procedures - Vegetarian and Non-Vegetarian Symbol.

UNIT II

Consumer Redressd Consumer Disputes - Consumer Movement - Consumer Court - Do's and Don'ts of Consumers Grievances Redressal - How to Files Complaints in Consumer Court.

UNIT III

Online Consumer- Meaning- Types of Online Consumers- Rights of Online Consumers.

UNIT IV

Eco Friendly Consumer Products - Green Consumerism- Important Steps of Green Consumerism.

UNIT V

Practical Session: Interacting with Experts, Field Visit.

COURSE BOOK:

Material prepared by the Consumer Club

BOOKS FOR REFERENCE:

1. Dr. L. Natarajan, Business Legislation, Merit India Publication, 2017.
2. Consumer Movements, Francesca Forno
3. Helping People and Communities Become and Remain Economically
4. www.insightcced.org
5. https://www.researchgate.net/publication/334126464

SCHEME OF EVALUATION

1.	Summative Examination (3 hours)	:	75 marks
2.	Continuous Internal Assessment	:	25 marks
	Total	**:**	**100 marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	*Attendance - 120 hours*	*10 Marks*
2.	*Field Visit*	*10 Marks*
3.	*Assignment*	*5 Marks*
Total		***25 Marks***

QUESTION PATTERN FOR SUMMATIVE EXAMINATION

Total Marks: 75 **Time: 3 hours**

EXTERNAL QUESTION PATTERN

PART - A

10 Questions × 1Mark = 10 Marks

(Multiple Choice Questions)

PART - B

5 Questions × 5 Marks = 25 Marks

Answer All Questions

(Either Or Questions)

PART - C

4 Questions × 10 Marks = 40 Marks

Answer Any Four Questions

(Four Questions Out of Six)

RED RIBBON CLUB

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

Code : 20STPRR01 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Analyze the Objectives of Red Ribbon Club	PSO - 3, PSO - 5	K, A, E
CO - 2	Examine the need of Blood Identification	PSO - 3, PSO - 4 , PSO - 5	K, A, E
CO - 3	Understand the importance of Blood Donation	PSO - 3, PSO - 5	K, C, A, E
CO - 4	Recognise the importance of HIV Awareness	PSO - 3, PSO - 5	A, AP
CO - 5	Able to realize the need of field visit to AIDS centres	PSO - 1,PSO - 3 , PSO - 5	K, AP, S, E

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

Semester: I, II, III & IV				**RED RIBBON CLUB**							**Hours: 120**
Code : 20STPRR01											**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	4	4	4	4	4	5	4	3	5	4	4	4.09
CO - 2	4	3	4	5	4	5	3	3	5	4	4	4.00
CO - 3	4	3	4	5	4	5	3	3	5	3	4	3.90
CO - 4	4	3	4	5	4	5	3	3	5	3	4	3.90
CO - 5	4	3	4	5	4	5	3	3	5	4	4	4.00
Overall Mean Score												**3.98**

Result: The score for this course is **3.98** (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 - Meaning -Vision - Objective - Popular colour - Symbol - Significance **(25 Hours)**

UNIT II

Blood Identification - Blood composition - Blood types - Methods for the identification of blood - Microscopic examination - Chemical methods - Spectrophoto - Metric Analysis - Immunological Methods - DNA analysis - Application of blood identification **(25 Hours)**

UNIT III

Blood Donation - Introduction - Benefits - Procedure - Importance of Blood Donation - Donors - Non-Donors - Donate Blood - Donation Process: Blood Banks - Outdoor camps - Registration - Medical Checkup - Donation - Refreshment **(25 Hours)**

UNIT IV

HIV Awareness**:** Definition - Causes - Effects**:** HIV Transmission - HIV Prevention - HIV Testing - Living with HIV - HIV Stigma **(25 Hours)**

UNIT V

Blood Donation Camp - Practical and Field Work: Blood Identification Camp - HIV AIDS Awareness Programme - Field visit to Jeevan Jothi - Aundipatti Government Hospital **(30 Hours)**

COURSE BOOKS:

- Books offered by Red Ribbon Club Committee Members

BOOKS FOR REFERENCE

1. S. Kartikeyan, R.N. Bharmal, R.P. Tiwari and P.S. Bisen. HIV and AIDS: Basic Elements and Priorities. Springer Publications. 2007.

"Everytwosecondssomeone NeedsbloodRedCrossurgesblooddonations." Http://www.redcross.org/news/article/il/chicago/Everytwosecondssomeone NeedsbloodRedCrossurgesblooddonations. Red Cross, n.d.

SCHEME OF EVALUATION

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

Scheme of Evaluation of Continuous Internal Assessment		
1.	*Test*	*15 Marks*
2.	*Field Visit*	*5 Marks*
3.	*Attendance*	*5 Marks*
Total		***25 Marks***

Total the marks of I, II, III & IV will be converted to 25 marks

Question Pattern for External Examination

Total Marks: 75 **Time: 2 hours**

Section - A

Answer All Questions 10 x 1 = 10 Marks

(Multiple Choice Questions)

Section - B

Answer All Questions 5 x 5 =25 Marks

(Either Or Questions)

Section - C

Answer Any Two Questions 2 x 20 = 40 Marks

(Two Questions Out of Three)

YOUTH RED CROSS
PROGRAMME OUTCOMES

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	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO - 1	Student will get a basic understanding of the origin, growth and development of humanity.	PSO - 1
PSO - 2	Will acquire basic knowledge about social subjects	PSO - 1, PSO - 2
PSO - 3	Could identify various social issues and problems	PSO - 3, PSO - 4
PSO - 4	Will help to build up a good career.	PSO - 1, PSO - 4
PSO - 5	Makes them aware of social responsibilities.	PSO - 1, PSO - 5

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	K
CO - 2	Identify the needs and problems of the community and involve them in problem-solving.	PSO - 2	C
CO - 3	Gain skills in mobilising community participation. Develop capacity to meet emergencies and social harmony.	PSO - 3	C
CO - 4	Educate and empower children and youth in the spirit of the Red Cross through constructive trainings and effective leadership	PSO - 4	AN
CO - 5	Provide opportunities for directing and harnessing their energies and idealism into worthwhile humanitarian activities	PSO - 5	AN

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

Semester: I - IV				**YOUTH RED CROSS**							**Hours: 120**
Code : 20STPRC01											**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	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	3	3	3.91
CO - 4	5	4	5	4	3	3	5	5	5	3	3	4.09
CO - 5	5	4	5	4	3	3	5	5	5	3	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 = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

BASICS OF YOUTH RED CROSS

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

Code: 20STPRC01

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:

Material Prepared By Parent Department

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.

SIGN OF YOUTH RED CROSS

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

Code: 20STPRC01 **Credits: 2***

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

International 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:

Material Prepared By Parent Department

BOOK FOR REFERENCE:

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

SCHEME OF EVALUATION

1.	Summative Examination (3 hours)	:	75 marks
2.	Continuous Internal Assessment	:	25 marks
	Total	**:**	**100 marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	*Attendance - 120 hours*	*10 Marks*
2.	*Field Visit*	*10 Marks*
3.	*Assignment*	*5 Marks*
Total		***25 Marks***

QUESTION PATTERN FOR SUMMATIVE EXAMINATION

Total Marks: 75 **Time: 3 hours**

EXTERNAL QUESTION PATTERN

PART - A

10 Questions × 1Mark = 10 Marks

(Multiple Choice Questions)

PART - B

5 Questions × 5 Marks = 25 Marks

Answer All Questions

(Either Or Questions)

PART - C

4 Questions × 10 Marks = 40 Marks

Answer Any Four Questions

(Four Questions Out of Six)

SKILL DEVELOPMENT PROGRAMME (SDP) (CERTIFICATE COURSE)

MUSHROOM CULTURE

Hours: 60

Code : 20ZO1SD01 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify the types of mushrooms.	PSO-1, PSO- 5	K, An
CO - 2	Prepare culture media, Produce mother culture and mushroom spawn.	PSO-1, PSO-4, PSO - 5	Ap
CO - 3	Select substrate, bed preparation, casting preparation and running of mushroom beds.	PSO - 4, PSO - 5	K, Ap
CO - 4	Manage diseases, pests, nematodes, weed moulds of *Agaricus bisporus* and *Pleurotus ostreatus*.	PSO - 1, PSO - 2, PSO - 5	K, Ap
CO - 5	Analyse the post harvesting methods and value added product production.	PSO - 1, PSO - 4, PSO - 5	K, An, S

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

					MUSHROOM CULTURE							**Hours: 60**
Code : 20ZO1SD01												**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	2	2	2	2	4	3	2	2	5	4	3.00
CO - 2	5	3	3	2	2	5	3	2	2	5	5	3.36
CO - 3	5	2	3	2	2	5	3	2	2	5	5	3.27
CO - 4	5	2	2	2	2	4	3	4	2	5	4	3.18
CO - 5	5	2	2	2	2	5	3	3	2	5	5	3.27
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

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 (CERTIFICATE COURSE)

GANDHIAN THOUGHT

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-awareness, set and pursue meaningful goals, and develop positive personal qualities such as self-esteem, positive attitude, self-discipline and self-motivation.

PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO - 1	Analyse the social, political, economic, cultural and religious conditions of the various dynasties of India, British India, Indian Constitution, Indian Administration and Indian Economy to acquire the special skill in the field of administration.	PO- 1, PO-2, PO-4
PSO - 2	Evaluate the History of World Civilizations and Europe in the world politics and compare the various types of constitution and the constitutional development in England.	PO- 1, PO-2
PSO - 3	Get knowledge on the principles of Economics, functions of banking system, development of Science and Technology, Tourism, the importance of Human Rights and equip with computer knowledge and applications for all competitive examinations.	PO- 1, PO-4, PO-5
PSO - 4	Recognize the sacrifice of the freedom fighters in the National Movement and picturize the traditional values in the right perception on Women Studies and Women Entrepreneurship.	PO- 1, PO- 5, PO- 6
PSO - 5	Participate in discussions by listening to others perspectives, asking productive questions, articulating original ideas, correspond efficiently with good vocabulary, realize the need of historical research and excel in General Studies for Competitive Examinations.	PO- 2, PO- 5, PO- 6

PAPER I: LIFE OF MAHATMA GANDHI - CCHYGT01

Code: CCHYGT01 **Hour: 1**
Credit: 1

COURSE OUTCOMES:

CO. NO	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain Knowledge on the Early Life of Mahatma Gandhi	PSO - 5	K
CO - 2	Analyse the racial equality and Mahatma Gandhi's Experience in South Africa	PSO - 5	An
CO - 3	Explain the role of Mahatma Gandhi in Indian Freedom Struggle	PSO - 2	Ap
CO - 4	Assess the constructive works of Mahatma Gandhi in Indian Nationalism	PSO - 2	Ap
CO - 5	Discuss the major Incidents from the Life of Mahatma Gandhi	PSO - 5	Ap

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

Code: CCHYGT01	PAPER I: LIFE OF MAHATMA GANDHI - CCHYGT01										Hours: 1 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	5	5	5	5	4	5	4	3	3	4.45
CO - 2	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 3	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 4	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 5	5	5	5	5	5	5	4	5	4	3	3	4.45
Overall Mean Score												**4.45**

Result: The score for this course is High

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

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.

PAPER II: NON VIOLENCE AND SARVODAYA - CCHYGT02

Code: CCHYGT02 **Hour: 1**

Credit: 1

COURSE OUTCOMES:

CO. NO	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO- 1	Gain Knowledge on Mahatma Gandhi's Non - violence	PSO - 5	As
CO-2	Discuss the Policies of Mahatma Gandhi on Truth and Action	PSO - 5	An
CO-3	Analyse Sarvodaya and Antyodaya	PSO - 5	K
CO-4	Assess the values introduced through Brahmacharya and Aparigraha	PSO - 5	Ap
CO-5	Relate violence and Truth in our day today life with the teachings of Gandhiji	PSO - 2	Ap

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

Code: CCHYGT02				PAPER II: NON VIOLENCE AND SARVODAYA - CCHYGT02								Hour: 1 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	5	5	5	5	4	5	4	3	3	4.45
CO - 2	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 3	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 4	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 5	5	5	5	5	5	5	4	5	4	3	3	4.45
Overall Mean Score												**4.45**

Result: The score for this course is High

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

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.

RECOMMENDED BOOKS

PAPER I

Mahatma Gandhi	:	An Autobiography சத்திய சோதனை
R. Nanda	:	Mahatma Gandhi - A Biography
டி.டி. திருமலை	:	காந்தி
கல்கி	:	மாந்தருள் ஒரு தெய்வம்
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
பா. ஆனந்தி, மங்களவதி கேப்ரியல் & வி.ஏ. வித்யா	:	காந்திய சிந்தனை வினா-விடை (Gandhian Thought Quiz)
சி. பெரிதாய் & பா. ஆனந்தி	:	மகாத்மா காந்தியடிகளின் காலம்

PAPER II

M.K. Gandhi	:	Sarvodaya
————	:	Nonviolence in Peace and War (2 Vols)
————	:	Truth is God
Richard B. Gregg	:	Power of Nonviolence
மு. வசந்தா (பதி.)	:	சர்வோதயம்
R.R. Diwakar	:	The Saga of Satyagraha
ச. செயப்பிரகாசம்	:	அகிம்சை

COURSE BOOK:

மகாத்மா காந்தியின் வாழ்வும் அறவியலும் - டாக்டர் பா. ஆனந்தி & டாக்டர் ச. செயப்பிரகாசம்

Life and Values of Mahatma Gandhi - Dr. B. Ananthi & Dr. S. Jeyapragasam

தாள் I - மகாத்மா காந்தியின் வாழ்வு - CCHYGT01

Code: CCHYGT01 **Hour: 1**

Credit: 1

COURSE OUTCOMES:

CO. NO	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO- 1	Gain Knowledge on the Early Life of Mahatma Gandhi	PSO - 5	K
CO-2	Analyse the racial equality and Mahatma Gandhi's Experience in South Africa	PSO - 5	An
CO-3	Explain the role of Mahatma Gandhi in Indian Freedom Struggle	PSO - 2	Ap
CO-4	Assess the constructive works of Mahatma Gandhi in Indian Nationalism	PSO - 2	Ap
CO-5	Discuss the major Incidents from the Life of Mahatma Gandhi	PSO - 5	Ap

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

Code: CCHYGT01	தாள் I - மகாத்மா காந்தியின் வாழ்வு - CCHYGT01										Hour: 1 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	5	5	5	5	4	5	4	3	3	4.45
CO - 2	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 3	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 4	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 5	5	5	5	5	5	5	4	5	4	3	3	4.45
Overall Mean Score												**4.45**

Result: The score for this course is High

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

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.

தாள் **II** - அகிம்சையும் சர்வோதயமும் - **CCHYGT02**

Code: CCHYGT02 **Hour: 1**

Credit: 1

COURSE OUTCOMES:

CO. NO	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO- 1	Gain Knowledge on Mahatma Gandhi's Non - violence	PSO - 5	As
CO-2	Discuss the Policies of Mahatma Gandhi on Truth and Action	PSO - 5	An
CO-3	Analyse Sarvodaya and Antyodaya	PSO - 5	K
CO-4	Assess the values introduced through Brahmacharya and Aparigraha	PSO - 5	Ap
CO-5	Relate violence and Truth in our day today life with the teachings of Gandhiji	PSO - 2	Ap

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

	தாள் **II** - அகிம்சையும் சர்வோதயமும் - **CCHYGT02**											**Hour: 1**
Code: CCHYGT02												**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	5	5	5	5	4	5	4	3	3	4.45
CO - 2	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 3	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 4	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 5	5	5	5	5	5	5	4	5	4	3	3	4.45
Overall Mean Score												**4.45**

Result: The score for this course is High

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

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 **(Skills)** கற்றல் - அமைதி வழியில் சிக்கல் தீர்வு அனுபவங்கள் - சர்வசமய நட்புறவு, உரையாடல் மற்றும் வழிபாட்டு அனுபவம் பெறல்.

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.	Think critically, evaluate analytically and apply the expertise of their discipline worldwide.
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-awareness, set and pursue meaningful goals, and develop positive personal qualities.

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: 20GL1SD01 **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	K
CO - 2	Understand the various kinds of Reference sources available in the Library	PSO - 1	C
CO - 3	Get the analytical approaches to classify and Arrange the reading materials in Library	PSO - 2	An
CO - 4	Apply various methods to search the reading material and thereby get it at the earliest	PSO - 3	Ap
CO - 5	To Acquire knowledge about the managerial principles and techniques in Libraries.	PSO - 5	K

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

Code: 20GL1SD01				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: 20GL1SDP1 **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	Ap
CO - 2	Analyse the title according to Dewey Decimal Classification Scheme.	PSO - 2	An
CO - 3	Synthesis code for the book title according to colon Classification.	PSO - 5	S
CO - 4	Apply code for the book title according to Dewey Decimal Classification.	PSO - 2	Ap
CO - 5	Get practical approaches to search and download online resources.	PSO- 2	Ap

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

Code: 20GL1SDP1				**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 : 20GL1SD01		Practical Paper Code : 20GL1SDP1	
Internal	25 Marks	Internal	50 Marks
External	75 Marks	External	50 Marks
Total	**100 Marks**	**Total**	**100 Marks**

QUESTION PATTERN

THEORY PAPER - EXTERNAL QUESTION PATTERN - 75 MARKS

Part - A

Multiple Choice Questions 1 × 10 = 10 Marks

From all units

Part - B

Paragraph Questions - 4 out of 6 4 × 5 = 20 Marks

From all units

Part - C

Essay in 400 words - 3 out of 6 3 × 15 = 45 Marks

From all units

DEPARTMENT OF HINDI

PART I - HINDI - COURSE PATTERN (2020- 2023)

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

TESTING AND EVALUATION

Course	Continuous Internal Assessment	Semester Examination
Hindi	40%	60%

Continuous Internal Assessment

Continuous Assessment will be carried out by the Course Teachers. The components of CIA are as follows:

Components	Marks
Test -I	30
Test -II	30
Seminar/Quiz	10
Assignment	05
Attendance	05
Total	***80**

* The total internal marks obtained for 80 will be converted into marks obtained for 40.

HINDI - EXTERNAL QUESTION PATTERN

Time: 3 Hours **Marls: 60**

Section A: (One Word / Sentence) 10 x 1 = 10 Marks

Section B: (Paragraph / Annotation) 4 x 5 = 20 Marks

Section C: (Essay) 3x 10 = 30 Marks

PAPER I - PROSE, SHORT STORY AND GRAMMAR - I

Semester: I **Hours: 5**

Code : 20GH1GS01 **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

PAPER II - NOVEL, ONE ACT PLAY AND GRAMMAR - II

Semester: II **Hours: 5**

Code : 20GH2GS02 **Credits: 3**

1. **Novel** : Nirmala (Abridged version)

   by Premchand, Hamsa Prakashan Allahabad

2. **One Act Play** : Aadarsh Ekanki

   Published by Dakshina Bharath Hindi Prachar Sabha,

   Thyagaraya Nagar, Chennai - 600 017.

   The following Ekankies have been prescribed

   a) Doosra din - Kanchanlatha sabbarval

   b) Rajpoothri Ka badla - Divjendralal Rai

3. **Grammar** : 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

PAPER III - POETRY AND HISTORY OF HINDI LITERATURE, ALANKAR

Semester: III **Hours: 5**

Code : 20GH3GS03 **Credits: 3**

1. POETRY:

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

The following poems have been prescribed

1. Sachche Devtha - Ayodhya Singh Upadhyay Harioudh
2. Murjhaphool
3. Vivshtha
4. Badal - Sumitranandan Panth
5. Vasanth Aayaa
6. Deep Koi jal raha hai
7. Kabir Ke Dohe - 5 numbers
8. Tulasi Ke Dohe - 5 numbers
9. Raheem Ke Dohe - 5 numbers
10. Bihari Ke Dohe - 5 numbers

2. HISTORY OF HINDI LITERATURE:

Hindi Sahitya Ka Ithas by Rajanath Sharma Vinod Pushhak Mandir, Agra - 2

The following topics have been prescribed Salient features of Aadikl Bakthikal (Gyan marg, Premmag, Rambakthi, Krishnabakthi and Reethika.

Short Notes from Adunikkal**:** Chayavad, Pragathivad, Mythili Sharan, Gupta, Dinkar Premchand Pant Prasad, Ramachandra Shukla

3. ALANKAR:

Ras chand Alankar Chandrika Karnataka Mahila Hindi Seva Samithi, Chamarajpet, Bangalore - 560 008. The following Alankars have been prescribed Anupras, Yamak, Vakrokthi, Upama, Virodabhas.

PAPER - IV - GENERAL ESSAY, TECHNICAL HINDI, TRANSLATION AND LETTER WRITING

Semester: IV **Hours: 5**

Code : 20GH4GS04 **Credits: 3**

1. General Essay:

Nibandh Praveshika, Dakshin Bharath Hindi Prachar Sabha T.Nagar, Chennai - 600 017

The following Sahityotar (General) essay have been prescribed

a. Anushashan

b. Parishram Ka Mahatva

c. Paropkar

d. Bharat Ki Kalatmak Ekta

e. Nari Ka Karthavye Aur Adhikaar

2. Translation: Anuvad Abyas - III (1-5 Lessons) English to Hindi, Hindi to English Published by Dakshina Bharath Hindi Prachar Sabha T.Nagar, Chennai - 600 017.

3. Technical Hindi: Karyalaya Sahayika, Kendriya Sachivalaya Hindi Parishad NewDelhi, Hindi Vathayan Dr. K. Chandra Mohan, Viswa Vidyalaya Prakashan Varanashi

Banking Terms	:	50 only
Nemikaryalaya Tippani	:	50 only
Name of the Ministries	:	33 only

4. Letter Writing: Pramanik Alekan Aur Tippan Prof Viraj M.A. Kashmirgate, Delhi - 110 006

PaariVarik Patra, Avedan Patra, Sampathak ke naam Patra, Padhadhikariyon ke naam Patra