NATIONAL COLLEGE (Autonomous)
POST GRADUATE AND RESEARCH DEPARTMENT OF ZOOLOGY
Under Graduate Programs Structure
(For Candidates to be admitted from the academic year 2019 onwards)
Practical Examinations will be held only in the even semester. There will be an oral test for all Practical Examinations and Communicative English Courses. The Oral test will carry 5 marks in the external component. Int= internal, Extension activities=NCC, NSS, Red Ribbon Club, etc. programs offered by the College, Inst Hours= instruction hours, Sem = semester.

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For Candidates to be admitted from the academic year **2019** onwards

The following regulations apply for the academic year 2019 onwards.

**Rules for Admission:**

1. **Qualifications:**
   - Candidates must have completed the 10th standard with a minimum of 40% in the aggregate.
   - Candidates must have completed the 12th standard with a minimum of 45% in the aggregate.
   - Candidates must have passed the 10th standard and 12th standard examinations.

2. **Document Submission:**
   - Applicants must submit the following documents:
     - Admit Card
     - Mark Sheets
     - Photographs
     - Signature

3. **Eligibility Criteria:**
   - Candidates who meet the above criteria are eligible for admission.

**Eligibility for Second Year Admission:**

1. **Qualifications:**
   - Candidates must have completed the 10th standard with a minimum of 40% in the aggregate.
   - Candidates must have completed the 12th standard with a minimum of 45% in the aggregate.
   - Candidates must have passed the 10th standard and 12th standard examinations.

2. **Document Submission:**
   - Applicants must submit the following documents:
     - Admit Card
     - Mark Sheets
     - Photographs
     - Signature

3. **Eligibility Criteria:**
   - Candidates who meet the above criteria are eligible for admission.

**Exceptions:**

- Candidates with special needs will be considered on a case-by-case basis.
- Candidates with a history of academic excellence will be considered for admission.

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**Note:**

- The above regulations are subject to change without prior notice.
- Candidates are advised to check the official website for the latest updates.
- Any questions or concerns can be directed to the admissions office.
For Candidates to be admitted from the academic year 2019 onwards
For Candidates to be admitted from the academic year 2019 onwards

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For Candidates to be admitted from the academic year 2019 onwards

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For Candidates to be admitted from the academic year 2019 onwards

For Candidates to be admitted from the academic year 2019 onwards

1. 21
For Candidates to be admitted from the academic year 2019 onwards
For Candidates to be admitted from the academic year 2019 onwards

ENGLISH FOR COMMUNICATION – U19E1

Semester: I                     English Language Course I
Instruction Hours/Week: 6               Credit: 3

COURSE OBJECTIVES

The Learner will be able to
a. communicate effectively and appropriately in real life situation:
b. use English effectively for study purpose across the curriculum;
c. develop interest in and appreciation of Literature;
d. develop and integrate the use of the four language skills i.e. Reading,
   Listening, Speaking and Writing;
e. revise and reinforce structure already learnt.

UNIT I:
1. At the College
2. On the Campus
3. Outside the Class
4. At the Post office
5. For Business and Pleasure
6. Review

UNIT II:
7. Are you Smart ?
8. Are You Creative?
9. Is it too hard to improve?
10. How to win ?
11. View Points
12. Snakes and Ladders
13. Yourself

UNIT III:
1. Birbal story- The loyal gardener
2. Hindu mythological story- The origin of coconut tree
3. A chinese story: The generous student
4. An African Story ; The Three Runners

UNIT IV:
5. The Golden place
6. The one – hundreth prince
7. The mouse Merchand

UNIT V:
8. When wishes come true – Rabindranath Tagore
9. The World and after
10. Julius Caesar

2. Creative English for Communication (2nd edition) by Krishnasamy and Sriram. Published by Macmillan
For Candidates to be admitted from the academic year 2019 onwards

ENGLISH THROUGH EXTENSIVE READING – U19E2

SEMESTER : II
COURSE : II
INSTRUCTION HOURS/WEEK : 4
CREDIT : 2

Course objectives:

The learner will be able to

1. develop interest in and appreciation of Literature;
2. develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing;
3. integrate the skill of Reading a variety of texts.
4. use English effectively for study purpose across the curriculum

UNIT I
Excitement : Mack R. Douglas
Tight Corners : E.V. Lucas

UNIT II
Water – The Elixir of Life : C.V. Raman
Tree Speaks : C. Rajagopalachari

UNIT III
The Art of Telling Tales : April Hersey
A Job Well Done : Ruskin Bond

UNIT IV
The Panorama of India’s Past : Jawaharlal Nehru
The Origin of Grammar : Margaret Bryant & Janet

UNIT V
Dangers of Drug Abuse : Hardin B. Jones
Crime and Punishment : R.K. Narayan

For Candidates to be admitted from the academic year 2019 onwards
COMMUNICATIVE ENGLISH I – U19CE1

Semester : II
Instruction Hours/ Week : 2
Communicative English Course : I
Credit : 1

COURSE OBJECTIVES:

The Learner will be able to

1. communicate, to define, classify, and understand the methods of communication,
2. improve their LSRW skills,
3. enable them to practice those skills in their daily life by identifying instances of communication in the circumstances of their own.

UNIT I
Writing Stories
Grammar Components : Articles, Prepositions and Tenses

UNIT II
Precis Writing
Grammar Components : Non- Finite Verbs and Phrasal Verbs

UNIT III
Writing Letters
Grammar Components : Conjunctions and Interjections and Punctuation

UNIT IV
Reporting
Grammar Components : Reported Speech and Transformation of Sentences

UNIT V
Writing an Essay
Grammar Components : Sentence structure (S/V/O/C/A) and Simple, Compound and Complex Sentences

For Candidates to be admitted from the academic year 2019 onwards

ENGLISH FOR COMPETITIVE EXAMINATIONS – U19E3

SEMESTER : III
COURSE : III
INSTRUCTION HOURS/WEEK : 6

CREDIT : 3

COURSE OBJECTIVES:

The Learner will be able to
1. have a knowledge in basic grammatical units of English
2. have a depth of knowledge in Concord, reconstructing passages and précis writing.
3. comprehend the given passage and understand it.
4. gain a good knowledge and understanding in vocabulary
5. write on his/her own on a given topic and gain a good skill in letter/report writing.

UNIT I:
Basics of English (Revision)
(a) Parts of speech and Articles
(b) Active and passive voice
(c) Framing Questions
(d) Tag questions
(e) Indirect speech
(f) Tenses

UNIT II:
(a) Errors and how to avoid them
(b) Spotting errors
(c) Reconstructing passages
(d) Précis writing

UNIT III:
Reading comprehension

UNIT IV:
(a) Sentence completion,
(b) Spelling
(c) Vocabulary – Words often confused or Misused, Synonyms, Antonyms.

UNIT V:
Letter writing, Report writing, Paragraph writing, Essay writing

Text book: English for Competitive Examinations by R.P. Bhatnagar & Rajul Bhargava
macmillanIndia ltd. Delhi.
For Candidates to be admitted from the academic year 2019 onwards

READING POETRY AND DRAMA – U19E4

SEMESTER : IV

COURSE : IV

INSTRUCTION HOURS/WEEK : 6

CREDIT : 2

ENGLISH LANGUAGE

COURSE OBJECTIVE:
The Learner will be able to
a. appreciate a piece of poem and analyze it
b. appreciate and interpret an one act play.
c. use English effectively for study purpose across the curriculum;
d. develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing;
e. revise and reinforce structure already learnt.

POETRY:
UNIT I : John Milton : On His Blindness
Oliver Goldsmith : The Village School Master
William Wordsworth : The Solitary Reaper

UNIT II : P.B.Shelly : Ozymandias
John Keats : La Belle Dame Sans Merci
Robert Browning : Incident of the French camp

UNIT III : John Masefield : Laugh and Be Merry
Robert Frost : Stopping by Woods On a Snowy Evening
John Drinkwater : The Vagabond

DRAMA:
UNIT IV : Anton Chekov : A Marriage Proposal
Lady Gregory : The Rising of the Moon

UNIT V : W.St. John Tayleur : Reunion
William Shakespeare : Othello, The Moor of Venice – Act V

Text Books : 1)An Introduction to Poetry edited by A.G.Xavier; [Macmillan]
2)A Book Plays: A Group of Editors, Published by Orient Blackswan
For Candidates to be admitted from the academic year 2019 onwards
COMMUNICATIVE ENGLISH II – U19CE2

SEMESTER : IV
INSTRUCTION HOURS/WEEK : 2
COMMUNICATIVE ENGLISH COURSE : II
CREDIT : 1

The learner will be able to
1. develop interest in and appreciation of Literature;
2. develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing;
3. integrate the skill of Reading a variety of texts.
4. use English effectively for study purpose across the curriculum

UNIT I:
Enriching Vocabulary – Register Development; who is who; Synonyms, Proverbs

UNIT II:
Tense Forms with emphasis on differences between Present and Present Continuous; Past and Present Perfect, Framing questions, Auxiliaries, if clauses; conjunctions and linkers; Prepositions

UNIT III
Pronunciation, Good Pronunciation habits, Phonetic Transcription, Greetings, Farewells commands etc.,

UNIT IV:
Conversational Skills – Affirmative or Negative Language – idiomatic expressions, Phrases, Dialogue Writing,

UNIT V:
□ Writing Skills – Note- taking, note- making, e-mail, Describing an object, narrating a story.
□ Circulars
□ Notes - reminders, warnings, farewells, apology.
□ Draft invitations – marriage, annual day, inaugural functions of associations, valediction, seminar, workshop.
□ Draft Short messages- compliments, birthday wishes, notifications
□ Draft Posters- Slogans, Announcements
□ Draft Advertisements
□ Dialogue writing

Text Book
1. Communicative English by Department of English, National College( Autonomous), Trichy.
For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
UG Part I – Hindi
Semester – 1

U19HI : Functional Hindi-1, Prose, Grammar And Translation – 1

Objectives :

Unit I : The Objective of teaching functional Hindi is to encourage the students to learn the functional words.

Unit II : The Objective of teaching grammar is to teach the basic grammatical structures.

Unit III : The Objective of teaching prose is to develop their language ability.

Unit IV : The Objective of teaching translation is to convey the original tone and meaning.

Unit V : The Objective of teaching short stories is to enhance their creative writing and spoken skills through story telling/story writing and story reading mode.

Program Outcome :
The learners will acquire the knowledge of basic letters and functional hindi words. They understand the grammatical structures and able to translate the sentences from source to target language. The learners can read and understand the prose and stories.
For Candidates to be admitted from the academic year 2019 onwards

SEMESTER – I
COURSE CODE : U19H1 6hrs/wk
Paper I–FUNCTIONAL HINDI-1, PROSE, GRAMMAR AND TRANSLATION 1

Unit – I Functional Hindi
1. Directions, Seasons, Days, Colours
2. Fruits, Vegetables, Flowers, Numbers
3. Groceries, Grains, Taste, Cardinals
4. Domestic Animals, Wild Animals, Relatives, English Month
5. Occupation, Parts of Body, Numbers and Tamil Months

Unit – II Grammar
1. Noun
2. Verb
3. Pronoun
4. Vachan
5. Gender

Unit – III Prose
1. Challis karod kurta kaha se….
2. Bhojan Aur Vigyan
3. Dr. Abdul Kalam

Unit – IV Translation
1. (Hindi to English Lesson -1 to 5 )

Unit – V Story
4. Raja Ka Chunaav – Ashok Kumar Kantha Bhatiya
5. Poos Ki Raat –Premchand
For Candidates to be admitted from the academic year 2019 onwards

DEPARTMENT OF HINDI
For Candidates admitted from the Academic Year 2019 onwards

SEMESTER – 1

Course Code U19H1 Credits – 3
Paper I – FUNCTIONAL HINDI-1, PROSE, GRAMMAR AND TRANSLATION– 1

PROSE

Prescribed Text Book
Bharat – Madhyaama Patya Samgiri
O.No.1619 Hindi Prachar Pushtakmala, Madras.

Prescribed Lessons
1. Challis karod kurta kaha se….
2. Bhojan Aur Vigyan
3. Dr. Abdul Kalam

STORY
Vaani Hindi Patmala – Ashok kumar, kanta Bhatya
1. Raja Ka Chunaav – Ashok Kumar Kantha Bhatiya

Poos Ki Raat – Premchand

Grammar

Reference Book
Sugam Hindi Vyakaran – Prof. Vanshi Dhar and Dharmapal Shastri
Siksha Bharathi, New Delhi

Prescribed Portion
Noun, Verb, Pronoun, Vachan, Gender

Functional Hindi
Hindi Vataayan – Dr. K.M. Chandra Mohan
For Candidates to be admitted from the academic year 2019 onwards

**Semester – II**

U19H2 : Comprehension, Grammar – 2, Drama And Hindi Literature-1

**Objectives :**

Unit I : The Objective of teaching comprehension is to incorporate self-reading and understanding.

Unit II : The Objective of teaching grammar is to acknowledge the basic rules of the grammatical structures.

Unit III : The Objective of teaching Literature is to acquire the knowledge of the origin of Hindi in literature.

Unit IV : The Objective of teaching one act play is to help the learners to understand the method of acting and writing a play.

Unit V : The Objective of teaching Drama is to acknowledge the basic dramatic structures.

**Program Outcome :**

The Learners will be able to comprehend on their own and to improve their reading skills. The learners will be able to communicate accurately free of grammatical errors. The learners will get a widen knowledge of Hindi literature. The learners will understand various genres of literary works. The learners will get deep and broad vision of drama.
SEMESTER - II

COURSE CODE : U19H2
PAPER II – COMPREHENSION, GRAMMAR – 2, DRAMA AND HINDI LITERATURE-1

6hrs/wk

Unit – I Comprehension

1. Discipline
2. Humanity
3. Coeducation
4. Student Life
5. Importance of Hard work

Unit – II Grammar

1. Adjective
2. Adverb
3. Conjunction
4. Tense

Unit – III Hindi Literature

1. Aadi kaal (Introduction, Specialities, Famous Poets)

Unit – IV One act play

1. Reed ki Hadhi (Jagdeesh Chandra Mathur)
2. Andheri Nagari (Bharathendu Harischandra)

Unit – V Drama

1. Swarg ke Jalak (Upendranath Ashak)
For Candidates to be admitted from the academic year 2019 onwards

DEPARTMENT OF HINDI
For Candidates admitted from the Academic Year 2019 onwards

U19H2

SEMESTER – II
PAPER II – COMPREHENSION, GRAMMAR – 2, DRAMA AND HINDI LITERATURE-1

Comprehension
Prescribed Text Book
Adhunik Hindi Nibandhavali - Praveshika Book
Hindi Prachar Pushtakmala, Madras.

Prescribed Lessons
1. Discipline
2. Humanity
3. Coeducation
4. Student Life
5. Importance of Hard work

One Act Play
Hindi Sahith Rastrabhasha patya saamgri
O.No.1636 Hindi Prachar Pushtakmala, Pushpa-507
1. Andheri Nagari – Bharatendu Harishchandra
2. Reed ki Haddi – Jagdesh Chandra Mathur

Drama
Swarag ki Jalak – Upendranath Ashk

Grammar
Sugam Hindi Vyakaran - Prof.Vanshi Dhar and Dharmapal Shastri
Siksha Bharathi, New Delhi

Prescribed Portion
Adjective, Adverb, Conjunction, Tense

Hindi Literature
Aadi kaal (Introduction, Specialities, Famous Poets)

Prescribed Book
1. Hindi Sahithya ki Pravirthiya – Dr. Jaykisan Prasad
For Candidates to be admitted from the academic year 2019 onwards

**Semester – III**


**Objectives :**

Unit I : The Objective of teaching couplet will give learners confidence and energetic.

Unit II : The Objective of teaching dialogue writing is to teach the learners about appropriate words and style in appropriate place.

Unit III : The Objective of teaching Bhakthi Literature is to acquire the knowledge of the origin of Bhakthi and its movement in Hindi literature.

Unit IV : The Objective of teaching Poetry is to make the learners to acquire the knowledge of the poets and their writings.

Unit V : The Objective of teaching Translation to the learners to get knowledge of translation from the source to target language. They also gain the knowledge of homonyms and synonyms in Hindi.

**Program Outcome :**
The Learners will understand the couplets and poetry by the prescribed units. The learners will come to know about the dialogue delivery and their usage in their daily life also they can translate from source to target language. They can understand the Bhakthi movement through Hindi Literature.
COURSE CODE : U19H3
6hrs/wk
PAPER – III DIALOGUE WRITING, POETRY, TRANSLATION -2 HINDI LITERATURE-2

SEMESTER - III

Unit – I Couplets
1. Couplets of Kabir
2. Couplets of Tulshi
3. Couplets of Rahim

Unit – II Dialogue Writing
1. Mother and Daughter
2. Teacher and Student
3. Between Two Friends
4. Brother and Sister
5. Customer and Shopkeeper

Unit – III Hindi Literature
1. Bhakthi Kaal (Introduction, Specialities, Famous Poets)

Unit – IV Poetry
1. Baghavan ke Dakiye (Ramdhari singh Dinakar)
2. Tera Sneh na kovoon (Sumitranandan Pant)
3. Kilona (Chiyaram Saran Gupta)

Unit – V Translation
1. English to Hindi (Lesson 1 to 5)
2. Homonyms
3. Synonyms
For Candidates to be admitted from the academic year 2019 onwards

DEPARTMENT OF HINDI
For Candidates admitted from the Academic Year 2019 onwards

U19H3

SEMESTER – III
PAPER – III DIALOGUE WRITING, POETRY, TRANSLATION -2 HINDI LITERATURE-2

Couplets

**Prescribed Text Book**
Kavya Sourab - Hindi Prachar Pushtakmala, Pushpa-437
O.No. 1242, Dakshin Hindi Prachar Sabha, Madras.

**Prescribed couplet**
1. Kabir – 5 dohas
2. Tulsi – 5 dohas
3. Rahim – 5 dohas

Poetry

**Prescribed Book**
Vasanth III
Subodh Hindi Patmala – 3, Hindi Prachar Pushtakmala, Pushpa – 507, O.No.1636

**Prescribed Poem**
4. Baghavan ke Dakiye - Ramdhari Singh Dinakar
5. Tera Sneh na kovoon - Sumitranandan Pant
6. Kilouna - Chiyaram Saran Gupta

Dialogue Writing

**Hindi Vataayan** – Dr. K.M.Chandra Mohan

Hindi Literature

Bhakthi Kaal (Introduction, Specialities, Famous Poets)

**Prescribed Book**
Hindi Sahithya ki Pravirthiya – Dr. Jaykisan Prasad

Translation

Subodh Hindi Patmala – 1
Hindi Prachar Sabha, Madras.

**Prescribed Lessons**
Lesson 6 to 10

Homonyms
Synonyms
Semester – IV

U19H4 : Letter Writing, General Essay, Hindi Literature-3

Objectives :
Unit I : The Objective of teaching letter writing is to improve their communication skills through writing letters in formal and informal way.

Unit II : The Objective of teaching Modern Era in Hindi literature to acquire the knowledge of various subjects which was used in pre independence and post independence and also in recent years.

Unit III : The Objective of teaching Street play is to introduce theatre arts and the origin of today’s theatre.

Unit IV : The Objective of teaching Technical words and phrases is to develop their writing skill. Writing essay will develop their creativity. The learners were encouraged to summarise a passage through precise writing.

Unit V : The Objective of teaching Fiction is to acquire knowledge of a long story and their characteristics.

Program Outcome :
The Learners will able to draft and structure letters on their own. They come to know about the modern era in Hindi literature. They understand the role of street play in recent times. They can be aware of using technical words and phrases. Now they can understand the role of fiction by reading and get the knowledge of authors vision.
For Candidates to be admitted from the academic year 2019 onwards

IV SEMESTER  
Course Code: U19H4  
6hrs/wk
PAPER IV- LETTER WRITING, GENERAL ESSAY, HINDI LITERATURE-3

Unit – I Letter Writing  
1. Leave Letter  
2. Placing Order for Books  
3. Complaint Letter

Unit – II Hindi Literature  
1. Modern Era (Introduction, Specialities, Famous Poets)

Unit – III Street Play  
1. Aurat

Unit – IV
1. Technical Words  
2. Technical Phrases  
3. General Essay  
4. General Essay  
5. Precise Writing

Unit – V Novel  
1. Kadiyan (Bhishma Sahani)
For Candidates to be admitted from the academic year 2019 onwards

DEPARTMENT OF HINDI
For Candidates admitted from the Academic Year 2019 onwards

U19H4

SEMESTER – IV

PAPER IV- LETTER WRITING, GENERAL ESSAY, HINDI

LITERATURE-3

Letter Writing

Prescribed Letters
6. Leave Letter
7. Placing Order for Books
8. Complaint Letter

Street Play

Prescribed Book
Indra Gandhi Rashtriya Mukta Vishva Vidhyalay, New Delhi.
ISBN – 81-7605-844-0

Prescribed Play
Aurat

Hindi Literature
Modern Era (Introduction, Specialities, Famous Poets)

Prescribed Book
Hindi Sahithya ki Pravirthiya – Dr. Jaykisan Prasad

Prescribed Book
Hindi Vataayan – Dr. K.M.Chandra Mohan

Prescribed Portion
4. Technical Words
5. Technical Phrases
6. General Essay
9. General Essay
10. Precise Writing
For Candidates to be admitted from the academic year 2019 onwards

NATIONAL COLLEGE (AUTONOMOUS)
LANGUAGE COURSE PART I SANSKRIT SEMESTER I PAPER I SANSKRIT I
(For the candidates admitted from June 2019 onwards)
SYLLABUS

SUBJECT CODE: U19S1

Unit I
संस्कृतमाणा देवनागरीलिपि: च - परिचय:
कर्तृपद-परिचय:

1. संस्कृत भाषा - प्रास्ताविकम्
2. अक्षराम्याः, वर्णः,
3. स्वस्तः, व्यज्ञानिः, संयुक्ताक्षराणि, लेखनप्रकारः च
4. अकारान्त-शब्दः:
5. लिङ्गगत्रयम्
6. वचनगत्रयम्
7. विमक्यः:
8. अनुवाद-अभ्यासः;
9. आइंग्ल/तमिल भाषायां संस्कृतात्
10. संस्कृते आइंग्ल/तमिल भाषाः:

Unit II
क्रियापदाणि (परिचयः)
1. वर्तमानकाले (लट) धातवः:
2. पुलिंक्व-कर्तृपदाणि
सर्वनामपदाणि च
3. निपुंसक-लिङ्ग-कर्तृपदाणि
4. अव्ययाणि
5. अन्ये अकारान्त-कर्तृपदाणि
For Candidates to be admitted from the academic year 2019 onwards

Unit III

1. अनुवाद-अभ्यासः

2. विभागीय परिचयः

3. प्रश्न-निर्माण-पदार्थः

4. क्रियापदार्थ (लट)

5. अनुवाद-अभ्यासः

Unit IV

1. विशेषण-विशेष्यः

2. संख्यावाचकपदार्थः

3. सर्वनामपदार्थः

4. भविष्यत्काले क्रियापदार्थ (लट लकारः)

5. भोज्यपदार्थनामानि
Unit V

1. प्रत्ययः:

2. क्रियापदार्थ (लट्ट लकारे)

3. कृषि-संबंधीनि पदार्थि

4. आकारान्त-स्त्रीलिंगः

5. सन्धि: (स्वरः)


(Omitted portions: Lesson 1: Passage starting: रामो राजमणि: with the meaning.
Lesson 6,7: Passage for memory (Memorise) at the end.
Lesson 10 and Lesson 12: Full)

References: Samskrita Bodhini (Prathama), Samskrita Bhasha Pracharini Sabha, Chittoor, Andhra Pradesh, 2011
For Candidates to be admitted from the academic year 2019 onwards

NATIONAL COLLEGE (AUTONOMOUS)
LANGUAGE COURSE PART I SANSKRIT SEMESTER II PAPER II SANSKRIT II
(For the candidates admitted from June 2019 onwards)
SYLLABUS
SUBJECT CODE: U19S2

Unit I

1. पुनस्वयं

2. कर्त्तृकपदानं परिचयः

3. क्रियापदानि
   वर्तमानकालः (लट)

Unit II

1. मविवीतकालः (लट) नूतनक्रियापदानि

1. नूतनकर्त्तृपद-परिचयः

2. आत्मनेपदिनि: धातवः (क्रियापदानि)
   वर्तमानकालेः (लट)

3. आत्मनेपदिनि: धातवः (लट क्रियापदानि)
For Candidates to be admitted from the academic year 2019 onwards

Unit III

1. भूतकाल: (लड़)
   1. सर्वंस्थापि धातवं दर्तमानकाले कृतां।
   2. भूतकालक्रियापदानि वाक्येषु उपयोगः।
   3. वर्तमानकालं भूतकालं च मिश्रित्य वाक्येषु
      उपयोगः।
   4. वाक्येषु उपयोगः अनुवाद-अभ्यासः च।

2. प्रेरणार्थक क्रियापदम् (भविष्यत्) लोट्
   1. सर्वंस्थापि धातव: ये वर्तमानकाले तथा
      भूतकाले कृतां।
   2. प्रेरणार्थक क्रियापदानि वाक्येषु उपयोगः:
      पूर्ववत् (मध्यमपुरुष-एकवक्तनमात्रम्)
   3. अनुवाद-अभ्यासः:

Unit IV

1. सचिप्रकरणम्
   1. यथा सचि:
   2. अविदसचि:

2. नूतन-कर्त्तृपदानि (पुलिंद्रं)
   1. उकारान्तः पुलिंद्रः गुरु शब्दः
   2. समानान्तः शब्दः केवलः
   3. उकारान्तः-पदानि वाक्येषु उपयोगः:
   4. अनुवाद-अभ्यासः
   5. संख्यावाचकपदानि १ - २५ संस्कृते।

3. नूतन-कर्त्तृपदानि (स्त्रीलिंद्रं)
   1. उकारान्तः स्त्रीलिंद्रः धेनु शब्दः
   2. समानान्तः-शब्दः केवलः
   3. उकारान्तः-पदानि स्त्रीलिंद्रः उपयोगः:
   4. अनुवाद-अभ्यासः
   5. पुलिंद्रं-स्त्रीलिंद्रं-पदानि मिश्रित्य
      वाक्येषु उपयोगः।
For Candidates to be admitted from the academic year 2019 onwards

4. कथालेखनम्

1. पाठचक्रम-अन्तर्गत-कथा
2. नूतन-कर्त्तृपदानि (कथा-अन्तर्गतानि)

Unit V

1. नूतन-प्रत्यया:

1. कथयतु प्रत्यय:- कहात्मकः
2. कर्त्तरि प्रयोगः कर्मणि प्रयोगः च
3. सन्नता:- इच्छाप्रकृति:(Desiderative)

2. नूतन-क्रियापदानि

1. प्रथु, प्री, बलद, भूष, मृण (मारी), लुज, रच, सिनह, हिस्स (लटू परस्परपदि, आलम्यपदि)
2. उपरि अभ्यसित-धातु तथा प्रत्ययान् वाब्येषु उपयोगः
3. संभाषणम् - कालिकासंहकलं अभिन्नान्तका कुंकतालम्

Prescribed Book: Sarala Sanskrit Sikshak Part II, Bharatiya Vidya Bhavan, Mumbai 400007.

(Omitted portions: 1. Lesson 2: श्लोकः (pages 14, 15)
2. Lesson 4, श्लोकः (page 23)
3. Lesson 10, सुभाषितानि, संस्कृत-लोकोक्तयः)

References: 1. संस्कृत-लयवहार-साहसी, Samskrita Bharati, Bengaluru 560085.
2. संस्कृतबोधिनी, प्रधानम, संस्कृतभाषाप्रचारिणी सभा, चिंतूर, आनंदप्रदेश 507507
संक्षेपः - २०११
For Candidates to be admitted from the academic year 2019 onwards

NATIONAL COLLEGE (AUTONOMOUS)
LANGUAGE COURSE PART I SANSKRIT SEMESTER III PAPER III SANSKRIT III
SYLLABUS
SUBJECT CODE: U19S3

Unit I

1. पुनःत्वर्या
2. पशु-पक्षी-पृथ्वी-पर्वत-समुद्र-शालानुका-कल-नामानि
3. वाणिज्य-उपयोग-पदानि
   मापनं तोलनं च
4. संख्याधारकपदानि
5. संक्षिप्तनामानि
6. संस्कृतनामानि
7. सरस्वति नामानि
8. धन्य-धनपत्र/नायक नामानि
9. हि शब्दः - पुनःपुरुषोऽभिः
10. अनुवाद अम्यासः

Unit II

1. क्रियापदानि
   लोऽ लकारे परस्मैपदि, आत्मनेपदि च
2. इत्योपि अवयाणि
3. कथालेखानामकाः
4. अनुवादः
5. उपसंग्
6. तेषा वाक्येऽधु उच्योऽन्तः

Unit III

1. इकारान्त-स्त्रीलिङ्गपदानि
   नदी, अटवी, कौनुदी, वाहिनी, नगरी
   इत्येतानि पदानि, तेषा शब्दरूपानि च
2. क्रियापदानि, परस्मैपदिनः
3. आत्मनेपदिनः
4. उभयपदिनः
5. शारीर-अंजंग्यनामानि, भूषण-नामानि
6. इकारान्त:पुलिलिङ्ग-शब्दः कर्तृ, पितृ,
   इतादः
7. क्रियापदानि
8. अनुवाद-अम्यासः
For Candidates to be admitted from the academic year 2019 onwards

Unit IV

1. कृषिकर्म
2. कृषिसंबन्धीनि उपकरणानि
3. अनुवाद-अभ्यास:
4. लघूता:
5. वाक्येशु उपयोगः
6. विशिष्टित्व (optative/potential mood)-1
7. ध्यासमेवं आत्मानेपदि च

Unit V

1. तकारान्त: मुख्तिंकृत: राजनृ शब्दः
2. सत्यप्रकरणम् - पुनर्युग्मः
3. विसंगसंधि:
4. जूतन-अव्यय-पदानि
5. अनुवाद-अभ्यास:
6. विशिष्टित्व (optative/potential mood)-2
7. भोजनवेला – संवाद:
8. जूतन-कर्तृ-क्रिया-अव्यय-विविध-प्रत्यय-पदानि।
9. शब्दरूपाणि, धातुरूपाणि च पुनर्युग्मः।


Omitted portions: 1. Lesson 9 स्वतान्तः स्वच्छवरः.

2. Lesson 11, सुभाषितानि, संस्कृत-लोकोक्तः.

References:
1. Sanskrit-Vyavaharasahasri, Samskrita Bharati, Bengaluru 85
For Candidates to be admitted from the academic year 2019 onwards

NATIONAL COLLEGE (AUTONOMOUS)
LANGUAGE COURSE PART I SANSKRIT SEMESTER IV PAPER IV SANSKRIT IV
SYLLABUS
SUBJECT CODE: U19S4

Unit I

1. प्रथम-पांमार्थिक, द्वितीय-पांमार्थिक,
   तृतीय-पांमार्थिक-अभ्यस्तानां विषयांना विषयां
   पुनर्विषया
2. सर्व-शब्द: श्रीयु लिखेउँगु।
3. बाचु शब्द: स्त्रीलिखिते
4. अनुवाद-अभ्यास:
5. हिमालय: - रचनालेखनम्

Unit II

1. ओकारान्तः: स्त्रीलिखितः गो शब्दः
2. गो-संबन्धिनि पदानि
3. गां अधिकृत्य लेखः
4. नूतन-कर्तृ-श्रीयापदानि - शब्दसंग्रहः
5. अनुवाद-अभ्यासः
6. पदानां वाक्येयुः उपयोगः

Unit III

1. समासः: - उपोद्घातः
2. तत्तुरुष-समासः
3. कर्मधारय-समासः
4. बहुवृहि-समासः
5. द्वन्द-समासः
6. हिंदु-समासः
7. अध्ययनाभ्रो-समासः
8. एकाक्षोषसमासः

संस्कृतम् - दैनन्दिनव्यवहारः
1. संस्कृत-व्यवहारः

11. संख्यावाचकविदानि २५ त: ५० पर्यन्तम्।
12. बन्धुवर्गनामानि
13. गुँहे उपपुलानां वस्तुनां नामानि
14. वास्त्र-सिद्धि-पक्ष-मास-नामानि
15. वैभव-ग्रहणानि नामानि
For Candidates to be admitted from the academic year 2019 onwards

UNIT IV
1. रचनात्सक कार्यम्
   1. पत्रलेखन - उपोद्धतः, उदाहरणानि च
   2. पिता/माता - पुत्राय/पुत्री
   3. पितार्थाय मातर्य प्रति - पुत्र/पुत्री
   4. मित्राय पत्रम्
   5. पतिः/पत्नी - पत्नी/पत्ये

2. अनुच्छेद:
   1. दर्तं अनुच्छेदं पतितवा उत्तरलेखनम् - प्रकारः
   2. सरल-कथायुक्तम् , सरल-गद्याशयुक्तम् च।

3. अनुच्छेदलेखनम्
   1. दर्तानि पदानि विपर्ययः परमवाक्येषु
      एकम् अनुच्छेद-लेखनम्।
   2. सरलकथा अथवा गद्याशयुक्तम्।

4. रचनालेखनम् (पाठयपुस्तक-अन्तर्गतम्)
   1. सरलकथा
   2. गद्यांश:

UNIT V
1. श्रेष्ठभाषा द्रविडभाषा - अस्वाः: ऐतिहासिकं स्थानम्।
   1. भाषाः: शास्त्रानि
   2. भाषा-समूहः
   3. श्रेष्ठभाषाः: गुणानि।
   4. श्रेष्ठभाषा: राष्ट्रीय-श्रेष्ठ-भाषाः – द्रविड-संस्कृते
   5. द्रविडभाषा: पुराणानि。
   6. द्रविडभाषाः श्रेष्ठभाषा-समूहे योजितमान्यतोलस्मायणम्।
   8. विश्व-श्रेष्ठद्रविडभाषा सम्मेलनम् २०१०

Prescribed Book: Sarala Sanskrit Sikshak Part IV, Bharatiya Vidya Bhavan,
Mumbai 400007.

(Omitted portions:
Lesson 2: विद्याश्रांशा, Lesson 7: नवकाले यदा हनुमानु प्रतिवृत्त: Lesson 8: रामकथा वहासनन्
Lesson 12: नालानयवली-वर्णनम् Lesson 13: किषकेत्व पश्य कि कृतम् Lesson 14: रामपाणि
Lesson 15: सुभाषितानि Lesson 17: लोकाभिप्रया)।
References: 1. संस्कृतभाषाय भागावास्त्री, संस्कृतभाषाती, बंगाली ५६५०८५।
2. संस्कृतशब्दिनी (द्वितीया), संस्कृतभाषाप्रचारिणी समा, बिचुरू, आन्नाथपुरम् ५९७५०८।

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For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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<th>CLASS</th>
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Course Educational Objectives
CEO1. To understand the basis of life processes in Protozoa
CEO2. To understand the basis of life processes in Porifera and Coelenterata
CEO3. To understand the basis of life processes in Platyhelminthes and Aschelminthes
CEO4. To understand the basis of life processes in Annelida and Arthropoda
CEO5. To understand the basis of life processes in Mollusca and Echinodermata

UNIT - I : ANIMAL KINGDOM AND PROTOZOA
Outline classification of animal kingdom, General characters and classification up to class level with examples for Protozoa.
Detailed Study: *Paramecium caudatum* (Slipper Animalcule).
General Topics: Protozoan parasites, Economic importance of protozoans.

UNIT - II : PORIFERA AND COELENTERATA
General characters and classification up to class level with examples for Porifera and Coelenterata
Detailed study: *Obelia longissima* (Sea fur).
General topics: Canal system in sponges, Coral and coral reefs

UNIT - III : PLATYHELMINTHES AND ASCHELMINTHES
General characters and classification up to class level with examples for Platyhelminthes and Aschelminthes
Detailed study: *Taenia solium* (Tape worm).
General topics: Parasitic adaptations of Aschelminthes and Platyhelminthes, Parasites of Aschelminthes (*Ascaris lumbricoides, Wuchereria bancrofti, Loa Loa*) and Platyhelminthes (*Fasciola hepatica, Schistosoma haematodius, Echinococcus granulose*).

UNIT - IV : ANNELIDA AND ARTHROPODA
General characters and classification up to class level with examples for Annelida and Arthropoda.
Detailed study: *Penaeus monodon* (Black Tiger Shrimp).
General topics: Adaptive Radiation in Annelida, Beneficial and harmful insects.

UNIT - V : MOLLUSCA AND ECHINODERMATA
General characters and classification up to class level with examples for Mollusca and Echinodermata.
Detailed study: *Pila globosa* (Apple Snail).
General topics: Larval forms of Echinoderms (*Dipleurula, Bipinnaria, Brachiolaria, ophiopluteus, echinopluteus, Auricularia, Doliolaria of Holothuroidea, Doliolaria of Crinoidea, pentacrinoïd), Water-vascular system of Starfish.
For Candidates to be admitted from the academic year 2019 onwards

**Course Outcomes**

CO1. Learn the evolution, hierarchy and classification of Invertebrates

CO2. Familiar with the life processes of various invertebrates

CO3. Familiar with the invertebrate biodiversity

CO4. Familiar with the adaptations of invertebrates

CO5. Familiar with the economic importance of invertebrates

**Text book**


**Reference Books:**


For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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<td>Course Title</td>
<td>MAJOR PRACTICAL – I</td>
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<tr>
<td></td>
<td>FAUNAL DIVERSITY (INVERTEBRATES &amp; CHORDATES)</td>
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</table>

Course Educational Objectives
CEO1. Gain experience in anatomy through simple dissections (commercially available dead animals) and virtual mode
CEO2. Learn the mounting techniques and organ system through prepared-slides
CEO3. Lear the organ systems through preserved specimen
CEO4. Learn the organ system through commercially available animals.
CEO5. Learn the economically important invertebrates and vertebrates

Dissection
Earthworm : Nervous system
Prawn : Nervous system
Fish/Frog/Chicken/ : Various systems through virtual mode

Mounting
Earthworm : Body setae, Penial setae
Prawn : Appendages

Spotters and slides
Protozoa : Paramecium
Porifera : Sycon
Coelenterata : Obelia (entire), Physalia, Obelia medusa, Porpita, Sea anemone,Aurelia.
Platyhelminthes : Liver fluke, Planaria, Tapeworm, and Scolex
Nematodermata : Ascaris (Male and Female).
Annelida : Nereis, Parapodium, Heteronereis, Trochophore larva, Arenicola,:Leech.
Arthropoda : Penaeus, Sacculina on crab, Peripatus, Limulus,
             Alima larva. Artemia, Cyclops.
Molluscs : Pila
Echinodermata : Starfish

Chordates
Mounting
Placoid, cycloid, and ctenoid scales

Spotters:
Prochordata : Amphioxus, Balanoglossus.
Fishes : Carla catla, Shark, Echeneis, Hippocampus, Exocoetus.
Amphibia : Bufo, Hyla, Ichthyophis.
Reptilia : Crocodile, Naja naja, Tortoise, Monitor Lizard,
Aves : Pigeon, Types of Feathers.
For Candidates to be admitted from the academic year 2019 onwards

Mammalia: Rabbit, Bat
Dentition: Rabbit, Man

Field study:
Collection and preservation techniques of Insects: Demonstration
Collection and preservation of Marine/freshwater fauna: Demonstration
Identification commercial Marine/Freshwater Fishes: Demonstration

A record of lab work should be maintained and submitted at the time of practical exam.

Course Outcomes
CO1. Familiar with the dissections (commercially available dead animals)
CO2. Familiar with the virtual dissection
CO3. Familiar with the mounting techniques
CO4. Familiar with the anatomy of organism
CO5. Familiar with the economically important invertebrates and vertebrates

Text Books:
For Candidates to be admitted from the academic year 2019 onwards

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(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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<tr>
<td>Course Title</td>
<td>FAUNAL DIVERSITY (CHORDATA)</td>
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<td>Hours: 5</td>
<td>Credits : 5</td>
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Course Educational Objectives
CEO1. Learn the diversity in form, structure and habits of Prochordates
CEO2. Learn the diversity in form, structure and habits of Pisces
CEO3. Learn the diversity in form, structure and habits of Amphibians and Reptiles
CEO4. Learn the diversity in form, structure and habits of Birds
CEO5. Learn the diversity in form, structure and habits of Mammals

UNIT - I: PROCHORDATA
General characters and classification of chordates up to order level with examples.
Detailed Study: Amphioxus - Branchiostoma lanceolat us
General Topics: Retrogressive metamorphosis in Ascidia, Affinities of Balanoglossus.

UNIT - II: PISCES
General characters and classification up to subclass with examples.
Detailed Study: - Shark - Scoliodon sor rakowah (Excluding endoskeleton)
General Topics: Migration in fishes, Accessory respiratory organs in fishes.

UNIT - III: AMPHIBIA AND REPTILIA
General characters and classification up to order with examples for Amphibia.
General characters and classification up to order with examples for Reptilia.
Detailed Study : Frog - Rana hexadactyla (Excluding endoskeleton)
General Topics : Parental care in Amphibia, Mesozoic reptiles.

UNIT - IV: AVES
General characters and classification up to order with examples.
Detailed Study : Pigeon - Columba livia (Excluding endoskeleton)
General Topics : Migration in birds, Beak and feet adaptation in birds.

UNIT - V: MAMMALIA
General characters and classification up to sub class with examples.
Detailed Study : Rabbit - Oryctolagus cuniculus (Excluding endoskeleton)
General Topics : Origin of mammals, Aquatic mammals.

Course Outcomes
CO1. Familiar with the classification and life process of Prochordates
CO2. Familiar with the classification and life process of Pisces
CO3. Familiar with the classification and life process of Amphibians and Reptiles
CO4. Familiar with the classification and life process of Birds
CO5. Familiar with the classification and life process of Mammals
For Candidates to be admitted from the academic year 2019 onwards

Text books:


Reference Books :

SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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<tr>
<td>Course Title</td>
<td>CELL AND MOLECULAR BIOLOGY</td>
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**Course Educational Objectives**

CEO1. To understand the structure of Prokaryotic cell and Eukaryotic cell
CEO2. To understand the structure and function of Golgi complex, Lysosomes and Mitochondria.
CEO3. To understand the structure and function of Chromosomes, Nucleus and RNA
CEO4. To understand the DNA, mitosis, meiosis, and gene
CEO5. To understand the basics of biotechnology

**UNIT – I**
Cell structures: Prokaryotes and Eukaryotes.
Plasma membrane: Fluid mosaic model, structure, and functions.
Endoplasmic reticulum: Structure, Types, and Functions.

**UNIT – II**
Golgi complex: Ultrastructure, and functions.
Lysosomes: Origin, Ultrastructure, and functions
Mitochondria: Origin, Ultrastructure and functions.

**UNIT – III**
Ribosomes: Structure and functions.
Nucleus: Ultrastructure and functions.
Chromosomes: Ultrastructure and functions.
RNA: Types, structure and function.

**UNIT – IV**
DNA: Molecular structure, types and functions.
Mitosis and Meiosis.
Genetic code and Protein synthesis.

**UNIT – V**
Principles and methods of gene cloning, application.
Gene Cloning Vectors: Plasmids- pBR322, Cosmids PJB 8, SV-40.
Recombinant DNA Technology: Gene library, Transformation, Transduction, Blotting techniques: Southern, Northern, Western.
Gene therapy.
For Candidates to be admitted from the academic year 2019 onwards

**Course Outcomes**

CO1. Familiar with Prokaryotic and Eukaryotic cell.
CO2. Familiar with the structure and functions of Golgi complex, Lysosomes, and mitochondria
CO3. Familiar with the structure and function of Chromosomes, Nucleus and RNA
CO4. Familiar with the DNA, mitosis, meiosis, and gene
CO5. Familiar with the basics of biotechnology

**Text book**


**Reference Books:**

For Candidates to be admitted from the academic year 2019 onwards

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(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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<td>MAJOR PRACTICAL – II</td>
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Course Educational Objectives
CEO1. Understand the microtechniques
CEO2. Able to distinguish different cells & muscle types
CEO3. Able to enumerate RBC & WBC and measure pH
CEO4. Able to do physiological and biochemical tests
CEO5. Understand the functional aspects of SEM, HPLC, AAS

Cell and Molecular Biology
2. Spotters: Columnar, Ciliated, Squamous epithelium, Cardiac, Striated, Non-striated
   Muscle, Nerve cell, Blood of Man and Frog, Compound microscope, Centrifuge,
   Micrometer, Camera Lucida, Microtome.
3. Isolation of DNA (Demonstration only)
4. DNA amplification (Demonstration only)
5. Spotters: Bioreactor, Plasmid (PBR³²², SV⁴⁰⁰), PCR.

Physiology
1. Enumeration of RBC and WBC.
2. Qualitative tests for ammonia, urea and uric acid.

Biochemistry
1. Qualitative tests for proteins, carbohydrates and lipids
2. pH measurement of various samples using pH meter and pH paper

Demonstration: SEM, HPLC, AAS at NCIF
Demonstration: Whole mount preparation-Killing, fixing, staining, permanent/temporary
   mounting Histological preparation-Collection of tissue, washing, Dehydration,
   clearing, infiltration, sectioning, staining.
A record of lab work should be maintained and submitted at the time of the practical
examinations.

Course Outcomes
CO1. Familiar with the microtechniques
CO2. Familiar with various cell & muscle types
CO3. Familiar with the blood test
CO4. Familiar with physiological and biochemical tests
CO5. Familiar with the SEM, HPLC, AAS

Text Books:
SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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<td>BIOLOGY OF INVERTEBRATES AND CHORDATES</td>
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Course Educational Objectives
CEO1. Understand the Invertebrates and Vertebrates with basis of Systematic
CEO2. Understand the life processes of paramecium
CEO3. Understand the life processes of Prawn
CEO4. Understand the life processes of Shark
CEO5. Understand the life processes of Rabbit

UNIT – I
General characters of invertebrates.
Outline classification of invertebrates up to class.
General characters of chordates.
Outline classification of chordates up to order.

UNIT – II
Detailed study of Paramecium caudatum - Slipper animalcule): External features, Nutrition, locomotion and reproduction

UNIT – III
Detailed study of prawn (Penaeus monodon - Tiger Shrimp): External features, digestive system, respiratory system, nervous system and reproductive system

UNIT – IV
Detailed study of Shark: External features, respiratory system, circulatory system, urinogenital system.

UNIT – V
Detailed study of Rabbit: External features, digestive system, respiratory system, circulatory system, urinogenital system.

Course Outcomes
CO1. Familiar with the classification of Invertebrates and Vertebrates
CO2. Familiar with the life processes of Paramecium
CO3. Familiar with life processes of Prawn
CO4. Familiar with the life processes of Shark
CO5. Familiar with the life processes of Rabbit

Text books:
For Candidates to be admitted from the academic year 2019 onwards

References:
For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
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PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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<td>ALLIED PRACTICAL  (Pertaining to Biology of Invertebrates &amp; Chordates and Economic Zoology)</td>
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Course Educational Objectives
CEO1. Learn the simple dissection technique
CEO2. Learn the virtual dissection technique
CEO3. Learn the mounting technique
CEO4. Learn the organ system through preserved specimen and permanent slides
CEO5. Learn the importance of animal products

1. Dissections
(commercially available dead animals)
Earthworm : Nervous system
Frog : General Anatomy (Virtual laboratory)

2. Mountings
Earthworm : Body and Penial setae
Shark : Placoid scale

3. Spotters
Paramecium, Simple sponge - Ascon, Obelia colony, Sea anemone, Ascaris, Fasciola hepatica, Taenia solium, Earthworm, Leech, Prawn, Scorpion, Grass hopper, Fresh water mussel, Pila, Starfish, Amphioxus, Shark, Catla, Frog, Calotes, Naja naja, Pigeon, Rat and Bat.


5. Products: Honey, Bee’s Wax, Silk, Cod liver oil, Pearl, Bird’s egg.

A record of lab work should be maintained and submitted at the time of practical exam

Course Outcomes
CO1. Familiar with dissection technique
CO2. Familiar with virtual dissection technique
CO3. Familiar with mounting technique
CO4. Familiar with the organ system through spotters/slides
CO5. Familiar with the animal products and their economic importance

Text Books:
For Candidates to be admitted from the academic year 2019 onwards

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(For Candidates to be admitted from 2019 June Onwards)
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<td>PHYSIOLOGY AND BIOCHEMISTRY</td>
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Course Educational Objectives
CEO1. To understand the physiology of digestion, respiration and circulation
CEO2. To understand the physiology of nerves and endocrine glands
CEO3. To understand the physiology of muscle and excretion
CEO4. To understand the metabolism of protein, carbohydrate and lipid
CEO5. To understand the enzymes and vitamins

UNIT – I
Nutrition : Types.
Digestion and absorption in Man.
Respiration : Transport of O$_2$ and CO$_2$ in man

UNIT – II
Nerve physiology: Neuron, Types, Neurotransmitters, Impulse transmission, Synapse, Synaptic transmission, Reflex action.
Endocrine physiology : Endocrine glands in man, Secretion and Disorders.

UNIT – III
Muscle physiology : Types of muscles, Ultrastructure of muscle fibre, Physiology of muscle contraction.
Excretion : Types of nitrogenous wastes, Structure of mammalian kidney and Urine formation.

UNIT – IV
Classification: Carbohydrates, Proteins and Lipids
Kreb’s cycle, Protein metabolism and Lipid metabolism.

UNIT – V
Enzymes: Classification, Characteristics, Mode of action, Theories, Factors affecting enzyme action.
Vitamins : Types, Sources, Functions and Deficiency diseases.
Calorific values, Balanced diet.

Course Outcomes
CO1. Familiar with the physiology of digestion, respiration, and circulation
CO2. Familiar with the physiology of nerves and endocrine glands
CO3. Familiar with the physiology of muscle and excretion
CO4. Familiar with various biochemical pathways
CO5. Familiar with the enzymes and vitamins
For Candidates to be admitted from the academic year 2019 onwards

**Text books:**

**Reference Books:**
For Candidates to be admitted from the academic year 2019 onwards

**SYLLABUS**
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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**Course Educational Objectives**
CEO1. To understand the prawn culture techniques
CEO2. To understand the pearl culture techniques
CEO3. To understand the sericulture techniques
CEO4. To understand the fish culture techniques,
CEO5. To understand the poultry farming techniques

**UNIT – I**

**UNIT – II**
Pearl culture: Technical requirements, Process and Methods: Species used-selection of farm sites, construction of farm, seeding, caring the oyster, sorting the pearls.

**UNIT – III**

**UNIT – IV**
Fish culture: Catla, Rohu, Live feed culture (Rotifers and Copepods), Induced breeding, Fish diseases: Protozoan White spot, Fungal Gill Rot. Fish byproducts.

**UNIT – V**
Poultry farming: Types of poultry, Fowl house construction, poultry nutrition, Diseases: Fowlpox and Ranikhet, Economic importance of poultry farming.

**Course Outcomes**
CO1. Aware the entrepreneurial opportunities in prawn culture
CO2. Aware the entrepreneurial opportunities in pearl culture
CO3. Aware the entrepreneurial opportunities in sericulture
CO4. Aware the entrepreneurial opportunities in fish culture
CO5. Aware the entrepreneurial opportunities in poultry farming

**Text Book**

**Reference Books:**
For Candidates to be admitted from the academic year 2019 onwards

3. Sardar Singh – Bees keeping in India.
SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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Course Educational Objectives
CEO1. To understand the air borne diseases
CEO2. To understand the food and water borne diseases
CEO3. To understand the insect borne diseases
CEO4. To understand the sexually transmitted diseases
CEO5. To understand the viral diseases

UNIT – I
Air borne diseases: Measles, Mumps, Small pox, Tuberculosis, Pneumonia, Diphtheria, Meningitis – Symptoms, Prophylaxis and Control measures.

UNIT – II
Food and water borne diseases: Cholera, Botulism, Typhoid, Amoebiasis, Tetanus - Symptoms, Prophylaxis and Control measures.

UNIT – III
Insect borne diseases: Yellow fever, Dengue fever, Malaria, Elephantiasis, Sleeping sickness - Symptoms, Prophylaxis and Control measures.

UNIT – IV
Sexually transmitted diseases: Gonorrhea, Vaginitis, Syphilis, Chlamydia, Trichomoniasis - Symptoms, Prophylaxis and Control measures.

UNIT – V
Viral hepatitis, Influenza, Polio, Rabies; Cold sores and AIDS - Symptoms, Prophylaxis and Control measures.

Course Outcomes
CO1. Familiar with air borne diseases and their preventive measures
CO2. Familiar with food and water borne diseases and their preventive measures
CO3. Familiar with insect borne diseases and their preventive measures
CO4. Familiar with sexually transmitted diseases and their preventive measures
CO5. Familiar with viral diseases and their preventive measures

Text books

Reference Books:
For Candidates to be admitted from the academic year 2019 onwards

For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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**Course Educational Objectives**

CEO1. To understand the structure and function of sperm and egg, and fertilization
CEO2. To understand Cleavage
CEO3. To understand Gastrulation
CEO2. To understand the Foetal membranes
CEO3. To understand the reproductive cycles and basics of biotechnology

**UNIT – I**

Spermatozoon: Spermatogenesis, shape and structure in different chordates. Egg: Oogenesis, egg membranes, patterns of eggs, organization of egg.
Fertilization: External and internal fertilization. Physical, Chemical and cytological perspectives.
Parthenogenesis: natural and artificial

**UNIT – II**

Cleavage: Salient features, Morula, Blastula (Types; Coeloblastula, Discoblastula, Blastocyst).
Cleavage: Cleavage laws, Planes of cleavage (Meridional, vertical, equatorial, Latitudinal), Patterns of cleavage: Holoblastic (Bilateral, Radial, Spiral), Meroblastic (Superficial).
Factors affecting cleavage, Molecular changes during cleavage.

**UNIT – III**

Gastrulation: Salient features, Metabolic and molecular changes during gastrulation, Exogastrulation.
Fate maps: construction of fate map (artificial markings, natural markings)
Morphogenic movements: Types, mechanism of morphogenetic movements
Organogenesis: Development of brain in frog, Development of eye in frog,

**UNIT – IV**

Development of extraembryonic membranes in chick:chorion, Amnion, Yolk sac, Allantois, serosa amniotic fluid, umbilical cord
Development of foetal membranes in mammals:chorion, Amnion, Yolk sac, Allantois, serosa amniotic fluid, umbilical cord
Placenta: characters, classification (Yolk sac, Chorio-allantoic, Diffuse, cotyledonary, intermediate, zonary, discoidal, metadiscoidal, indecuate, deciduate, epitheliochorial, syndesmochorial, endotheliochorial, haemochorial, haemoendothelial)
Development of placenta

**UNIT – V**

Reproductive cycles: oestous cycle, Puberty, spermiation, ovulation, menstrual cycle, pregnancy, parturition
Infertility: Types, causes, artificial insemination
Test Tube Baby
For Candidates to be admitted from the academic year 2019 onwards

Neoteny, Metamorphosis in Amphibians
Stem cells: Definition, Unique properties, Proliferation and Differentiation, Types: Totipotent, Pluripotent, Multipotent and Unipotent. Functions of stem cells.

**Course Outcomes**
CO1. Familiar with the structure and function of sperm, egg, and reproduction
CO2. Familiar with cleavage in embryology
CO3. Familiar with Gastrulation
CO4. Familiar with Foetal membranes
CO5. Familiar with reproductive cycles and basics of biotechnology

**Text book**

**Reference books:**
For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
(For Candidates to be admitted from 2016 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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Course Educational Objectives
CEO1. To understand the scope and basics of microbiology
CEO2. To understand the food, industrial, soil and medical microbiology
CEO3. To understand the scope and basics of immunology
CEO4. To understand antigen and antibody
CEO5. To understand immune response

UNIT – I
Introduction: History and scope of microbiology, Classification of Bacteria and Viruses, General structure of microbes (Bacteria and Viruses), Bacterial Culture techniques (Agar Plate and Broth cultures).

UNIT – II
Food microbiology: Food poisoning, Food spoilage, Food preservation.
Industrial microbiology: Production of antibiotics (penicillin).
Soil microbiology: Role of soil microbes in Nitrogen fixation.
Medical microbiology: Diseases caused by Bacteria - Cholera, Tuberculosis. Diseases caused by viruses – AIDS, Polio.

UNIT – III
Scope of Immunology – Immunity: Innate and Acquired, Humoral and Cell mediated.
Lymphoid Organs: Structure and functions of Primary Lymphoid Organs (Thymus, Bone marrow, Bursa) and Secondary lymphoid organs (Lymph node, Spleen, Tonsil, Payer’s patches).

UNIT – IV
Antigens: Structure, Types, Properties, Adjuvant.
Antibodies: Structure of Immunoglobulin, types of Immunoglobulin, functions of Immunoglobulin, biological properties.

UNIT – V
Immune response: factors causing immune response, mechanism of immune response, types.
Humoral immune response: mechanisms, types.
Cell mediated immune response: Mechanism
Comparison of humoral immunity and cell mediated immunity

Course Outcomes
CO1. Familiar with the Microbes
CO2. Familiar with food, industrial, soil and medical microbiology
CO3. Familiar with the basics of immunology
CO4. Familiar with antigen and antibody
CO5. Familiar with immune response
For Candidates to be admitted from the academic year 2019 onwards

Text books

Reference books:
For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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**Course Educational Objectives**
CEO1. To understand the classification of Insects
CEO2. To understand the destructive insects
CEO3. To understand the beneficial insects
CEO4. To understand household pests
CEO5. To understand insect pest management

UNIT – I
Classification of Insects up to order: Basis of classification – Classification of important pests up to order level (any five), Key characteristics with South Indian Examples. External anatomy of a typical Insect – Exoskeleton, Head, Thorax and Abdomen. Mouth parts of Insects.

UNIT – II
Destructive insects:

UNIT – III
Beneficial Insects: productive and helpful
Economic importance of Honeybee, Silkworm and Lac-insect.
Insects as pollinators, predators, parasites, weed killers, soil builders and scavengers.
Commercial products of insects: honey, bee-wax, silk, lac, galls, cochineal dye, cantheridine, insect-food, medicines

UNIT – IV
Household insect pests: Mosquito, Cockroach, Housefly, Termites, damages caused and their control measures.

UNIT – V
Insect Pest Management: Conventional Methods: Prophylactic – Curative – Cultural.
Mechanical – Physical – legal & Biological method. Non conventional methods: Plant
For Candidates to be admitted from the academic year 2019 onwards

products – Chemosterilants – Antifeedants – Pheromones – Insect repellants – Attractants.
Integrated pest management (IPM).

Course Outcomes
CO1. Familiar with the world of insects
CO2. Familiar with the destructive insects
CO3. Familiar with the beneficial insects
CO4. Familiar with the household pests
CO5. Familiar with insect pest management

Text books
4. D.B Tembhare, Modern Entomology, Himalaya Publishing House

References:
For Candidates to be admitted from the academic year 2019 onwards

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(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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Course Educational Objectives
CEO1. To understand the scope of aquaculture
CEO2. To understand Fish culture
CEO3. To understand ornamental fish culture
CEO4. To understand edible oyster culture
CEO5. To understand marine prawn culture

UNIT – I
Scope of Aquaculture in India.
Water quality parameters: Physical factors (Visibility, Temperature); Chemical factors (O₂, CO₂, Salinity, pH, Biological Oxygen Demand, Nutrients; Biological factors (Plankton, Aquatic weed).

UNIT – II
Fish culture : Cultivable species of fishes (Indian major Carps - *Catla catla*, *Labeo rohita* (Rohu), *Channa punctatus*), Methods of fish farming (Fish farm design, Selection of site, Weed control, Stocking, and Feeding), Fish feed (Live and Artificial). Fish diseases (Bacterial-Columnaris, Bacterial kidney Disease and Viral-Lymphocystis, spring viremia) and control methods, Economic importance of fishes.

UNIT – III
Ornamental fresh water fish culture: Aquarium design, Maintenance of aquarium, Common cultivable species: Goldfish (*Carassius auratus*), Fighter fish (*Betta splendens*), Guppy (*Poecilia reticulata*). Commercial importance.

UNIT – IV
Edible oyster culture: Biology of edible oyster (*Crossestra madrasensis*), Needs for oyster culture, Essential condition for oyster culture, Farming operation, Economic importance.
Pearl culture: Types of pearls, pearl producing animals, Mechanism of pearl formation, Freshwater pearl culture.

UNIT – V
Marine prawn culture: Common cultivable species, Seed collection, Culture methods (Extensive, Semi-intensive, Intensive, Pen), Diseases: Bacterial (Luminous), Viral (White spot) Commercial importance.
Role of ICAR, MPEDA, FSI and CMFRI in the growth of Aquaculture in India.
For Candidates to be admitted from the academic year 2019 onwards

**Course Outcomes**

CO1. Familiar with the world of aquaculture  
CO2. Familiar with fish culture  
CO3. Familiar with ornamental fish culture  
CO4. Familiar with edible oyster culture  
CO5. Familiar with prawn culture  

**Text Books**


**References**

For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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<td>MAJOR PRACTICAL – III (Pertaining to Developmental Biology, and Microbiology and Immunology)</td>
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Course Educational Objectives
CEO1. To understand the various developmental stages of chick embryo
CEO2. To identify the blood group
CEO3. To understand the lymphoid organs
CEO4. To differentiate bacteria using stains
CEO5. To understand the basic biotechnological methods

Developmental Biology
1. Observation of the structure of spermatozoa of Cattle from a cattle farm/ breeding centre.
2. Observation of prepared micro slides.

Spotters: (a). Egg, cleavage, blastula and yolk plug stages in frog.
(b). Egg, 24, 48, and 72 hrs developmental stages in chicks

Immunology
1. ABO Blood grouping, Rh Type.
2. Vidal Test- Agglutination (Demonstration).
3. Observation of lymphoid organs in rat (Chart, Virtual)
4. Spotters: Immuno electrophoresis (from picture), Lymphoid organs in rat.

Microbiology
1. Fixing and staining of bacteria using simple stain.
2. Bacteria culture (demonstration)
3. Differentiation of bacteria in a smear using gram staining.
4. Spotters: Autoclave, Petri plate, Micropipette, Laminar air flow chamber, Inoculation loop.

A record of lab work should be maintained and submitted at the time of the practical examination.

Course Outcomes
CO1. Familiar with various developmental stages of chick
CO2. Familiar with blood group
CO3. Familiar with lymphoid organs
CO4. Familiar with bacterial differentiation technique
CO5. Familiar with basic biotechnological methods

Text book
For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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<td>MAJOR PRACTICAL – IV (Pertaining to Genetics and Evolution, Environmental Biology and management, Biophysics and Biostatistics)</td>
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Course Educational Objectives
CEO1. To understand the genetic importance by studying different chromosomal aberrations in man
CEO2. Ability to enumerate RBC & WBC and measure pH
CEO3. Ability to estimate dissolved oxygen and CO2
CEO4. Ability to understand and identify the fossils
CEO5. Ability to do statistical analysis

Genetics:
1. Simple mendelian traits in man – Sex linked traits – Inheritance of colour blindness.
2. Drosophila – Identification of Sex, Mutant forms (from pictures), Genetic importance.
3. Human Karyotypes: Normal, Down’s, Klinfelter’s and Turner’s syndromes.

Evolution:
1. Fossils: Trilobite, Nautilus.
2. Mimicry: Leaf insects, Stick insects, Monarch and Viceroy butterfly

Environmental Biology:
1. Estimation of Dissolved oxygen.
2. Mounting and Identification of plankton (Fresh water or marine)
3. Spotters: Animal association (parasitism, mutualism and commensalisms), Inter tidal fauna (rocky, sandy, and deep sea), Secchi disc, Thermometer, Barometer, Luxmeter, Sedgwick Rafter Cell.
4. Food web.

Biodiversity: Field visit

Biophysics:
1. Spotters: Spectrophotometer, pH meter and Electrophoretic unit.

Demonstration of Infrared Spectrometer, Fluorescent spectrometer at NCIF

Biostatistics:
1. Construction of Bar and Pie diagram.
2. Calculation of Mean, Median and Mode, Standard deviation and Standard error.
3. Chi square test.
4. Student t test.
For Candidates to be admitted from the academic year 2019 onwards

“Industrial-/Forest-/Zoo-visit (Educational Tour) report should be included in the practical record”

A record of lab work should be maintained along with tour report and submitted at the time of the practical examination.

**Course Outcomes**
- CO1. Familiar with chromosomal aberrations in man
- CO2. Familiar with RBC and WBC count and pH measurement
- CO3. Familiar with the estimation of dissolved oxygen and CO2
- CO4. Familiar with fossils
- CO5. Familiar with statistical techniques

**Reference**

For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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Course Educational Objectives
CEO1. To understand the scope and importance of vermiculture
CEO2. To understand the techniques involved in vermiculture
CEO3. To understand the economic, legal and social contexts associated with vermiculture
CEO4. To understand the scope and importance of apiculture
CEO5. To understand the economic, legal and social contexts associated with apiculture

UNIT – I


UNIT – II

Environmental requirements, culture methods – wormery – breeding techniques, indoor and outdoor cultures – monoculture and polyculture – Outline and ecological classification – Epigeic, Endogeic and Anecic species.

UNIT – III

Applications of vermiculture – vermiculture Biotechnology, vermiculture composting, use of vermicastings and vermiwash in organic farming: horticulture, earthworms for management of municipal waste, selected biomedical solid wastes as feed, bait for capture, culture fisheries, forest regeneration. Medicinal importance.

UNIT IV


UNIT V

Natural enemies and diseases of honey bees and control methods. Bee poisoning and utility of bees in toxicity studies. Economics of Apiculture and Management. Honey yield in national and international market. Prospects of apiculture as self employment venture. Preparing proposals (Layout and budget) for financial assistance and funding agencies. Uses of honey and beeswax in Indian medicine.
For Candidates to be admitted from the academic year 2019 onwards

Students must be exposed to Apiculture units and submit a report along with other practical records.

**Course Outcomes**

CO1. Familiar with the world of cultivable earthworms  
CO2. Familiar with the cultivable earthworms  
CO3. Familiar with the economic aspects of earthworms  
CO4. Familiar with the world of cultivable bees  
CO5. Familiar with the economic aspects of bees

**Text books**


**Reference books:**

For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
(For Candidates to be admitted from 2016 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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Course Educational Objectives

CEO1. To understand the genetic aspects of chromosomes
CEO2. To understand the mutation and changes in chromosomal numbers
CEO3. To understand the molecular genetics
CEO4. To understand basic concepts of evolution
CEO5. To understand the evolution of man

UNIT – I

UNIT – II
Chromosomal aberrations: Structural changes in Chromosome; Types – Deletion (Deficiency), Duplication, Inversion, Translocation.
Changes in Chromosome number- Euploidy: Monoploidy, Polyploidy – Autopolyploid, Allopolyplod, Synthesized allopolyplod.
Aneuploidy: Monosomy, Nullisomy, Trisomy, Double Trisomy, Tetrasomy.

UNIT – III

UNIT – IV

UNIT – V

Course Outcomes

CO1. Familiar with genetic aspects of chromosomes
CO2. Familiar with mutation and changes in chromosomal numbers
CO3. Familiar with the molecular genetics
CO4. Familiar with basic concepts of evolution
CO5. Familiar with the evolution of man

Text books
For Candidates to be admitted from the academic year 2019 onwards


References Books:
For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
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Course Educational Objectives
CEO1. To understand the scope and importance of our environment
CEO2. To understand the components of an ecosystem
CEO3. To understand the concepts of community and population ecology
CEO4. To understand the biogeochemical cycles
CEO3. To understand the global warming

UNIT – I

UNIT – II

UNIT – III

UNIT – IV
Biogeochemical cycles: Oxygen, Nitrogen and Phosphorus. Pollution and Management: Types, Sources, Effects (Air, Water, Land, Noise)

UNIT – V

Course Outcomes
CO1. Familiar with our environment
CO2. Familiar with various components of ecosystem
For Candidates to be admitted from the academic year 2019 onwards

CO3. Familiar with various concepts of community and population ecology
CO4. Familiar with biogeochemical cycles
CO5. Familiar with global warming

Text books

Reference Books:
SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

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<td>Core course – (CC13)</td>
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<tr>
<td>Course Title</td>
<td>BIOPHYSICS AND BIOSTATISTICS</td>
</tr>
<tr>
<td>Hours:</td>
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<td>Credits:</td>
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<td>Max Marks:</td>
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Course Educational Objectives
CEO1. To understand the colloids
CEO2. To understand the laws of thermodynamics
CEO3. To understand the principles involved in chromatography, electrophoresis, and spectrophotometer
CEO4. To understand biological method of data collection
CEO5. To understand basic statistical tests

UNIT – I

UNIT – II
Components of Light: Beer and Lambert’s law of light absorption.
Laws of thermodynamics.

UNIT – III
Principles and applications of electrophoresis – Agarose gel electrophoresis – PAGE – SDS-PAGE.
Principles and applications of electrophoresis Spectrophotometer,

UNIT – IV
Data: Measurement of data, Primary and Secondary data
Hypothesis: Null and Alternative, Type I error, Type II error
Types of variables: Continuous and discontinuous variables, Qualitative and quantitative variables.
Presentation of data: Tabulation of data, Histogram, Polygon, Pie diagram.

UNIT – V
Definition, illustration and significance: Mean, Median, Mode, Standard deviation, Standard Error, Variance and Co Variance.
For Candidates to be admitted from the academic year 2019 onwards

Definition, illustration and significance: Chi square, t-test, Simple Correlation and regression.

**Course Outcomes**
- CO1. Familiar with colloids
- CO2. Familiar with the laws of thermodynamics
- CO3. Familiar with the principles involved in chromatography, electrophoresis, and spectrophotometer
- CO4. Familiar with the method of biological data collection and analyses.
- CO5. Familiar with basic statistical tests

**Text books**

**Reference Books:**
For Candidates to be admitted from the academic year 2019 onwards

SYLLABUS
(For Candidates to be admitted from 2019 June Onwards)
PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE
(AUTONOMOUS)

<table>
<thead>
<tr>
<th>CLASS</th>
<th>III – B.Sc., Zoology</th>
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<td>Major based Elective course – (EC3)</td>
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<tr>
<td>Course Title</td>
<td>WILDLIFE BIOLOGY AND NANOBIOLOGY</td>
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**Course Educational Objectives**
- CEO1. To understand the values and importance of wildlife
- CEO2. To understand the conservation priorities
- CEO3. To understand various ongoing conservation projects in India
- CEO4. To understand the basic concepts of nanobiology
- CEO5. To understand applications of nanobiology

**UNIT – I**
Wildlife concept: Importance of Wild life conservation:- ecological, ethical, educational, scientific, commercial, aesthetic, and recreational. Conservation methods:- In situ conservation- sanctuaries, national parks, biosphere reserves, Ex situ conservation-captive breeding, modern zoo, safari, nocturnal zoo.

**UNIT – II**

**UNIT – III**

**UNIT – IV**
Origins of concepts of Nano, Basic and Basis: size of Nano, The meaning of Nanotechnology, Four Generations of Nanotechnology Development, Technology of General Applicability, Multi-purpose Technology, Exponential Proliferation. Applications of Nanotechnology in biological filed

**UNIT – V**
Nanobiology:
Basic concepts and applications: drug delivery, cancer diagnosis and therapy, surgery, In vivo therapy, Neuro-electronic Interfaces, cell Repair Machines.
For Candidates to be admitted from the academic year 2019 onwards

Biosensors: definition, principles of detection, optical biosensor, electrochemical biosensor, nanobiosensor, DNA sensors, Quantum dots.

**Course Outcomes**
- CO1. Familiar with the importance of wildlife
- CO2. Familiar with the conservation priorities
- CO3. Familiar with the conservation projects
- CO4. Familiar with the basic concepts of nanobiology
- CO5. Familiar with the applications of nanobiology

**Text books**

**References**
For Candidates to be admitted from the academic year 2019 onwards

BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI- 620 024
ENVIRONMENTAL STUDIES – U19ES
(Applicable to the candidates admitted from the Academic year 2019-20 onwards)

Unit: 1  The Multidisciplinary nature of environmental studies
Definition, scope and importance. Need for public awareness
(2 lectures)

Unit: 2  Natural Resources:
Renewable and non-renewable resources:
Natural resources and associated problems.

a) Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

f) Land resources: Land as a resources, land degradation, man induced Landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

(8 lectures)

Unit: 3  Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession.
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem:-

1
For Candidates to be admitted from the academic year 2019 onwards

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries)

(6 lectures)

Unit: 4  **Biodiversity and its conservation**

- Introduction – Definition: Genetic, species and ecosystem diversity
- Biogeographical classification of India
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Biological Diversity Act 2002/ BD Rules, 2004

(8 lectures)

Unit: 5  **Environmental Pollution**

Definition

Causes, effects and control measures of:
- a. Air Pollution
- b. Water Pollution
- c. Soil Pollution
- d. Marine Pollution
- e. Noise pollution
- f. Thermal Pollution
- g. Nuclear hazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides.
- Ill-Effects of Fireworks: Firework and Celebrations, Health Hazards, Types of Fire, Firework and Safety

(8 lectures)
For Candidates to be admitted from the academic year 2019 onwards

Unit: 6  Social Issues and the Environment

- From Unsustainable to Sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people; its problems and concerns.
  Case studies
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental legislation
- Public awareness.

(7 lectures)

Unit: 7  Human Population and the Environment

- Population growth, variation among nations.
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights - Value Education
- HIV/ AIDS - Women and Child Welfare
- Role of Information Technology in Environment and human health
- Case studies.

Unit: 8  Field Work

- Visit to a local area to document environmental assets-river / forest/ grassland/ hill / mountain
References:

2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt Ltd, Ahamedabad – 380013, India. E-mail: mapin@icenet.net(R)
7. Down to Earth, Centre for Science and Environment (R)
9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society, Bombay (R)

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SEMESTER – II
COURSE CODE: U19SBE1
HOURS: 2 CREDITS: 2

OFFICE AUTOMATION

UNIT I:

UNIT II:

UNIT III:

UNIT IV:
Conditional Functions and Data Sorting – Limit the data on a worksheet - Data Validation –Data consolidation - Chart creation - Checking and Correcting Data - Tracking and Managing Changes- Advanced Features

UNIT V:

TEXTBOOKS
DESKTOP PUBLISHING

UNIT I:
Photoshop Tools: Move, Type, Marquee, Lasso, Crop, Shapes, Healing, Brush, Patch, Cloning Stamp, Eraser, Gradient, Blur, Smudge, Dodge, Pen, Eye Dropper, Patch selection and Zoom tool.
Layer: New layer, Layer set, Duplicate layer, Rasterize and Merge down
Layer Styles: Drop shadow, inner shadow, outer glow & inner glow, Bevel and Emboss, Gradient overlay, Stroke.
Text formatting

UNIT II:
File: Save, File formats, Page set up.
Edit: Check spelling, Copy merged, Fill, Transform, Define pattern.
Image: Motion blur, Twirl, lens flare, Glowing edges, lighting effects, solarize, water paper, Stained glass, Mosaic Tiles.
Window: Character and Paragraph settings.

COREL DRAW:

UNIT III:
Drawing Tools: Pick, Shape, Knife, eraser, Smudge, Roughen brush, free transform, Zoom, hand, Free hand, Bezier, Artistic, Pen, Poly line, Point, Interactive connective, Spiral tool.

UNIT IV:
Special Effects: 3D effects, Add perspective, Blend, Contour, Artistic media, lens, and Power clip.
Shaping Options: Weld, trim, Intersect.
Text Effects: Format text, bullet, and fit text to path, align and straighten, spell check.
File Menu: Save, Save as, Import, Page set Up.

PAGE MAKER:

UNIT V:
Text layout, Style and Objects: Alignments, Styles, fill, frame options, Stroke, Group, Lock, unlock, mask, polygon settings character and paragraph settings.
Text Editing: Edit story: Undo, Redo, Cut, Copy, Paste, paste Special, Spelling check and Find.
File: Page set up, save, Save as.

TEXTBOOKS
1. CorelDraw IN Simple Steps – Shalini Gupta Corel DRAW Bible - DEBORAH MILLER
2. Teach Yourself Adobe Photoshop – Rose Carla Adobe Photoshop Cs Classroom in a Book by Adobe Press.
SEMESTER – III

COURSE CODE: U19SBE3P

HOURS: 2

CREDITS: 2

OFFICE AUTOMATION & DESKTOP PUBLISHING LAB

UNIT I:

Office Automation

1. MS – Word: Text Formatting, Mail Merge
2. Ms – Excel: Implement the Statistical & Mathematical Function
   ( Using Min, Max, Median, Average, Standard Deviation, Correlation, Logical ‘if’ Condition ) for the given data.

Prepare a Chart for a given Data using Pie diagram / Histogram

UNIT II:

Photoshop

3. Design a College Brochure / Birthday Card.
4. Cropping, rotating and Overlapping the image.
5. Create a single image from Multiple image.
6. Creating an image with multilayer’s.

UNIT III:

Corel Draw

8. Create a logo for a Company / College.

UNIT IV:

Page Maker

9. Type and format a letter using text tool.
PART – IV: VALUE EDUCATION - U19VE

HOURS: 2 CREDITS: 2

Learning Objectives

This subject deals with the

- Philosophy of life
- Individual qualities
- Social values
- Mind culture
- Personal health.

UNIT I:

PHILOSOPHY OF LIFE Human Life on Earth (Kural 629), Purpose of Life (Kural 46) Meaning and Philosophy of Life (Kural 131, 226) The Law of Nature (Kural 374) Glorifying All form of Life in this Universe (Kural 322, 327) – Protecting Nature / Univer

UNIT II:

INDIVIDUAL QUALITIES Basic Culture (Kural 72, 431) Thought Analysis (Kural 282, 467, 666) Regulating desire (Kural 367), Guarding against anger (Kural 158, 305, 306, 314), To get rid of Anxiety (Kural 629), The Rewards of Blessing (Kural 3), Benevolence of Friendship (Kural 786), Love and Charity (Kural 76), Self – tranquility / Peace (Kural 318)

UNIT III:

SOCIAL VALUES (INDIVIDUAL AND SOCIAL WELFARE) Family (Kural 45), Peace in Family (Kural 1025), Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807), The Pride of Womanhood (Kural 56) Five responsibilities/duties of Man : a) to himself, b) to his family, c) to his environment, d) to his society, e) to the Universe in his lives (Kural 43, 981), Thriftness (Thrifty) Economics (Kural 754), Health (Kural 298), Education (Kural 400), Governance (Kural 691), People’s responsibility/ duties of the community (Kural 37), World peace (Kural 572)

UNIT IV:

MIND CULTURE Mind Culture (Kural 457) Life and Mind - Bio - magnetism, Universal Magnetism (God – Realization and Self Realization) - Genetic Centre – Thought Action – Short term Memory – Expansiveness – Thought – Waves, Channelising the Mind, Stages - Meditation (Kural 261, 266, 270), Spiritual Value (Kural 423)

UNIT V:

TENDING PERSONAL HEALTH Structure of the body, the three forces of the body, life body relation, natural causes and unnatural causes for diseases (Kural 941), Methods in Curing diseases (Kural 948, 949) The Five units, simple physical exercises.
LEARNING OUTCOMES:
On successful completion of the course, the students should have acquired knowledge over
- Philosophy of life
- Individual qualities
- Social values
- Mind culture
- Personal health

TEXTBOOKS

1. Philosophy of Universal Magnetism (Bio-magnetism, Universal Magnetism) The World Community Service Centre Vethatri Publications (for Unit IV)

2. Pope, G.U., Dr. Rev., Thirukkural with English Translation, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613004 (for All Units)

3. Value Education for Health, Happiness and Harmony, The World Community Service Centre Vethatri Publications (for All Units)
PART – IV: SOFT SKILLS - U19SS

HOURS: 2
CREDITS: 2

Learning Objectives
This subject deals with knowledge of understanding
- Interpersonal skills
- Communicative skills
- Corporate skills
- Resume Writing.

LEARNING OUTCOMES:
On successful completion of the course, the students should have acquired knowledge over
- Interpersonal skills
- Communicative skills
- Corporate skills
- Resume Writing.

UNIT I:
Know Thyself / Understanding Self Introduction to soft skills self discovery – Developing positive attitude – Improving perceptions – Forming values.

UNIT II:
Interpersonal Skills/ Understanding Others Developing interpersonal relationship – Team building – group dynamics – Net working – Improved work relationship

UNIT III:
Communication Skills/ Communication with others Art of Listening – Art of reading – Art of speaking – Art of writing – Art of writing emails – e mail etiquette

UNIT IV:
Corporate Skills/ Working with Others Developing body language – Practising etiquette and mannerism – Time management – Stress management.

UNIT V:
Selling Self/ Job Hunting Writing resume / cv-interview skills – Group discussion – Mock interview Mock GD – Goal setting – Career planning

TEXT BOOKS
2. Soft Skills – Know Yourself & Know the World, S.Chand & Company LTD, Ram Nagar, New Delhi - 110 055. Mobile No: 94425 14814(Dr.K.Alex)

REFERENCE BOOKS
1. Developing the leader within you John C Maxwell
2. Good to Great by Jim Collins
3. The Seven habits of highly effective people Stephen Covey
4. Emotional Intelligence Daniel Goleman
5. You can Win Shive Khera

Principle centred leadership Stephen Covey
Learning Objectives
This subject deals with
- Concept of gender,
- Women’s Studies vs Gender Studies,
- Areas of Gender Discrimination,
- Women development and Gender Empowerment

Learning Outcomes:
On successful completion of the course, the students should have acquired knowledge over
- Concept of gender Women’s Studies vs Gender Studies Areas of Gender Discrimination
- Women development and Gender Empowerment

UNIT I:
Concepts of Gender: Sex-Gender-Biological Determinism- Patriarchy- Feminism -Gender Discrimination -Gender Division of Labour -Gender Stereotyping-Gender Sensitivity - Gender Equity — Equality-Gender Mainstreaming Empowerment

UNIT II:
Women’s Studies Vs Gender Studies: UGC’s Guidelines - VII to XI Plans- Gender Studies: Beijing Conference and CEDAW-Exclusiveness and Inclusiveness.

UNIT III:

UNIT IV:

UNIT V:
Women’s Movements and Safeguarding Mechanism:— In India National / State Commission for Women (NCW) - All Women Police Station Family Court- Domestic Violence Act - Prevention of Sexual Harassment at Work Place Supreme Court Guidelines - Maternity Benefit Act - PNDT Act - Hindu Succession Act 2003 Eve Teasing Prevention Act - Self Help Groups 73 and 74 Amendment for PRIS.

Textbooks
5. Agarwal Bina, Humphries Jane and Robeyns Ingrid (ed.,)


