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**ST. TERESA'S COLLEGE, ERNAKULAM**  
**(AUTONOMOUS)**

**Affiliated to Mahatma Gandhi University, Kottayam**



**CURRICULUM FOR**  
**BACHELOR'S PROGRAMME**  
**IN ZOOLOGY**

Under Choice Based Credit & Semester System  
& Outcome Based Education  
(2018 Admissions)

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**BZOO - B.Sc. ZOOLOGY**  
**PROGRAM SPECIFIC OUTCOMES**

**PSO1: Explain the major concepts and theoretical principles in the undergraduate programme in Zoology.**

**PSO2: Apply different domains of knowledge to deal with problems in Zoology**

**PSO3: Integrate critical thinking and scientific knowledge to design, perform, record and analyse experiments**

**PSO4: Develop communication skills to decipher and transmit the basic concepts and emerging trends in Zoology**

**PSO5: Apply the theoretical knowledge and skills in biology and Chemistry and environmental consciousness to identify, investigate and formulate new ideas and concepts**

**SEMESTER I**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>	<b>Course Type</b>
EN1A01B18	Fine-Tune Your English	4	Common Course I
EN1A02B18	Pearls From The Deep	3	Common Course I
FR1A01B18	French Language And Communicative Skills -I	4	Common Course II
HN1A01B18	Kahaani Aur Upanyas	4	
MA1A01B18	Kathasahithyam	4	
ZY1B01B18	General Perspectives In Science & Protistan Diversity	2	Core Course
CH1C01B18	Basic Theoretical And Analytical Chemistry	2	Complementary Course I
BO1C01B18	Cryptogams, Gymnosperms And Plant Pathology	2	Complementary Course II

**SEMESTER I**

**COMMON COURSE I**

**EN1A01B18– FINE-TUNE YOUR ENGLISH**

**Credits: 4**

**Total Lecture Hours: 90**

**Course Outcomes:**

**CO1:** Recognize the basics of English grammar

**CO2:** Choose the appropriate word classes

**CO3:** Identify common errors in the use of English language in various contexts

**CO4:** Apply the rules of grammar to comprehend, speak, and write grammatically correct English

**CO5:** Compose materials for business communication

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	1	3	1
<b>CO2</b>	1	1	1	3	1
<b>CO3</b>	1	1	1	3	1
<b>CO4</b>	1	1	1	3	1
<b>CO5</b>	1	1	1	3	1

**Syllabus Content:**

**Module I**

**(18 Hours)**

**The Sentence and its Structure**

How to Write Effective Sentences – Phrases: What are They? – The Noun Clauses – The Adverb

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Clause – “If All the Trees Were Bread and Cheese” – The Relative Clause – How Clauses are Conjoined

**Module II (18 Hours)**

**Word-Classes and Related Topics**

Understanding the Verb – Understanding Auxiliary Verbs – Understanding Adverbs – Understanding Pronouns – The Reflexive Pronoun – The Articles I – The Articles II – The Adjective – Phrasal Verbs – Mind your Prepositions

**Module III (18 Hours)**

**To Err is Human**

Concord – Errors – Common and Uncommon

**Spelling and Pronunciation**

Pronunciation: Some Tips – More Tips on Pronunciation – An awesome Mess? – Spelling Part II

**Module IV (18 Hours)**

**Tense and Related Topics**

‘Presentness’ and Present Tenses – The ‘Presentness’ of a Past Action – Futurity in English – Passivisation

**Interrogatives and Negatives**

Negatives – How to Frame Questions – What’s What? – The Question Tag

**Module V (18 Hours)**

**Conversational English**

Some time expressions – Is John There Please?

**Miscellaneous and General Topics**

Reading

Letter Writing

**In addition there will be an essay question on a gene**

**SEMESTER I**

**COMMON COURSE I**

**EN1A02B18 - PEARLS FROM THE DEEP**

**Credits: 3**

**Total Lecture Hours: 72**

**Course Outcomes:**

**CO1:** Name prominent literary figures and recognize various literary devices

**CO2:** Analyze inherent themes and motives

**CO3:** Identify the nuances of the age in which the literary work was written

**CO4:** Examine the different aspects of theatre

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	3	1
CO2	1	1	1	3	1
CO3	1	1	1	3	1
CO4	1	1	1	3	1

**Syllabus Content**

**Module I (Fiction)**

**(18hours)**

Ernest Hemingway: The Old Man and the Sea

**Module II (One Act Plays)**

**(18hours)**

Susan Glaspell: Trifles

Asif Currimbhoy: The Refugee

A.A Milne: The Boy Comes Home

**Module III (Short Stories)**

**(18hours)**

Guy De Maupassant: Two Friends

O. Henry: The Gift of Magi

K.A Abbas: Sparrows

Flora Annie Steel: Valiant Vicky, the Brave Weaver

**Module IV (Poems)**

**(18hours)**

Rumi: The Chance of Humming

Walter Scott: Lochinvar

John Keats: La Belle Dame Sans Mercy

Robert Frost: After Apple Picking

Chinua Achebe: Refugee Mother and Child

Kamala Das: My Grandmother's House

Ted Hughes: Jaguar

Pablo Neruda: Tonight I can Write the Saddest Lines

P.P Ramachandran: How Simple It Is!

**SEMESTER I**

**COMMON COURSE II**

**FR1A01B18 – FRENCH LANGUAGE AND COMMUNICATIVE SKILLS -I**

**Credits: 4**

**Total Lecture Hours: 72**

**Course Outcomes:**

**CO1:** Describe topics such as family, professions, time, place, likes and dislikes, daily life situations.

**CO2:** Develop language, vocabulary and grammar skills.

**CO3:** Articulate various speech sounds and their determined combinations.

**CO4:** Prepare conversations based on scenarios which helps while traveling

**CO5:** Articulate the concepts to express one's opinion in a specific situation.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	1	3	1
<b>CO2</b>	1	1	1	3	1
<b>CO3</b>	1	1	1	3	1
<b>CO4</b>	1	1	1	3	1
<b>CO5</b>	1	1	1	3	1



**Syllabus Content:**

**Module I**

**(25 hours)**

La population L'alphabét – Les chiffres – Identité – Se présenter – Poser des questions – Les professions – Les nationalités

**Module II**

**(23 hours)**

La banlieue Demander une information, un prix – l'heure – la ville

**Module III**

**(24 hours)**

Quartier de Paris Décrire un lieu – Indiquer un prix, un itinéraire.

**SEMESTER I**

**COMMON COURSE II**

**HN1A01B18 - KAHAANI AUR UPANYAS**

**Credits: 4**

**Total Lecture Hours: 72**

**Course Outcomes:**

**CO1:** Discuss story content and structure in depth

**CO2:** Analyse characterisation and comment on the development of the characters as the story/  
novel unfolds

**CO3:** Analyse short stories and novels on the basis of literary elements like plot, theme,  
metaphor, and image

**CO4:** Compare treatments of theme, character and subject matter of different short stories.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	1	3	1
<b>CO2</b>	1	1	1	3	1
<b>CO3</b>	1	1	1	3	1
<b>CO4</b>	1	1	1	3	1

**Syllabus Content:**

**Module I ( 16Hrs)**

Syllabus- Anthim Saakshya –Chandrakaanta Chapters 1 ,2

Eidgaah- Premchand

**Module II (20 hrs)**

Syllabus-Anthim Saakshya –Chandrakaanta Chapters 3, 4, 5 Jangal Ka Daah- Swayam Prakash  
ChchuttiKa Din- UshaPriyamvada

**Module- III (20hrs)**

Syllabus- Anthim Saakshya –Chandrakaanta Chapters 6,7,8MaaRasoi Mei Rehti Hai – Kumar  
Ambuj Kheer – Madhavi Kutty

**Module IV ( 16 Hrs)**

Syllabus- Anthim Saakshya –Chandrakaanta Chapters 9, 10 Heelibon Ki Baththakhe- Agyey

**SEMESTER I**

**COMMON COURSE II**

**MA1A01B18 - KATHASAHITHYAM**

**Credits: 4**

**Total Lecture Hours: 72**

**Course Outcomes:**

- CO1:** ചെറുകഥ, നോവൽ പഠനത്തിലൂടെ വായനാശേഷിയും ആസ്വാദനപ്രാപ്തിയും കൈവരിക്കൽ.
- CO2:** ചെറുകഥയുടെയും നോവലിന്റെയും കാലാനുസൃതമായ ഭാവുകത്വ പരിണാമം തിരിച്ചറിയൽ
- CO3:** നിലവിലുള്ള സാമൂഹ്യജീവിത യാഥാർത്ഥ്യങ്ങളെ അഭിമുഖീകരിക്കാൻ പ്രാപ്തരാക്കൽ
- CO4:** ആശയവിനിമയം, ഭാഷാവിഷ്കരണം എന്നീ ശേഷികൾ കൈവരിക്കുന്നു
- CO5:** കഥ, നോവൽ എന്നിവയുടെ വ്യതിരിക്ത സവിശേഷതകൾ തിരിച്ചറിയുന്നു.
- CO6:** പുതുകാലജീവിതാനുഭവങ്ങൾ വിലയിരുത്താൻ പര്യാപ്തരാകുന്നു

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	1	3	1
<b>CO2</b>	1	1	1	3	1
<b>CO3</b>	1	1	1	3	1
<b>CO4</b>	1	1	1	3	1
<b>CO5</b>	1	1	1	3	1
<b>CO6</b>	1	1	1	3	1

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**വണ്ഡം ഒന്ന്** **10 മണിക്കൂർ**

- 1.പുവമ്പഴം -കാരുർ
- 2.ഭൂമിയുടെ അവകാശികൾ -വൈക്കം മുഹമ്മദ്ബഷീർ

**വണ്ഡം രണ്ട്** **15മണിക്കൂർ**

- 1.കടൽ -ടി .പള്ളനാഭൻ
- 2.പെരുമഴയുടെ പിറ്റേന്ന് -എം. ടി. വാസുദേവൻ നായർ
- 3.മാനാഞ്ചിറടെസ്സ് -വി .കെ.എൻ
- 4.തരിശു നിലം -മാധവിക്കുട്ടി

**വണ്ഡം മൂന്ന്** **15മണിക്കൂർ**

- 1.ആർക്കറിയാം -സക്കറിയ
- 2.ഓരോഏഴുത്തുകാരിയുടെഉള്ളിലും -സാരാജോസഫ്
- 3.തിരുത്ത് -എൻ .എസ് .മാധവൻ
- 4.മോഹമത്തെ -കെ .ആർ .മീര

**വണ്ഡം നാല്** **10 മണിക്കൂർ**

- 1.അഗ്നി -സിതാര.എസ്
- 2.ബിരിയാണി -സന്തോഷ് എച്ചിക്കാനം
- 3.മോദസ്ഥിരനായി അങ്ങാടിപ്പുമല പോലെ -എസ്. ഹരീഷ്
- 4.സ്നേഹബഹുമാനപ്പെട്ട അന്നാമ്മയ്ക്ക്ഗീതാലക്ഷ്മി എഴുതുന്ന കത്ത് -പ്രിയ എ .എസ്
- 5.ചിലസ്വപ്നങ്ങളിൽ .....സീതാലക്ഷ്മിയുടെ കറുത്ത മുടിയിഴ -ഇന്ദുമേനോൻ

**വണ്ഡം അഞ്ച്** **22മണിക്കൂർ**

- ആടുജീവിതം -ബന്യാമിൻ

**SEMESTER I**

**COMPLEMENTARY COURSE I**

**CH1C01B18 BASIC THEORETICAL AND ANALYTICAL CHEMISTRY**

**Credits: 2**

**Total Lecture Hours: 36**

**Course Outcomes:**

**CO1:** Describe the Bohr atom model, types of bonds, Valence bond and VSEPR theories and Hybridization.

**CO2:** Explain the periodic properties of elements and concepts of chemical equilibrium.

**CO3:** Identify methods for separating a given organic compound from a reaction mixture and quantification of inorganic metal ions using titrimetric and gravimetric analysis

**CO4:** Differentiate between column chromatography, PC, TLC, GC, IEC and HPLC techniques

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	1	1	3
<b>CO2</b>	1	1	2	1	3
<b>CO3</b>	1	1	2	1	3
<b>CO4</b>	1	1	2	1	3

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**Syllabus**

**Module 1 : Atomic Structure and Chemical Bonding (12 Hrs)**

*Atomic Structure:* Bohr atom model and its limitations, Dual nature of matter and radiation. Photoelectric effect, de Broglie equation, Heisenberg's uncertainty principle, Concept of orbital, Quantum numbers, shapes of orbitals (*s, p, d*), Electronic configuration of atoms - Aufbau principle, Hund's rule of maximum multiplicity, Pauli's exclusion principle.

*Chemical Bonding:* Introduction – Type of bonds. Ionic bond: Factors favouring the formation of ionic bonds. Covalent bond: Valence bond theory – Coordinate bond. VSEPR theory and examples. Hybridisation: -  $sp^3$ ,  $sp^2$  and  $sp$  (ethane, ethene, ethyne). Intermolecular forces - Hydrogen bonding in H<sub>2</sub>O - Dipole-dipole interactions.

**Module II : Fundamental Concepts in Chemistry (9 hrs)**

*Periodic Properties:* Modern periodic law – Long form of periodic table. Periodicity in properties: Atomic radii, ionic radii, ionization enthalpy, electron affinity (electron gain enthalpy) and electronegativity (Pauling scale). Atomic mass - Molecular mass - Mole concept – Molar volume - Oxidation and reduction – Oxidation number and valency - Equivalent mass.

*Concept of Equilibrium:* Acids and Bases - Arrhenius, Lowry-Bronsted and Lewis theories. Ionic product of water - pH and pOH, Strengths of acids and bases -  $K_a$  and  $K_b$ ,  $pK_a$  and  $pK_b$ . Buffer solution. Solubility, solubility product, common ion effect and their applications.

**Module III : Basic Principles of Analytical Chemistry (9 Hrs)**

*Methods of Analysis:* Volumetric method of analysis - General principles. Primary and secondary standards, criteria for primary standards, preparation of standard solutions, standardization of solutions, end point. Acid base, redox and complexometric titrations and corresponding indicators. Double burette method of titration: Principle and advantages. Microanalysis and its advantages. Gravimetric method of analysis: General principles.

*Reporting of Analytical Data:* Precision and accuracy – Types of errors – Ways of expressing precision – Methods to reduce systematic errors.

*Separation and Purification Techniques:* Recrystallisation, use of drying agents, sublimation. General principles of distillation, fractional distillation, distillation under reduced pressure.

Solvent extraction.

**Module 1V: Chromatographic Techniques**

**(6 Hrs)**

Chromatography - Principle of differential migration. Classification of chromatographic methods. Basic principle and uses of Thin layer chromatography (TLC), Paper chromatography (PC),  $R_f$  value, Column chromatography, Gas chromatography(GC), High performance Liquid chromatography (HPLC), Ion Exchange chromatography (IEC).



**SEMESTER I**

**COMPLEMENTARY COURSE II**

**BO1C01B18 - CRYPTOGRAMS, GYMNOSPERMS AND PLANT PATHOLOGY**

**Credits: 2**

**Total Lecture Hours: 36**

**Course Outcomes:**

**CO1:** Identify the different cryptogam specimens by a detailed study of their characteristics and life cycles.

**CO2:** Explain the morphological, anatomical and reproductive features of bryophytes, pteridophytes and gymnosperms and their life cycles.

**CO3:** Describe the evolutionary advancement and diversity of the plant world

**CO4:** Identify major plant diseases based on symptoms, their causative organisms and the control measures adopted.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	2	1	3
<b>CO2</b>	1	1	2	1	3
<b>CO3</b>	1	1	2	1	3
<b>CO4</b>	1	1	2	1	3

**Syllabus Content:**

**CRYPTOGAMS**

**(27 hours)**

**Module I: Algae (13 hrs)**

Algae: General characters of algae and their classification up to classes (F E Fritsch); range of thallus variation in Algae. Reproduction and life history of the following groups with reference to the types mentioned: Cyanophyceae - Nostoc; Chlorophyceae - (Volvox, Spirogyra, Cladophora - vegetative features only), Oedogonium; Phaeophyceae – Sargassum; Rhodophyceae – Polysiphonia. Economic importance of Algae: food, industry, medicine, biofertilizers; algal bloom.

**Module II: Fungi and Lichens**

**(9 hours)**

Fungi: General characters and outline on the classification of fungi by Ainsworth. General characters, thallus structure, reproduction and life history of the following groups with reference to the types mentioned: Zygomycotina – Rhizopus; Ascomycetes – Xylaria; Basidiomycetes – Puccinia. Economic importance of Fungi: as food, industry, decomposition of organic matter. Fungal toxins and human health. Lichens: Classification based on thallus morphology. Usnea - morphology and anatomy of vegetative and reproductive structure. Economic importance of lichen: food, industry, medicine.

**Module III: Bryophytes**

**(5 hours)**

Bryophytes: General characters of Bryophytes. Morphology, anatomy, reproduction and life cycle of Riccia. Pteridophytes: General characters of Pteridophytes. Morphology, anatomy (stem), reproduction and life cycle of Selaginella.

**Module IV: Gymnosperms**

**(4hours)**

Gymnosperms: General characters of Gymnosperms. Morphology, anatomy (stem, root, coralloid root, rachis and leaf let), reproduction and life cycle of Cycas.

**PLANT PATHOLOGY (5 hrs)**

**Module V: Plant Diseases**

**(5hours)**

Plant diseases: Classification of plant diseases on the basis of causative organism and symptoms. Study the following diseases with special emphasis on causative organism, symptoms and control measures: (i) Nut fall of Arecanut (ii) Bacterial blight of Paddy (iii) Leaf mosaic of Tapioca.

**PRACTICAL**

**(36 hours)**

1. Micropreparation and identification preparation of the following: (i) Algae: Vegetative structure of Nostoc, Volvox, Spirogyra, Oedogonium, Cladophora, Polysiphonia. Vegetative and reproductive structure of Sargassum. (ii) Fungi: Vegetative and reproductive structure of Rhizopus, Xylaria, Puccinia. (iii) Lichen: Morphology of Usneathallus and apothecium. (iv) Bryophytes: Ricciathallus morphology and anatomy. (v) Pteridophytes: Selaginella – morphology (vegetative and reproductive) and anatomy (stem). (vi) Gymnosperms: Cycas – morphology (vegetative and reproductive) and anatomy of corolloid root, rachis and leaflet. 2. Identify plant diseases mentioned in the syllabus.

**SEMESTER I**

**CORE COURSE**

**ZY1B01B18 - GENERAL PERSPECTIVES IN SCIENCE & PROTISTAN DIVERSITY**

**Credits: 2**

**Total Lecture Hours: 36**

**Course outcome**

**CO1:** Explain perspectives in science

**CO2:** Differentiate the systematic principles for classification of animals.

**CO3:** Identify Protistan Diversity

**CO4:** Distinguish Parasitic protists

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	1
CO2	3	1	2	1	1
CO3	3	1	2	1	1
CO4	3	1	2	1	2

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**Syllabus Content**

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**PART I      PERSPECTIVES IN SCIENCE      8Hrs**

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**Module I      Introduction to Scientific Studies      4 Hrs**

Types of knowledge: practical, theoretical, and scientific knowledge. What is science, Features of science, Deductive and inductive models, scientific temper, empiricism, vocabulary of science.

**Module II      What is Biology?4 Hrs**

Life and its manifestations, History of Biology: Biology in ancient times Landmarks in the progress of Biology. Branches of Zoology, Scope of Zoology

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**PART II      SYSTEMATICS      10 Hrs**

**Module III      Taxonomical Principles and tools**

Systematic, Taxonomy, Phylogeny [Brief account], Approaches to taxonomy, Molecular taxonomy, Bar coding, Tree of Life, Zoological nomenclature, International Code of Zoological Nomenclature (ICZN), Law of Priority. Five Kingdom Classification; Linnaean classification, Basis for Animal kingdom classification [Levels of organization, Symmetry, Coelom],

Identification tools: Taxonomic key. Types: Single access key- Dichotomous [linked and nested] and Polytomous key, Multi access key, Computer aided Interactive Key, Advantages and Disadvantages.

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**PART III    PROTISTAN DIVERSITY** **18 Hrs**

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**Module IV    Kingdom    Protista**

**Type: Paramecium** **5 Hrs**

Salient features of Kingdom Protista **10 Hrs**

Classification of Protista up to phyla

1. Phylum Rhizopoda                   : Eg. Amoeba
2. Phylum Actinopoda                : Eg. Actinophrys
3. Phylum Dinoflagellata            : Eg. Noctiluca
4. Phylum Parabasalia               : Eg. Trichonympha
5. Phylum Metamonada               : Eg. Giardia
6. Phylum Kinetoplasta              : Eg. Trypanosoma
7. Phylum Euglenophyta             : Eg. Euglena
8. Phylum Cryptophyta               : Eg. Cryptomonas
9. Phylum Opalinata                 : Eg. Opalina
10. Phylum Bacillariophyta         : Eg. Diatoms
11. Phylum Chlorophyta              : Eg. Volvox
12. Phylum Choanoflagellata        : Eg. Proterospongia
13. Phylum Ciliophora                : Eg. Balantidium coli
14. Phylum Sporozoa                 : Eg. Plasmodium
15. Phylum Microsporidia          : Eg. Nosema
16. Phylum Rhodophyta              : Eg. Red Alga

(Mention any five general characters for each phylum. Detailed accounts of examples are not necessary.)

**General Topics:** **3 Hrs**

1. Parasitic protists (diseases mode of transmission and prophylactic measures) - Entamoeba, Trypanosoma, Plasmodium (detailed account of life cycle), Leishmania.

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**SEMESTER II**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>	<b>Course Type</b>
EN2A03B18	English 3 - Issues that Matter	4	Common Course I
EN2A04B18	English 4 - Savouring the Classics	3	Common Course I
FR2A03B18	French - French Language and communicative skills-II	4	Common Course II
MA2A03B18	Malayalam – Kavitha	4	
HN2A03B18	Hindi - Kavita Vyakaran Aur Anuvad	4	
CH2C01B18	Basic Organic Chemistry	2	Complementary Course I
CH2CP01B18	Volumetric Analysis	2	Complementary Course Practical
BO2C01B18	Plant Physiology	2	Complementary Course II
BO2CP01B18	Cryptogams, Gymnosperms, Plant Pathology and Plant Physiology	2	Complementary Course Practical
ZY2B02B18	Animal Diversity- Non Chordata	2	Core Course 2
ZY2BP01B18	General Perspectives in Science, Protistan Diversity & Animal Diversity –Non Chordata	2	Core Course Practical

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**SEMESTER II**

**COMMON COURSE I**

**EN2A03B18– ISSUES THAT MATTER**

**Credits: 4**

**Total Lecture Hours: 90**

**Course Outcomes:**

**CO1.** Identify the major issues of contemporary significance

**CO2.** Discuss the consequences of war and refugee crisis with respect to the psychological dimension

**CO3.** Employ theoretical learning in classrooms to current developments in the world

**CO4.** Critique the diverse experiences both historical and contemporary to create a more informed vision of the future

**CO5.** Develop oneself as a conscious, concerned, conscientious human being

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	1	3	1
<b>CO2</b>	1	1	1	3	1
<b>CO3</b>	1	1	1	3	1
<b>CO4</b>	1	1	1	3	1
<b>CO5</b>	1	1	1	3	1

**Syllabus Content:**

**Module 1**

**(18 hours)**

“The Unsundered People” – Kenzaburo Oe

“The Old Prison” – Judith Wright

“War” – Luigi Pirandello



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**Module 2** (18 hours)

Persuasions on the Power of the Word:

“On Censorship” – Salman Rushdie

“Peril” – Toni Morrison

“The Burning of the Books” – Bertolt Brecht

“The Censors” – Luisa Valenzuela

**Module 3** (18 hours)

“The Poisoned Bread” – Bandhu Madhav

“A Trip Westward” – Zitkala-Sa

“The Pot Maker” – Temsula Ao

**Module 4** (18 hours)

“Does it Matter?” – Richard Leakey

“On Killing a Tree” – Gieve Patel

“Hagar: A Story of a Woman and Water” (Gift in Green (chapter 2)) – Sarah Joseph

**Module 5** (18 hours)

“Understanding Refugeeism: An Introduction to Tibetan Refugees in India” – Mallica Mishra

“Refugee Blues” – W.H Auden

“The Child Goes to the Camp” (from Palestine’s Children) – Ghassan Kanafani

**SEMESTER II**

**COMMON COURSE I**

**EN2A04B18 - SAVOURING THE CLASSICS**

**Credits: 3**

**Total Lecture Hours: 72**

**Course Outcomes:**

**CO1:** Recognise the time-tested literary masterpieces from diverse cultures

**CO2:** Identify the representative authors from various genres (poetry, drama, novel, short fiction)

**CO3:** Recite celebrated lines from Classic works

**CO4:** Discuss the 'universals' of human condition

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	3	1
CO2	1	1	1	3	1
CO3	1	1	1	3	1
CO4	1	1	1	3	1

**Syllabus Content**

**Module 1 (Poems)**

**(18hours)**

Homer: "Father and Son" (Odyssey Book 16: 113-189) (Translated by Robert Fagles)

Kalidasa: "Lovely is Youth" (Translated by J.G Jennings)

Omar Khayyam: Rubaiyat (quatrains: 25-28) (Translated by Edward Fitzgerald)

Dante: Dante meets Virgil (Inferno Canto 1: 49-102) (Translated by J.G Nichols)

John Milton: "On his Blindness"

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**Module 2 (Shakespeare Excerpts) (18hours)**

Romeo and Juliet: Act II, Scene ii

The Merchant of Venice: Act IV, Scene i

**Module 3 (Novel Excerpts) (18hours)**

Miguel de Cervantes: Don Quixote (Chapter 8) (Translated by Edith Grossman)

Jane Austen: Pride and Prejudice (Chapters 1-6)

Victor Hugo: Les Miserables (Part 1- Fantine, Book II, Chapters 9-13) (Translated by Christine Donougher)

**Module 4 (Short Fiction) (18hours)**

Charles Dickens: The Black Veil

Leo Tolstoy: How Much Land Does a Man Need? (Translated by Louise & Aulmer Maude)

Rabindranath Tagore: Kabuliwala (Translated by Mohammad A Quayum)

Jorge Louis Borges: The Shape of the Sword (Translated by Andrew Hurley)

**SEMESTER II**  
**COMMON COURSE II**

**FR2A03B18 – FRENCH LANGUAGE AND COMMUNICATIVE SKILLS-II**

**Credits: 4**

**Total Lecture Hours: 72**

**Course Outcomes:**

**CO1:** Identify familiar everyday expressions and basic phrases.

**CO2:** Ask questions to get meaningful responses in effective communication.

**CO3:** Develop language, vocabulary and grammar skills.

**CO4:** Prepare conversations based on various situations

**CO5:** Articulate the concepts to express one's opinion in a specific situation.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	1	3	1
<b>CO2</b>	1	1	1	3	1
<b>CO3</b>	1	1	1	3	1
<b>CO4</b>	1	1	1	3	1
<b>CO5</b>	1	1	1	3	1

**Syllabus Content**

**Module I** (25 hours)

Chambre pour étudiants Localiser des objets – l'habitat – les meubles – l'appréciation

**Module II** (23 hours)

Petits boulots Téléphoner – Raconter – l'emploi

**Module III** (24 hours)

Le resto U Exprimer une opinion – Poser des questions – la nourriture

**SEMESTER II**

**COMMON COURSE II**

**HN2AO3B18 - KAVITA , VYAKARAN AUR ANUVAD**

**Credits : 4**

**Total Lecture Hours: 72**

**Course Outcomes:**

**CO1:**Contextualize and Summarise the poems of different genres in Hindi.

**CO2:**Evaluate the Poets contribution to Hindi literature.

**CO3:**Demonstrate linguistic ability for translation of texts between Hindi & English

**CO4:**Classify Parts of Speech

**CO5:**Illustrate greater fluency in Hindi by applying theoretical knowledge of Grammar

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	3	1
CO2	1	1	1	3	1
CO3	1	1	1	3	1
CO4	1	1	1	3	1
CO5	1	1	1	3	1

**Syllabus Contents**

**Module I (18 Hours)**

Vyaakaran

**Module II (20 Hours)**

Tulasidas

Kabir

Ve Muskathe Phool Nahi- Mahadevi Verma

Cheenane Aaye Hain Ve – Sarweshvar Dayal Saxena

Dilli Darwaaza – Kumar Vimal

Jungle Ke Ujaad Mei – Vinod Kumar Shukla

Aazadi Urf Gulaami – Gyanendrapathi

**Module III**

**( 20 Hours)**

Meera

Bazaar- Mangalesh Dabraal

Beesvi Sadi Ke Antim Dino Ka Aashcharya- Rajesh Joshi

Do Haathiyon Ki Ladaai- Uda Pakash

Thande Paani Ki Machine – Ekant Srivastav

Saboot – Arun Kamal

Tumhe Kuch Karna Chahiye – Chanrakanth Devthale

**Module IV**

**(14 Hours)**

Anuvaad

**SEMESTER II**  
**COMMON COURSE II**  
**MA2A03B18-കവിത**

ക്രെഡിറ്റ് : 4

പഠനസമയം : 72 മണിക്കൂർ

**കോഴ്സ് ഔട്ട്കോം (Course Outcome)**

**CO1.**പത്തൊൻപത് കവിതകളുടെ പഠനത്തിലൂടെ വായനാശേഷിയും ആസ്വാദന പ്രാപ്തിയും കൈവരിക്കൽ.

**CO2.**മലയാളകവിതകളിലെ കാലാനുസൃതമായ ഭാവുകത്വപരിണാമം തിരിച്ചറിയൽ.

**CO3.**നിലവിലുള്ള സാമൂഹ്യജീവിതയാഥാർത്ഥ്യങ്ങളെ അഭിമുഖീകരിക്കാൻ പ്രാപ്തമാക്കൽ.

**CO4.**പരിസ്ഥിതിസൗന്ദര്യശാസ്ത്രത്തെയും ചില സാമൂഹ്യചരിത്ര പശ്ചാത്തലങ്ങളെയും കുറിച്ച് ഗ്രഹിക്കൽ.

**CO5.**വിദ്യാർത്ഥികളുടെ സർഗ്ഗാത്മകശേഷി വികസിക്കൽ .

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	1	3	1
<b>CO2</b>	1	1	1	3	1
<b>CO3</b>	1	1	1	3	1
<b>CO4</b>	1	1	1	3	1
<b>CO5</b>	1	1	1	3	1

**ഖണ്ഡം ഒന്ന്-**

**20 മണിക്കൂർ**

1. മാംസനിബലമല്ല രാഗം -കുമാരനാശാൻ ( ലീലയിലെ 47 മുതൽ 74 വരെയുള്ള 28 ശ്ലോകങ്ങൾ)

2.സ്നേഹസുന്ദരപാതയിലൂടെ -വൈലോപ്പിള്ളി ('കുടിയൊഴിക്കലി'ലെ അവസാന ഖണ്ഡം)

**വണ്ഡം രണ്ട്**

**15 മണിക്കൂർ**

- 1.ഒറ്റയ്ക്കിരിക്കാൻ പഠിച്ചുകഴിഞ്ഞു ഞാൻ -സുഗതകുമാരി
- 2.കോഴി -കടമ്മനിട്ടരാമകൃഷ്ണപിള്ള
- 3.പഴഞ്ചൊല്ലുകൾ -സച്ചിദാനന്ദൻ
- 4.മുള്ളൻപന്നി -കെ.ജി.ശങ്കരപ്പിള്ള

**വണ്ഡം മൂന്ന്**

**15 മണിക്കൂർ**

- 1.തിരുത്ത്-പി .പി.രാമചന്ദ്രൻ
- 2.പിറക്കാത്ത മകൻ -ബാലചന്ദ്രൻ ചുള്ളിക്കാട്
- 3.മൃഗശിക്ഷകൻ -വിജയലക്ഷ്മി
- 4.കുന്നിമണികൾ-കുഞ്ഞുണ്ണി

**വണ്ഡം നാല്**

**22 മണിക്കൂർ**

- 1.ആടിയടില അലഞ്ഞ മരങ്ങളേ -അൻവർ അലി
- 2.കൽവീട് -വി.എം.ഗിരിജ
3. ആഴങ്ങൾ അടച്ചിട്ട പുഴ -എസ് .ജോസഫ്
- 4.സ്മാരകം -വീരാൻകുട്ടി
- 5.കുട്ടമ്മാൻ -എം.ർ.രേണുകുമാർ
- 6.നാഷണൽ ജ്യോഗ്രഫി -എസ് .കണ്ണൻ
- 7.വാഴക്കുല -കെ .ആർ.ടോണി
- 8.പഴയ ചിലത് -പി.രാമൻ
- 9.ഗോതമ്പുശിലം -കവിത ബാലകൃഷ്ണൻ



SEMESTER II

COMPLEMENTARY COURSE I

CH2C01B18 BASIC ORGANIC CHEMISTRY

Credits: 2

Total Lecture Hours: 36

Course Outcomes:

**CO1:** Apply the IUPAC nomenclature to name and write the structure of organic compounds including stereoisomers.

**CO2:** Explain the types of reagents, reactive intermediates, reaction mechanisms and the corresponding influencing factors in organic chemistry.

**CO3:** Explain stereoisomerism in organic chemistry.

**CO4:** Explain the classification, structure, properties, methods of preparation, uses and environmental toxicity of polymers.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	1	3
CO2	1	1	1	1	3
CO3	1	1	1	1	3
CO4	1	1	1	1	3

Syllabus Content

Module 1: Fundamental Concepts of Organic Chemistry

(9 hrs)

Introduction: Origin of organic chemistry – Uniqueness of carbon – Homologous series. IUPAC nomenclature of alkyl halides, alcohols, aldehydes, ketones, carboxylic acids and amines. Structural isomerism: Chain isomerism, position isomerism, functional isomerism, metamerism and tautomerism. Bond fission - homolytic and heterolytic fission. Types of reagents - Electrophiles and nucleophiles. Polarity of bonds. Reaction Intermediates: Carbocations,

carbanions and free radicals (Structure and stability). Types of organic reactions: Addition, Elimination, Substitution and Rearrangement (definition and one example each).

**Module II: Mechanisms of Organic Reactions (9 hrs)**

Meaning of reaction mechanism. Polarity of bonds. Electron Displacement Effects: Inductive effect - Definition - Examples - +I and -I groups. Applications: Explanation of substituent effect on the acidity of aliphatic carboxylic acids. Mesomeric effect: Definition – Characteristics - +M and -M groups, Applications. Hyperconjugation: Definition – Characteristics. Applications: Baker-Nathan effect, Comparison of stability of 2-methyl-1-butene & 2-methyl-2-butene. Steric effect (causes and simple examples).

*Substitution reactions:* nucleophilic substitution of alkyl halides- S<sub>N</sub>1 and S<sub>N</sub>2 mechanisms. Electrophilic substitutions in benzene.

*Addition reactions:* Electrophilic addition to alkene - Markwonikoff's rule, Peroxide effect.

*Elimination reactions:* E1 and E2 mechanisms. (General mechanism is only needed)

**Module III: Stereochemistry of Organic Compounds (9 hrs)**

*Stereoisomerism* – definition, classification.

*Geometrical Isomerism:* Definition – Condition – Geometrical isomerism in but-2-ene and but-2-ene-1,4-dioic acid. cis and trans, *E* and *Z* configurations. Methods of distinguishing and interconversion of geometrical isomers.

*Conformations:* Newman projection, Saw-horse projection. Conformations of ethane.

*Optical Isomerism:* Optical activity – Chirality – Enantiomers - Meso compounds - Diastereoisomers – Optical isomerism in lactic acid and tartaric acid - Racemisation and resolution (elementary idea only).

**Module IV: Natural and Synthetic Polymers (9 hrs)**

Introduction. Classification of polymers: Natural, synthetic; linear, cross-linked and network; plastics, elastomers, fibres; homopolymers and copolymers. Polymerization reactions. Typical examples: Polyethylene, polypropylene, PVC, phenol-formaldehyde and melamine-formaldehyde resins, polyamides (nylons) and polyesters. Natural rubber: structure, latex processing methods, vulcanization and uses. Synthetic rubbers: SBR, nitrile rubber and neoprene. Biodegradability of polymers, environmental hazards.

SEMESTER I and II

COMPLEMENTARY COURSE I (PRACTICAL)

CH2CP01B18: VOLUMETRIC ANALYSIS

Credits – 2

Total Hours: 72

Course Outcomes:

CO1: Prepare standard solutions for microscale volumetric analysis.

CO2: Record the molarity of the given intermediate solution by standardizing it.

CO3: Calculate the mass of the analyte in a given solution by microscale volumetric analysis.

CO4: Administer microscale analysis of solutions by different types of volumetry like acidimetry, alkalimetry, permanganometry, dichrometry, iodometry and iodimetry.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	3	1	2
CO2	1	1	3	1	2
CO3	1	1	3	1	2
CO4	1	1	3	1	2

Syllabus Content

Standard solution must be prepared by the student.

1. Acidimetry and Alkalimetry

1. Standardization of HCl with standard Na<sub>2</sub>CO<sub>3</sub> solution
2. Standardization of NaOH with standard oxalic acid solution
3. Estimation of any acid using standard NaOH
4. Estimation of any alkali using standard HCl.

**2. Permanganometry**

1. Standardization of  $\text{KMnO}_4$  using (i) oxalic acid (ii) Mohr's salt
2. Estimation of  $\text{Fe}^{2+}$  in Mohr's salt and crystalline Ferrous Sulphate using standard  $\text{KMnO}_4$ .

**3. Dichrometry**

1. Estimation of Ferrous ions (external indicator)
2. Estimation of Ferrous ions (internal indicator)
3. Estimation of  $\text{FeSO}_4 \cdot 7 \text{H}_2\text{O}$  (external indicator)

**4. Iodimetry and Iodometry**

1. Standardization of Iodine solution
2. Standardization of Sodium thiosulphate
3. Estimation of  $\text{KMnO}_4$
4. Estimation of Copper

**SEMESTER II**  
**COMPLEMENTARY COURSE II**  
**BO2C01B18 - PLANT PHYSIOLOGY**

**Credits: 2**

**Total Lecture Hours: 36**

**Course Outcomes:**

**CO1:** Discuss the mechanism of water and mineral absorption in plants.

**CO2:** Interpret the mechanisms of photosynthesis

**CO3:** Explain the translocation of photosynthate

**CO4:** Analyze the processes of growth and development in plants

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	1	3
CO2	1	1	1	1	3
CO3	1	1	1	1	3
CO4	1	1	1	1	3

**Syllabus Content:**

**Module 1: Water Relations**

**(10 hrs)**

Plant water relations: Physical aspects of water absorption - Diffusion, DP, DPD. Imbibition. Osmosis OP, Exosmosis, Endosmosis, Plasmolysis. Water potential and its components. Mechanism of water absorption by root - active and passive absorption. Movement of water towards xylem by apoplast and symplast pathway. Ascent of sap – theories - transpiration pull theory, root pressure theory; guttation.

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Transpiration: types, mechanism of transpiration and stomatal movement ( $K^+$  - ABA theory), significance and factors affecting transpiration, antitranspirants.

**Module 2: Mineral Nutrition**

**(5 hrs)**

General account on micro and macro nutrients. Absorbable form, function and deficiency symptoms of the following mineral nutrients: N, P, K, Mg, B, Fe, Zn.

**Module 3: Photosynthesis**

**(10 hrs)**

Basic requirements of Photosynthesis: Light - PAR; organs and site of photosynthesis; chloroplast. Photosynthetic pigments, photosynthetic unit; red drop and Emerson's enhancement effect; two pigment systems.

Mechanism of photosynthesis: light dependent reaction - cyclic and non cyclic photo phosphorylation. Light independent reaction (dark reactions) C<sub>3</sub> cycle, brief account on C<sub>4</sub> and CAM Cycles. Factors affecting photosynthesis. Photorespiration (brief study only).

**Module 4: Translocation of Photosynthate**

**(3 hrs)**

Translocation of photosynthate and organic solutes: path of translocation, mechanism of translocation (Pressure Flow Hypothesis).

**Module 5: Growth and Development**

**(8 hrs)**

Seed dormancy - causes of seed dormancy - methods of breaking dormancy. Germination of seeds - physiological changes. Growth: Phases of growth, plant growth regulators - auxins, gibberellins, cytokinins, abscissic acid and ethylene and their physiological role (brief study only). Photoperiodism definition, short day plants, long day plants, day neutral plants. Vernalization.

**COMPLEMENTARY COURSE II (PRACTICAL)**

**SEMESTER I**

**BO1C01B18 - CRYPTOGAMS, GYMNOSPERMS AND PLANT PATHOLOGY**

**Credits – 1**

**Total Hours: 36**

**Course Outcomes:**

**CO1.** Determine the distinctive features of plant groups and categorise them to correct groups in the plant kingdom using morphological, anatomical and reproductive features.

**CO2.** Distinguish common plant diseases that affect crops based on symptoms and recommend the preventive and remedial measures

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	3	1	2
<b>CO2</b>	1	1	3	1	2

**Syllabus Content**

1. Micropreparation and identification preparation of the following:
  - (i) Algae: Vegetative structure of *Nostoc*, *Volvox*, *Spirogyra*, *Oedogonium*, *Cladophora*, *Polysiphonia*. Vegetative and reproductive structure of *Sargassum*.
  - (ii) Fungi: Vegetative and reproductive structure of *Rhizopus*, *Xylaria*, *Puccinia*.
  - (iii) Lichen: Morphology of *Usnea* thallus and apothecium.
  - (iv) Bryophytes: *Riccia* thallus morphology and anatomy.
  - (v) Pteridophytes: *Selaginella* – morphology (vegetative and reproductive) and anatomy (stem).
  - (vi) Gymnosperms: *Cycas* – morphology (vegetative and reproductive) and anatomy of corolloid root, rachis and leaflet.
2. Identify plant diseases mentioned in the syllabus

**SEMESTER II**

**BO2C01B18- PLANT PHYSIOLOGY**

**Credit- 1**

**Total Hours: 36 hrs**

**Course Outcomes:**

**CO1.** Analyze the physiological requirements and responses in plants during water absorption and photosynthesis through defined experiments.

**CO2.** Determine plant growth responses using specific experimental apparatus.

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	3	1	2
<b>CO2</b>	1	1	3	1	2

**Syllabus Content**

**Core Experiments:**

1. Demonstration of osmosis using Potato tuber Osmoscope/Papaya petiole Osmoscope.
2. Separation of leaf pigments by paper chromatography.
3. Compare the stomatal indices of mesophytes and xerophytes.
4. Evolution of oxygen during photosynthesis.

**Demonstration experiments:**

1. Measure the rate of transpiration by Ganong's potometer.
2. Relationship between transpiration and absorption.
3. Measurement of growth using Arc Auxanometer.
4. Demonstration of geotropic curvature using Clinostat.
5. Mohl's half leaf experiment.
6. Ganong's Light screen experiment.



**SEMESTER II**

**CORE COURSE**

**ZY2B02B18: ANIMAL DIVERSITY - NON CHORDATA**

**Credits :2**

**Total Lecture Hours: 36**

**Course Outcomes**

**CO1:** Explain the classification of the lower groups of animal kingdom

**CO2:** Differentiate the characteristics and identify the non-chordates phyla.

**CO3:** Distinguish the economically important invertebrates.

**CO4:** Identify the larval forms of non-chordates.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	1	2	1	1
<b>CO2</b>	3	1	2	1	1
<b>CO3</b>	3	1	2	1	1
<b>CO4</b>	3	1	2	1	1

**Syllabus Contents**

**Module I: Kingdom Animalia**

**10 Hrs**

Outline classification of Kingdom Animalia

Three branches - Mesozoa, parazoa and Eumetazoa

Mesozoa: Phylum Orthonectida - Eg. Rhopalura (mention 5 salient features)

Parazoa: 1. Phylum Placozoa – Eg. Trycoplax adherens

2. Phylum Porifera – Classification upto classes; Mention gemmules

Class I: Calcarea. Eg. Sycon

Class II: Hexactinellida Eg. Euplectella

Class III: Demospongia Eg. Cliona.



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**Phylum Annelida**

**2 Hrs**

Salient features, Classification upto classes.

Class I: Archannelida	Eg. Polygordius
Class II: Polychaeta	Eg. Chaetopterus
Class III: Oligochaeta	Eg. Megascolex.
Class IV: Hirudinea	Eg. Ozobranchus, Hirudinaria

**Module III**

**11 Hrs**

**Phylum Onychophora** Eg. Peripatus (Mention its affinities)

**Phylum Arthropoda**

Salient features, Classification upto classes

Type: Prawn – Fenneropenaeus (Penaeus)

**1. Sub Phylum - Trilobitomorpha**

Class -Trilobita (mention the salient features) Eg. Triarthrus – A trilobite (extinct)

**2. Subphylum –Chelicerata**

Class 1 Merostomata (Xiphosura)	Eg. Limulus
Class 2. Arachnida	Eg. Palamnaeus- Scorpion
Class 3 Pycnogonida	Eg. Pycnogonum – Sea spider

**3. Subphylum- Crustacea**

Class 1 Branchiopoda	Eg. Daphnia
Class 2 Ostracoda	Eg. Cypris -seed shrimp
Class 3 Copepoda	Eg. Cyclops
Class 4 Remipedia	Eg. Speleonectes (eyeless crustacean seen in caves)
Class 5. Branchiura	Eg. Argulus (common fish louse)
Class 6 Cirripedia	Eg. Sacculina (parasitic castrator of crabs)
Class 7 Malacostraca	Eg. Squilla (spot tail mantis shrimp)

**4. Subphylum- Uniramia**

Class 1 Chilopoda	Eg. Scolopendra – (Centipede)
Class 2 Symphyla	Eg. Scutigera – (garden centipedes or pseudocentipedes)
Class 3 Diplopoda	Eg. Spirostreptus- (Millipede)

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Class 4 Pauropoda	Eg. Pauropus
Class 5 Hexapoda	Eg. Bombyx mori – (silk moth) (Insecta)

**Module IV**

**Phylum Mollusca**

**3 Hrs**

Salient features, Classification upto classes

Class I- Aplacophora	Eg. Neomenia
Class II- Monoplacophora	Eg. Neopilina
Class III Amphineura	Eg. Chiton
Class IV Gastropoda	Eg. Aplysia
Class V Scaphopoda	Eg. Dentalium
Class VI Pelecypoda (Bivalvia)	Eg. Pinctada
Class VII Cephalopoda	Eg. Sepia

**Phylum Echinodermata**

**3 Hrs**

Classification upto classes

Class I- Asteroidea	Eg. Astropecten
Class II- Ophiuroidea	Eg. Ophiothrix
Class III- Echinoidea	Eg. Echinus
Class IV- Holothuroidea	Eg. Holothuria
Class V – Crinoidea	Eg. Antedon

General Topics

- Larval forms of Echinodermata.

**Phylum Hemichordata:**

Eg. Balanoglossus

**2 Hrs**

**Minor Phyla**

1. Chaetognatha	Eg. Sagitta
2. Sipunculida	Eg. Sipunculus

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**SEMESTER II**

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**CORE COURSE- PRACTICAL**

**ZY2BP01B18: GENERAL PERSPECTIVES IN SCIENCE, PROTISTAN DIVERSITY & ANIMAL DIVERSITY – NON CHORDATA**

**Credits: 2**

**Total Hours: 72**

**Course Outcomes**

**CO1:** Dissect the prawn and cockroach nervous system and distinguish the body parts of non-chordates

**CO2:** Differentiate the characteristics and identify the non-chordate phyla.

**CO3:** Distinguish and classify the various protists and non chordates

**CO4:** Illustrate the non chordates

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	2	1	3	1	1
<b>CO2</b>	2	1	3	1	2
<b>CO3</b>	2	1	3	1	2
<b>CO4</b>	2	1	3	1	1

**SEMESTER I**

**CORE COURSE – PRACTICAL**

**GENERAL PERSPECTIVES IN SCIENCE AND PROTISTAN DIVERSITY**

1. Taxa, identification techniques  
Bird body parts  
Butterfly/ dragonfly body parts
2. Identification using keys  
Insects (Any 3 specimens)
3. General identification - The students are expected to identify any 6 Protistans studied by their generic names and write the general characters of their Phylum.
4. Identification of any 4 economically important protists/parasitic protists (Slides/ figures may be used for identification)

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5. Identification of two Protistans from pond water.

**SEMESTER II**  
**CORE COURSE –PRACTICAL**  
**ANIMAL DIVERSITY – NON CHORDATA**

Scientific Drawing:-

Make scientific drawings of 5 locally available invertebrate specimens belonging to different phyla.

Anatomy:-Study of sections (Any two)

1. Hydra
2. Ascaris (male and female)
3. Earthworm
4. Fasciola

Dissections:

1. Prawn - Nervous system
2. Cockroach - Nervous system

Mounting:-

1. Prawn appendages.
2. Mouth parts - Cockroach/ Plant bug/ House fly / Mosquito. (Any Three)

Identification:-

General identification & classification - The students are expected to identify, classify and describe the following Phylum -wise number of animals by their common names, generic names and 30% of these by their scientific names. Porifera-1, Coelenterata-3, Platyhelminthes-2, Annelida-2, Arthropoda-5, Mollusca- 4, Echinodermata-3.

Identification of (a) Parasitic protist – any 2 (b) larval forms of Fasciola- any 2(c) Nematode parasites of man- any 3 (Slides/figures may be used for study)

Taxonomic identification with key:-

Identification of insects up to the level of Order (any Four).

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**SEMESTER III**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>	<b>Course Type</b>
EN3A05B18	Literature and/as Identity	4	Common Course I
FR3A05B18	An Advanced course in French -I	4	Common Course II
HN3A05B18	Naatak AurLambi Kavita	4	
MA3A05B18	Drisyakalasaahithyam	4	
CH3C01B18	Inorganic and Organic Chemistry	3	Complementary Course I
BO3C01B18	Angiosperm Taxonomy and Economic Botany	3	Complementary Course II
ZY3B03B18	Animal Diversity - Chordata	3	Core Course III

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**SEMESTER III**

**COMMON COURSE I**

**EN3A05B18 – LITERATURE AND/AS IDENTITY**

**Credits: 4**

**Total Lecture Hours: 90**

**Course Outcomes:**

**CO1.** Explain how literature problematizes identity.

**CO2.** Analyze the quest for identity in the Indian diaspora.

**CO3.** Illustrate the effects of partition and communal violence in South Asian Literature.

**CO4.** Critique the social construction of identity.

**Mapping of Course Outcomes with Program Specific Outcomes**

<b>Mapping</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
<b>CO1</b>	1	1	1	3	1
<b>CO2</b>	1	1	1	3	1
<b>CO3</b>	1	1	1	3	1
<b>CO4</b>	1	1	1	3	1
<b>CO5</b>	1	1	1	3	1

**Syllabus Content**

**Module 1 (Diasporic Identities)**

**(18 hours)**

Agha Shahid Ali: Postcard from Kashmir

Amy Tan: Mother Tongue

Imtiaz Dharker: At the Lahore Karhai

Chitra Banerjee Divakaruni: Indian Movie, New Jersey

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**Module 2 (South Asian Identities)**

**(18 hours)**

Sadat Hassan Manto: The Dog of Tetwal

Intizar Hussain: A Chronicle of Peacocks

Selina Hossain: Fugitive Colours

Punakante Wijenaik: That Deep Silence

**Module 3 (Life Writings)**

**(18 hours)**

Malcolm X: —Nightmare, excerpt from *The Autobiography of Malcolm X*.

Sashi Deshpande: Learning to be a Mother in *Janani— Mothers, Daughters, Motherhood*, (Ed.) Rinki Bhattacharya.

**Module 4 (Indigenous Identities)**

**(18 hours)**

Leslie Marmon Silko: Lullaby

*Garhwali Songs in Painted Words- An Anthology of Tribal Literature* – Edited

by G.N. Devy

Mamang Dai: Pinyar the Widow (Excerpt from Legends of Pensam)

**Module 5 (Alter Identities)**

**(18 hours)**

Nathaniel Hawthorne: The Birth Mark

Girish Karnad: Hayavadana (Excerpt)

Ruskin Bond: The Girl on the Train

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**SEMESTER III**

**COMMON COURSE II**

**FR3A05B18- AN ADVANCED COURSE IN FRENCH - I**

**Credits: 4**

**Total Lecture Hours: 90**

**Course Outcomes:**

**CO1:** Describe topics such as physical appearance of a person, sports and entertainments.

**CO2:** Articulate the concepts to express ones opinion in a specific situation.

**CO3:** Compose conversations based on scenarios which help while shopping.

**CO4:** Articulate the concepts to give advice and instructions and to invite a person in a specific situation.

**CO5:** Construct conversations based on scenarios which help during medical and health consultations.

**Mapping of Course Outcomes with Program Specific Outcomes**

<b>Mapping</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
<b>CO1</b>	1	1	1	3	1
<b>CO2</b>	1	1	1	3	1
<b>CO3</b>	1	1	1	3	1
<b>CO4</b>	1	1	1	3	1
<b>CO5</b>	1	1	1	3	1

**Syllabus Content:**

**Module I** (30 hours)

**Jeunes artistes:** Décrire une personne - Exprimer une opinion - La description physique - Les spectacles

**Module II** (30 hours)

**Tenue de soirée :** Inviter - Les vêtements - Les chaussures - Les couleurs - Les matières

**Module III** (30 hours)

**Faites du sport ! :** Donner des conseils - Les parties du corps - Les mouvements - Les sports

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SEMESTER III

COMMON COURSE II- HINDI

HN3AO5B18 - NAATAK AUR LAMBI KAVITHA

Credits – 4

Total Lecturer Hours - 90

Course Outcomes:

Upon completion of this course, the student will be able to

CO1: Summarise the poems and Illustrate the socio-political and cultural concerns of the Author

CO2: Discuss the Authors contribution to Hindi Literature

CO3: Analyse the characterisation of the Drama Konark

CO4: Critique excerpts of the poems and Drama

CO5: Communicate in oral and written form of Hindi with competence.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	3	1
CO2	1	1	1	3	1
CO3	1	1	1	3	1
CO4	1	1	1	3	1
CO5	1	1	1	3	1

Module- I

22 Hours

Syllabus- Konark Introduction & Act 1 (Jagdishchandra Mathur)

Module- II

24 Hours

Syllabus- - Konark Act 2 & 3(Jagdishchandra Mathur)

**Module- III**

**22 Hours**

Syllabus-

Nagayi Mahura (Thrilochan)

Shahenshah Ki Neend (Umashankar Chaudhary)

Dhaaba- Nilesh Raghuvanshi

**Module- IV**

**22 Hours**

Syllabus-Ithni Door Mat Bhyahna Baba- Nirmala Putul

Jawahar Tunnel – Agnishekhar

സെമസ്റ്റർ : മൂന്ന്

കോമൺ കോഴ്സ് മലയാളം  
ബി.എ/ബി.എസ്.സി (റഗുലർ), ബി.എസ്.സി സൈക്കോളജി (സ്വാശ്രയം)

MA3A05B18- ദൃശ്യകലാസാഹിത്യം

Credits: 4

Total Lecture hours: 90

പഠനനേട്ടങ്ങൾ (Course Outcomes)

CO1: കേരളീയരംഗകലാപാരമ്പര്യവും സംസ്കാരപരിണാമവും ചർച്ചചെയ്യുക

CO2: ദൃശ്യകലാപഠനത്തിലൂടെ കേരളീയസംസ്കാരപരിണാമം, ചരിത്രം എന്നിവ അപഗ്രഥിക്കുക

CO3: കഥാപാത്രപഠനത്തിലൂടെ സമകാലികവിഷയങ്ങളെ വിലയിരുത്തുക

CO4: ഇതിവൃത്ത പഠനത്തിലൂടെ കഥാപാത്രങ്ങളെ വിമർശനാത്മകമായി നിരൂപണം ചെയ്യുക

CO5: സമകാലികസംഭവങ്ങളെ അടിസ്ഥാനമാക്കി നാടകം, ഹൃസ്വചിത്രം എന്നിവ തയ്യാറാക്കുക.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	3	1
CO2	1	1	1	3	1
CO3	1	1	1	3	1
CO4	1	1	1	3	1
CO5	1	1	1	3	1

**പാഠഭാഗങ്ങൾ**

ഖണ്ഡം ഒന്ന് - സംസ്കൃത നാടകം

20 മണിക്കൂർ.

മലയാളശാക്തളം നാലാമങ്കം - എ. ആർ രാജ രാജ വർമ

ഖണ്ഡം രണ്ട് - ആട്ടക്കഥ

15 മണിക്കൂർ

നളചരിതം (ഒന്നാം ദിവസം) - ഉണ്ണായി വാര്യർ (തുടക്കം മുതൽ ഹംസം നളനിലുള്ള പ്രണയം ഉറപ്പിക്കുന്നത് വരെ)

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<b>ഖണ്ഡം മുൻ - തുള്ളൽ</b>	<b>15 മണിക്കൂർ</b>
കല്യാണസൗഗന്ധികം (ശീതങ്കൻ തുള്ളൽ) - കുഞ്ചൻ നമ്പ്യാർ - (ഭീമൻറെ കദളീവന പ്രവേശം മുതൽ ശ്രീരാമ ദാസൻറെ വംശേ ജനിക്കയാൽ പാരം നിനക്കു മഹംഭാവമിങ്ങനെ' വരെ ഭാഗങ്ങൾ	
<b>ഖണ്ഡം നാല് - മലയാള നാടകം</b>	<b>20 മണിക്കൂർ</b>
1128 ൽ ക്രൈം 27 - സി. ജെ. തോമസ്	
<b>ഖണ്ഡം അഞ്ച്- സിനിമ</b>	<b>20 മണിക്കൂർ</b>
നിർമാല്യം തിരക്കഥ - എം. ടി. വാസുദേവൻ നായർ	

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**SEMESTER III**

**COMPLEMENTARY COURSE- II**

**BO3C01B18 -ANGIOSPERM TAXONOMY AND ECONOMIC BOTANY**

**Credits: 3**

**Total lecture hours - 54 hrs**

**Course Outcomes:**

**CO1:** Explain the morphological characters of angiosperms and distinguish the plant species based on their characteristic features.

**CO2:** Classify the angiosperm families based on Bentham and Hooker's classification and explain about the common angiosperm species of Kerala.

**CO3:** Compare the morphologically useful parts of plants having economic importance and classify the economically important plants of Kerala according to their uses.

**CO4:** Justify the use of medicinal plants for the treatment of various ailments by folkloric medicine and compare the morphologically important parts used for it.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	2	1	2
<b>CO2</b>	1	1	2	1	3
<b>CO3</b>	1	1	2	1	3
<b>CO4</b>	1	1	2	1	3

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SEMESTER III

COMPLEMENTARY COURSE- II

**CH3C01B18: INORGANIC AND ORGANIC CHEMISTRY**

**Credits: 3**

**Total lecture hours - 54 hrs**

**Course Outcomes:**

**CO1:** Explain the nuclear stability, fission and fusion processes and applications of radioactive isotopes.

**CO2:** Summarize the biochemical reactions taking place during photosynthesis and respiration and the role of metal ions in biological processes.

**CO3:** Explain the classification, uses and toxic effects of drugs, cosmetics, food additives, fertilizers and pesticides.

**CO4:** Illustrate the preparation, properties, structure and aromaticity of furan, pyrrole and pyridine.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PS01	PS02	PS03	PS04	PS05
<b>CO1</b>	1	1	1	1	3
<b>CO2</b>	1	2	1	1	2
<b>CO3</b>	1	1	1	1	2
<b>CO4</b>	1	1	2	1	3

**Syllabus Content:**

**Module I : Nuclear Chemistry**

**(12 Hrs)**

Nuclear Stability - Mass defect, Binding energy, Nuclear forces, Magic number, Packing fraction, n/p ratio. Natural and induced radioactivity, radioactivity – detection, Units of radioactivity. Modes of decay – Group displacement law. Isotopes, isobars and isotones with examples. Nuclear



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fission - Atom bomb – Nuclear fusion – Hydrogen bomb - Nuclear reactors - Nuclear reactors in India. Application of radioactive isotopes –  $^{14}\text{C}$  dating – Rock dating – Isotopes as tracers – Radio diagnosis and radiotherapy.

**Module II: Bioinorganic Chemistry and Agricultural Chemistry (18 Hrs)**

*Bioinorganic Chemistry:* Thermodynamics of Living cell- Exergonic and endergonic reactions. Metal ions in biological systems - Biochemistry of iron – Metalloporphyrins - Haemoglobin and myoglobin, pH of blood, cytochromes, Ferredoxine - Mechanism of  $\text{O}_2$  and  $\text{CO}_2$  transportation - Chlorophyll and photosynthesis (mechanism not expected) elementary idea of photophosphorylation. Photosynthesis and respiration – comparison. – Elementary idea of structure and mechanism of action of sodium potassium pump. Biochemistry of zinc and cobalt.

*Chemistry and Agriculture:* Fertilizers - NPK, superphosphates, triple super phosphate, uses of mixed fertilizers, micronutrients and their role, bio-fertilizers, plant growth hormones.

Pesticides - Classifications with simple examples, Biopesticides. Insecticides – stomach poisons, contact insecticides, fumigants. Method of preparation and use of DDT. Herbicides - function of 2, 4,-D and 2,4,5 -T, Fungicides - inorganic and organic- Bordeaux mixture. Excessive use of pesticides – environmental hazards.

**Module III : Heterocyclic Compounds (8 Hrs)**

Aromaticity – Huckel's rule, preparation (any one method), properties, structure and aromaticity of furan, pyrrole and pyridine.

**Module IV: Drugs (8 Hrs)**

Classification of drugs. Structure, therapeutic uses and mode of action (synthesis not required) of Antibiotics: Ampicillin, Sulpha drugs: Sulphanilamide, Antipyretics: Paracetamol, Analgesics: Aspirin, Antacids: Ranitidine, Antimalarials: Chloroquine and Anti-cancer drugs: Chlorambucil. Psychotropic drugs: Tranquilizers, antidepressants and stimulants with examples. Drug addiction and abuse. Prevention and treatment.

**Module V: Food Additives and Cosmetics**

**(8 Hrs)**

*Food Additives:* Food preservatives, artificial sweeteners, flavours, emulsifying agents, antioxidants, leavening agents and flavour enhancers (definition and examples, structures not required) – Structure of BHT, BHA and MSG - Commonly used permitted and non-permitted food colours (structures not required) - Fast foods and junk foods & their health effects – Soft drinks and their health effects.

*Cosmetics:* Introduction. Dental cosmetics, Shampoos, Hair dyes, Skin products, Shaving cream, Talcum powder, Perfumes and Deodorants (health effects).

**SEMESTER III**

**CORE COURSE III**

**ZY3B03B18: ANIMAL DIVERSITY –CHORDATA**

**Credits – 3**

**Duration: One Semester**

**Total Lecture Hours: 54**

**Course outcome**

**CO1:** Summarize general characters, origin and outline classification of Chordata.

**CO2:** Compare general characters and classification of Vertebrata.

**CO3:** Distinguish different Orders coming under Tetrapoda.

**CO4:** Illustrate salient characteristics of mammals and classify them into different orders.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	1	2	1	2
<b>CO2</b>	3	1	2	1	2
<b>CO3</b>	3	1	2	1	2
<b>CO4</b>	3	1	2	1	2

**Syllabus Content**

**MODULE I**

**Introduction**

**(1 Hr)**

General Characters and outline classification of Chordata up to class,

Origin of Chordates – mention theories in brief

Protochordates

**General characters and Classification**

**( 2 Hrs)**

1. Sub phylum: Urochordata

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Class I Larvacea Eg. Oikopleura

Class II Ascidiacea Eg: Ascidia (Mention Retrogressive Metamorphosis)

Class III Thaliacea Eg: Doliolum

**2. Sub phylum: Cephalochordata (2 Hrs)**

Example - Amphioxus (Structure and affinities)

## **MODULE II**

**3. Sub phylum: Vertebrata General characters and Classification (2 Hrs)**

### **4. Division 1– Agnatha**

Class I Ostracodermi Eg: Cephalaspis

Class II Cyclostomata Eg: Petromyzon

**Division 2 - Gnathostomata (10 Hrs)**

Super class Pisces

General Characters and Classification

Class: Chondrichthyes - General Characters

Sub class - Elasmobranchi Eg: Narcine

Sub class - Holocephali Eg: Chimaera

Class: Osteichthyes - General Characters

Sub class - Choanichthyes

Order 1 Crossopterygii (Coelocanth) Eg: Latimeria (Evolutionary Significance)

Order 2 Dipnoi Eg: Lepidosiren - Distribution, affinities and systematic position of lung fishes.

Sub class: - Actinopterygii

Super order 1. Chondrostei Eg: Acipenser

Super order 2. Holostei Eg: Amia

Super order 3. Teleostei Eg: Sardine

### **General topics**

1. Accessory respiratory organs in fishes.
2. Parental care in fishes.
3. Scales in fishes.
4. Migration in fishes

**MODULE III**

**Super class: Tetrapoda General characters, Classification up to Orders ( 11 Hrs)**

Class Amphibia - Type Frog (*Euphlyctis hexadactylus*)

Order I : Anura Eg: *Hyla*

Order II :Urodela Eg: *Amblystoma* (mention axolotl larva and Paedomorphosis /neotony)

Order III Apoda Eg: *Ichthyophis*.

**Class Reptilia ( 4 Hrs)**

Sub class I: Anapsida

Order Chelonia Eg: *Chelone*

Sub class II: Parapsida Eg: *Ichthyosaurus*

Sub class III: Diapsida

Order I Rhynchocephalia Eg: *Sphenodon*

Order II Squamata Eg: *Chamaleon*

Order III. Crocodilia Eg..*Crocodylus*

Sub class IV: Synapsida Eg: *Cynognathus*

General topic

Identification of poisonous and non-poisonous snakes

Poisonous and non-poisonous snakes

**Class Aves (5 Hrs)**

Sub class I: Archeornithes Eg: *Archaeopteryx* (Affinities)

Sub class II: Neornithes

Super order I: Palaeognathe Eg: *Struthio*

Super order II: Neognathe Eg: *Brahminy kite*

General topics

1. Migrations in birds

2. Flight adaptations in birds

## **MODULE IV**

**Class Mammalia Type: Rabbit (*Oryctolagus cuniculus*)**

**( 17 Hrs)**

Brief mention of general characters and classification up to order with example. (Mention any five salient features of each order, detailed accounts of examples are not necessary) Sub class I:

Prototheria Eg: Echidna, Ornithorhynchus

Sub class II: Metatheria Eg: Macropus

Sub class III: Eutheria

Order 1 Insectivora Eg: Talpa

Order 2 Dermoptera Eg: Galeopithecus

Order 3 Chiroptera Eg: Pteropus

Order 4 Primates Eg: Loris

Order 5 Carnivora Eg: Panthera

Order 6 Edentata Eg: Armadillo

Order 7 Pholidota Eg: Manis

Order 8 Proboscidea Eg: Elephas

Order 9 Hydracoidea Eg: Procavia

Order 10 Sirenia Eg: Dugong

Order 11 Perissodactyla Eg: Rhinoceros

Order 12 Artiodactyla Eg: Camelus-mention ruminant stomach

Order 13 Lagomorpha Eg: Oryctolagus

Order 14 Rodentia Eg: Hystrix (Porcupine)

Order 15 Tubulidentata Eg: Orycteropus

Order 16 Cetacea Eg: Delphinus

### **General topics**

1. Dentition in Mammals
2. Aquatic Mammals and their adaptations.

**SEMESTER IV**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>	<b>Course Type</b>
EN4A06B18	Illuminations	4	Common Course I
FR4A06B18	An Advanced course in French –II	4	Common Course II
HN4A06B18	Gadya Aur Ekanki	4	
MA4A06B18	Malayala Gadhyarachanakal	4	
CH4C01B18	Advanced Bio-Organic Chemistry	3	Complementary Course I
CH4CP01B18	Organic Chemistry Practicals	2	Complementary Course Practical
BO4C01B18	Anatomy and Applied Botany	3	Complementary Course II
BO4CP01B18	Angiosperm Taxonomy, Economic botany, Anatomy and Applied Botany (Practical)	2	Complementary Course Practical
ZY4B04B18	Research methodology, Biophysics & Biostatistics	3	Core Course
ZY4BP02B18	Animal Diversity –Chordata, Research methodology, Biophysics & Biostatistics	2	Core Practicals

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**SEMESTER IV**

**COMMON COURSE I**

**EN4A06B18 – Illuminations**

**Credits: 4**

**Total Lecture Hours: 90**

**Course Outcomes:**

**CO1:** Discover life lessons through the study of life sketches.

**CO2:** Explain multiple perspectives of life from the viewpoint of great minds.

**CO3:** Apply the language skills acquired in academic and non-academic contexts.

**CO4:** Analyze creative texts with a special focus on human emotions and the spirit of survival.

**CO5:** Critique the conventional notions of happiness, courage and failure.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	3	1
CO2	1	1	1	3	1
CO3	1	1	1	3	1
CO4	1	1	1	3	1
CO5	1	1	1	3	1

**Syllabus Content**

**Module I- Life Sketches**

**(18 hours)**

Helen Keller: Three Days to See

Jesse Owens: My Greatest Olympic Prize

Thus Spoke Sudarshan: An Interview with God's Own Physicist Compiled from E C G

Sudarshan's interviews



**Module II- Essays** (18 hours)

Stephen Leacock: Are the Rich Happy?

A.G. Gardiner: On Courage

**Module III- Speeches** (18 hours)

Lafcadio Hearn: On Reading

J.K. Rowling: The fringe benefits of failure and the importance of imagination

Chimamanda Ngozi Adichie: An Ode to Makeup

**Module IV- Short Stories** (18 hours)

Oscar Wilde: The Nightingale and the Rose

George Orwell: Roucolle, the Miser

John Galsworthy: Quality

Alice Walker: Everyday Use

**Module VI- Poems** (18 hours)

William Ernest Henley: Invictus

Robert Frost: The Road Not Taken

Kahlil Gibran: Of Good and Evil

Maya Angelou: Still I Rise

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SEMESTER IV

COMMON COURSE II

**FR4A06B18-AN ADVANCED COURSE IN FRENCH II**

**Credits: 4**

**Total Lecture Hours: 90 hours**

**Course Outcomes:**

**CO1:** Develop language, vocabulary and grammar skills.

**CO2:** Prepare conversations based on various situations and speak about them.

**CO3:** Articulate the concepts to express one's opinion in a specific situation.

**CO4:** Ask questions to get meaningful responses in effective communication.

**CO5:** Describe events or topics based on various daily life situations such as persons, family, time schedules, visiting countries

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	3	1
CO2	1	1	1	3	1
CO3	1	1	1	3	1
CO4	1	1	1	3	1
CO5	1	1	1	3	1

**Syllabus Content:**

**Module I (30 Hours)**

**En voiture** Proposer – Accepter – Refuser – Faire des projets- Les routes – La voiture

**Module II (30 Hours)**

**Sur la route** Exprimer l'obligation/ L'interdiction – La météo– Le temps

**Module III (30 Hours)**

**Raconter un emploi du temps** Se justifier – Le tourisme - Les pays et les continents

**SEMESTER IV**

**COMMON COURSE II**

**HN4AO6B18 - GADYA AUR EKAANKI**

**Credits: 4**

**Total Lecture Hours: 90**

**Course Outcomes:**

**CO1:** Discuss the authors contribution to Hindi Literature

**CO2:** Summarise the central theme and other relevant details of all literary works.

**CO3:** Illustrate the socio-political and cultural concerns of the Author

**CO4:** Critique excerpts of the Prose and One Act Plays

**CO5:** Communicate in oral and written form of Hindi with competence.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	1	3	1
<b>CO2</b>	1	1	1	3	1
<b>CO3</b>	1	1	1	3	1
<b>CO4</b>	1	1	1	3	1
<b>CO5</b>	1	1	1	3	1

**Syllabus Content:**

**Module- I** (22 hours)

1. Aaiye hum vriksh devta ki aaradhana karen- Dr. Kishorilal vyas
2. Raajniti ka batvaara- Harishankar parsai
3. Deep daan – Ramkumar verma

**Module- II** (24 hours)

4. Himachadit uttung shikhar aur dhuli hariyali – Vijay kumar sandesh
5. Kaphan chor ka beta – Ushabaala
6. Bahu ki vida- Vinod rastogi

**Module- III** (22 hours)

7. Jab mai fail hua- Ramkumar Verma
8. Jaan se pyare – Mamta Kaaliya
9. Sati – G.K. Harjeeth

**Module- IV** (22 hours)

10. Jab intizar hussain apni janmabhoomi laute – Azhar vajahat
11. Hari ghaas par ghante bhar – Surendra verma

**SEMESTER IV**

**COMMON COURSE II**

**MA4A06B18 - മലയാള ഗദ്യരചനകൾ**

**Credits: 4**

**Total Lecture Hours: 90**

**Course Outcomes:**

**CO1:** മലയാള ഗദ്യസാഹിത്യത്തിലെ സമകാലിക വിഷയങ്ങൾ ചർച്ച ചെയ്യുക

**CO2:** കേരളീയസംസ്കാര - കലാപരിണാമം , ചരിത്രം, ആത്മകഥ എന്നിവ അപഗ്രഥിക്കുക

**CO3:** ഗദ്യപാഠങ്ങളിലൂടെ സമകാലികവിഷയങ്ങളെ വിലയിരുത്തുക

**CO4:** സമകാലിക സാമൂഹിക വിഷയങ്ങളെ വിമർശനാത്മകമായി നിരൂപണംചെയ്യുക

**CO5:** വിവിധ വിഷയങ്ങളെ ആസ്പദമാക്കി ലേഖനങ്ങൾ തയ്യാറാക്കുക. സ്യാനുഭവങ്ങൾ വിവിധ ആഖ്യാന രൂപങ്ങളിലൂടെ ആവിഷ്കരിക്കുക.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	1	3	1
<b>CO2</b>	1	1	1	3	1
<b>CO3</b>	1	1	1	3	1
<b>CO4</b>	1	1	1	3	1
<b>CO5</b>	1	1	1	3	1

**പാഠഭാഗങ്ങൾ**

**പുസ്തകങ്ങൾ : ഗദ്യാരാമം , ഓർമ്മകൾ ചന്ദനഗന്ധം പോലെ**

**ഖണ്ഡം ഒന്ന്** **15 മണിക്കൂർ**

1. കാളിദാസനും കാലത്തിന്റെ ദാസൻ - ജോസഫ് മുണ്ടശ്ശേരി
2. മേഘസന്ദേശവിവർത്തനങ്ങൾ - ഡോ. എൻ .അജയകുമാർ
3. മാതൃഭാഷയിലേക്കു വീണ്ടും - എൻ .വി . കൃഷ്ണവാര്യർ

**ഖണ്ഡം രണ്ട്** **20 മണിക്കൂർ**

1. വാക്കുകളുടെ വിസ്തൃതം - എം .ടി.വാസുദേവൻനായർ
2. മാറുന്ന മലയാള സംസാരഭാഷ - ടി .ബി .വേണുഗോപാലപ്പണിക്കർ
3. നമ്മുടെ അടുക്കള തിരിച്ചുപിടിക്കുക - സാനാ ജോസഫ്
4. കലയും കലാദർശനവും - ഡോ. ജെ . ഉണ്ണികൃഷ്ണപിള്ള

**ഖണ്ഡം മൂന്ന്** **15 മണിക്കൂർ**

1. ചെമ്പൈ വൈദ്യനാഥ ഭാഗവതർ സംഗീതത്തിലെ സിംഹനാദം - ഇന്ദിരാമേനോൻ
2. ഈശ്വരപിള്ളയെ ആരോർക്കുന്നു - പി. കെ . രാജശേഖരൻ
3. രവിവർമ്മ - വിജയകുമാർ മേനോൻ

**ഖണ്ഡം നാല്** **15 മണിക്കൂർ**

1. പ്രകാശത്തിന്റെ ആയിരം തടവറകൾ - ജീവൻ ജോബ് തോമസ്
2. ജനാധിപത്യ വിദ്യാഭാസം ചില ചിന്തകൾ - ഡോ. കെ .എൻ. പണിക്കർ
3. ഞങ്ങൾ നിങ്ങൾക്ക് ഭൂമി വിറ്റാൽ - സിയാറ്റിൽ മൂപ്പൻ

**ഖണ്ഡം അഞ്ച്** **25 മണിക്കൂർ**

1. ഓർമ്മകൾ ചന്ദനഗന്ധം പോലെ - ബി. സരസ്വതിയമ്മ

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SEMESTER IV

COMPLEMENTARY COURSE I

**CH4C01B18: ADVANCED BIO-ORGANIC CHEMISTRY**

**Credits: 3**

**Total lecture hours - 54 hrs**

**Course Outcomes:**

**CO1:** Summarize the classification, isolation and properties of essential oils, alkaloids and lipids.

**CO2:** Explain the structure, classification and biological functions of Amino acids, proteins, enzymes, nucleic acids, vitamins, steroids and hormones.

**CO3:** Summarize the preparation, properties and configuration of glucose, fructose, sucrose, starch and cellulose.

**CO4:** Explain the classification, cleaning action and environmental effects of soaps and detergents.

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	1	3
CO2	1	1	2	1	3
CO3	1	1	2	1	3
CO4	1	1	2	1	3
CO5	1	1	2	1	3

**Syllabus Content:**

**Module I : Natural Products**

**(12 Hrs)**

*Terpenoids:* Classification with examples – Isoprene rule – Isolation of essential oils by steam distillation – Uses of lemongrass oil, eucalyptus oil and sandalwood oil - Source, structure and uses of citral and geraniol.

*Alkaloids:* Classification – Isolation, general properties. Source, structure and physiological activity of nicotine, coniine and piperine.

*Lipids:* Classification – Oils, fats and waxes (definition, structure, biological functions and examples). Hydrogenation and Rancidity - Acid value, Saponification value and Iodine value –. Biological functions of phospholipids and glycolipids

*Soaps and Detergents:* Soaps – Types of soaps. Cleansing action of soaps. Synthetic detergents - Classification. Comparison between soaps and detergents. Environmental aspects.

**Module II: Amino Acids and Proteins**

**(12 Hrs)**

*Amino acids:* Classification – Zwitter ion formation and isoelectric point- Synthesis of glycine, alanine, and phenyl alanine (any one method). Peptides: Peptide bond. Synthesis of peptides (upto dipeptides). Proteins: Classification of proteins – Primary, secondary and tertiary structure of proteins -- Denaturation of proteins – Tests for proteins.

**Module III : Enzymes and Nucleic Acids**

**(9 Hrs)**

*Enzymes:* Nomenclature, classification and characteristics. Mechanism of enzyme action. Theory of enzyme catalysis – Michaelis-Menten theory. Cofactors and coenzymes. Enzyme inhibitors. Uses of enzymes.

*Nucleic acids:* Structure of pentose sugar, nitrogenous base, nucleoside and nucleotide – Double-helical structure of DNA – Differences between DNA and RNA. Biological Functions – Replication and protein biosynthesis. Transcription and Translation. Genetic code.

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*Energy rich molecules:* Elementary structure of ATP, ADP and AMP.

**Module IV : Carbohydrates**

**(12 Hrs)**

Classification with examples. Preparation and properties of glucose, fructose and sucrose. Cyclic structures and Haworth projections of glucose, fructose, maltose and sucrose (ring size determination not expected). – Mutarotation. Conversion of glucose to fructose and vice versa. – Structure of starch and cellulose (structure elucidation not expected). Industrial applications of cellulose.

**Module V: Vitamins, Steroids and Hormones**

**(9 Hrs)**

*Vitamins:* Classification. Structure, biological functions and deficiency diseases of vitamins A, B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, B<sub>5</sub>, B<sub>6</sub>, B<sub>12</sub> (structure not required), C and D.

*Steroids:* Introduction. Structure and functions of cholesterol. Elementary idea of HDL and LDL. Bile acids.

*Hormones:* (only examples and biological functions needed. Structures are not needed.) Introduction. Steroid hormones, peptide hormones and amine hormones (examples, endocrine gland and biological functions, structure not required). Artificial hormones (elementary study only).

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SEMESTER IV

COMPLEMENTARY COURSE PRACTICAL

CH4CP01B18- ORGANIC CHEMISTRY PRACTICALS

Credit – 2

Total Hours: 72 Hrs

Course Outcomes:

CO1: Determine the heteroatoms present in an organic compound.

CO2: Identify the functional groups present in an organic compound.

CO3: Recall method of preparation of solid derivative of the analyzed organic compound.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	2	1	3
CO2	1	1	2	1	3
CO3	1	1	2	1	3

Syllabus Content:

1. Tests for elements: Nitrogen, Halogen and Sulphur
2. Determination of physical constants
3. Study of reactions of common functional groups.
4. Qualitative analysis with a view to characterization of functional groups and identification of the following compounds: Naphthalene, anthracene, chlorobenzene, benzyl chloride, p-dichlorobenzene, benzyl alcohol, phenol, o-, m- and p- cresols,  $\alpha$ -naphthol,  $\beta$ -naphthol, resorcinol, benzaldehyde, acetophenone, benzophenone: benzoic acid, phthalic acid, cinnamic acid, salicylic acid, ethyl benzoate, methyl salicylate, benzamide, urea, aniline,

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o-, m- and p- toluidines, dimethyl aniline, nitrobenzene, o-nitrotoluene, m-dinitrobenzene and glucose. (minimum of ten compounds to be analysed).

5. Organic preparation involving halogenation, nitration, oxidation, reduction, acetylation, benzylation, hydrolysis, diazotization. ( non- evaluative)
6. Isolation of an organic compound from a natural source. ( non- evaluative)

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SEMESTER IV

COMPLEMENTARY COURSE II

**BO4C01B18 - ANATOMY AND APPLIED BOTANY**

**Credits- 3**

**Total Lecture Hours – 54**

**Course Outcomes**

**CO1:** Identify the differences in the anatomy of root and stem of dicots and monocots with special reference to its primary and secondary structure.

**CO2:** Classify the plants into different ecological groups based on their morphological and anatomical adaptations.

**CO3:** Apply the crop improvement practices in plant breeding like hybridization and plant propagation methods in real life scenario

**CO4:** Analyze the various principles, practices involved in the tissue culture and its significance

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	2	1	3
CO2	1	1	2	1	3
CO3	1	1	2	1	3
CO4	1	1	2	1	3

**Syllabus Content:**

**PLANT ANATOMY (34 hrs)**

**Module 1: Cells and Tissues (9 hrs)**

Gross structure of primary and secondary cell walls; structure and function of Plasmodesmata; non- living inclusions - cystolith, raphides; Tissues - meristematic and permanent, types of

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meristems; simple and complex tissues, secretory tissues (nectaries, hydathodes, mucilage ducts and lactiferous tissue)

**Module 2: Anatomy of Plant Organs (16 hrs)**

Primary structure of stem and root in dicots and monocots; anatomy of monocot and dicot leaf. Secondary thickening in dicot stem and dicot root; growth rings, dendrochronology, heart wood and sap wood; tyloses; hard wood and soft wood.

Anomalous secondary thickening in Bignonia.

**Module 3: Ecological Anatomy (9 hrs)**

Study of the morphological and anatomical adaptations of the following groups: Hydrophytes – Nymphaea, Hydrilla; Xerophytes – Nerium; Epiphytes – Vanda; Halophytes – Avicennia/ Rhizophora.

**APPLIED BOTANY (20 hrs)**

**Module 4: Plant Breeding (14 hrs)**

Objectives of plant breeding, methods of plant improvement - plant introduction, acclimatization, plant quarantine; selection - mass selection, pureline selection and clonal selection; hybridization-intervarietal, interspecific and intergeneric; procedure of hybridization.

Artificial vegetative propagation methods. Propagation of plants through cutting, layering - air layering; budding T and patch budding; grafting - tongue and splice grafting. Role of cambium in budding and grafting.

**Module 5: Plant Tissue Culture (6 hrs)**

Principles of tissue culture, micropropagation - different steps - selection of explants, culture media, sterilization (explants and culture media), callus. Regeneration of plants: organogenesis, somatic embryogenesis; artificial seeds. Applications of plant tissue culture.

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SEMESTER IV

**COMPLEMENTARY COURSE PRACTICAL**

**BO4CP01B18- ANGIOSPERM TAXONOMY, ECONOMIC BOTANY, ANATOMY AND  
APPLIED BOTANY**

**Credits- 2**

**Total Lecture Hours – 36**

**Course Outcomes**

**CO1:** Distinguish the plants of various categories based on their morphological, ecological and anatomical features. (Understand).

**CO2:** Practice the emasculation and plant propagation techniques to produce desirable traits in the plants. (Apply)

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	1	2
CO2	3	1	2	1	3

**Syllabus Content**

1. Primary structure of stem and root of dicots and monocots; Dicot stem - Centella; Monocot stem – Bamboo, grass, asparagus; Dicot root - Tinospora; Monocot root - Colocasia, Musa.
  2. Structure of dicot stem and dicot root after secondary thickening; Stem - Vernonia, Eupatorium; Root - Tinospora, Papaya.
  3. Anomalous secondary thickening in Bignonia.
  4. Anatomical adaptations of Hydrophytes - Nymphaea petiole, Hydrilla stem; Xerophytes - Nerium Leaf; Epiphytes - Velamen root of Vanda; Halophyte – Pneumatophore of Avicennia.
  5. Emasculation of pea or Caesalpinia flower.
  6. Demonstrate T and patch budding.
  7. Demonstration of tissue culture techniques: culture media, surface sterilization and inoculation of explants.
  8. Identification of non-living inclusions – cystolith and raphides.
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**SEMESTER IV**

**CORE COURSE**

**ZY4B04B18-RESEARCH METHODOLOGY, BIOPHYSICS AND BIOSTATISTICS**

**Credits: 3**

**Total Lecture Hours: 54**

**Course Outcomes:**

**CO1:** Employ basic methodology of research and bioethics in research.

**CO2:** Design experiment employing animal collection methods.

**CO3:** Compare different types of microscopes and separation techniques

**CO4:** Apply principles of Biostatistics in solving problems

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	2	1	3
CO3	3	1	2	1	2
CO4	3	3	1	1	3

**Syllabus Content**

**RESEARCH METHODOLOGY**

**Module I**

**13 Hrs**

Basic concepts of research: Meaning, Objectives, Approaches, Types of research. Research Process: Scientific method in research (eight steps). Importance of literature reviewing in defining a problem, Identifying gap areas from literature review. Research Communication and scientific documentation: Project proposal writing, Research report writing, (Structure of a scientific paper), Thesis, dissertation, research article. Presentation techniques: Oral presentation, Assignment, Seminar, Debate, Workshop, Colloquium, Conference. Sources of Information: Primary and

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secondary sources. Library- Books, Journals, Periodicals, Reviews, Internet. Search engines, Online libraries, e-Books, e-Encyclopedia, Institutional Websites. Plagiarism

**Module II**

**12 Hrs**

Animal Collection – Tools & techniques. Sampling techniques. Quadrate Line transect Measurements -Density Abundance Frequency- Biodiversity indices – concepts Simpson index. Collection methods, techniques and equipments-Plankton, Insects, Fish, Bird Preservation techniques – Taxidermy Rearing techniques. Laboratory and field Units of measurements- units, SI system, Equivalent weight, normality, molarity

**BIOPHYSICS**

**Module III**

**14 Hrs**

Basic understanding on principle and uses of the following:

Microscopy

(a) Light microscopy, Parts of a microscope, Dry and Oil immersion objectives, Bright field (Compound Microscope), Phase contrast, Dark field microscopy, Fluorescence, Polarization microscopy, Video microscopy.

(b) Electron - Scanning (SEM), Transmission (TEM) and STEM Micrometry – Stage and Eyepiece micrometers Camera Lucida

Instrumentation: pH Meter

Separation Techniques: Centrifuge, Chromatography, Electrophoresis

Analytical techniques: Colorimeter, Spectrophotometer, X-ray crystallography

**BIOETHICS**

**Module IV**

**5 Hrs**

Bioethics : Introduction, Animal rights and animal laws in India, Prevention of cruelty to animals Act 1960, Biodiversity Act 2003.



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Concept of 3 R – conservation (Refined- to minimize suffering, Reduced – to minimize animals, Replaced – modern tools and alternate means), Animal use in research and education.

Laboratory animal use, care and welfare, Animal protection initiatives- Animal Welfare Board of India, CPCSEA, ethical commitment. Working with human: Consent, harm, risk and benefits.

## **BIOSTATISTICS**

### **Module V**

**10 Hrs**

Sample & Sampling techniques: Collection of data, classification of data, frequency distribution tables, graphical representation: - Bar diagrams, Histogram, Pie diagram and Frequency curves - Ogives.

Measures of Central Tendency: Mean, Median, Mode (Problem - Direct method only) Measures of dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Standard error. (Merits & demerits and problems on SD).

Correlation: Definition, Types of correlation.(mention in brief) Test of Hypothesis and Test of Significance: Basic concept, Levels of significance, test of significance, Procedure for testing hypothesis, types of hypothesis- Null hypothesis and Alternate hypothesis.

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**SEMESTER IV**

**CORE PRACTICAL**

**ZY4BP02B18-ANIMAL DIVERSITY – CHORDATA, RESEARCH METHODOLOGY,  
BIOPHYSICS & BIOSTATISTICS**

**Credits – 2**

**Total Hours: 72**

**Course Outcomes:**

**CO1:** Identify, classify and sketch chordates.

**CO2:** Compare vertebrate systems.

**CO3:** Identify animal collection tools, techniques and major laboratory equipments.

**CO4:** Calibrate and measure microscopic objects using micrometer.

**CO5:** Construct diagrams and solve problems applying statistical principles.

**Mapping of Course Outcomes with Program Specific Outcomes**

<b>Mapping</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
<b>CO1</b>	3	1	3	1	2
<b>CO2</b>	3	1	3	1	2
<b>CO3</b>	3	1	3	1	3
<b>CO4</b>	1	3	3	1	3
<b>CO5</b>	1	3	3	1	3

**ANIMAL DIVERSITY –CHORDATA**

**1. Scientific Drawing**

Make scientific drawing of 5 locally available vertebrate specimens belonging to different classes

**2. Dissections**

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Frog: Photographs/diagrams/one dissected & preserved specimen each/models may be used for study.

- a. Frog Viscera
- b. Frog Digestive System
- c. Frog Arterial System
- d. Frog 9th & 1st Spinal nerve
- e. Frog Sciatic Plexus
- f. Frog Brain

3. Mounting of placoid scales; study of cycloid and ctenoid scales

4. Osteology

Frog vertebrae - typical, atlas, 8th, 9th and Urostyle.

Rabbit – Atlas, Axis and typical vertebra

Pectoral and pelvic girdles of Frog and Rabbit/ Bird - Keel and Synsacrum

Turtle/Tortoise - plastron and carapace

5. Study of sections.

Amphioxus T. S. through pharynx/T.S. through intestine

6. Identification

Identify, classify and describe the following animals by their generic names and 30 % of them by their scientific names.

Protochordata-1, Pisces-5, Amphibia-5, Reptilia- 5, Aves-2, Mammalia-2.

Taxonomic identification with key:-

- i) Identification of fishes up to the level of order.
- ii) Identification of snakes up to family

## **RESEARCH METHODOLOGY, BIOPHYSICS & BIOSTATISTICS**

### **PART A - RESEARCH METHODOLOGY**

Animal collection Tools, Techniques & Estimation

1. Quadrate study
2. Transect study
3. Sampling Methods

4. Species area curve

5. Simpson index

### **PART B - BIOPHYSICS**

1. Study of simple and compound light microscopes

2. Micrometry –calibration and measurement of microscopic objects –low power

3. Camera Lucida (draw a few diagrams using Camera Lucida)

4. Paper chromatography (demonstration only)

5. Instrumentation – demonstration (write notes on principle, equipment and its use) pH

Meter, Colorimeter/ Spectrophotometer, Centrifuge

### **PART C - BIOSTATISTICS**

1. MS Excel: To create mean and median, Construction of bar diagram, Pie diagram and Line graphs.

2. MS Access: To create grade of students

3. Internet: Access a web page on any biological topic.

4. Frequency distribution of the given samples to find out arithmetic mean, median, mode.

5. Range and standard deviation for a biological data

6. Correlation using any biological data.

7. Graphical representation of data. Construction of bar diagrams, Histograms, Pie diagram and Line graphs.