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Part II—Section 2
(Supplement)
NOTIFICATIONS BY GOVERNMENT

பள்ளிக் கல்வித் துறை

No. II(2)/SE/1030/2024.

[பள்ளிக்கல்வி -ஆசிரியர் தேர்வு வாரியம் - முதுகலை ஆசிரியர் / உடற்கல்வி இயக்குநர் நிலை-1 மற்றும் கணினி பயிற்றுநர் நிலை-1 பணியிடங்களுக்கு ஆசிரியர் தேர்வு வாரியம் மூலம் நேரடி நியமன போட்டித் தேர்வு நடத்த மாற்றியமைக்கப்பட்ட முதுகலை ஆசிரியர் பாடங்களுக்கான பாடத்திட்டத்தை (Syllabus) அரசிதழில் வெளியிடுதல் ஆணை வெளியிடப்படுகிறது.]

கீழ்க்கண்ட அரசாணை வெளியிடப்படுகிறது:-

[அரசாணை (நிலை) எண்.219, பள்ளிக் கல்வி (ஆதேவா)த் துறை, 3 அக்டோபர் 2024,
புரட்டாசி 17, குரோதி, திருவள்ளூர் ஆண்டு-2055.]

படிக்கப்பட்டது:-

பள்ளிக்கல்வி இயக்குநரின் ந.க எண்.074007/டபிள்யூ3/இ3/2023, நாள்: 20.08.2024

ஆணை: எண், 219, பள்ளிக் கல்வி (ஆதேவா)த் துறை, நாள்: 3 அக்டோபர் 2024.

மேலே படிக்கப்பட்ட கடிதத்தில், பள்ளிக் கல்வி இயக்குநர், முதுகலை ஆசிரியர் / உடற்கல்வி இயக்குநர் நிலை-1 மற்றும் கணினி பயிற்றுநர் நிலை-1 பணியிடங்களுக்கான நேரடி நியமனம் செய்ய போட்டித் தேர்வு நடத்துவதற்கு அரசிதழில் வெளியிடப்பட்ட பாட வாரியான புதிய பாடத்திட்டங்கள் அனுப்புமாறு ஆசிரியர் தேர்வு வாரிய தலைவர் கோரியுள்ளதாகவும், அதனடிப்படையில் மாநில ஆசிரியர் கல்வியியல் ஆராய்ச்சி மற்றும் பயிற்சி நிறுவனத்தின் மூலம் பாட வல்லுநர்களைக் கொண்டு உருவாக்கப்பட்ட முதுகலை ஆசிரியர் உடற்கல்வி இயக்குநர் நிலை-1 மற்றும் கணினி பயிற்றுநர் நிலை-1க்கான பாடத்திட்டம் (Syllabus), போட்டித் தேர்வுக்கான சிறுபான்மை மொழிகளான உருது, அராபிக், தெலுங்கு மற்றும் மலையாளம் ஆகிய பாடங்களுக்கான மொழிப் பாடத்திட்டம் (Language Syllabus) தமிழ்நாடு மாநில பொதுப்பள்ளி கல்வி வாரியத்தின் ஒப்புதலுடன் பெறப்பட்டுள்ளது எனத் தெரிவித்துள்ளார்.

2 எனவே, முதுகலை ஆசிரியர் உடற்கல்வி இயக்குநர் நிலை-1 மற்றும் கணினி பயிற்றுநர் நிலை-1க்கான பாடத்திட்டம் (Syllabus), போட்டித் தேர்வுக்கான சிறுபான்மை மொழிகளான உருது அராபிக், தெலுங்கு மற்றும் மலையாளம் ஆகிய பாடங்களுக்கான மொழிப் பாடத்திட்டத்தினை (Language Syllabus) அரசிதழில் வெளியிடுமாறு பள்ளிக்கல்வி இயக்குநர் கோரியுள்ளார். (பாடத்திட்டத்தினை இணைப்பில் காணலாம்.

3. பள்ளிக்கல்வி இயக்குநரின் கருத்துருவினை நன்கு பரிசீலனை செய்த அரசு, அதனை ஏற்று, முதுகலை ஆசிரியர் / உடற்கல்வி இயக்குநர் நிலை-1 மற்றும் கணினி பயிற்றுநர் நிலை-1க்கான பாடத்திட்டம் (Syllabus) மற்றும் சிறுபான்மை மொழிகளான உருது, அராபிக், தெலுங்கு மற்றும் மலையாளம் ஆகிய பாடங்களுக்கான மொழிப் பாடத்திட்டத்தினை (Language Syllabus) இவ்வரசாணையின் இணைப்பில் காணும் தமிழ்நாடு மாநில பொதுப்பள்ளி கல்வி வாரியத்தின் ஒப்புதல் பெறப்பட்ட பாடத்திட்டத்தினை அரசிதழில் வெளியிட அனுமதி அளித்து ஆணையிடுகிறது.

(ஆளுநரின் ஆணைப்படி)



GOVERNMENT OF TAMILNADU

**DIRECT RECRUITMENT FOR THE
POST OF POST GRADUATE ASSISTANTS /
PHYSICAL EDUCATION DIRECTORS – GRADE-I**

**SYLLABUS
2024-2025**



State Council of Educational Research and Training

Chennai - 600 006.

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SUBJECT : தமிழ் SYLLABUS

அலகு 1	<p>மொழி வரலாறு திராவிட மொழிகள், தமிழ்மொழியின் தொன்மை, தமிழ்மொழியின் தனித்தன்மை, தமிழின் கிளைமொழிகள், தமிழும் உலகச் செம்மொழிகளும், புதைபொருள் ஆய்வு, பண்பாட்டுப் பரவல்.</p>
அலகு 2	<p>சங்க இலக்கியமும், சங்கம் மருவிய கால இலக்கியமும் எட்டுத்தொகை, பத்துப்பாட்டு, பதினெண்கீழ்க்கணக்கு நூல்கள், இவற்றின் காலம், தொகுப்புமுறை, பாடுபொருள், அகநூல்கள், புறநூல்கள், அகப்புற நூல்கள், அற நூல்களின் சிறப்புகள்.</p>
அலகு 3	<p>காப்பியங்கள் ஐம்பெருங்காப்பியங்கள், ஐஞ்சிறுகாப்பியங்கள், புராணங்கள், பிற்காலக் காப்பியங்கள், கம்பராமாயணம், பெரியபுராணம், நளவெண்பா, தேம்பாவணி, இரட்சணிய யாத்திரிகம், சீறாப்புராணம், இயேசு காவியம். இவற்றின் காலம், ஆசிரியர் வரலாறு, நூலின் மையப் பொருள், பதிப்புகள், உரைகள்.</p>
அலகு 4	<p>பக்தி இலக்கியம் பண்ணிரு திருமுறைகள், நாலாயிர திவ்விய பிரபந்தம், இவற்றின் அமைப்பு, ஆசிரியர்கள் வரலாறு, பதிப்புகள், உரைகள். சித்தர் பாடல்கள்: தாயுமானவர், பட்டினத்தார், அருணகிரிநாதர், வள்ளலார் ஆகியோர் படைப்புகள்.</p>
அலகு 5	<p>சிற்றிலக்கியம் 96 வகைச் சிற்றிலக்கியங்கள் அறிமுகம்: கலம்பகம், உலா, தூது, பிள்ளைத்தமிழ், குறவஞ்சி, பரணி, பள்ளு இவற்றின் அமைப்பு, ஆசிரியர் வரலாறு, காலம், சிறப்புக் கூறுகள். தனிப் பாடல்கள்: காளமேகப் புலவர், ஒளவையார், கம்பர், இராமச்சந்திரக் கவிராயர், பலபட்டடை சொக்கநாதப் புலவர்.</p>
அலகு 6	<p>இக்கால இலக்கியம் கவிதை: பாரதியார், கவிமணி தேசிக விநாயகனார், பாரதிதாசன், முடியரசன், சுரதா, நாமக்கல் கவிஞர் வெ.இராமலிங்கனார், பட்டுக்கோட்டை கல்யாணசுந்தரம், உடுமலை நாராயணகவி, கண்ணதாசன், மருதகாசி, வாலி, அப்துல் ரகுமான், ஈரோடு தமிழன்பன், மு.மேத்தா, வைரமுத்து, சிற்பி, மீரா, பிரமிள், இன்குலாப், இரா.மீனாட்சி - படைப்புகள். சிறுகதை: வ.வே.சு.ஐயர், புதுமைப்பித்தன், மௌனி, பி.எஸ்.ராமையா, கு.அழகிரிசாமி, வல்லிக்கண்ணன், கு.ப.ராசகோபாலன், அகிலன், வண்ணதாசன், ஆர்.சூடாமணி, அம்பை - படைப்புகள்.</p>

புதினம்:

மாயூரம் வேதநாயகம் பிள்ளை, இராஜம் ஜயர், அ.மாதவையா, கல்கி, மு.வரதராசனார், ஜெயகாந்தன், தி.ஜானகிராமன், கிராஜநாராயணன், இராஜம் கிருஷ்ணன், இந்திரா பார்த்தசாரதி, பாமா - படைப்புகள்.

நாடகம்:

மனோன்மனீயம் சுந்தரனார், சங்கரதாஸ் சுவாமிகள், பம்மல் சம்பந்த முதலியார், சி.என்.அண்ணாதுரை, கலைஞர் மு.கருணாநிதி, பி.எஸ்.இராமையா, ஆர்.எஸ்.மனோகர் படைப்புகள் - நவீன நாடக முயற்சிகள்.

விருதுகள்:

தமிழக அரசு, ஞானபீடம் மற்றும் சாகித்ய அகாடெமி விருது பெற்ற படைப்புகள்.

அலகு 7**இலக்கணம்**

ஐந்திலக்கணம் - எழுத்து, சொல், பொருள் (அகப்பொருள், புறப்பொருள்), யாப்பு, அணி - பாட்டியல் - புலமை இலக்கணம் - தொல்காப்பியம், நன்னூல், யாப்பருங்கலம், யாப்பருங்கலக்காரிகை, நம்பியகப் பொருள், புறப்பொருள் வெண்பாமாலை, தண்டியலங்காரம்.

அலகு 8**திறனாய்வு**

திறனாய்வு - விளக்கம், வரையறை, பயன்கள், புதிய போக்குகள்.

வகைகள்:

பகுப்பு முறை, விளக்க முறை, மதிப்பீட்டு முறை, ஒப்பீட்டு முறை, பாராட்டு முறை.

அணுகுமுறைகள்:

அறவியல், சமூகவியல், வரலாற்றியல், உளவியல், மானிடவியல், தலித்தியம், பெண்ணியம், அமைப்பியல்.

அலகு 9**நாட்டுப்புறவியல்**

பாடல்கள், கதைகள், கதைப்பாடல்கள், பழமொழிகள், விடுகதைகள், விளையாட்டுகள், சடங்குகள், நம்பிக்கைகள், திருவிழாக்கள், வழிபாட்டு முறைகள்.

அலகு 10**தமிழோடு தொடர்புடைய பிற துறைகள்**

இதழ்கள், வானொலி, தொலைக்காட்சி, திரைப்படங்கள், இணையத்தமிழ், கணினித் தமிழ், அறிவியல் தமிழ், தொல்லியல்.

SUBJECT : ENGLISH
SYLLABUS

Unit I ENGLISH LITERATURE FROM 1400-1600

Poetry

Geoffrey Chaucer	Prologue to the Canterbury Tales (The Book of the Duchess Chapter only)
Edmund Spenser	Prothalamion and Epithalamion
Sir Thomas Wyatt	Remembrance

Prose

Bacon - Essays	Of Truth, Of Friendship, Of Studies, Of Adversity, Of Revenge and Of Ambition
Sir Philip Sydney	An Apologie for Poetrie
The Bible	The Book of Job

Drama

Christopher Marlowe	Dr. Faustus
Thomas Kyd	The Spanish Tragedy
Ben Jonson	Every Man in His Humour

Unit II ENGLISH LITERATURE FROM 1601-1798

Poetry

John Milton	Paradise Lost, Book – 1X
Andrew Marvell	To His Coy Mistress
John Donne	The Canonization
Alexander Pope	The Rape of the Lock
John Dryden	Absalom and Achitophel
Thomas Gray	Elegy Written in a Country Churchyard

Prose and Fiction

Samuel Johnson	Life of Milton
Jonathan Swift	Gulliver's Travels
John Bunyan	The Pilgrim's Progress
Daniel Defoe	Robinson Crusoe

Drama

John Dryden	All for Love
Richard B. Sheridan	The School for Scandal
William Congreve	The Way of the World
Oliver Goldsmith	She Stoops to Conquer

Unit III ENGLISH LITERATURE FROM 1798-1850**Poetry**

William Wordsworth	Immortality, Tintern Abbey, The Prelude - Book-I
Samuel Coleridge	Ode to Dejection, Kubla Khan
John Keats	Ode to a Nightingale
Percy Bysshe Shelley	Ozymandias, Adonais

Prose and Fiction

Charles Lamb	Essays of Elia Christ's Hospital, The South Sea House, Dream Children, New Year's Eve
William Hazlitt	My First Acquaintance with Poets
William Wordsworth	Preface to Lyrical Ballads
Jane Austen	Sense and Sensibility
Emily Bronte	Wuthering Heights

Lyrical Drama

Percy Bysshe Shelley	Prometheus Unbound
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Unit IV LITERATURE FROM 1851 TO THE PRESENT DAY**Poetry**

Mathew Arnold	Dover Beach, The Scholar Gypsy
Robert Browning	Andrea Del Sarto
Alfred Lord Tennyson	Ulysses
W.B. Yeats	Byzantium
T.S. Eliot	The Waste Land
G.M. Hopkins	God's Grandeur
W.H. Auden	The Unknown Citizen
Ted Hughes	The Thought Fox

Prose and Fiction

Thomas Carlyle	On Heroes, Hero-Worship and the Heroic in History Lecture III- Shakespeare
Mathew Arnold	The Study of Poetry
George Orwell	You and the Atom Bomb
Charles Dickens	Hard Times
George Eliot	The Mill on the Floss
Thomas Hardy	Mayor of Casterbridge
Virginia Woolf	Mrs. Dalloway

Drama

John Osborne	Look Back in Anger
Bertolt Brecht	Mother Courage and Her Children
J.M. Synge	Riders to the Sea
Caryl Churchill	Top Girls

Unit V**PLAYS AND SONNETS BY SHAKESPEARE****Drama**

Othello, King Lear, The Tempest, Measure for Measure

Sonnets

18, 29,65, 104,106, 116, 129,130

Unit VI**AMERICAN LITERATURE****Poetry**

Walt Whitman	Out of the Cradle Endlessly Rocking
Anne Bradstreet	Prologue
R.W. Emerson	Brahma
Robert Frost	Birches, Mending Wall
Paul Lawrence Dunbar	The Sparrow
Maya Angelou	I Know Why the Caged Bird Sings
E.E. Cummings	The Cambridge Ladies
Charlotte Perkins Gilman	The Anti-Suffragists

Prose and Fiction

H.D. Thoreau	Where I Lived and What I Lived For
R.W. Emerson	The American Scholar
William Faulkner	Nobel Prize Acceptance Speech
Toni Morrison	Beloved
Jhumpa Lahiri	The Namesake

Drama

Arthur Miller	The Death of a Salesman
Eugene O' Neil	Emperor Jones
Tennessee Williams	A Street Car Named Desire

Unit VII**(A) INDIAN WRITING IN ENGLISH****Poetry**

Rabindranath Tagore	Gitanjali
Nissim Ezeikel	Goodbye Party to Miss Pushpa
Toru Dutt	Our Casuarina Tree
Kamala Das	An Introduction
Sujatha Bhatt	A Different History

Prose and Fiction

Jawaharlal Nehru	An Autobiography
Dr. B.R. Ambedkar	Annihilation of Caste
Mulk Raj Anand	Coolie
Kamala Markandeya	A Handful of Rice
Arundathi Roy	The God of Small Things

Drama

Girish Karnad	Hayavadana
Vijay Tendulkar	Silence! The Court is in Session
Mahasweta Devi	Rudali
Mahesh Dattani	Dance like a Man

(B) COMMONWEALTH LITERATURE**Poetry**

Kath Walker	A Song of Hope
Banjo Patterson	Waltzing Mathilda
Wole Soyinka	The Telephone Conversation
E.J. Pratt	The Dying Eagle
Judith Wright	At Cooloolah
Abioseh Nicol	The Meaning of Africa
A.D. Hope	Australia

Prose and Fiction

Thomas King	Godzilla Vs Post-Colonial
Chinua Achebe	Things Fall Apart
Alan Paton	Cry, the Beloved Country
Patrick White	Voss

Drama

Wole Soyinka	The Lion and the Jewel
George Ryga	The Ecstasy of Rita Joe
Jane Harrison	Stolen

Unit VIII LITERARY CRITICISM

1. Aristotle	Poetics
2. Dryden	Essay of Dramatic Poesy
3. Coleridge	Biographia Literaria Ch. XIV and Ch XVII
4. T. S. Eliot	Metaphysical Poets
5. I. A. Richards	Four Kinds of Meaning
6. William Empson	The Seven Types of Ambiguity
7. Northrop Frye	The Archetypes of Literature
8. Cleanth Brooks	Irony as a Principle of Structure
9. Allen Tate	Tension in Poetry
10. Elaine Showalter	Towards a Feminist Poetics
11. Simone de Beauvoir	The Second Sex

Unit IX LANGUAGE, LINGUISTICS AND PEDAGOGY**History of English Language and its Growth**

Indo – European Family and the Place of English language

Old, Middle and Modern English

Growth of Vocabulary from various Foreign Languages, Change in Meaning,

Influence of The Bible, Shakespeare, Milton and Dr. Johnson

Characteristics of Modern English, Spelling Reform and the English Lexicon

Linguistics

English Phonetics and Phonology (Vowels, Consonants and Diphthongs)

Morphology, Word formation and its different types

Semantics

Dialect & Idiolect

Grammar – Traditional, Transformational Generative

Grammar and Deep Structure

Applied Linguistics

English Language Teaching (ELT)

History of ELT

Second Language Acquisition

Designing Syllabus

Materials Production

Language Testing and Evaluation

UNIT X APPLICATION OF LANGUAGE SKILLS

Phrases, Synonyms, Antonyms, Prefix and Suffix, Tenses, Voice,

Parts of Speech, Homophones, Articles and Determiners, Identifying Sentence

Patterns, Compound Words, Figures of Speech, Identifying and Correcting

Errors, British and American English

SUBJECT : MATHEMATICS

SYLLABUS

Unit I

ALGEBRA

Groups – Examples – Cyclic Groups – Permutation Groups – Lagrange's theorem – Normal subgroups – Homomorphism – Cayley's theorem – Cauchy's theorem – Sylow's theorems – Finite Abelian Groups.

Rings – Integral Domain – Field – Ring Homomorphism – Ideals and Quotient Rings – Field of Quotients of Integral domains – Euclidean Rings – Polynomial Rings – Unique factorization domain.

Fields – Extension fields – Elements of Galois theory – Finite fields.

Vector Spaces – Linear independence of Bases – Dual spaces – Inner product spaces – Linear transformations – Rank – Characteristic roots – Matrices – Canonical forms – Diagonal forms – Triangular forms – Nilpotent transformations – Jordan form – Quadratic forms and Classification – Hermitian, Unitary and Normal transformations.

Unit II

REAL ANALYSIS

Elementary set theory – Finite, countable and uncountable sets – Real number system as a complete ordered field – Archimedean Property – Supremum, infimum, Sequences and Series – Convergence – limit supremum – limit infimum – The Bolzano – Weierstrass theorem – The Heine – Borel Covering theorem – Continuity, Uniform Continuity, Differentiability – The Mean Value theorem for derivatives – Sequences and Series of functions – Uniform convergence.

Riemann – Stieltjes integral: Definition and existence of the integral – properties of the integral – Integral and Differentiation – Integration of vector valued functions – Sequences and Series of functions: Uniform convergence – Continuity, Integration and Differentiation.

Power series – Fourier series.

Functions of several variables – Directional derivative – Partial derivative – derivative as a linear transformation – The Inverse function theorem and The Implicit function theorem.

Unit III **TOPOLOGY**

Topological spaces – Basis – The order Topology – The product Topology – The subspace Topology – Closed sets and limit points.

Continuous functions – The box and product Topologies – The matrix Topology.

Connected spaces – Connected subspaces of the real line – Components and local connectedness – compact spaces – Compact subspaces of the real line – Limit point compactness – Local compactness.

Countability and separation Axioms – Normal spaces – The Urysohn Lemma – The Urysohn metrization theorem – The Tietze extension theorem.

Unit IV **COMPLEX ANALYSIS**

Introduction to the concept of analytic function: Limits and continuity – Analytic functions – Polynomials and rational functions – Elementary theory of power series – Maclaurin's series – Uniform convergence – Power series and Abel's limit theorem – Analytic functions as mapping – Conformality arcs and Closed curves – Analytical functions in regions – Conformal mapping – Linear transformations – the linear group, the cross ratio and symmetry.

Complex integration – Fundamental theorems – line integrals – rectifiable arcs – line integrals as functions of arcs – Cauchy's theorem for a rectangle – Cauchy's theorem in a Circular disc – Cauchy's integral formula: The index of a point with respect to a closed curve – The integral formula – Higher derivatives – Local properties of Analytic functions and removable singularities – Taylor's theorem – Zeros and Poles – The local mapping – The maximum modulus Principle.

Unit V **FUNCTIONAL ANALYSIS**

Banach Spaces – Definition and examples – Holder's inequality and Minkowski's inequality – Continuous linear transformations – The Hahn-Banach theorem – Natural imbedding of X in X^{**} – The Open mapping and The Closed graph theorem – Properties of conjugate of an operator.

Hilbert spaces – Orthonormal bases – Conjugate space H^* – Adjoint of an operator – Projections – Matrices – Basic operations of matrices – Determinant of a matrix – Determinant and Spectrum of an operator – Spectral theorem for operators on a finite dimensional Hilbert space – Regular and Singular elements in a Banach Algebra – Topological divisor of zero – Spectrum of an element in a Banach algebra – The formula for the spectral radius – Radical and semi-simplicity.

Unit VI DIFFERENTIAL GEOMETRY

Curves in spaces – Serret – Frenet formulae – Locus of centers of curvature – Spherical curvature – Intrinsic equations – Helices – Spherical Indicatrix Surfaces – Curves on a surface – Surface of revolution – Helicoids – Gaussian curvature – First and Second fundamental forms – Isometry – Meusnier's theorem – Euler's theorem- lines of curvature – Dupin's Indicatrix – Asymptotic lines – Edge of regression – Developable surfaces associated to a curve – Geodesics – Conjugate points on Geodesics.

Unit VII DIFFERENTIAL EQUATIONS**Ordinary Differential Equations**

Linear differential equation with constant and variable co-efficients – Linear dependence and independence – Wronskian – Non homogeneous equations of order two and n – Initial value problems for nth order equations – Second order equations with ordinary point and regular singular points – Legendre Equations – Bessel's equation – Hermite's equation and their properties – Existence and Uniqueness of solutions to first order equations – Exact equation – Lipschitz condition – Non local existence of Solution – Approximation to Uniqueness of solutions.

Partial Differential Equations

Lagrange and Charpit methods for solving first order Partial Differential equations – Classification of Second order partial differential equations – General solution of higher order partial differential equation with constant co-efficients – Method of separation of variables for Laplace, Heat and Wave equations (upto two dimensions only).

Unit VIII CLASSICAL MECHANICS AND NUMERICAL ANALYSIS**Classical Mechanics**

Generalised Co-ordinates – Lagrange's equations – Hamilton's Canonical equations – Hamilton's principle – Principle of least action – Canonical transformations – Differential forms and Generating functions – Lagrange and Poisson brackets.

Numerical Analysis

Numerical solutions of algebraic and transcendental equations – Method of iteration – Newton Raphson method – Rate of convergence – Solution of Linear algebraic equations using Gauss elimination and Gauss – Seidel methods.

Finite differences – Lagrange, Hermite and Spline Interpolation, Numerical differentiation and integration – Numerical solutions of Ordinary differential equations using Picard, Euler, Modified Euler and Runge- Kutta methods.

Unit IX OPERATIONS RESEARCH

Linear programming problem – Simplex Methods – Duality – Dual Simplex Method – Revised Simplex Method – Integer Programming Problem – Dynamic Programming – Non linear programming – Network Analysis – Directed Network – Max Flow Min Cut theorem – Queuing theory – Steady State solutions of M/M/1, M/M/1 with limited waiting space, M/M/C, M/M/C with limited waiting space, M/G/1 models – Inventory models – Deterministic models with and without shortages – Single Price break models.

Unit X PROBABILITY THEORY

Sample space – Discrete Probability – Independent events – Baye's theorem – Random variables and Distribution functions (Univariate and Multivariate) – Expectation and Moments – Moment Generating function – Characteristic functions and Cumulants – Independent Random variables – Marginal and conditional distributions – Probability inequalities (Tchebyshev, Markov, Jensen) – Modes of convergence, Weak and Strong laws of large numbers – Central limit theorem (i.i.d case).

Probability distributions – Binomial, Poisson, Uniform, Normal, Exponential, Gamma, Beta, Cauchy distributions – Standard Errors – Sampling distributions of t, F and Chi square and their uses in tests of significance – ANOVA – Large sample tests for mean and proportions.

SUBJECT : PHYSICS

SYLLABUS

Unit I

MATHEMATICAL PHYSICS

Dimensional analysis: Differential equation (ordinary and partial) – order of equation – Expressions for gradient, divergence, curl and Laplacian – vector algebra and vector calculus – Gauss divergence theorem – Green’s theorem – Stokes’ theorem. Matrix: Cayley – Hamilton theorem, inverse of matrix – Eigen values and Eigen vectors. Polynomials: Hermite, Bessel and Legendre Functions. Special function: Beta and Gamma functions. Probability: Elementary probability theory – Random variables – Binomial – Poisson and Normal distribution. Complex variables: Analytic functions – Singular points – Cauchy’s integral theorem and formula -Taylor’s and Laurent’s expansions, poles, Calculus of residues and evaluation of integrals. Integral transforms: Fourier series and Fourier transform and their properties.

Unit II

CLASSICAL MECHANICS

Mechanics of particles and systems of particles: Constraints and Generalized coordinates, Law of conservation of Energy, Linear and Angular momentum, Conservative and Non-Conservative systems, Degrees of freedom, Holonomic – Nonholonomic – Scleronomic systems. Lagrangian Formalism: Lagrange equations of motion – D’Alembert’s principle – Applications (Simple pendulum, Atwood’s machine, Harmonic Oscillator, Electrical circuit). Hamiltonian Formalism: Hamilton’s equation of motion – Cyclic co-ordinates – Hamilton’s equation from variational principle, Principle of least action, Canonical transformation, Liouville’s theorem. Rigid body Dynamics: Euler’s angles – Moment of inertia tensor, Euler’s equation of motion – Symmetrical top, Special theory of Relativity: Inertial and Non- inertial frames, Lorentz transformation, Lorentz inverse transformation, Length contraction, Time dilation, Mass invariance, Einstein’s mass-energy relation.

Unit III

ELECTROMAGNETIC THEORY

Electrostatics: Coulomb’s law – Gauss’s law and its application. Laplace and Poisson’s equations. Magnetostatics: Biot Savart’s law – Ampere’s law – Magnetic scalar and vector potentials – magnetic susceptibility – Equation of continuity – Displacement current – Maxwell’s equations (free space and linear isotropic media) – Electromagnetic waves – Poynting’s theorem – Dielectrics: Retarded potentials – Polarization – Radiation from a linear antenna – Transmission lines and Wave guides.

Unit IV**QUANTUM MECHANICS**

Failures of Classical mechanics – Black body radiation – Wave and particle duality – Postulates of Quantum mechanics – Wave function and properties – Expectation values – Heisenberg's uncertainty principle – Schrodinger equations (time – dependent and time- independent). Eigen value problems: Particle in a box (1D and 3D), Particle in a finite potential well & barrier, Tunnelling, Harmonic oscillator. Operators: Ladder operators, Angular momentum operator, Hydrogen atom, spin – Stern Gerlach experiment. Approximation methods: Variational principle, Time independent (1st and 2nd order) degenerate and non-degenerate perturbation theory – Time-Dependent perturbation theory – Fermi's golden rule, Identical particles. Relativistic Quantum Mechanism: Pauli's spin Matrices, Dirac and Klein Gordon equation. Commutators. Scattering theory: Scattering cross-section, Scattering by a central potential, Partial wave analysis, Breit-Wigner formula.

Unit V**THERMODYNAMICS AND STATISTICAL MECHANICS**

Laws of thermodynamics and their consequences – thermodynamic system (closed and open) – thermodynamic processes (isothermal, adiabatic, isochoric, isobaric, isotropic) – cyclic process – thermodynamic potentials (U, S, G, H) – relation between them. Specific heat – equation of state – intensive and extensive variables – The P-V diagram – Carnot cycle and its efficiency – Entropy – reversible and irreversible – T-S diagram – Equipartition theorem. Phase space – micro and macrostates – Liouville's theorem – ensembles – partition function – classical (MB distribution) – Maxwell's distribution of velocities – Kinetic Theory of gases – Pressure exerted by gas – Mean free path – Mean – RMS and most probable speed – and quantum (BE & FD distribution) statistics – applications to black body radiation – Bose Einstein condensation.

Unit VI**ATOMIC PHYSICS AND SPECTROSCOPY**

Quantum states of an electron in an atom – Hydrogen atom spectrum – Electron spin -Spin orbit coupling – Fine structure – Relativistic correction – Spectroscopic terms and selection rules – Hyperfine structure – Exchange symmetry of wave functions – Pauli's exclusion principle – Hund's rule – Periodic table – Alkali type spectra – LS and JJ Coupling – Zeeman, Paschen – Back and Stark effects. Principles of ESR, NMR, Chemical shift – Frank Condon principle – Born Oppenheimer approximation – Electronic, rotational and vibrational spectra of diatomic molecules, Selection rules.

Unit VII SOLID STATE PHYSICS

Crystal Physics: Lattice, Crystal structures – Bravais lattices – Miller indices – Reciprocal lattices – Lattice Dynamics: Monoatomic, diatomic lattices – Theories of specific heat – Einstein's and Debye's model for lattice specific heat. Classical free electron theory: Drude model – Thermal conductivity – Wiedemann Franz law. Energy bands in solids: Energy bands in metals, insulators and semiconductors, E-k diagram – Density of states – Brillouin zones – Wave equation of electron in a Periodic potential. Semiconductor Physics: Types of semiconductors – Mobility – Carrier concentration of charge carriers – Bloch's theorem – Kronig – Penney model. Dielectrics: Polarization Mechanism – Clausius – Mossotti Equation – Piezo, Pyro and Ferroelectricity. Magnetism: Dia, Para, Ferro, Anti-Ferro and Ferri magnetism. Superconductivity: Meissner effect – Type I and Type II superconductivity – BCS theory – Josephson effect.

Unit VIII NUCLEAR AND PARTICLE PHYSICS

Nuclear properties (size, shape, charge distribution, spin and parity) – Binding energy, Nuclear force – Liquid drop model – semi – empirical mass formula, Shell model and Collective model – Deuteron, Ground state of deuteron – excited state of deuteron – Meson theory of nuclear force – Yukawa potentials – Elementary ideas of alpha, beta and gamma decays – Radioactive decay – Fission, Fusion – Chain reaction – Nuclear reactor. Elementary particles: Classification of elementary particles, Fundamental interactions (EM, Strong, Weak, Gravitational) and their quantum numbers (charge, spin, parity, isospin, strangeness, etc.) – Gell-Mann-Nishijima formula. Elementary particles – Classifications – Quark model, Baryons and Mesons, Parity non-conservation in weak interaction.

Unit IX ELECTRONICS

Semiconducting devices: Diodes – Junction diode – Rectification – Zener diode – Light Emitting Diode. Junction Transistors: common base, common emitter and common collector configurations – Static characteristics – Transistors as amplifier and oscillators – FET, JFET, MOSFET. IC: Fabrication technology, Monolithic IC Processing. 555 Timer, Phase shift, Wien bridge oscillators. Operational Amplifier (IC 741): Op-Amp characteristics, Inverting and Non-inverting Amplifiers, Adder, Subtractor, Differentiator and Integrator. Digital techniques and applications: Flip Flops, Registers – Counters. Digital integrated circuits: Logic gates, NAND and NOR – Universal building blocks – Half and Full adder. Communication Electronics: Modulation and Demodulation (AM, FM, Phase), Transmitter and Receiver, Satellite and Fiber optic communication.

Unit X**EXPERIMENTAL PHYSICS**

Units and dimension of physical quantities – significant figures. Data interpretation and analysis, precision and accuracy, error analysis, propagation of errors, Least square fitting. Measurement of fundamental constants – e , h , c – Detection of X-rays, gamma rays, Charged particles, neutrons. Ionization chamber – proportional counter – Measurement of e/m ratio – Measurement of Hall voltage, mobility and charge carrier concentration – measurement of resistance and capacitance in series and parallel.

SUBJECT : CHEMISTRY
SYLLABUS

INORGANIC CHEMISTRY

Unit I

Chemical Periodicity: Modern periodic law – Periodicity in properties, the trend in the atomic and ionic radii, ionization potential and electron affinity along the period. Effective nuclear charge – Slater rules and its uses.

Structure and bonding in homo – and hetero-nuclear molecules, including shapes of molecules. (VSEPR Theory): Linear combination of AOs in hybridization, Stereochemistry of the hybrid orbitals, Calculation of s & p characters of equivalence and non-equivalence of hybrid orbitals.

MO theory: MO diagram for the homo-nuclear diatomic molecules, hetero-nuclear diatomic molecules and triatomic molecules.

Concepts of acids and bases: HSAB concept – theory, classification, characteristics of hard and soft species – symbiosis. Bronsted-Lowry concept – conjugate acid-base theory – relative strength of acids and bases, applications. Lewis concept-characteristic features of the Lewis theory.

Non-Aqueous Solvents: Classification of solvents –characteristics of a solvent/ionizing solvent. Advantages and disadvantages of the following non-aqueous solvents: NH_3 , HF, HCN, acetic acid, H_2SO_4 . Molten salts as solvents and ionic liquids, supercritical fluids in inorganic chemistry.

Nature of bonding of Main group elements: Alkali and alkaline earth metal complexes: ligands – alkylamines, alkoxides, b-diketones and crown ethers. Electron rich and electron deficient compound of main group elements. Allotropes of carbon.

Transition elements and coordination compounds: Structure, bonding theories, spectral and magnetic properties, reaction mechanisms. Transition Elements – General group trends, Stability of various oxidation states. Difference between the first, second and third transition series. Types of transitions, selection rules for electronic transitions, ground states, correlation diagrams, Orgel and Tanabe Sugano diagrams.

Coordination compounds: Crystal field theory – splitting of d orbitals under different geometries – CFSE – Spectrochemical series – Jahn Teller distortion – Limitations of CFT – MO theory – sigma and pi-bonding in complexes.

Inner transition elements: Spectral, magnetic, redox properties and its applications.

Unit II

Organometallic Compounds: synthesis, structure of bonding and important types of reactions of organometallic compounds – oxidative addition, reductive elimination. Catalysis – Hydrogenation, Hydroformylation, Monsanto and Wacker processes, alkene polymerization.

Cages and clusters: Chemistry and molecularity of metal clusters such as binuclear and trinuclear metal clusters, metal carbonyl, halide type clusters, Borazines and phosphazenes.

Bioinorganic Chemistry: Structures and biological importance of porphyrin ring system, metalloporphyrin, haemoglobin, myoglobin and chlorophyll. Iron-sulphur proteins, Metalloenzymes, Photosynthesis – photosystem-I and photosystem-II. Metal storage and transport – Fe, Cu and Zn storage and transport.

Nuclear chemistry: Nuclear fission and fusion reactions, radio-analytical techniques and activation analysis. Decay modes, types of nuclear reaction – threshold energy, energy barrier, Q-value, nuclear cross section, photonuclear reaction, nuclear fission, spallation, fragmentation and fusion. Fission as a chain reaction – nuclear fuels: fertile and fissile isotopes, radiation hazards – nuclear reactors in India.

PHYSICAL CHEMISTRY**Unit III**

Basic principles of quantum mechanics: Planck's quantum hypothesis and black body radiation; photoelectric effect – classical theory and Einstein's quantum theory. Bohr's theory of hydrogen atom; failure of Bohr's model. Postulate of quantum chemistry; Heisenberg's uncertainty principle; Davison and Germer experiment. Operator algebra; linear, differential and Hermitian operator; Hamiltonian operator; angular momentum; eigen values and eigen functions. Wave equation – time-independent and time-dependent Schrodinger's wave equation. Particle-in-a-box (1D & 3D); rigid rotator; harmonic oscillator and hydrogen atom, including shapes of atomic orbitals; orbital and spin-angular momenta; tunnelling.

Approximation method of quantum mechanics: Variational principle and its application to hydrogen molecule. Perturbation theory up to second order in energy and its applications.

Atomic structure and Spectroscopy: Term symbols, RS and jj coupling, spectra of hydrogen, many electron systems and anti-symmetry principle.

Chemical bonding in diatomic: Elementary concepts of MO and VB theories, Huckel theory conjugated pi electron system (ethylene, butadiene and benzene).

Chemical applications group theory: Symmetry elements, symmetry operations, point groups, their symbols, character tables (C_{2v} , C_{2h} , C_{3v} and C_{4v}), reducible and irreducible representation, great orthogonality theorem and its consequences. Applications of group theory in vibrational spectroscopy, symmetry aspects of molecular vibrations, symmetry selection rules for IR and Raman spectra. Determining symmetries of normal modes of vibration. Symmetry applied to MO theory and orbital hybridization.

Molecular spectroscopy: Spectrum, electromagnetic radiation and its properties, regions of electromagnetic spectrum and their uses, rotational and vibrational spectra of diatomic, Born-Oppenheimer approximation. UV-Visible spectroscopy – principle, Beer-Lambert's law, instrumentation, types of electronic transitions, chromophore and auxochromes. Absorption bands and intensity, factors governing absorption maximum and intensity. UV-VIS spectra of simple organic compounds such as alkenes, phenols, anilines, carbonyl compounds and 1,3-diketones.

IR spectroscopy: Principle, regions of IR, selection rule of IR, modes of vibration of diatomic, triatomic linear (CO_2) and nonlinear molecules (H_2O); types of molecular vibration, application of IR spectroscopy, overtones, IR regions of alcohols, aldehyde, ketones. Raman spectroscopy – Principle, types of stokes and anti-stokes lines. Raman shift – difference between Raman and IR spectroscopy, mutual exclusion principle, vibrations of CO_2 molecule, dipole moment and polarizability.

Electronic spectra: Theory of ESR spectra, position of ESR absorption, g and A factor, hyperfine structure, ESR spectra of simple carbon centered free radicals – CH_3 , CD_3 electronic spectra of diatomic molecule – Morse function and Frank Condon principle and basic principles of magnetic resonance spectroscopy.

Chemical thermodynamics: Scope and limitations of thermodynamic system, surroundings and boundary – types of system, extensive and intensive properties; thermodynamic processes – state functions, enthalpy, entropy and internal energy; concept of work and heat, heat capacity, molar heat capacity, first law of thermodynamics and its mathematical expressions. Hess's law of constant heat summation – enthalpies of bond dissociation, combustion, formation, atomization, sublimation, phase transition, hydration, ionization and solution.

Reversible and irreversible process: Spontaneity of processes, criteria for spontaneity with respect to ΔS of the universe and ΔG of the system. Second law of thermodynamics, Clausius's statement and Kelvin – Planck's statement. Third law of thermodynamics and zeroth law of thermodynamics. Joule – Thomson

effect, Inversion temperature, Maxwell's relations, Carnot theorem, Gibbs free energy and Helmholtz work function and Nernst heat theorem.

Unit IV

Classical thermodynamics: Partial molar properties, chemical potential, Gibb's-Duhem equation. Determination of partial molar quantities, Thermodynamics of real gases, fugacity – determination of fugacity by graphical and equation of state methods, dependence of temperature, pressure and composition, Thermodynamics of ideal and non-ideal mixtures. Activity and activity coefficients.

Statistical thermodynamics: Concepts of statistical thermodynamics, distinguishable and non-distinguishable particles. Assemblies, ensembles, canonical particles. Boltzmann distribution, Bose-Einstein, Fermi-Dirac statistics, comparison and application; kinetic theory of gases, partition function and their relation to thermodynamic quantities, calculation for model systems.

Phase Rule: Phase, degree of freedom, component, One component system, water system – triple point – two components system, reduced phase rule – eutectic temperature – lead & silver system – congruent and incongruent melting point – Zn & Mg system – NaCl & Water system – CST – Phenol & water system. Henry's law – Raoult's law – Nernst distribution law – solvent extraction – steam distillation – fractional crystallization – Parke's process.

Colloids and Surfaces: Stability and properties of colloids, gold number, types of adsorption, Freundlich's and Langmuir's adsorption isotherms and surface area; heterogeneous catalysis.

Unit V

Chemical kinetics: Empirical rate laws and temperature dependence, Rate of reaction, order of a reaction, examples and rate equations for zero order, first order, second order and third order reaction. Molecularity of a reaction – unimolecular and bimolecular reaction, half-life period. Theories of reaction rates – collision theory, kinetics of collision theory, failure of collision theory, modification of collision theory, Lindeman theory, Hinshelwood theory and transition state theory/absolute reaction rate theory (ARRT). Potential energy surfaces and reaction coordinates. Study of complex reactions – kinetics of reversible, parallel, consecutive and chain reactions, photochemical reactions ($\text{H}_2\text{-Br}_2$), steady-state approximation, Stern-Volmer equation. Reactions in solutions – cage effect, primary and secondary salt effects, kinetic isotropic effect, linear free energy relationships, Hammett and Taft equation. Kinetic methods of analysis – flow techniques, stopped-flow and continuous-flow techniques, pulse

methods, flash photolysis and pulse radiolysis. Relaxation theory and relaxation technique – kinetic of relaxation methods (T-jump and P-jump). Ionic liquids and its applications. Catalysis – homogeneous catalysis, acid-base catalysis, protolytic and prototropic mechanism, acidity function. enzyme catalysis – Michaelis-Menten kinetics, types of inhibitor in enzyme catalysis.

Electrochemistry: Faraday's laws of electrolysis; specific, equivalent and molar conductance, measurement of conductance. Variation of conductance with dilution for strong and weak electrolytes. Kohlrausch law and its applications. Ostwald's dilution law, transport number and its determination by Hittorf method and moving boundary method. Debye-Huckel theory. Electrochemical cells – cells types, galvanic cells, reversible and irreversible cells, electrode potential, oxidation potential, reduction potential, Nernst equation, redox systems.

Ion-ion interaction and activity coefficient – concept of ionic atmosphere, derivation of Debye-Huckel limiting law, verification and experimental validity. Ion-transport in solution – electrolytic conductance, derivation of Debye-Huckel-onsagar equation and experimental validity, first and second Wien effect. Ion-association – Bjerrum treatment of ion association, factors influencing ion association, effect of ion association on conductivity and activity coefficient of electrolytes in solution and triple ion formation.

Electrodelectrics – electrode-electrolyte interface, electrical double layer – Helmholtz-Perrin, Gouy-Chapman and stern models and its comparison. Electrocapillary phenomena and electrocapillary curves, Lippmann equation, electrocapillary maximum, electrokinetic phenomena, Zeta potential and its applications. Electrode kinetics Butler-Volmer equation for one-step electron transfer, high field approximation, Tafel equation, high and low over potential limits, ionic equilibria, conductometric and potentiometric titrations. Electrochemical energy systems – primary and secondary cells, fuel cells, types of fuel cells, batteries – primary and secondary batteries, lead acid storage battery, liquid lithium-ion batteries, solid-state sodium-ion batteries.

Solid state: Classification of solids, isotropic and anisotropic crystals, unit cell and space lattice, Miller indices for lattice planes, crystal structures, diffraction of X-rays by crystals, Bragg's law and its applications. Defects of crystals and band structure of solids.

Polymer chemistry: Polymerization – types of polymerization, mechanism of free radical, anionic and cationic polymerization. Polymers molecular weight

determination. Preparation, properties, uses of thermoplastic and thermosetting polymers. Elastomers, vulcanization and molding methods of polymers.

ORGANIC CHEMISTRY

Unit VI

IUPAC nomenclature: Organic molecules including regio and stereoisomers.

Principles of stereochemistry: Configurational and conformational isomerism in acyclic and cyclic compounds, stereogenicity, stereoselectivity, enantioselectivity, diastereo selectivity and asymmetric induction. Geometrical isomerism resulting from double bonds – E, Z system of nomenclature, monocyclic compounds and fused ring systems, stereo specific and stereo selective reactions with examples.

Aromaticity: Benzenoid and non-benzenoid compounds, generation and reactions.

Organic reactive intermediates: Generation, stability and reactivity of carbocations, carbanions, free radicals, carbenes, benzyne and nitrenes. Organic reaction mechanisms involving the addition, elimination and substitution reactions with the electrophilic, nucleophilic or radical species. Reaction pathways determination.

Common named reactions and rearrangements – Still Coupling, Heck reaction, Pauson-Kahn Reaction, Suzuki Coupling, Mitsunobu reaction, Baylis-Hillman reaction, Mukaiyama's reaction, Metathesis reaction. Nef reaction, Henry reaction, Ritter reaction. Pinacol-Pinacolone, Wagner-Meerwein, Demjanov, dienone-phenol, Favorskii, Baeyer-Villiger, Wolff, Wittig, Neber, Stevens, Hofmann, Lossen, Curtius, Beckmann, Benzidine and Von Richter rearrangements. Applications in organic synthesis.

Polarimetry: Circular dichroism, Optical Rotatory Dispersion, principles and applications.

Unit VII

Organic transformations and reagents: Functional group inter-conversion including oxidations and reductions. Common catalysts and reagents (organic, inorganic, organometallic and enzymatic), organic transformations in Chemo, regio and stereo selective reactions.

Concepts in organic synthesis: Retro-synthesis, disconnection, synthons, linear and convergent synthesis, umpolung of reactivity and protecting groups. Regioselectivity and chemoselectivity. Alkene synthesis-uses of acetylenes. Two

group C-C disconnections in 1,2; 1,3; 1,4; 1,5 difunctional substituents, Diels-Alder reactions, Regio and stereo control in carbonyl condensation, Michael addition and Robinson annulations.

Asymmetric synthesis: Chiral auxiliaries, methods of asymmetric induction, substrate, reagent and catalyst controlled reactions, determination of enantiomeric and diastereomeric excess. Enantiomeric discrimination, resolution, kinetics and optical studies.

Pericyclic reactions: Electrocyclisation, cycloaddition, sigmatropic rearrangements and other related concerted reactions. Principles and applications of photochemical reactions in organic chemistry.

Synthesis and reactivity of common heterocyclic compounds containing one or two heteroatoms: Furan, thiophene, pyrrole, pyridine, quinoline, isoquinoline, indole, flavins and anthocyanins. Chemistry of natural products – Carbohydrates (Maltose, Starch, Cellulose) proteins and peptides, fatty acids, nucleic acids, terpenes, steroids (Cholesterol, Oestrone, Progesterone) and alkaloids (Reticulene, Reserpine, Morphine). Biogenesis of terpenoids (Zingiberene, Squalene, Lanosterol).

Biopolymers: Structure and functions of proteins and Nucleic acids. Mechanism of Enzyme action on DNA and RNA.

Theory and spectral interpretations – Structure determination of organic compounds by IR, UV-Vis, ^1H & ^{13}C NMR and Mass spectroscopic techniques.

ANALYTICAL CHEMISTRY

Unit VIII

Data analysis: Nature of quantitative measurements and treatment of data. Mean, median, precision and accuracy, standard deviation, significant figures, Gaussian distribution curves, Null Hypothesis, Confidence interval of mean, Rejection of data (Q test), Student's t, F tests. Errors – absolute and relative errors, linear regression, covariance and correlation coefficient.

Sampling: Principles of sampling methods for solid, liquids and gases. Gross sampling, Sampler's responsibility and pitfalls, hazards of sampling.

Separation Techniques: Classical forms of chromatography – Introduction, principle and applications of column, thin layer chromatography and paper chromatography, Gas and High-Performance Liquid Chromatography.

Thermo analytical techniques: Principles and applications of TGA, DTA and DSC.

Unit IX

Instrumental Analysis: Fluorimetry – Principles of fluorescence, Instrumentation and its Applications. Turbidimetry and Nephelometry – Theory, instrumentation and its applications.

Emission spectrometry: Principle, instrumentation and interferences, determination of alkali metals and iron in non-ferrous alloys. Flame Photometry – Theory, Instrumentation and a few important applications, Emission Techniques – Theory, techniques of excitation, electrodes and their shapes, flame and plasma emission spectrometry – instrumentation and its applications. Atomic Absorption Spectrometry – Theory, instrumentation (flame and flameless atomization) and its applications.

Mossbauer spectroscopy: Introduction, principle, instrumentation, recoil energy, Doppler effect, number of MB signals, isomer shift, quadrupole splitting, magnetic hyperfine splitting applications.

NMR spectroscopy: Nuclear spin states, NMR active nuclei, nuclear magnetic moment, Larmor equation. Absorption of energy and resonance, population density of nuclear spin states, saturation phenomena, relaxation mechanisms, Bloch equation (only significance and derivation, not required). Comparison of CW and FT NMR instrument. Chemical shift – Standards in NMR, Shielding and De-shielding, Spin-spin coupling, splitting origin and rules – factors affecting coupling constant.

Unit X

Nano Chemistry: Basics, nanoparticles and nanomaterials, types of nanoparticles, preparation, properties and uses of nanoparticles. Carbon nanomaterials – nanotubes, nanorods and nanofibre. Porous solids – nanowires, nanomachines and quantum dots. Methods of nanomaterials synthesis.

Chemical Microscopy: Microscope – parts and optical path application and qualitative study. Electron Microscopy – Principle, Microscope and its operation, sample preparations, applications to analysis, electron probe analyzer, ion microscopy, SEM, TEM, EDS. Fluorescence microscopy – Confocal, Phase contrast SPM, AFM, STM, MFM, EFM. XPS – Electron spectroscopy for Chemical Analysis (ESCA), Principle, Instrumentation, Auger electron spectroscopy – Theory, Principle, instrumentation and general applications – qualitative analysis and depth profiling of solid surfaces.

Green chemistry: Principles and Concepts of Green Chemistry, green solvents, super critical CO₂. Waste minimization techniques Green catalysis.

Environmental Chemistry: Scope and importance, renewable resources, solar, wind, hydrothermal and tidal energies. Polymers, plastics and its harmful environment effects. Pollution effects on human health.

Supramolecular Chemistry: Nature of supramolecular interaction, host-guest interaction, molecular recognition and its types, self assembly, cation binding hosts, cation, anion and neutral receptors, crown ethers, clathrates and its applications.

Medicinal chemistry: Drug and drug metabolism, mechanism of different types of drug actions, common disease, disorders and their treatment methods. Blood and clinical tests – estimation of blood urea, cholesterol, sugar, Fe protein, cholesterol, albumin, vitamins and minerals. Medicinally important compounds and disease caused by deficiency of vitamins.

SUBJECT : BOTANY**SYLLABUS****Unit I****Algae:**

General account of algology. Contributions of Indian Phycologists: (M.O.Parthasarathy, V.Desikachary, V.Krishnamurthy and V.S.Sundaralingam). Classification of algae by F.E. Fritsch (1935-45). Algae of diverse habitats, Range of thallus organization in algae. Reproduction (vegetative, asexual and sexual) and life cycle patterns of algae. Cyanobacteria (blue green algae). Economic importance of algae.

Fungi:

General Characteristics, Contributions of Indian Mycologists (C.V.Subramanian). Classification of Fungi by Alexopoulos and Mims (1979). Heterothallism and para-sexuality in fungi. Sex hormones in fungi. Reproduction in fungi (asexual and sexual). Spore dispersal mechanism in fungi. Mycorrhizae. Fossil fungi, Economic importance of fungi. Mushroom cultivation.

Lichens:

Classification of lichens based on Morphology, habitat, internal structure and fungal partner. Interrelationship of phycobionts and mycobionts. Structure and reproduction in Ascolichens, Basidiolichens and Deuterolichens. Lichens as indicators of pollution. Economic importance of lichens.

Bryophytes:

General feature, Classification of Bryophytes (Proskauer, 1957). Distribution, Morphology, Anatomy, Reproduction and Life cycle of Marchantiales, Jungermanniales, Anthocerotales and Polytrichales. Spore dispersal mechanisms and germination pattern. Evolutionary trends in Sporophytes and gametophytes of bryophytes. Fossil bryophytes. Economic importance of bryophytes.

Unit II**Pteridophytes:**

Classification of Pteridophytes (Reimer, 1954). Stelar evolution. Telome theory. Sorus – Origin, types and sporangial development. Heterospory and seed habit – Alternation of generations. Apogamy, Apospory and parthenogenesis in Pteridophytes. Comparative morphology, anatomy, reproduction and evolutionary studies of the following groups: Psilopsida, Lycopsida, Sphenopsida and Pteropsida. Economic importance of Pteridophytes.

Gymnosperms:

General character, classification of gymnosperms (Sporne, 1974). Origin and Evolution of gymnosperms. Comparative study of vegetative, anatomical and reproductive characteristics of Cycadales, Ginkgoales, Coniferales, Gnetales. Economic importance of gymnosperms.

Paleobotany:

Concept of Paleobotany: Geological time scale. Contributions of Birbal Sahni, Technique for paleobotanical studies. Fossilization process, Types of fossils, the fossil records: systematic reconstruction and nomenclature of fossil plants, Determination of Age of Fossils, Fossil Pteridophytes: *Rhynia*, *Sphenophyllum*, *Lepidocarpon*, *Botryopteris*. Fossil Gymnosperms: *Williamsonia* and *Cordaites*.

Unit III**Morphology:**

The plant body. Root: Structure and functions. Root modification. Stem: aerial and underground stem modifications. Leaf: Types, phyllotaxy, venations and leaf modifications. Inflorescence: Types. Flower: Floral whorls, sex, symmetry, aestivation, fusion. Ovary position, placentation. Fruits: Types. Seeds: Parts of seeds, Types, seed dispersal.

Taxonomy and Systematics:

Objectives of plant systematics, Concepts of Taxonomic hierarchy. Species concepts. Botanical nomenclature: principle, Rules and Recommendation of ICN. Systems of classification: Linnaeus, Bentham and Hooker, Engler and Prantl, Takhtajan, Angiosperm phylogeny Groups (APG systems). Modern Trends in Plant Taxonomy – DNA Bar coding and Molecular Systematics – Cladistic Methodology – Taxonomic keys, Botanical Gardens, BSI, Herbarium techniques and Application. Virtual/digital Herbarium. Systematic Position, salient features and economic importance of the following families: Nymphaeaceae, Magnoliaceae, Aristolochiaceae, Arecaceae, Orchidaceae, Commelinaceae, Zingiberaceae, Cyperaceae, Menispermaceae, Combretaceae, Lythraceae, Moraceae, Rosaceae, Meliaceae, Sapindaceae, Nyctaginaceae, Portulacaceae, Boraginaceae, Fabaceae, Rubiaceae, Bignoniaceae, Pedaliaceae and Convolvulaceae.

Economic Botany:

General account on utilization of selected crop plants: (i) Cereals and millets (ii) Pulses (iii) Vegetables, Fruits and Nuts (iv) Cosmetics plants (v) Oil seeds (vi) Sugar yielding plants, (vii) Spices and condiments, (viii) Fibre yielding Plants (ix) Timber yielding plants (x) Resins, gums and latex (xi) Essential oils (xii) Beverages, (xiii) Dyes, (xiv) Plants used as avenue trees for shade, pollution control and aesthetics and (xv) Energy plantation – uses of *Casuarina*.

Medicinal Botany:

Traditional medicinal systems in India. Importance of ethnobotany in Indian context. Active principles, biochemical properties and medicinal uses of *Phyllanthus amarus*, *Justicia adhatoda*, *Andrographis paniculata*, *Curcuma longa*, *Cannabis sativa*, *Gloriosa superba*, *Cymbopogon citratus*, *Catharanthus roseus* and *Rauwolfia serpentina*.

Unit IV**Anatomy:**

Classification of tissues. Theories of organization of shoot, root and floral meristems. Root and shoot transition. Cambium – Vascular cambium and cork cambium – origin, development and types. Anomalous thickening in dicot and monocot stems. Xylem: components, structure. Secondary elements, hard wood, soft wood, growth ring, heart wood and sap wood, Tyloses, Reaction wood and Tension wood. Patterns of secondary wall thickening. Phloem – components and structures. Tissue system: Types and characteristics – Secondary elements, Secretory cells and tissues: Structure, classification and significance. Nodal anatomy. Leaf: Epidermal tissue, development of stomata, Stomatal types, leaf anatomy: monocots and dicots. Plant galls: types, structure and development. Experimental anatomy – PGR and tissue differentiation.

Embryology:

Microsporangium – Microsporogenesis, Microspores: morphology, ultrastructure, Microgametogenesis. Pollen wall development, Pollen – Stigma – Incompatibility. Methods to overcome incompatibility. Megasporangium. Megagametogenesis: Female gametophyte, Monosporic, Bisporic and Tetrasporic, Nutrition of embryo sac and fertilization. Pollination: Types and pollination agents – Fertilization and post fertilization events: Endosperm: Types. Endosperm haustoria. Cytology and physiology of endosperms. functions of endosperms. Embryo development in Dicot and Monocot. Polyembryony – Causes. Apomixis, Apospory and parthenocarpy – Their role in plant improvement program. Seed development.

Microtechniques:

Microscopy – Principle and applications, Light microscope: Bright field, Dark field, Phase contrast microscopy, Fluorescence Microscope, Electron microscope (TEM & SEM). Microtome: Types, Principles and operating mechanisms. Maceration, Squashes, Smears, Whole mount and clearing techniques. Fixation and fixatives, dehydration, clearing, infiltration, Embedding, Block making and sectioning. Stains and staining techniques.

Unit V**Cell Biology:**

Cell structure, organization of prokaryotic and Eukaryotic cells. Cell theory, ultrastructure and molecular organization of cell wall, Plasma membrane, cytoplasm, protoplasm, Endoplasmic reticulum, Golgi bodies, plastids, mitochondria, chloroplast, lysosomes, Ribosome, vacuoles, Nucleus. Cell division and cell cycle: Mitosis and meiosis, their regulation, steps in cell cycle and control of cell cycle. Organization of nuclear genome: DNA as genetic material – prokaryotic and eukaryotic DNA – chromatin – chromosomes – Gene – Transposon. Replication of DNA and types.

Molecular Biology:

Transcription in prokaryotes and eukaryotes (RNA synthesis – enzymology – signaling) – mechanics of initiation, elongation, termination – post-transcriptional modifications and RNA splicing – regulation of gene expression (lac and trp operons) – RNA interference (TGS and PTGS) – Translation (genetic code – redundancy and elucidation of base composition – tRNA charging – initiation, elongation and termination) – post translational modifications. Molecular Chaperones – Heat shock proteins. Bioinformatics: Concepts, scope and applications.

Unit VI**Genetics and Biostatistics:**

Mendelian genetics – Mendel's Law of inheritance, non mendelian inheritance, Gene interactions – complementary genes, Lethal genes, Epistasis, Quantitative inheritance. Chromosomal basis of inheritance. Gene Linkage and crossing over. Kinds of linkage, types of crossing over mechanism. Sex determination in plants, theories of sex determination. Sex linked characters. Multiple alleles and pseudo alleles. Cytoplasmic inheritance, organelle heredity with reference to chloroplast and mitochondrial mutants – male sterility in plants. Population Genetics – Gene pool, Gene Frequencies, Mutation, Selection, Migration, genetic drift, Hardy – Weinberg law. Mutation: Types of Mutation. Mutagenic agents and their mode of action.

Biostatistics: principle, scope and application in biological sciences. Standard deviation and coefficient of variation (CV). Test of significance: Z test, t-test and chi square test. probability and distribution. Correlation and regression.

Plant Breeding:

Domestication and introduction of plants. Origin of cultivated Plants. Vavilov's center of origin. Organic Agriculture. Conventional Plant Breeding systems: introduction, Selection – Types of selection, selection in self and cross pollinated crops. Hybridization-Hybridization techniques, male sterility, self-incompatibility, heterosis and hybrid vigor. Role of polyploidy in crop improvement. Green revolution, Applications of tissue culture and molecular techniques in plant breeding.

Unit VII**Plant Physiology:**

Solute transport: Properties of water, Diffusion, Osmosis and water potential, mechanism of water absorption. Translocation of water and solutes through membranes, Mechanisms of loading and unloading of photo-assimilates. Transpiration and stomatal movements. Mineral nutrition: Role of Macro and Micro nutrients. Deficiency symptoms.

Photosynthesis:

Light harvesting complexes; photosynthetic pigments, mechanisms of electron transport; photo protective mechanisms; CO₂ fixation – C₃, C₄ and CAM pathways – Factors affecting photosynthesis.

Respiration:

Types of respiration, Glycolysis, Citric acid cycle; electron transport system and ATP synthesis; photorespiration and its significance.

Nitrogen metabolism and Secondary metabolites:

Nitrogen cycle and metabolism, Biological Nitrogen fixation. Secondary metabolites: Biosynthesis of terpenes, flavonoids, phenols and alkaloids and their physiological roles.

Plant Growth Regulators:

Physiological role and mechanisms of action of auxins, gibberellins, cytokinins, Ethylene and abscisic acid. Photobiology and photo morphogenesis: Phytochromes-history and discovery, occurrence and distribution; Cryptochromes – photochemical and biochemical properties. Vernalization. Circadian rhythm in plants. Plant Movements – nastic and tropic movements. Seed dormancy: causes and methods to break seed dormancy. Physiology of seed germination. Abscission and Senescence.

Stress physiology:

Causes, mechanisms, effects of plant responses and adaptation to biotic and abiotic stresses.

Biochemistry:

Chemical bonds and their interactions. Water – structure, pH concept – buffer, Molarity, Molality and Normality. Carbohydrates: Structures and classification. Lipids: Structure, classification and properties. Biosynthesis and biological significance of major lipids. Amino acids – classification, properties of Amino acids. Amino acid metabolism, Proteins: classification, structure (primary, secondary, tertiary and quaternary), properties of protein. Enzymes – general feature, naming and classification – Factors affecting enzyme activities. Enzyme inhibition, Mechanism of enzyme action. Nucleic acids: Structure of nitrogenous bases; Structure and function of nucleotides; Types of nucleic acids.

Unit VIII**Ecology:**

History and scope of ecology, Autecology: Characteristics of a population; population growth curves; population regulation; life history strategies (R and K selection); concept of metapopulation – demes and dispersal, interdemec extinctions, age structured population. Synecology – Characteristics of community, composition and structure, origin and development, ecotone, edge effect, ecological niche. Ecological interdependence and interaction – positive and negative interactions. Competition – inter-specific and intra-specific. Ecological Succession: Types, mechanisms, concept of climax.

Concept and dynamics of Ecosystem:

Types of Ecosystem, components, Food chain, food webs. Concept of trophic level, Ecological pyramids, Energy flow ecosystem. Mineral cycling (C, N, P); primary production and decomposition; structure and function of terrestrial (forest, grassland) and aquatic (fresh water, marine, estuarine) ecosystems.

Environmental pollution and Management:

Types, causes, effects and control measures of air, soil, water, thermal, noise and heavy metal pollution; Bioremediation and biodegradation – Bio-mining, microbes in leaching metals. Biodiversity management; climate change and its consequences; global environmental change; greenhouse effect, Climate change conferences.- Kyoto Protocol climate agreement – Carbon trade and carbon credits. Blue carbon and IPCC. Tools to study global climate change. GIS application in Biodiversity and Environmental Impact Assessment (EIA).

Biodiversity conservation:

Need for conservation – *in-situ* conservation – sanctuaries, national parks, biosphere reserves; *ex-situ* conservation – Gene banks, seed banks, Pollen banks and Cryopreservation. Role of indigenous people in conservation of sacred species, sacred groves; Human and animal conflicts in Biodiversity conservation, Red List categories of IUCN. Forest conservation through laws – the biological diversity Act (2002) in force. National Biodiversity Authority.

Phytogeography:

Principle of plant geography – Phytogeographic regions of India, Dispersal and migration barrier hypothesis, Willis age and area hypothesis. Continuous range, cosmopolitan, circumboreal and circum austral, pantropical, Discontinuous distribution Wegner's theory continental drift hypothesis, land bridges hypothesis, Endemism. Biogeographic classification of India, Biodiversity hotspot regions of India and the World.

Unit IX**Microbiology and Plant Pathology:**

Bacteria: Classification of bacteria (Bergey's Manual of Bacteriology, 1994), structural organization and reproduction of bacteria, Motility, flagella and pili – Growth and Nutrition, growth curve, kinetics of bacterial growth. Sterilization techniques, culture media, staining techniques for bacterial identification – Bacterial genetics: conjugation, transformation and transduction. Application: fermentor and types of fermentations – industrial products from bacteria, agricultural applications of bacteria, bacteria in Bioremediation. Structure and reproduction of Archaeobacteria, Cyanobacteria, Mycoplasma and Actinobacteria (Actinomycetes).

Virology:

General characteristics, Classification of plant viruses (ICTV,1970), structure and multiplication of plant viruses. Bacteriophage: Structural characteristics and multiplication. Virion, viroid, virusoids and prions. Isolation and purification of plant viruses.

Plant Pathology:

Classification of plant diseases, Symptomology. Principles of plant infection: Inoculum, inoculum potential, Pathogenicity, Disease triangle. Epidemiology and forecasting of plant diseases – Host parasite inter relationships and interaction. Pathogenesis: Mechanism of penetration- Disease development of pathogen

(colonization) and dissemination of pathogens. Environment and nutrition in relation to disease development – Defence mechanism. Role of enzymes and toxins in disease development. Diseases and disease cycle – Important diseases of crop plants in India: Sheath blight of rice, leaf spot of groundnut, Black rust of wheat, Late blight of potato, Fusarium wilt of cotton, Bacterial blight of rice, Citrus canker, Bunchy top of Banana, Root knot of Brinjal, Red rust of tea. Disease Resistance mechanism in plants. Techniques adopted in plant breeding for disease resistance. Principles of plant disease management – Cultural practices, physical, chemical and biological methods, disease controlled by immunization. Plant quarantine and legislation. Integrated Pest Management System. Plant protection organizations in India.

Unit X

Introduction to Plant Tissue Culture:

Basics of plant tissue culture – concepts in plant tissue culture. Plant tissue culture techniques. Micropropagation, organ culture, meristem culture, protoplast culture and haploid plant production. Callus induction, Cell suspension culture, somatic embryogenesis, synthetic seed technology. Conservation of Plant genetic resources. Application of cell culture systems in metabolic engineering. Concepts and application of nanobiotechnology: Application of nano particles in Agriculture, environment and medicine. Impact of nano-science and nanobiotechnology to society.

Genetic Engineering:

Principles of rDNA technology. Molecular tools in Genetic engineering. Cloning vectors – Plasmids – types, Mechanism of plasmids, Isolation of plasmids. Cosmids and phage vectors. Construction of Genomic library, polymerase chain reaction (PCR), Molecular Markers (RAPD, RFLP and AFLP). Blotting techniques (Southern, Northern and Western blots). Sequencing methods for DNA. Genetic transformation and development of transgenic plants for insect, herbicide and viral resistances, Golden rice, Edible vaccines, Bio-farming, bioremediation and bioprospecting, salt and drought tolerant plants, enhancement of shelf life of flowers and fruits. Socio-economic and ethical aspects of biotechnology. Environmental laws; Intellectual property rights; World Intellectual Property Organization (WIPO) GATT, TRIPS, PBR and Farmers rights and its role. Ecological impact and biosafety issues of GM crops.

SUBJECT : ZOOLOGY

SYLLABUS

Unit I**ANIMAL DIVERSITY AND PHYLOGENY**

- Concepts of species and hierarchical taxa, biological nomenclature. Levels of structural organization – Unicellular, colonial and multicellular forms. Organization of Coelom, Symmetry and Metamerism.
- Structure and life history of Protozoa – *Entamoeba histolytica*, *Plasmodium vivax*, *Plasmodium ovale*, *Plasmodium malariae*, *Plasmodium falciparum*, *Trypanosoma gambiense* and *Leishmania donovani*.
- Canal systems in Porifera. Polymorphism and Metagenesis in Coelenterates. Types of Corals and Coral reefs.
- Structure and life history of helminth parasites – *Fasciola hepatica*, *Taenia solium*, *Wuchereria bancrofti* and *Ascaris lumbricoides*.
- Adaptive Radiation in Polychaetes. Torsion in Gastropods. Invertebrate larval forms and their evolutionary significance.
- Structure, affinities and life history of Minor Phyla – Ctenophora, Rotifera, Chaetognatha, Onychophora, Siphunculida, Entoprocta, Ectoprocta and Phoronida.
- Origin and outline classification of Chordata – Phylogeny, evolutionary significance and inter-relationships of Hemichordata, Urochordata and Cephalochordata and their relation with other deuterosomes. Retrogressive metamorphosis.
- Origin, Evolution and general characters of Agnatha (Ostracoderms and Cyclostomes). Early Gnathostomes (Placoderms).
- General characters and classification of fishes. Accessory respiratory organs in fishes. Adaptive Radiation in Bony fishes.
- Origin, Evolution and adaptive radiation of Amphibia. Parental care in Amphibia.
- Origin and evolution of Reptiles. Skulls of reptiles and its importance in biosystematics. Outline classification of Reptiles. Poisonous and Non-poisonous snakes.
- Origin and evolution of Birds. Origin of flight and flight adaptations in birds. Flightless birds
- Origin of mammals. Primitive mammals – Prototheria, Metatheria and Eutherian Mammals. Aquatic adaptations in Mammals.
- Structure and functions of integument and its derivatives (glands, scales, feathers and hairs). Comparative account of jaw suspension, girdles and limbs. Comparative study of integument, brain, heart and urinogenital organs in Vertebrates.

Unit II**ENTOMOLOGY AND ECONOMIC ZOOLOGY**

- General characters and classification of Insects up to Order level with examples.
- Beneficial insects – Silkworm – common cultivable species, rearing of silkworm, diseases of silkworm, by-products of sericulture, economic importance of silk. Honeybees – common species of honeybees, rearing in modern hives, by-products of apiculture, economic importance of honey, beeswax and propolis.
- Harmful insects – Insects as plant pests – pests of rice, cotton, sugarcane, coconut and stored grains. Pest control strategies – physical, mechanical, chemical and biological, IPM.
- Poultry farming – Breeds of Poultry for egg and meat, common diseases of poultry.
- Dairy farming – Economically important dairy cattle breeds of India, white revolution, diseases of cattle, dairy by-products.

Unit III**CELL AND MOLECULAR BIOLOGY**

- Cellular organization – Prokaryotic and Eukaryotic cells, Ultrastructure, organization and functions of cell membrane, Nucleus, Endoplasmic reticulum, Golgi bodies, Lysosomes, Mitochondria and Ribosomes. Structure and function of cytoskeleton and its role in mobility.
- Organization of Genes and Chromosomes – Structure of chromatin and chromosomes, heterochromatin, Euchromatin and Giant chromosomes.
- Cell division and cell cycle, regulation and control of cell cycle – Mitosis and meiosis, their regulation, steps in cell cycle, Significances of Mitosis and Meiosis, Mitotic Apparatus.
- Structure and function of DNA (A, B, C and Z forms) and RNA (tRNA, mRNA and rRNA). DNA replication and DNA repair mechanisms.
- RNA synthesis and processing – Transcription factors and machinery, formation of initiation complex, transcription activator and repressor, RNA polymerases, capping, elongation and termination, RNA processing, RNA editing, splicing and polyadenylation. Genetic code. Translation – components of protein synthetic machinery, steps involved in translation – formation of initiation complex, initiation factors and their regulation, aminoacylation of tRNA, tRNA-identity, aminoacyl tRNA synthetase, elongation and elongation factors, termination and translational proof-reading, translational inhibitors, Post-translational modification of proteins.

- Control of gene expression at transcription and translation level – Regulating the expression of prokaryotic and eukaryotic genes – lac and trp Operon, role of chromatin in gene expression and gene silencing.
- Cellular communication – General principles of cell communication, cell adhesion and roles of different adhesion molecules, gap junctions, extracellular matrix and integrins.
- Cell signaling – Hormones and their receptors, cell surface receptor, signaling through G-protein coupled receptors, signal transduction pathways, second messengers and regulation of Signaling pathways.
- Cancer – Types of cancer. Characteristics of cancer cells, Genetic rearrangements in progenitor cells, oncogenes, tumor suppressor genes, cancer and cell cycle, virus-induced cancer, physical and chemical carcinogenic agents, metastasis, interaction of cancer cells with normal cells, therapeutic interventions of uncontrolled cell growth.
- Programmed cell death (Apoptosis), aging and senescence.

Unit IV

GENETICS

- Mendelian principles – Dominance, segregation, independent assortment.
- Concept of gene – Allele, multiple alleles and pseudoalleles.
- Modern concept of gene – Cistron, Muton and Recon.
- Extensions of Mendelian principles – Codominance, incomplete dominance, gene interactions, Epistasis, pleiotropy, genomic imprinting, penetrance and expressivity, phenocopy, linkage and crossing over, sex linkage, sex limited and sex influenced characters.
- Sex determination in man.
- Gene mapping methods – Linkage maps, tetrad analysis, mapping with molecular markers, mapping by using somatic cell hybrids.
- Cytoplasmic Inheritance – Inheritance of mitochondrial genes, maternal inheritance, shell coiling in Limnaea, Milk factor in mice, extra nuclear inheritance by endosymbionts – Kappa particles in Paramecium.
- Microbial genetics – Methods of genetic transfers – transformation, conjugation, transduction and sexduction, mapping genes by interrupted mating.
- Human genetics – Pedigree analysis, LOD score for linkage testing, karyotypes, genetic disorders and syndromes.
- Mutation – Types, causes and detection, mutant types – lethal, conditional, biochemical, loss of function, gain of function, germinal verses somatic mutants, insertional mutagenesis. Significance of mutation.

- Structural and numerical alterations of chromosomes – Deletion, duplication, inversion, translocation, ploidy and their genetic implications.
- Quantitative genetics – Polygenic inheritance, heritability and its measurements, QTL mapping.
- Recombination – Homologous and non-homologous recombination including transposition.
- Population genetics – Hardy-Weinberg equilibrium, derivation of Hardy-Weinberg equilibrium, factors affecting Hardy-Weinberg equilibrium. Determination of allelic frequency in a population.
- Animal breeding – Inbreeding, Outbreeding and Heterosis.

Unit V

ANIMAL PHYSIOLOGY

- System Physiology – Digestion and absorption of Carbohydrates, Proteins and Lipids, BMR, Nutritional disorders.
- Blood and Circulation – Blood and its composition, function, haemopoiesis and haemostasis, mechanism of blood clotting.
- Cardiovascular system – Structure of myogenic heart, cardiac cycle, pace maker, Pulse pressure and blood pressure, ECG.
- Blood vessels – Arteries, veins and lymphatic vessels.
- Respiratory Physiology – Respiratory structures – Invertebrates, vertebrates-fishes, birds and mammals. Respiratory pigments, Transport of gases, exchange of gases, neural and chemical regulation of respiration.
- Muscle Physiology – Types of muscle cells, ultrastructure of the striated muscle fibre, physiology of muscle contraction.
- Neurophysiology – Central Nervous system, Peripheral and Autonomic nervous system. Structure of Neuron, types, transmission of nerve impulses, action potential, synapse, conduction of nerve impulse across a synapse, neurotransmitters, Neuroanatomy of the brain and spinal cord and Reflex action. EEG.
- Sensory Physiology – Receptors – Photoreceptors, Mechanoreceptors and Gustatoreceptors. Echolocation. Bioluminescence, Mimicry and colouration. Lateral line system in fishes.
- Renal Physiology – Ammonotelism, Uricotelism and Ureotelism process, structure of kidney and Nephron, Mechanism of urine formation, Counter-current principle, micturition, regulation of water balance, electrolyte balance and acid-base balance.

- Thermoregulation and Stress adaptation – Thermoregulation in homeotherms, poikilotherms – acclimation and acclimatization, physical, chemical and neural regulation of body temperature, adaptation to high altitudes, deep sea adaptation.
- Endocrinology – Endocrine glands, mechanism of hormone action – peptide and steroid hormones, membrane receptors and signal transduction. Hormones and diseases, neuroendocrine regulation. Invertebrate hormones.

Unit VI

DEVELOPMENTAL BIOLOGY AND IMMUNOLOGY

- Gametogenesis, fertilization and early development – Production of gametes, cell surface molecules in sperm-egg recognition in animals, types of fertilization and mechanism of fertilization, embryo sac development and zygote formation, cleavage, blastula formation, embryonic fields, fate maps – presumptive organ forming areas, gastrulation and formation of germ layers and embryogenesis. Parthenogenesis.
- Morphogenesis and organogenesis – Ectodermal, Mesodermal and Endodermal derivatives, formation of primary organ rudiments, involvement of genes in the development process. Organogenesis with reference to brain, eye, heart and kidney in amphibians, birds and mammals. Post embryonic development- larval formation, metamorphosis (frog and insect).
- Regeneration – hydra, flatworms and salamanders. Aging and senescence. Stem cells – properties, types and applications.
- Human Reproduction – Reproductive organs, Menstrual cycle, Human Fertilisation process, reasons for infertility and assisted reproductive technology (ART) – Intra Uterine Insemination (IUI), In vitro fertilization (IVF) and types – GIFT, ZIFT, ICSI and ET, Twins – types, Cryopreservation of gametes, Birth control methods.
- Immunology – Cells and molecules involved in innate and adaptive immunity, antigens, antigenicity and immunogenicity. B and T cell epitopes.
- General properties, structure, types and functions of antibody molecules, generation of antibody diversity, monoclonal antibodies, antibody engineering, antigen-antibody interactions.
- Primary and Secondary Lymphoid organs – MHC molecules, antigen processing and presentation, activation and differentiation of B and T cells, B and T cell receptors.
- Humoral and cell-mediated immune responses, primary and secondary immune modulation, the complement system, Toll-like receptors, cell-mediated effector functions, inflammation.
- Hypersensitivity and autoimmunity, acquired immune-deficiencies.
- Vaccines and immunization schedule.
- Immune responses to bacterial, viral and parasitic infections.

Unit VII**ENVIRONMENT, CONSERVATION AND MANAGEMENT**

- The Environment – Physical environment, biotic environment, biotic and abiotic interactions. Habitat and Niche – Concept of habitat and niche, niche width and overlap, fundamental and realized niche, resource partitioning, character displacement.
- Population Ecology – Characteristics of a population, population growth curves, population regulation, life history strategies (r and K selection), concept of metapopulation – demes and dispersal, interdemec extinctions, age structured populations. Species Interactions – Types of interactions, interspecific competition, herbivory, carnivory, pollination, symbiosis.
- Community Ecology – Nature of communities, community structure and attributes, levels of species diversity and its measurement, edges and ecotones. Ecological Succession – Types, mechanisms, changes involved in succession, concept of climax.
- Ecosystem Ecology – Ecosystem structure, ecosystem function, energy flow and mineral cycling (C,N,P), primary production and decomposition, structure and function of some Indian ecosystems – terrestrial (forest, grassland) and aquatic (fresh water, marine, eustarine).
- Biogeography – Major terrestrial biomes, theory of island biogeography, biogeographical zones of India.
- Biodiversity – Definition, types, Hotspots, Flagship species, Keystone species, Biodiversity concerns. Biodiversity conservation – In situ and ex situ conservation, concept of protected areas, National parks, sanctuaries, Red data book, Gene bank, threatened and endangered species. Salient features of Wildlife Protection Act, 1972 and Biological Diversity Act, 2002. Threats to survival and conservation strategies for Elephant, Tiger, Olive Ridley Sea Turtle, White Rumped Vulture and Gangetic Dolphin.
- Environmental issues – Pollution – definition, types, sources, effects. Global warming, climate change, glacial melting and rising sea levels, floods, drought and desertification, creating buffer zones, sustainable development, carbon sequestration, carbon sink, carbon foot print, carbon credit, carbon trading and carbon budget. Environmental Exploitation – Exploitation and depletion of natural resources. Urbanisation, deforestation, habitat loss, remote sensing and GIS in conservation.
- Environmental Management – Environmental Summits – Conventions, Climate change conventions, Environmental laws and Acts. E-wastes and its eradication. Clean energy sources – solar, wind, hydel, biofuel, hydrogen as fuel. Effluent Management – Hazardous and biomedical waste management. Emission standards – BS6, AQI, WQI. Clean potable water – Desalination, rain water harvesting, conserving water bodies.

Unit VIII EVOLUTIONARY PRINCIPLES AND ANIMAL BEHAVIOUR

- Emergence of evolutionary thoughts – Lamarck, Darwin–concepts of variation, adaptation, struggle, fitness and natural selection, Spontaneity of mutations, the evolutionary synthesis.
- Origin of cells and unicellular evolution – Origin of basic biological molecules, Abiotic synthesis of organic monomers and polymers, Concept of Oparin and Haldane, Urey-Miller Experiment, The first cell, Evolution of prokaryotes, Origin of eukaryotic cells.
- Paleontology and Evolutionary History – The evolutionary time scale, Major events in the evolutionary time scale, Stages in primate evolution. Evolution of Man. Human racial diversity.
- Molecular Evolution – Concepts of neutral evolution, molecular divergence and molecular clocks, Molecular tools in phylogeny, classification and identification, Protein and nucleotide sequence analysis, origin of new genes and proteins, Gene duplication and divergence.
- Adaptive radiation, Isolating mechanisms, Speciation, Allopatric and Sympatric, Convergent evolution, Sexual selection, Co-evolution.
- Brain, Behaviour and Evolution – Approaches and methods in the study of behaviour, Proximate and ultimate causation, Altruism and evolution-Group selection, Kin selection, Reciprocal altruism.
- Neural basis of learning, memory, cognition, sleep and arousal, Biological clocks.
- Development of behaviour, Social communication, Social dominance, Use of space and territoriality, Mating systems, Parental investment and Reproductive success, Parental care, Aggressive behaviour, Habitat selection and optimality in foraging, Migration, orientation and navigation, Domestication and behavioural changes.

Unit IX BIOPHYSICS AND BIOCHEMISTRY

- Structure of atoms, molecules and chemical bonds.
- Stabilizing interactions – Van der Waals, electrostatic, hydrogen bonding, hydrophobic interactions etc.
- Principles of biophysical chemistry – pH, buffer reaction kinetics, thermodynamics and colligative properties.
- Composition, structure and functions of biomolecules – Carbohydrates, Proteins, Lipids, Nucleic acids and Vitamins.

- Bioenergetics, glycolysis, oxidative phosphorylation, coupled reaction, group transfer, biological energy transducers.
- Principle of catalysis, enzyme classification and enzyme kinetics, enzyme regulators, mechanism of enzyme action, isozymes, coenzymes and cofactors, enzyme inhibitors and inhibition. Metabolism of Carbohydrates, Proteins and Lipids.

Unit X

BIOSTATISTICS

- Collection of Data – Primary data and Secondary data, Methods of collecting Primary data and Sources of Secondary data, Concept of Statistical Population and Sample, Census and Sampling Methods. Variable – Discrete and Continuous.
- Classification of Data – Types of classification, Characteristics of Frequency Distribution.
- Presentation of Data – Tabulation – Parts and types of tables. Diagrams – One dimensional diagrams – Bar diagram, Two-dimensional diagrams – Pie Chart. Graphs – Histogram, Frequency Polygon, Frequency Curve, Ogives.
- Descriptive Statistics – Measures of Central Tendency – Arithmetic Mean, Median and Mode (Properties and Computation for unclassified, discrete and continuous data).
- Measures of Dispersion – Range, Quartile Deviation, Mean Deviation and Standard Deviation (Properties and Computation for unclassified, discrete and continuous data).
- Correlation – types, methods for measuring correlation and computation of Karl Pearson's coefficient and Spearman's rank correlation.
- Simple Regression – Regression coefficients, Regression equations (including computation), Regression lines.
- Probability – Addition and Multiplication rule, Permutation and Combination. Probability distributions – Binomial, Poisson and Normal distributions, Properties of Normal distribution.
- Inferential Statistics – Hypothesis testing – Null and alternative hypothesis, Levels of Significance, Degrees of freedom, errors. Parametric and Non parametric tests – Steps in hypothesis testing.
- Student's 't' test – Population and Sample Means, Means of Independent samples, Means of Dependent samples.
- Chi square test for predicted expected values and goodness of fit for pre fixed ratio.
- F-test and ANOVA – One way and Two way analysis.

Unit XI**BIOTECHNOLOGY**

- Recombinant DNA technology – Molecular tools, host cells, Isolation and purification of nucleic acids, Cloning vectors, methods of gene transfer. Gene cloning strategies, Blotting techniques, PCR, gene libraries, screening strategies. DNA sequencing methods, Protein sequencing methods, methods for analysis of gene expression at RNA and protein level, large scale expression, micro array based techniques. Isolation, separation and analysis of carbohydrate and lipid molecules RFLP, RAPD and AFLP techniques. Human Genome project.
- Biotechnology in health care – Gene therapy, DNA in the diagnosis of genetic diseases. DNA finger printing. Pharmaceutical Products of DNA Technology – Human protein replacements and therapeutic agents for human diseases. Insulin, Recombinant vaccines, production of monoclonal antibodies.
- Microbial Fermentation Technology – Production of low and high molecular weight compounds. Enzyme Technology – Commercial production of enzymes, immobilization of enzymes and cells, therapeutic applications, Biosensors, Bioreactors.
- Animal cell culture methods and Applications, Transgenic animals.
- Biodegradation and Bioremediation. IPR, Patenting, Trade Mark, Copy rights. GMOs and GM foods–Pros and Cons. Microbial warfare, Microbial weapons, bioterrorism.

Unit XII**TOOLS AND TECHNIQUES IN BIOLOGY**

- Histochemical and Immuno techniques – Antibody generation, Detection of molecules using ELISA, RIA, immunoprecipitation, flow cytometry and immune fluorescence microscopy, detection of molecules in living cells, in situ localization by techniques such as FISH and GISH.
- Biophysical Method – Molecular analysis using UV/visible, fluorescence, circular dichroism, NMR and ESR spectroscopy Molecular structure determination using X-ray diffraction and NMR, Molecular analysis using light scattering, different types of mass spectrometry and surface plasma resonance methods.
- Radiolabeling techniques – Detection and measurement of different types of radioisotopes normally used in Biology, incorporation of radioisotopes in biological tissues and cells, molecular imaging of radioactive material, safety guidelines.
- Microscopic techniques – Visualization of cells and subcellular components by light microscopy, resolving powers of different microscopes, microscopy of living cells, scanning and transmission microscopes, different fixation and staining techniques for EM, freeze-etch and freeze-fracture methods for EM, image processing methods in microscopy.

SUBJECT : HISTORY**SYLLABUS****Unit I HISTORY OF INDIA UPTO 10TH CENTURY A.D.**

Sources of Indian History – Archaeological – Literary – Foreign Accounts – Pre and Proto History – Harappan Civilization – Early Vedic Age – Later Vedic Age – Formation of State – Urbanization – Mahajanapadas – Jainism – Buddhism – Rise of Magadha – Alexander’s Invasion and its impact – Mauryan Empire – Chandra Gupta Maurya – Bindusara – Ashoka – Mauryan Administration – Sungas – Satavahanas – Indo-Greeks – Sakas – Parthians – Kushans – Kanishka – Gandhara Art – Age of Guptas – Chandra Gupta I – Samudra Gupta – Chandra Gupta II – Administration – Art and Architecture – Literature – Education – Nalanda – Vikramasila – Valabhi – Invasion of Huns – Vardhana Dynasty – Harsha Vardhana – Hieun-Tsang’s Account – Chalukyas – Three Crowned Kingdom – Pratihara – Palas – Rashtrakutas – Second Western Chalukyas.

Unit II HISTORY OF MEDIEVAL INDIA UPTO 1565 A.D.

Arab Conquest of Sind – Mohammad-Bin-Qasim – Dahir – Impact of Arab Conquest – Turkish Invasion – Mohammad of Ghazni – Mohammad of Ghor – First and Second Battle of Tarain – The Delhi Sultanate – Slave Dynasty – Qutub-ud-din Aibak – Iltutmish – Raziya Sultana – Balban – Mongol threat – Khilji Dynasty – Jalaluddin Khilji – Alauddin Khilji – Malik Kafur Invasion – Tughlaq Dynasty – Mohammad-Bin-Tughlaq – Feroz-Shah-Tughlaq – Invasion of Timur – The Sayyid Dynasty – The Lodi Dynasty – Ibrahim Lodi – Administrative System – Socio – Economic and Religious Conditions – Art and Architecture – Vijayanagar Empire – Sangama – Harihara and Bukka – Saluva – Narashima Deva Raya – Tuluva Dynasty – Krishna Devaraya – Aravidu – Thirumala – Battle of Talikota – The Bahmani kingdom – The Bhakti Movement.

Unit III HISTORY OF MUGHAL INDIA AND THE RISE OF MARATHAS

India on the eve of Babur’s Invasion – The First Battle of Panipat – Battle of Khanwa-Chanderi – The Battle of Ghaghra – Tuzuk-i-Babri – Humayun – Sur Dynasty – Shershah Suri – Administrative Reforms – Akbar the Great – The Second Battle of Panipat – Relations with Rajputs – Military Conquest – Administration – Religious Policy – Abolition of Jiziya – Ibadat Khana –

Din-i-Ilahi – Jahangir – Influence of Nurjahan – Shah Jahan – NWF Policy – Aurangzeb – Military Exploits – Deccan Policy – Religious Policy – Socio-Economic condition under Mughals – Art and Architecture – Decline and Disintegration of the Mughal Empire – Rise of the Marathas – Early Victories of Shivaji – Administration of Marathas – The Peshwas – Balaji Viswanath – Baji Rao.

Unit IV THE COMPANY RULE IN INDIA

Advent of the Europeans – The Portuguese – Vascodegama – Francisco-de-Almeida – Alphonso de Albuquerque – The Dutch – The Danes – The British – The French – Anglo-French Rivalry – Carnatic Wars – Dupleix – Robert Clive – Battle of Plassey – Battle of Buxar – Dual Government in Bengal – Warren Hastings – Administrative Reforms – Lord Cornwallis – Judicial Reforms and Permanent Land Revenue Settlement – Anglo-Mysore Wars – Hyder Ali – Tipu Sultan – Anglo Maratha Wars – Lord Wellesley – Subsidiary Alliance – Hastings and Establishment of British Paramountcy – William Bentinck and his Reforms – Ranjith Singh – Anglo Sikh Wars – Dalhousie – Doctrine of Lapse and his Reforms – Deindustrialization – Peasant and Tribal Revolts.

Unit V CROWN TO INDEPENDENCE

The Great Revolt of 1857 – Lord Canning – Lord Lytton – Lord Rippon – Socio-Religious Reform Movements in 19th Century India – Pre Congress Associations – Formation of Indian National Congress – Moderates – Partition of Bengal – Muslim League – Swadeshi Movement – Surat Split – Home Rule Movement – Rowlatt Act – Jallianwala Bagh massacre – Gandhian Era – Non-Cooperation Movement – Chauri Chaura – Swaraj Party – Simon Commission – Revolutionary Movements – Dandi March – Gandhi – Irwin Pact – Round Table Conferences – Trade and Labour Unions – Civil Disobedience Movement – Cripps Mission – Quit India Movement – Mountbatten Plan – Government of India Act 1858 – Queen's Proclamation of 1858 – Indian Council Act of 1861 – Indian Council Act of 1892 – Minto-Morley Reforms of 1909 – Montague Chelmsford Reforms of 1919 – Government of India Act, 1935 – Indian Independence Act of 1947.

Unit VI POST-INDEPENDENT INDIA

Integration of Indian States – Role of Sardar Vallabhbhai Patel – Republic – Constitution of India – Salient Features – Nehruvian Era – Economic Policy –

Five Year Plans – Social Welfare Programmes – Foundation of Foreign Policy – Indira Gandhi Regime – Domestic Policy – 20 Point Programme – Declaration of Emergency – Janata Party – Resurgence of Indira Gandhi – Administrative Reforms – Coalition Governments – Mandal Commission – India's role in World Affairs – Economic, Diplomatic and Military role – Indo-China Border Dispute – Indo-Pak Conflict – India's Nuclear Capabilities – India and Common Wealth – India and NAM – India and UNO – SAARC – G-20 – BRICS.

Unit VII HISTORY OF TAMIL NADU UPTO 13TH CENTURY

Geographical Features of Tamil Nadu – Sources of the History of Tamil Nadu – Pre-Historic Tamilagam – Sangam Age – Three Ancient Kingdom – Cheran Senguttuvan – Karikala Chola – Pandya Nedunchelian – Socio – Economic Condition – Five Fold Division – Trade and Commerce – Kalabharas – Pallavas of Kanchi – Simhavarman – Mahendravarman – Narasimhavarman – Rajasimha – Nandivarman II – Pallava Chalukya Conflict – Art and Architecture of the Pallavas – Imperial Cholas – Raja Raja I – Rajendra Chola I – Kulothunga I – Administration – Economy – Kudavolai System – Maritime Activities – Art and Architecture – Later Pandyas – Maravarman Sundara Pandya I – Maravarman Sundara Pandya II – Jatavarman Sundara Pandya – Kulasekara Pandya – Accounts of Marco Polo – Art and Architecture.

Unit VIII MEDIEVAL TO CONTEMPORARY TAMIL NADU

Malik Kafur's invasion of Tamil Region – Sultanate of Madurai – The Vijayanagar rule in the Tamil Country – Nayaks of Madurai – Nayaks of Tanjore – Nayaks of Gingee – Sethupathis of Ramnad – Tamil Nadu under Marathas – Advent of the Europeans – British – French – Dutch – Poligar Rebellion – South Indian Rebellion – Vellore Mutiny – Tamil Nadu under British Rule – Tamil Nadu and Freedom Struggle – Early Nationalist – Radical Nationalist – Social Reform Movement – Congress – Rajaji – Kamaraj – Justice Party – Periyar and his Self Respect Movement – Anti-Hindi Agitation – Dravidian Parties – Dravida Kazhagam – DMK – C.N. Annadurai – Kalaignar M. Karunanithi – Emergence of ADMK – M.G. Ramachandran – J. Jayalalitha (AIADMK) – MDMK – PMK – Other Political Parties – Education and Empowerment of Women – Reservation Policy – Agrarian Condition – Irrigation – Industrialization – Information Technology.

Unit IX **RISE OF MODERN WEST**

Geographical Discoveries – Renaissance and Reformation – Enlightened Despots – Age of Revolution – American War of Independence – Industrial Revolution – Agrarian Revolution – French Revolution – Rise of Napoleon Bonaparte – Napoleonic Wars – Congress of Vienna – Metternich – Concert of Europe – Holy Alliance – Greek War of Independence – The Revolution of 1830 and 1848 in France.

Unit X **HISTORY OF MODERN WORLD**

Unification of Italy – Mazzini – Young Italy – Garibaldi – Count Cavour – Unification of Germany – Zollverein – Bismarck – Napoleon III – Crimean War – Young Turk Revolution – Balkan Wars – Russian Revolution – First World War – League of Nations – Rise of Dictatorships – Adolf Hitler, Benito Mussolini and Mustafa Kemal Pasha – Second World War – UNO – Cold War – Third World Countries and Non-Alignment – UNO and Global Disputes – Formation of European Union – End of Cold War.

SUBJECT : GEOGRAPHY

SYLLABUS

Unit I

PHYSICAL GEOGRAPHY

Geomorphology:

The origin of Earth: Gaseous Hypothesis of Kant, Nebular Hypothesis of Laplace, The Nova Hypothesis of Hoyle and Lytleton – **The Age of Earth:** Sedimentation method, Radioactivity method. **The Earth's Interior:** Layers of the earth interior: The Crust, Mantle, Core, Thickness and depth of different layers of the Earth, Distribution of continents and Oceans – Plate tectonics and continental drift – **Rocks:** Definition and classification: Igneous Rocks, Sedimentary rocks, Metomorphic rocks – **Mountain Building Process:** Volcanoes, Earthquakes, Mountains, Plateaus and Plains, Geomorphic processes – Denudational Agencies, **Cycle of erosion:** Davis and Penck, Theories and process of slope development.

Climatology:

Composition and Structure of Atmosphere, Solar Radiation, Heat Budget of the Earth and Atmosphere. **Distribution of Temperature:** Vertical, Horizontal distribution of temperature, Temperature Inversion – **Atmospheric Pressure:** factors affecting Atmospheric Pressure – Distribution of Atmospheric Pressure, **Wind:** Types of winds – Monsoon winds, Area of monsoon winds, the Indian monsoon, Jet stream, kinds of Humidity – **Clouds:** formation of clouds, classification of clouds, **Precipitation:** types of rainfall, **Air masses:** classification of air masses, Fronts – frontal zones, major fronts, **Cyclones:** Cyclones and Anticyclones, classification of thunderstorms – **Climatic classification:** Koppen and Thornthwaite – **Climate change:** Cause and effects of climate change – Global warming, Effect of El-Nino, La Nina.

Oceanography:

Distribution of Water and Land, **Relief of the Ocean:** Continental shelf, Continental slope, Continental rise, Mid Oceanic Ridges, Abyssal plain Island, Guyots and seamounts, Ocean deeps and Oceanic trenches – **Bottom Relief of the Ocean floors:** Pacific, Atlantic, Indian Ocean, Ocean temperature, Ocean salinity and density of Ocean water – Ocean deposits – Sea waves – **Ocean currents:** Major Ocean currents – Tides – Sea level changes – Tsunami – Coral reefs.

Unit II

HUMAN GEOGRAPHY

Population Geography:

Sources of population data in India – **Population:** Distribution, Density and Growth, world population distribution, factors affecting population distribution, density patterns – measures and determinants of fertility, mortality – World's population growth and its trend – **Theories of population growth:** Malthus, Sadler and Ricardo – **Migration:** types of migration, causes of migration,

consequences of migration, **Population composition and characteristics:** Age, Sex, Rural-urban, Occupational structure and educational levels and literacy – **Population of Tamilnadu:** Population, Distribution, Density and Growth, Optimum population – Over population, Under population – Potential population, Population policies.

Settlement Geography:

Geography of settlements: Nature and Scope of Settlement Geography – **Rural Settlements:** Types, Pattern and distribution of rural settlements – Problems of Rural Settlements: Rural-Urban Migration, land use changes, Land acquisition and Transactions; Urban Settlements: Theories of origin of Towns (Gordon Childe, Henri Pirenne, Lewis Mumford) – Characteristics and process of urbanisation in Developed and developing countries – **Urban settlements:** concept and characteristics – Functional classification of urban centres – functions and characteristics of CBD – Urban morphology – **Urban Classical models:** Burger, Homer Hoyth and Harris Ullmann – Rural-Urban fringe – hierarchy of urban centres – Rank size rule – Central Place Theory – Urban problems – Slums – Urban planning – Urbanisation in India and its associated problems.

Agricultural Geography:

Nature, Scope and significance of Agricultural geography – Approaches to study of Agriculture geography – Land Capability, Classification and land use planning – Determinants of Agriculture – Von Thunen's Theory of agriculture location – Agricultural productivity – crop combination (weaver's, Doi's, Raffiullah's), Crop diversification, **Types of Crops:** Food crops, Horticultural crops – Plantation crops, Fibre crops – Agricultural Systems of the world – Agricultural regions of India – Agricultural regions of Tamilnadu, Role of Remote sensing in Agricultural Studies.

Urban Geography:

Nature and scope of urban Geography – trends of urbanisation – size, structure and functions of urban areas – urban systems: law of primate city and rank size rule – Center Place theories: Christaller and bosch – Internal structure of the city – **Models of urban land use:** Burgess, Harris, Ullman and Homer Hoyt – **Concept of cities:** Mega cities, Global cities, edge cities – **Changing urban form:** peri-urban areas, rural – urban fringe – Sub-urban, ring and satellite towns – social segregations in the city – urban social area analysis – **Urban issues:** slums, in formal sectoral growth, crime and social exclusion.

Transport Geography:

Nature, scope and significance of transport Geography – Different types of transportation – Merits and demerits of transport – Terminal charges and operating charges – Tapering cost structure – Variation in freight structure on distance – Commodity – Size and elasticity of demand – Long haul advantages – Nodes and links – Connectivity – Accessibility – Centrality – Structural analysis

of transportation network – Graph theoretic measures – Measures of nodal accessibility – Matrix measures – Detour index – Theories of spatial interaction – Gravity model – Transportation and spatial structure – Role of transport in socio-economic integration – Urban and regional transport planning – Problems of transport.

Cultural Geography:

Concept of cultural – Evolution of Human beings – Major Races of the World – Culture interaction and diffusion – Culture exchange – **Measurement of Human Development:** Social, Economic and Environmental Indicators – Human Development Index.

Social Geography:

Nature and scope of social geography – Environmental and landscape ecology – Social structure (family, marriage and kinship) and processes – Rural and urban society – spatial distribution of ethnicity – Tribe – Dialect – Language – caste and religion in the world with special reference to India – welfare and social well being – Quality of life – Health – Education, Economic Status – Gender – well being of women – Spatial distribution of social groups in India – Health care planning and policies in India.

Economic Geography:

The significance of Economic Geography – Factors affecting spatial organisation of economic activities – **Natural resources:** Classification of Resources – Renewable and non – renewable resources – Distribution and associated problems conservation of resources – **Industries:** Agro based Industries – Mineral based Industries – Engineering – Industries – Chemical industries – Industrial regions of the world – Trade blocs – Major importing and exporting countries – World Energy crisis in developed and developing countries.

Political Geography:

Trends and development in political Geography – Geography of federation – Boundaries and frontiers of India – Electoral reforms in India – **Geopolitics:** climate change, world resources and Indian Ocean – **Regional organisations of co-operations:** SAARC, ASEAN, OPEC and EU – Neopolitics of world natural resources – India's Foreign Policies.

Unit III

GEOGRAPHICAL THOUGHT

Contributions of Greek, Romans, Arabs, German, French, British, America and Indian scholar in geography – **Contemporary trends in Indian geography:** Cartography, Thematic and Methodological contributions – **Major Geographic Traditions:** Earth science, Man and Environment relationship, Area studies and spatial analysis – Dualism in Geographical studies: physical vs human, region vs systematic, qualitative vs quantitative – Paradigm shift

in Geography – **Perspectives in Geography:** Positivism, Behaviouralism, Humanism, Feminism and Post modernism.

Unit IV REGIONAL DEVELOPMENT AND PLANNING

Definition of region – Evolution – Types of region – Formal and functional region – Planning region – Need and types of regional planning – Characteristics and ideal planning region – Delimitation of planning region – Regionalisation of India for planning – Theories and models of regional planning – Growth pole model of perroux, growth centre model in Indian context myrdal, rostow and Friedman – Village cluster – Changing concept of development – Concept of under development – Efficiency – Explicitness – Indicators – Economic, social and environment – Global pattern of development – Inter-regional variation of human development – International – Interstate comparison of India – Geospatial technology of regional planning.

Unit V GEOGRAPHY OF RESOURCE

Natural Resource: Concept, Classification and Techniques – Distribution, Utilisation of resources – Problems and Management of Land Resources and Water Resources – Distribution, Utilisation, Problems and Management of Forests and Energy Resources – Appraisal and Conservation of Natural Resources – Sustainable Resource Development – Concepts and definitions of Disaster and Natural Hazard – **Disaster:** Disaster Management Cycle – Basic Concepts of Disaster Risk Reduction (DRR) – **Hazards:** Hazard types and hazard mapping – **Vulnerability:** types and their assessment – physical, social, economic and environmental vulnerability – Disaster Risk Assessment – approaches and procedures for disaster management.

Unit VI GEOGRAPHY OF ENVIRONMENT

Nature and scope of Environmental Geography – Concept of an Ecosystem – Structure and function of an Ecosystem – **Ecosystem:** Types of ecosystem – Forest, Grassland, Desert, Aquatic Ecosystem – Ecological succession – Energy flow in an ecosystem – **Biogeochemical Cycle:** Carbon, Nitrogen, Oxygen, Phosphorus and sulphur cycle – Food Chain, Food web, Ecological pyramid – **Biomes:** Major Biomes of the world: Tundra Biome, Temperate forest biome, Coniferous forest biome, Temperate Grassland biome, mediterranean biome, Savanna biome, Tropical Evergreen Rainforest biome, Monsoon Deciduous forest biome, Desert biome – **Biodiversity:** Hotspots of biodiversity – **Threats to biodiversity:** Habitat loss, poaching of wildlife, Man-wildlife conflicts – Endangered species of India – **Conservation of biodiversity:** In situ and Ex situ Conservation of biodiversity – hydrological cycle – International programmes and policies – Environment policy of India.

Unit VII GEOGRAPHY OF INDIA

Major physiographic Regions and their Characteristics – Drainage system – Indian Monsoon – Soil – Vegetation – Water – Mineral and Marine Resources – Regional variation in Agricultural Development – Population characteristics – Growth and Composition – development population – population policies in India – Development and Pattern of Transport – Internal and External Trade – Regional Development planning in India – Trade policy – Export Processing zones – India Space programme – Natural Disasters in India.

Unit VIII GEOGRAPHY OF TAMILNADU

Tamil Nadu: Location – Administrative units of Tamil Nadu – **Physiography:** Mountains, Plateaus, Plains – **Climate:** Seasons (South West, North East Monsoon, summer and winter) – **Rainfall:** Cyclonic Rainfall – Distribution of Rainfall – Rivers of Tamil Nadu – **Soils:** Types of Soil – **Natural Vegetation:** Forest and its types – Flora and Fauna – Wild life sanctuaries – Bird sanctuaries – Botanical gardens. **Distribution of Crops:** Food Crops: Paddy, Millets, Pulses, Oilseeds – **Cash Crops:** (Sugarcane, Cotton) – Plantation Crops (Tea, Coffee, Rubber and Spices) – Livestock (cattle, sheep and dairying) – Fisheries (inland and deep sea fishing). **Distribution of Minerals and Industries:** Metallic, Non-Metallic (Iron, Manganese, Bauxite, Copper, Mica, Illuminate and power resources) – Agro Based Industries – (Textile, Sugar, Paper) – Cement – Automobile – **Population:** Distribution – Growth, Density and Population Problems – **Transportation:** Roadways, Railways, Airways, Waterways Trade: (Import and Export) – Special Economic Zones.

Unit IX CARTOGRAPHY

Nature and scope of cartography – Maps: History and definition of maps – classification of maps – Scope and types of scale – **Map projection:** Meaning, definition, shape, distance, area and direction properties – classification of projections – Selection of projection – **Map compilation and design:** Base map concepts, scanning and digitization – Topographic and thematic maps – elements of maps and layouting principles – **Map design:** fundamental symbol, conventional signs, color theory, colors or patterns, Map lettering – **Map making:** Definition of Choropleth, Isopleth maps – class interval selection and shading – flow maps – cadastral maps – Demographic and statistical mapping – Map reproduction – Map printing – Printing standard in various medium.

Unit X**TECHNIQUES IN GEOGRAPHY**

Definition of Remote Sensing – Advantages and limitations in remote sensing – Remote Sensing System – Platforms and sensors – Resolutions in remote sensing – **Satellite data products:** Analog and digital products – Visual Image Interpretation – **Digital Image Processing:** Pre-processing, post-processing, **Digital Image Interpretation:** Supervised and unsupervised classification – Change detection analysis – Basic concepts of Geographic Information System (GIS) – Components of GIS – **Data Models in GIS:** Relational and entity relational model – **Data structure:** Raster and Vector – Data requirement – Methods of data capturing – Meta data – Raster and Vector Query – Geographic visualization – Data analysis – Geo statistical analysis.

SUBJECT : COMMERCE & ACCOUNTANCY
SYLLABUS

Unit I BUSINESS ORGANISATION AND MANAGEMENT

Business: Meaning and Characteristics – Divisions of business: Industry, Commerce and Trade – Objectives of business – Social responsibilities of a business – Business ethics and Corporate governance – Evolution of business – Forms of business organisation: Sole proprietorship, Hindu undivided family, Partnership, Limited liability partnership, Joint stock company, Co-operative organisation, Government organization – Location of a plant – Business combinations: Meaning, types, forms, advantages and limitations – Micro, Small and Medium Enterprises – Self Help Groups.

Management: Meaning, Nature and Levels – Evolution of Management Thought – Planning – Decision making – Organising – Power and authority – Coordination – Staffing – Directing – Motivation – Leadership – Communication – Controlling.

Unit II MARKETING AND HUMAN RESOURCE MANAGEMENT

Marketing – Concepts, Approaches, Functions and Environment – Marketing mix – Market Segmentation – Market Targeting and Positioning – Product: Meaning, Features, Attributes, Mix, Product life cycle, New product planning and development – Pricing Policies and Strategies – Promotional methods: Personal selling, Advertising, Publicity, Sales promotion – Channels of distribution: Functions, Types – Retail management: Agent middlemen, Wholesaler, Retailer, Consumer Behaviour – Need for consumer protection – Consumer grievance redressal mechanism under Consumer Protection Act – Services marketing – Rural and Agricultural Marketing – Recent Trends in Marketing: Digital Marketing, Social marketing, Green marketing.

Human Resource Management: Objectives and Importance – Human resource planning – Functions of Trade Unions – Forms of Collective Bargaining – Workers' Participation in Management – Grievance Management – Employee Welfare: Types of Employee Welfare Measures – Remuneration.

Unit III BANKING, INSURANCE, FINANCIAL MARKETS AND AUDITING

Indian Banking System – Banking Structure in India: RBI, Public Sector Banks, Private Banks, Foreign Banks, RRB, UCB, Payment Banks and Small Finance Banks – Branch Banking – Unit Banking – Universal Banking – Central bank

and commercial banks – Types of Accounts: Savings, Recurring, Fixed Deposit, CASA, Pradhan Mantri Jan Dhan Yojana – KYC norms – Digital Banking Services: e-banking, Mobile banking – Green Banking – Electronic Mobile Wallets – ATM – Electronic Money – NEFT, RTGS, IMPS, UPI and Digital currency.

Insurance: Meaning and features – Life insurance – General Insurance – IRDAI: Purpose, Duties, Powers and functions.

Financial Markets: Capital Markets – Money Markets – Primary Market Operations – Secondary Market Operations – Functions of Stock Exchanges – Listing – Role of SEBI – Venture Capital, Leasing and Credit Rating.

Auditing: Meaning, Objectives – Types of audit – Audit Planning and control – Internal Control-Internal Check and Internal Audit – Vouching – Verification and Valuation of Assets and Liabilities – Professional Ethics of Auditors – Auditors: Qualification, Appointment and Removal, Duties and Liabilities – Investigation and Audit.

Unit IV

BUSINESS LAW AND COMPANY LAW

The Indian Contract Act, 1872: Introduction – Elements of a valid contract – Offer and Acceptance – Consideration – Capacity to contract – Free consent – Legality of object – Void agreements – Contingent contract – Performance of contract – Quasi contract – Discharge of contracts – Remedies for breach of contract.

The Sale of Goods Act, 1930: Sale of goods – Conditions and warranties – Transfer of property – Performance of contract of sale – Rights of an unpaid seller.

Companies Act, 2013: Characteristics of Company – Lifting or Piercing the Corporate Veil – Classification of Companies – Formation of a Company (Promoter, Prospectus, Memorandum of Association and Articles of Association, Incorporation, Commencement of business) – Share capital and Debentures – Directors – Meetings – Company Secretary (Appointment, Rights, Duties and Liabilities).

Unit V

ENTREPRENEURIAL DEVELOPMENT AND INTERNATIONAL BUSINESS

Entrepreneurship: Meaning, Characteristics and types – Entrepreneur: Traits, Classification and Functions – Idea Generation – Identification of Business Opportunities – Design Thinking: Meaning and Process – MSME: Definition,

Importance of MSME for Economic Growth – Role of banks in EDP – Role of SIDCO – SIPCOT in Tamil Nadu – Government Schemes – Prime Minister Employment Generation Programme – Problems of small Entrepreneurs – Women Entrepreneurship in India: Incentives and Subsidies.

International Business – Meaning – Nature – Scope and Importance – Stages of Internationalisation of business – Methods of entry into foreign markets: Licensing – Franchising – Joint Ventures – Strategic Alliances – Subsidiaries and Acquisitions – Balance of Payment – Balance of Trade – Tariffs, Quotas and Licenses – Multi-Lateral Agreements and Institutions: Economic Integration – Forms: Free Trade Area, Customs Union, Common Market and Economic Union-Regional Blocks: Developed and Developing Countries – NAFTA – EU – SAARC, ASEAN-BRICS – OPEC – Promotional role played by IMF-World Bank and its affiliates – IFC, MIGA and ICSID – ADB-Regulatory role played by WTO and UNCTAD.

Unit VI FINANCIAL ACCOUNTING

Introduction to Accounting – Accounting Concepts and Conventions – Indian Accounting Standards – Accounting Equation – Double Entry System – Journal – Ledger – Cash Book – Other Subsidiary Books – Trial Balance – Rectification of Errors – Bank Reconciliation Statement – Depreciation Accounting – Capital Expenditures and Revenue Expenditures – Final Accounts of Sole Proprietors – Average due date – Account current. Bills of Exchange – Accounts from incomplete records – Accounts of Not-for-profit organisation – Partnership Accounts: Fundamentals, Final accounts, Admission, Retirement, Death of partners – Dissolution of partnership firms – Consignment accounts – Joint venture accounts.

Unit VII CORPORATE ACCOUNTING

Issues of Shares – Bonus Issues – Sweat Equity Shares – Employee Stock Option Scheme and Employee Stock Purchase Scheme – Buy Back of Shares – Redemption of Preference Shares – Issue and Redemption of Debentures – Underwriting of Securities – Profit Prior to Incorporation – Valuation of Goodwill and Shares – Final Accounts of Companies – Amalgamation: Merger and Acquisition – Alteration of Capital and Internal Reconstruction – Corporate Financial Reporting – Consolidated financial statements.

Unit VIII COST AND MANAGEMENT ACCOUNTING

Introduction to Cost Accounting – Methods and Techniques of Costing – Classification of cost – Materials – Labour – Overheads – Cost sheet – Job

Costing – Process Costing – Joint Products and By-Products – Operating Costing – Contract Costing – Standard costing and Variance Analysis (Material and Labour only) – Activity Based Costing.

Introduction to Management Accounting – Functions and Benefits of Management accounting – Analysis and Interpretation of Financial statements: Comparative statements, Common size statements and Trend analysis – Ratios – Funds flow statement – Cash Flow Statement as per AS 3 – Budgets and Budgetary control – Marginal Costing and Break – Even analysis.

Unit IX FINANCIAL MANAGEMENT AND BUSINESS STATISTICS

Introduction to Financial management – Sources of finance – Sources of (National and International) – Time value of money – Risk and return – Cost of capital – Capital structure – Leverages – Dividend policy – Working capital forecast – Cash management – Receivable management – Inventory management – Capital budgeting.

Introduction to Statistics – Sampling and sample designs – Collection of Primary and Secondary data – Measures of Central tendency – Measures of Dispersion – Simple Correlation – Regression Analysis – Chi-square Test – Probability.

Unit X TAXATION

Basic concepts relating to Income Tax – Residential status and Tax Incidence – Scope of Income – Basic concepts of Income – Income exempt from tax – Income from salaries – Income from house property – Profits and Gains from Business or Profession – Capital Gains – Income from Other Sources – Clubbing of Income – Set off and Carry forward of losses – Deductions from Gross total income – Assessment of individuals – Return of income – Advance payment of tax – Deduction and Collection of Tax at Source – E-filing of Income Tax Returns.

Introduction to Goods and Services Tax – CGST – SGST – UTGST – IGST – Taxable Event – Consideration – Levy and Collection of GST – Exemptions from GST – Place and Time of Supply – Value of taxable supply – Input Tax Credit – Procedure for Registration – Goods and Services Valuation Rules – Tax Invoice – Credit and Debit Notes – Payment of tax – Interest on Delayed Payment of Tax – Furnishing of Returns – Default in Furnishing Returns – Demand and Appeals – Authority for Advance Ruling – Settlement of cases.

SUBJECT : ECONOMICS
SYLLABUS

UNIT I MICRO ECONOMICS

- Theory of Consumer Behaviour – Cardinal and Ordinal approaches – Revealed Preference hypothesis – Hicks Revision of demand theory – The Modern Utility analysis of Choices involving risk or uncertainty – Elasticity of demand – The concept of Consumers Surplus.
- Theory of Producer Behaviour: Production Function – Law of Variable Proportions and Return to scale – Production Function: Cobb-Douglas, CES – Technical progress – Least Cost Combination – The Theory of Costs.
- Theory of Markets: Market structure – Concept of equilibria – Perfect Competition – Monopoly and Price Discrimination – Monopolistic Competition – Oligopoly – Duopoly – Game theory – Non-cooperative games.
- Factor Pricing: Marginal Productivity Theory – Product Exhaustion Theorem – Theories of Rent, Wages, Interest and Profits – General Equilibrium Analysis – Efficiency criteria: Pareto – Hicks and Kaldor – Welfare Economics: old and new – Economics of information.

UNIT II MACRO ECONOMICS

- National Income and Social Accounting: Concepts and Measurements – Determination of Output and Employment: Classical and Keynesian, Post Keynesian.
- Consumption and Investment Functions: Theories of Consumption Function – The Principles of Multiplier and Accelerator – Interaction of Multiplier and Accelerator – Theories of Investment Function – New Theories of Investment: Financial, Jorgenson and Tobin.
- Macro theories of Distribution: Ricardo, Marx, Keynes, Kalecki and Kaldor.

UNIT III MONEY BANKING

- Theories of demand for and supply of money: Classical, Keynesian and Post-Keynesian approaches – Components of Money Supply – High Powered Money – The Money Multiplier – Theories of Inflation – Theories of Business Cycles – Controls of Business Cycles – Inflation and Phillips Curve Analysis.

- Functions of Central Banking and Credit Control – Instruments and Workings of Monetary Policy – Different Currency Standards – Rational Expectations Hypothesis and its critique – capital market and its regulations – Role and Functions of Commercial Banks and Non-Banking Financial Institutions.

UNIT IV INTERNATIONAL ECONOMICS

- International Trade and Economic Development – Theories of International Trade: Smith, Ricardo, Hecksher-Ohlin and Krugman.
- Factor Price Equalization Theorem by Rybczynski – Balance of Payments: Concept, Composition, Equilibrium and Disequilibrium – Terms of Trade – Trade Multiplier.
- Theories of Exchange Rate – Exchange Rate Policies – Foreign exchange market – Optimum Currency Area – International Capital Movements – Free trade vs Protectionism – Qualitative and Quantitative Restrictions – Trade policy for developing countries – GATT and WTO – Regional Trade Blocks: EU, ASEAN, SAARC, NAFTA, BRICS etc. – IMF and World.

UNIT V PUBLIC ECONOMICS

- Role of Public Finance – Canons of Taxation – Principles of Taxation – Taxable Capacity – Direct and Indirect Taxes – GST design – Implementation and impact of GST.
- Theories of Public Expenditure: Musgrave, Wagner, Peacock and Wiseman – Public Debt: Meaning, Theories and Methods of Repayment.
- Budget: Procedures and types – Objectives and Instruments of Fiscal Policy – Deficit Financing and Methods – Effectiveness of Monetary and Fiscal policy.
- Principles of Federal Finance – Problems of Allocation of Resources of the Centre and State – Fiscal Responsibility of the Centre and State – Finance Commission in India – Local Finance in India – Sources of Local Finance – Functions and Their Defects – Fiscal Correction and Additional Stimulus.

UNIT VI ECONOMIC GROWTH AND DEVELOPMENT

- Indicators of Economic Development: GDP, Per Capita Income, PQLI, HDI and GDI.
- Theories of Economic Development: Smith, Ricardo, Mark, Schumpeter and Rostow – Balanced and Unbalanced, Amartya Sen – Technical Progress: Embodied and Disembodied – Endogeneous Growth – Models of Economic Growth: Harrod – Domar, Robinson, Kaldor, Solow and Mahalanobis.
- Concepts and Measurement: Sustainable Development Goals, Poverty and Inequalities.

UNIT VII ENVIRONMENTAL ECONOMICS AND DEMOGRAPHY

- Environment as a public good – Market failures – Coase Theorem – Cost Benefit Analysis and Compensation Criteria – Validation of Environmental Goals.
- Theories of Population – Concept, Measures and Features: Population Pyramid, Fertility, Morbidity, Mortality, Aging, Demographic dividend, Life Table, Migration, Urbanization.

UNIT VIII INDIAN ECONOMY-I

- Features of Indian Economy – National Income in India: Measurement, Growth and Structure – Economic reformation in India: Fiscal, Financial and Trade – Challenges facing in chain Economy: Human capital formation, Unbalanced regional development, Unemployment, Poverty and Inequality.
- Agriculture in India – Land reforms – Green revolution – Agricultural credit and marketing – Food Security – Reformation in agriculture – Major Issues in Agriculture: Agrarian crisis, farm subsidies, food security, doubling farmers income and farmers' suicide – WTO and agriculture.
- Industries in India – Industrialization: Role, Growth, Pattern, Features and Performance – Industrial Policies in the post independence era – Performance of Public Sector – Disinvestment policy – Large Scale Industries and MSMEs in the transformative era (2014-15) – Make in India, Startup India, Skill India – Special Economic Zones – Industrial Labour reforms in India – Impact of GST and Demonetization on Unorganized and Informal industries.
- Services in India: Foreign Trade: Composition, Direction, Balance of Payment Problems and Policies – Financial Services in India: Commercial Banks, Money and Capital Markets – Infrastructure: Transport, Energy, Telecommunication, Health and Education – Fiscal System in India.

UNIT IX INDIAN ECONOMY-II

- New Economic Policy: Liberalisation, Privatisation and Globalisation – critical appraisal of pre and post liberalisation.
- Planning Commission in India: Five Year Plans, Strategies, Achievements and performance – Planning Commission vs NITI Aayog.
- Rural Economy in India: Features, Problems and Challenges – Rural Development: Meaning, Need and Policies – Rural poverty and unemployment: causes and remedies – Rural indebtedness: features, causes and remedies – Rural infrastructure.
- Tamil Nadu Economy: Features, Growth, Structure, Performance and Models of development – Major Challenges in Tamil Nadu Economy – Dravidian Model of development.

UNIT X**QUANTITATIVE METHODS**

- Collection of Data – Sampling methods – Organisation and Presentation of Data – Measures: Central tendency, Dispersion and Distribution – Correlation – Regression – Index Numbers – Time series and Analysis – Sampling distributions – Theories of estimation – Testing of hypothesis – Linear Regression models: Simple and Multiple – Violations of assumptions of Linear Regression model: Autocorrelation, Heteroscedasticity, Multicollinearity and Misspecification.
- Mathematical Economics: Sets – Functions and Continuity, Sequence, Series – Differential Calculus and its applications – Integral calculus (Basic Techniques) – Differential and difference equations with applications – Linear Algebra – Matrices and their application in Economics – Input-Output Model – Linear Programming Problems.

SUBJECT : PHYSICAL EDUCATION
SYLLABUS

Unit I PRINCIPLES OF MOTOR DEVELOPMENT

Meaning of Motor Development, Motor Learning, Motor Control, Physical Growth, Maturation & Aging – Theoretical perspectives in Motor Development – Newell’s Model of Motor Development – Principles of motion and stability – Motor Milestones – Development of motor skills across the lifespan – Motor Skills: Locomotor, nonlocomotor and manipulative skills – Movement concepts: Body, Space, Effort & Relationship – Sensory perceptual development: Visual, Kinesthetic, Auditory and Intermodal perception – Functional constraints in Motor Development.

Unit II SKILLS, RULES AND REGULATIONS OF SPORTS AND GAMES (WITH REFERENCE TO RDG/BDG AND RD/BD COMPETITIONS OF TN GOVT.)

Skills (Fundamental and Advanced Skills) – Physical, Technical and Tactical preparation – Rules and regulations – Duties of Officials – Methods of officiating – Official Signals – Scoring – Playfield dimensions, layout and marking – Equipment specifications- Organizational Set-up – Qualification and Qualities of Coach.

Unit III RULES AND REGULATIONS OF ATHLETICS (WITH REFERENCE TO BDS OF TN GOVT.) AND CHESS

Athletics: Techniques – Physical, Technical and Tactical preparation – Rules and regulations – Duties of Officials – FOP preparation – Equipment and implement specifications, layout and marking of track (400m Oval and Short track) and field events – Organizational Set-up.

Chess: Chessboard – Chessman – Values of Chessmen – Capturing – Attack – Checkmate – Technical and Tactical preparation – Rules and regulations – Duties of Officials.

Unit IV TOURNAMENTS, SCHEMES AND AWARDS

Tournaments at School, College & University level – Federation/Association tournaments at District, State, Regional, National, Asian and International Level – Sports schemes of State and Central Government including SDAT and SAI – State and National awards in Sports – Sports Hostel – Centre of Excellence – Incentives for sportsperson at state and National Level – Significant sports tournaments / trophies / sportspersons – CM Trophy – National Games – Asian Games – Olympic Games/World Cup – Organisational setup and functions of DSE, SCERT & DIET – Role of CIPE & DIPE.

Unit V HUMAN PERFORMANCE MEASUREMENT

Concept of Tests and Measurements – Purpose of Tests, Measurements and Evaluation – Domain of Human Performance – Criteria for Tests Selection – Norm referenced & Criterion referenced reliability and validity – Developing knowledge based tests and Survey – Components of Physical Fitness – Assessment of Physical Fitness in Youth and Adults – Sports Skills Assessment – psychomotor tests – psychological measurements – Sports Analytics.

Unit VI GENERAL THEORY AND METHODS OF SPORTS TRAINING

Principles of Sports Training – Training load components – Periodization in Sports Training – Individualization and Adaptation in Training Programs – Multilateral physical development – Sports Specific Physical development – Skill acquisition and Technique Development – Tactical and Psychological preparation – Recovery and Regeneration Techniques – Strength and Conditioning Methods – Endurance Training Strategies – Speed, Agility and coordination Training – Injury Prevention and Rehabilitation in Sports Training.

Unit VII EXERCISE PHYSIOLOGY AND SPORTS NUTRITION

Exercise Physiology: Development and aging of body systems – Energy systems and metabolism – fatigue and recovery – Body temperature regulation – Endocrine Responses to Exercise – Cardiovascular Physiology – Respiratory Physiology – Neuromuscular Physiology.

Sports Nutrition: Macronutrients: Carbohydrates, Proteins and Fats – Micronutrients: Vitamins and Minerals – Fluids and Hydration Strategies – Pre-Exercise Nutrition – During-Exercise Nutrition – Post-Exercise Nutrition and Recovery – Nutrition for Athletes – Supplements in Sports Nutrition – Nutrition Strategies for Weight Management and Body Composition – Ergogenic aids – Doping.

Unit VIII RESEARCH PROCESS IN PHYSICAL EDUCATION AND SPORTS

Meaning and Definition of Research – Need, Nature and importance of research in Physical Education – Types of Research: (i) Basic, Applied & Action research, (ii) Analytical Research (Philosophical, Historical, Meta Analysis), Descriptive Research, Experimental Research, Qualitative Research – Steps in research process – Formulation of hypothesis – Purpose of the literatures – Variables and its types – Data collection tools in Research – Research Design – Mechanism of writing thesis / dissertation – Method of Writing Research proposal, Research Synopsis, Research Paper & Abstract – APA format in Bibliography writing – Research ethics.

Unit IX**STATISTICS IN PHYSICAL EDUCATION AND SPORTS**

Definition of Statistics – Types of Statistics – Data and its types (Nominal, ordinal, interval and ratio) – Variables and attributes – Parametric and non-parametric statistics – Measures of Central Tendency & Measures of Variability – Principles of Normal Probability Curve – Skewness and Kurtosis – Type I & II Error- Level of significance – Population & Sample – Types of Sampling: Probability and Non-Probability sampling – Concept of t-test, F-test & Correlation – Graphical Representation in Statistics.

Unit X**MODERN TRENDS IN PHYSICAL EDUCATION AND SPORTS**

Biomechanical Analysis – Stress Management Techniques – Wearable Fitness Trackers – Virtual Reality Training – Data Analytics for Performance Enhancement – Technological innovation in equipment, surfaces/play fields and coaching – Sports and Games for Children with Special Needs (CWSN) – Interdisciplinary Approaches – Early Childhood Physical Literacy – Thirumoolar Astanga Yoga – Sport tourism.

SUBJECT : POLITICAL SCIENCE

SYLLABUS

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|-----------------|---|
| Unit I | <p>POLITICAL THEORY AND IDEOLOGIES</p> <p>Concepts: State, Sovereignty, Political Obligation, Law, Power, Citizenship, Human Rights, Liberty, Equality, Property, Justice, Common Good, Democracy and Development.</p> <p>Approaches: Traditional, Behavioural, Post Behavioural, Structural-Functional, Communication and Decision Making.</p> <p>Ideologies: Liberalism, Neo-Liberalism, Realism, Conservatism, Post – Colonialism – Marxism – Neo-Marxism – Socialism – Fascism – Anarchism – Feminism – Ecologism – Multi-Culturalism –Environmentalism.</p> |
| Unit II | <p>WESTERN POLITICAL THOUGHT</p> <p>Ancient: Socrates – Plato – Aristotle.</p> <p>Medieval: St Augustine – St Thomas Aquinas – Niccole Machiavelli.</p> <p>Modern / Post Modern: Hobbes-Locke – Rousseau – John Stuart Mill – Karl Marx – Gramsci – John Rawls.</p> |
| Unit III | <p>INDIAN POLITICAL THOUGHT</p> <p>Evolution & Characteristics: Vedic Polity – Concept of Dharma / Artha / Kama.</p> <p>Ancient Thinkers: Manu – Kautilya – Thiruvalluvar – Mohammad Iqbal – E.V. Ramasamy Periyar.</p> <p>Modern Thinkers: Swami Vivekananda – Aurobindo – M.K. Gandhi – M.N. Roy – Ambedkar – Jayaprakash Narayan, Jawaharlal Nehru.</p> |
| Unit IV | <p>INTERNATIONAL RELATIONS</p> <p>Introduction: Meaning / Origin and Evolution – Theories: Idealism – Realism – Liberalism – Marxism – Constructivism – Global Justice.</p> <p>Role of Modern State/ Nation & the concept of Nationalism: Security – War Impacts (First-World War & Second-World War / Cold War & Post-Cold War / Nuclear Weapons) – Dynamics of Diplomacy (Types – Mechanism – Institutions – Modern Trends) – UN & its Agencies – Regional Organisations (European Union / African Union / Shanghai Corporation Organisation / SAARC, ASEAN & BRICS).</p> <p>Contemporary Issues in Foreign Policy of India during the 21st Century: Relations with Neighbourhood (Pakistan, China, Sri Lanka, Bangladesh, Nepal, Bhutan, Maldives, Afghanistan) Russia, USA and European Union.</p> |

Unit V POLITICAL INSTITUTIONS IN INDIA

Introduction: Making of the Indian Constitution – Constituent Assembly – Philosophy of the Constitution, Constitutionalism and Constitutional Amendment.

Features and Structure: Executive (President, Prime Minister and Council of Ministers) – Legislature (Union Parliament – Parliamentary Committees) – Judiciary (Supreme Court, High Court, Judicial Review, Judicial Activism, Judicial Reform).

Various Institutions and Challenges: Electoral Process and Election Commission of India – Local Government Institutions (Functioning and Reforms) – Constitutional and Statutory Bodies (Comptroller and Auditor General, National Commission for Scheduled Castes, National Commission for Scheduled Tribes, National Commission for Human Rights, National Commission for Women, National Commission for Minorities).

Unit VI POLITICAL PROCESS IN INDIA

Introduction: State Economy and Development / Planning and Development / Policies for Growth & Development.

Political Processes in Indian Politics: Reorganization of Indian State – Identity Politics (Religion / Tribe / Caste / Region / Language) – Ideology and Party Politics (National & State Parties).

Globalization and its Dynamics: Gender & Politics (Issues of Equality and Representation) / Electoral Politics (Participation & Representation and Emerging Challenges) / Role of Civil Society.

Unit VII PUBLIC ADMINISTRATION

Origin and growth: Concepts, principles and theories (Classical – Bureaucratic – Scientific Management – Human Relations – Ecological).

Features of Administration: Accountability and control (Legislature, Executive and Judiciary) – Human Resource Management (structure of bureaucracy, civil service at central, state and district level) – Budgetary process – Committees – Tribunals.

Issues and Challenges in Public Administration: Ethics and Integrity – New Public Management – Issues challenges and changing trends in Public Administration.

Unit VIII GOVERNMENT AND POLITICS OF TAMILNADU

Establishment of Madras Presidency and Dravidian Nationalism: Non-Brahmanism, rise of Justice Party, growth of Dravidian identities and parties, Self-respect Movement, Formation of Dravida Kazhagam.

Role of government and its rise and decline: Congress Regime – Rajaji – State Reorganization – K. Kamaraj – M. Bhakthavatsalam – **DMK Regime:** 1967 elections – Formation of DMK – Anti-Hindi agitations – C.N. Annadurai – M. Karunanidhi – M.K. Stalin – **AIADMK Regime:** M. G. Ramachandran – J. Jayalalitha – O. Pannerselvam – Edapadi Palanisamy – Other Political Parties and Issues: PMK–MDMK–DMDK–VCK–CPI–BJP–IUML – role and impact of Language, Cinema, Caste and Social media.

Policies and Politics from 1947 till date: Welfare schemes, Social Justice programmes, Committees and Commissions, Sectoral policies and issues concerning the State & its relation with the Central Government.

Unit IX MODERN GOVERNMENTS: (UK, USA & SWITZERLAND)

Introduction: Establishment of modern constitutions and their characteristics. Introduction to the State and the Government – State and its Nature – State and Government – Sovereignty – Division of powers – Unitary state – Federal State- Constitution and its classifications – Written and Unwritten – Flexible and Rigid – Parliamentary and Non-Parliamentary forms of Government.

Types of governments: Presidential, Parliamentary, Quasi-Presidential and Direct Democracy in the UK, USA and Switzerland (structure and function of Executive, Legislature and Judiciary).

Nature of Political Parties & Electoral process: UK, USA and Switzerland.

Unit X PUBLIC POLICY AND GOVERNANCE IN INDIA

Introduction: Concepts (public interest, public sector, output, development, economic growth, equity, government and governance) – Theories (elite theory, group theory, political systems theory and institutionalism, policy output, incremental theory, rational choice theory) – Features of Public policy in India.

Institutions and Policy Making in India: Governance Structure (Right to Information / Consumer Protection Act / Citizen Charter / Grievance Redressal System / Lokpal / Lokayukta – Panchayat Raj Institutions – System & functions)

Policy Governance in India: Instrument of Socio-Economic Development – Centre and State Organizations and their Schemes/ Programmes/ Policies (Housing, Health, Drinking Water, Education, Food Security, Science & Technology etc).

SUBJECT : COMPUTER SCIENCE

SYLLABUS

Unit I

COMPUTER SYSTEM ARCHITECTURE

Number Systems: Introduction, Conversion from One Number System to another, Digital Codes, Introduction – Weighted Binary Code, Non-Weighted Binary Code, Alphanumeric Code, Error Detection and Error Correction Codes.

Boolean Algebra: Introduction, Boolean Logic, Boolean Operations, Operator Precedence, Laws of Boolean Algebra, Representation of Boolean Function, Simplification methods in Boolean algebra.

Digital Logic Circuits and Components: Digital Computers, Logic Gates, Boolean Algebra, Map Simplifications, Combinational Circuits, Flip-Flops, Sequential Circuits, Integrated Circuits, Decoders, Multiplexers, Registers and Counters, Memory Unit.

Basic Computer Organization and Design: Stored Program Organization and Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output, Interrupt.

Programming the Basic Computer: Machine Language, Assembly Language, Assembler, Program Loops, Subroutines, Input-Output Programming.

Central Processing Unit: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, RISC Computer, CISC Computer.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA, Serial Communication.

Memory Hierarchy: Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

Unit II

DATABASE MANAGEMENT SYSTEM

Database System Concepts and Architecture: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, Centralized and Client/Server Architectures for DBMS.

Data Modeling: Entity Relationship Diagrams, Relational Model, Constraints, Languages, Design and Programming, Relational Database Schemas, Relational Algebra and Relational Calculus, Codd Rules.

Normalization for Relational Databases: Functional Dependencies and Normalization, Algorithms for Query Processing and Optimization, Transaction Processing, Concurrency Control Techniques, Database Recovery Techniques, Object and Object-Relational Databases, Database Security and Authorization.

Constraints and Views: Constraints and its types, Integrity constraints, Check constraints, Referential constraints, Introduction to views, updates on views, comparison between tables and views.

Transaction management and Concurrency control: Transaction management, ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, optimistic methods, database recovery management.

Unit III

SYSTEM SOFTWARE AND OPERATING SYSTEM

System Software: Machine, Assembly and High-Level Languages, Compilers and Interpreters, Loading, Linking and Relocation, Macros, Debuggers.

Basics of Operating Systems: Operating System Structure, Operations and Services, System Calls, Operating-System Design and Implementation, System Boot.

Process Management: Process Scheduling and Operations, Inter-process Communication, Communication in Client-Server Systems, Process Synchronization, Critical-Section Problem, Peterson's Solution, Semaphores, Synchronization.

Threads: Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.

CPU Scheduling: Scheduling Criteria and Algorithms, Thread Scheduling, Multiple Processor Scheduling, Real-Time Scheduling.

Deadlocks: Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance and Detection, Recovery from Deadlock.

Memory Management: Contiguous Memory Allocation, Swapping, Paging, Segmentation, Demand Paging, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped Files.

Unit IV

DATA STRUCTURES AND ALGORITHMS

Data Structures: Abstract data types, Arrays and their Applications, Sparse Matrix, Stacks, Queues, Priority Queues, Linked Lists.

Trees and Graphs: Trees, Forest, Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree, B Tree, B+ Tree, B* Tree, Graphs, Sorting and Searching Algorithms, Hashing.

Performance Analysis of Algorithms and Recurrences: Time and Space Complexities, Asymptotic Notation, Recurrence Relations.

Design Techniques: Divide and Conquer, Dynamic Programming, Greedy Algorithms, Backtracking, Branch and Bound.

Graph Algorithms: Breadth-First Search, Depth-First Search, Shortest Paths, Maximum Flow, Minimum Spanning Trees.

Advanced Algorithms: Parallel Algorithms for Sorting, Searching and Merging, Approximation Algorithms, Randomized Algorithms.

Unit V

DATA COMMUNICATION AND COMPUTER NETWORKS

Data Communication: Components of a Data Communication System, Simplex, Half Duplex and Duplex Modes of Communication, Analog and Digital Signals, Noiseless and Noisy Channels, Bandwidth, Throughput and Latency, Digital and Analog Transmission, Data Encoding and Modulation Techniques, Broadband and Baseband Transmission, Multiplexing, Transmission Media, Transmission Errors, Error Handling Mechanisms.

Computer Networks: Network Topologies, Local Area Networks, Metropolitan Area Networks, Wide Area Network, Wireless Networks, Internet.

Network Models: Layered Architecture, OSI Reference Model and its Protocols, TCP/IP Protocol Suite, Physical, Logical, Port and Specific Addresses, Switching Techniques.

Functions of OSI and TCP/IP Layers: Framing, Error Detection and Correction, Flow and Error Control, Sliding Window Protocol, HDLC, Multiple Access – CSMA/CD, CSMA/CA, Reservation, Polling, Token Passing, FDMA, CDMA, TDMA, Network Devices, Backbone Networks, Virtual LANs.

World Wide Web (WWW): Uniform Resource Locator (URL), Domain Name Service (DNS), Mapping Names to Addresses and Addresses to Names, Electronic Mail Architecture, SMTP, POP and IMAP, TELNET and FTP.

Unit VI

PROGRAMMING WITH C++

Language Design and Translation Issues: Programming Language Concepts, Paradigms and Models, Programming Environments, Virtual Computers and Binding Times, Programming Language Syntax, Stages in Translation, Formal Transition Models.

Elementary Data Types: Properties of Types and Objects, Scalar and Composite Data Types.

Object Oriented Programming: Class, Object, Encapsulation, Inheritance, Abstract Class, Polymorphism.

Basics of C++: Tokens, Identifiers, Variables and Constants, Data types, Operators, Control statements.

Functions: User-defined Functions, Parameter Passing, Virtual Functions.

Class and Objects: Constructors and Destructors, Overloading, Inheritance, Templates.

Files and Event Handling: Streams and Files, Multi-file Programs, Exception and Event Handling.

Unit VII PYTHON PROGRAMMING

Basics: Python interpreter and interactive mode, debugging, values and types: int, float, Boolean, string and list, variables, expressions, statements, tuple assignment, precedence of operators, comments.

Python libraries: Numpy, Pandas and Matplotlib, SciPy.

Conditionals: Boolean values and operators, conditional statements, Iteration: statement, while, for, break, continue.

Functions: Functions types, return values, parameters, local and global scope, function composition, recursion.

Strings: string slices, immutability, string functions and methods, string module, Lists as arrays.

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters.

Tuples: tuple assignment, tuple as return value, Dictionaries: operations and methods, advanced list processing – Iterator and generator.

Unit VIII WEB DEVELOPMENT

HTML: Introduction – Basic Tags-formatting and fonts, Working with colour.

Elements of HTML: Working with Tables, Working with Images, Working with Links, List and Tables, Frame and Frameset, Forms and Controls.

CSS: Introduction to Cascading Style Sheet, using CSS background images, colour and properties, Manipulating texts using fonts, border and boxes margins, padding lists, positioning using CSS.

Menu and Division: Types of Style Sheets, Class and ID, selector, Inline Menu, DIV and CSS layout.

JavaScript: Introduction to JavaScript, Understanding Variables, Loops and Arrays, Functions, Working with alert, confirm and prompt boxes, Creating Rollover image, Working with Operators, Events.

Unit IX

PHP AND MYSQL

Basics of PHP: Evaluation of PHP, Basic Syntax, Defining variable and constant, PHP Data type, Operator and Expression, Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with HTML.

Functions: Defining a function, Call by value and Call by reference, Recursive function.

String Handling: Creating and accessing, String Searching and Replacing String, Formatting String, String Related Library functions.

Array: Anatomy of an Array, Index based and Associative array, Accessing array, Element Looping with Index based array, Looping with associative array.

Working with file and Directories: Understanding file and directory, Opening and closing a file, Copying, renaming and deleting a file, working with directories, Creating and deleting folder, File uploading and downloading.

MySQL: MySQL database connection, Creating a table with key constraints, dropping a table, adding, retrieving, updating data, deleting data, Performing additional queries (Joins and subqueries), Connecting to MySQL, Accessing MySQL using PHP, Querying MySQL database with PHP.

Unit X

CYBER SECURITY

Cyber Crime: Introduction to Cyber Crime, Malware type, Kinds of Cyber Crime.

Cyber Security Techniques: Authentication, Encryption, Digital Signatures, Antivirus, Firewall, Steganography.

Password Management: Guidelines for Secure Password, Two Step verification, Generating Secure password, Using Password Manager, Enabling Two-step verification, Securing Computer using antivirus.

Cryptography: Symmetric cipher model, cryptographic system, substitution techniques, Caesar cipher, mono alphabetic ciphers, Hill ciphers, Transposition techniques, steganography, Data encryption standard, The strength of DES.

Attacks: Investigating DoS Attacks, Types of DoS Attacks, Classification of DoS Attacks, Techniques to Detect, DoS Attacks.

SUBJECT : TELUGU

SYLLABUS

పాఠ్యప్రణాళిక

1. ప్రాచీన తెలుగు సాహిత్యం
2. ఆధునిక తెలుగు సాహిత్యం
3. అత్యాధునిక సాహిత్యం: వివిధ వాదాలు, ప్రక్రియలు
4. బాల వ్యాకరణం మరియు అప్పకవీయం
5. తెలుగు వ్యాకరణం- ఛందస్సు అలంకారాలు
6. భారతీయ ఆలంకారిక విమర్శ రీతులు, తెలుగు విమర్శ
7. తెలుగు భాషా చరిత్ర పరిణామాల అధ్యయనం
8. జానపద సాహిత్యం
9. ఆంధ్రుల చరిత్ర - సంస్కృతి
10. సంస్కృత సాహిత్యం

యూనిట్ - I

ప్రాచీన తెలుగు సాహిత్యం: నన్నయ, తిక్కన, ఎర్రన, శివకవులు (నన్నెచోడుడు, మల్లికార్జున పండితారాధ్యుడు, పాల్కురికి సోమనాథుడు), నాచనసోమన రామాయణ కవులు, భాస్కర, రంగనాథ రామాయణ కవులు - శ్రీనాథుడు-పోతన, పిల్లలమర్రి పినవీరభద్రుడు - గౌరనఅనంతామాత్యుడు - కొరవి గోపరాజు - నంది మల్లన, ఘంట సింగన అష్టదిగ్గజ కవులు తాళ్ళపాక కవులు, పొన్నగంటి తెలగన్న - చేమకూర వెంకటకవి, తంజావూరు రాజకవులు, కవయిత్రులు - కందుకూరి రుద్రకవి, మడికి సింగన, అన్నమయ్య, త్యాగయ్య, రామదాసు కీర్తనలు శతకాలు: వేమన, సుమతీ, దాశరథి తదితర శతకాలు.

యూనిట్ - II

ఆధునిక సాహిత్యం: ఆధునిక సాహిత్య ఆవిర్భావం, వీరేశలింగం, గురజాడ, రాయప్రోలు - విశ్వనాథ దేవులపల్లి - బసవరాజు - పింగళి కాటూరి, దువ్వూరి, పుట్టపర్తి, శ్రీశ్రీ కాళోజీ, దాశరథి, సి. నారాయణ రెడ్డి, - ప్రసిద్ధ ఆధునిక కవులు, భావ, అభ్యుదయ, విప్లవ, దిగంబర, చేతనావర్తన కవులు.

యూనిట్ - III

అత్యాధునిక సాహిత్యం: వివిధ వాదాలు, ప్రక్రియలు: స్త్రీవాదం, దళితవాదం, ప్రాంతీయ వాదం, మైనారిటీ వాదం, బహుజన వాదం, మానవతావాదం మినీకవిత్వం, హైకూలు, నానీలు, గజకృష్ణ తదితర రూపాలు. నవల, నాటకం, కథానిక, వ్యాసం ఆవిర్భావ వికాసాలు.

యూనిట్ - IV

బాల వ్యాకరణం: సంజ్ఞ, సంధి, క్రియా, తత్వము, అచ్చిక ప్రకరణాలు.

అప్పకవీయం: స్వరవకులు, వ్యంజనవకులు.

యూనిట్ - V

తెలుగు వ్యాకరణం ఛందస్సు అలంకారాలు

వృత్తాలు: ఉత్పలమాల, చంపకమాల, మత్తేభం, శార్దూలం.

జాతులు: కందం, ద్విపద; ఉపజాతులు: తేటగీతి, ఆటవెలది, సీసం, తరువోజు, ఉత్సాహము.

అర్థాలంకారాలు: ఉపమ - రూపక ఉల్లేఖా - సందేహ ఉత్తేక్ష -

అతిశయోక్తి - దృష్టాంత - శ్లేషా - యధాసంఖ్యా - అర్థాంతరన్యాస -

స్వభావోక్తి - లోకోక్తి - వ్యతిరేకాలంకారం - ప్రతిపాలంకారం - అన్వయాలంకారం.

శబ్దాలంకారాలు: వృత్తానుప్రాస ఛేకానుప్రాస - లాటానుప్రాస - అంత్యానుప్రాస - యమకం ముక్తపదగ్రస్తాలంకారం.

యూనిట్ - VI

భారతీయ అలంకారిక విమర్శ రీతులు, తెలుగు విమర్శ

కవి కావ్యం, కావ్య నిర్వచనాలు కావ్య హేతువులు కావ్య ప్రయోజనాలు కావ్యాత్మ వాదాలు (సంప్రదాయాలు)

- రససిద్ధాంత స్వరూపం దశ రూపకములు గద్య కావ్య భేదాలు నాయిక నాయక భేదాలు, వృత్తులు -

గుణములు - రీతులు - పాకములు, సౌందర్య, సాహిత్య విమర్శ అధ్యయనం (ప్రాక్, పశ్చిమ) ఆధునిక

తెలుగు సాహిత్య విమర్శ.

యూనిట్ - VII

తెలుగు భాషా చరిత్ర - పరిణామాల అధ్యయనం

భాషా నిర్వచనాలు - లక్షణాలు, వర్గీకరణ, ద్రావిడ భాషలు - తెలుగు స్థానం, ఆంధ్రం - తెనుగు -

తెలుగు, ధ్వని విజ్ఞానం, వర్ణం - సవర్ణం, పదం పదాంశం, వాక్యం వాక్య నిర్మాణ రీతులు, ధ్వని పరిణామం,

పరిణామం, అర్థ విపరిణామం, అర్థ విపరిణామ హేతువులు రకాలు: వ్యావహారిక భాషోద్యమం, తెలుగు

మాండలికాలు, ఆదాన ప్రదానాలు- అన్యదేశ్యాలు.

యూనిట్ - VIII

జానపద సాహిత్యం: జానపద విజ్ఞానం గేయాలు- కథాగేయాలు- గద్యాఖ్యానాలు- (పురాణగాథలు ఐతిహ్యాలు

- కథలు), సామెతలు - పొడుపుకథలు - జానపద కళలు (వీధి నాటకాలు, యక్షగానాలు, బొమ్మలాటలు,

పగటి వేషాలు, చిందు, ఒగ్గు, జాతరలు, కళారూపాలు మొదలైనవి.

యూనిట్ - IX

ఆంధ్రుల చరిత్ర - సంస్కృతి: ఆంధ్ర దేశ భౌతిక వర్ణన, ఆంధ్ర దేశ సిరిసంపదలు, ఆంధ్ర దేశ పూర్వ కాలపు పేర్లు మండలములు, ఆంధ్ర దేశ ప్రజానీకము, ఆంధ్ర రాజులు, ఆంధ్రుల సంస్కృతి, ఆచార వ్యవహారాలు, శాతవాహనులు, ఇక్ష్వాకులు, పల్లవులు, శాలంకాయనులు, చాళుక్యులు, కాకతీయులు, కొండవీటి రెడ్లు, విజయనగర రాజులు, ఆంధ్రనాయకరాజులు, గోల్కొండ కుతుబ్ షాహీలు, నిజాం పాలన, బ్రిటిష్ పాలన, ఆధునిక ఆంధ్రప్రదేశ్. తెలుగు వారి ఆటలు, పాటలు, స్త్రీలు.

యూనిట్ - X

సంస్కృత సాహిత్యం - కావ్యాలు, పరిచయం

సంస్కృత సాహిత్య చరిత్ర, ఆవిర్భావ వికాసాలు, వాల్మీకి రామాయణం, వ్యాస మహాభారతం, హితోపదేశం, కాళిదాసు కృతులు- రఘువంశం, అభిజ్ఞాన శాకుంతలం సంస్కృత పంచ కావ్యాలు, భర్తృహరి నీతి శతకం.

SUBJECT : MALAYALAM

SYLLABUS

Unit 1

മലയാളസാഹിത്യം പ്രാരംഭം

മലയാളസാഹിത്യത്തിന്റെ പ്രാചീനകാലഘട്ടം മുതൽ പതിനഞ്ചാം നൂറ്റാണ്ടുവരെയുള്ള സാഹിത്യപാരമ്പര്യമാണ് പ്രാചീനസാഹിത്യം എന്ന ഭാഗത്ത് ഉൾപ്പെടുത്തിയിരിക്കുന്നത്. വാമൊഴിപ്പാട്ട്, പാട്ട്-മണിപ്രവാളസാഹിത്യങ്ങൾ എന്നിവയെ മുൻനിർത്തി പൂർവ്വസാഹിത്യത്തെ മനസ്സിലാക്കുക എന്നതാണ് ഈ ഭാഗത്തിന്റെ ലക്ഷ്യം. കർത്താവ്, കാലം, പ്രസ്ഥാനരീതി, സാഹിത്യപരമായും സാംസ്കാരികമായും ഉള്ള പ്രസക്തി എന്നിവ മനസ്സിലാക്കുക എന്ന ലക്ഷ്യവും ഈ ഭാഗത്തിനുണ്ട്.

മോഡ്യൂൾ 1

വാമൊഴിസാഹിത്യം

നാടോടിപ്പാട്ടുകൾ, നിർവ്വചനങ്ങൾ, പ്രമേയം, തോറ്റംപാട്ടുകൾ, തോറ്റംപാട്ടുകളിലെ കീഴാളജീവിതം, വടക്കൻപാട്ടുകൾ, ഇവയുടെ രൂപപരവും സാമൂഹികവുമായ പ്രത്യേകതകൾ തുടങ്ങിയവ.

അനുഷ്ഠാനഗാനസാഹിത്യവും ദേവീസ്തോത്രങ്ങളും, വരവിളിത്തോറ്റങ്ങൾ, തോറ്റംപാട്ടുകളുടെ ചരിത്രം, അനുഷ്ഠാനപരമായ ധർമ്മങ്ങൾ, സാമൂഹിക - ചരിത്രപരാമർശങ്ങൾ തുടങ്ങിയവ വിശകലനം ചെയ്യുക.

ജനകീയഗാനങ്ങൾ, വടക്കൻപാട്ടുകളുടെ ചരിത്രം, വിഭജനങ്ങൾ, വിരകമാഗാനങ്ങൾ, സാമൂഹികപ്രസക്തി, കഥാസംഗ്രഹം, എന്നിവയിലൂടെ വാമൊഴിപാരമ്പര്യത്തിലെ വടക്കൻപാട്ടുശാഖ പരിചയപ്പെടുക.

മോഡ്യൂൾ 2

പാട്ടും മണിപ്രവാള സാഹിത്യവും

രാമചരിതം, തിരുനിഴൽമാല എന്നിവയുൾപ്പെടുന്ന രണ്ടാം ഭാഗത്തിലൂടെ പാട്ടുപ്രസ്ഥാനത്തിന്റെ ഉത്ഭവവികാസപരിണാമങ്ങളെ മനസ്സിലാക്കുക. വിശാലമായുള്ള പഠനമാണ് ലക്ഷ്യമാക്കുന്നത്.

മലയാളത്തിലെ ഏറ്റവും പ്രാചീനകാവ്യമായ രാമചരിതത്തിന്റെ കർത്താവ്, കാലം, ചർച്ചകൾ, ഘടന, പ്രതിപാദ്യവിഷയത്തിന്റെ സാമൂഹികപ്രസക്തി, ഉൾപ്പെടുന്ന പ്രസ്ഥാനവും അതിന്റെ സവിശേഷതകളും, ഭാഷാപരമായ പ്രത്യേകതകൾ, എന്നിവ.

കണ്ണശ്ശരാമായണം: പാട്ടുപ്രസ്ഥാനത്തിന്റെ വികാസപരിണാമങ്ങൾ, ഭക്തിപ്രസ്ഥാനം, നിരണം കവികൾ, കാലം, കൃതികൾ, ഭാഷ, ഭാഷാ സാഹിത്യവികാസപദ്ധതിയിൽ നിരണം കവികളുടെ സംഭാവന, കാവ്യസംഗ്രഹം എന്നിവ.

**മൊഡ്യൂൾ 3
മണിപ്രവാളവും മലയാളവും**

ലീലാതിലകം, കണ്ണശ്ശരാമായണം, ഉണ്ണുനീലിസന്ദേശം, ഭാഷാനൈഷധചമ്പു ഇവ പരിചയപ്പെടുകവഴി മണിപ്രവാളസാഹിത്യത്തെക്കുറിച്ചും മലയാളഭാഷയുടെ രൂപീകരണത്തെക്കുറിച്ചും ധാരണയുണ്ടാക്കുന്നു. മണിപ്രവാളത്തിന്റെ സ്വാധീനം മനസ്സിലാക്കുക.

Unit 2

ഇരുപതാം നൂറ്റാണ്ട് മുതലുള്ള മലയാള കവിത

മൊഡ്യൂൾ 1

വിലാപകാവ്യം - ഖണ്ഡകാവ്യങ്ങൾ - കാല്പനികതയും മലയാള കവിതയും - അന്തസംഘർഷങ്ങൾ - പ്രണയവും വിരഹവും ആശാൻ കവിതകളിൽ - ചങ്ങമ്പുഴയുടെ കാവ്യശൈലി - ആധുനികപൂർവ്വ കവിത - എൻ. വി.കൃഷ്ണവാര്യരുടെ കവിതകൾ -

മൊഡ്യൂൾ 2

ആധുനികതാവാദവും മലയാളകവിതയും - കുരുക്ഷേത്രം - അയ്യപ്പപ്പണിക്കർ - ആറ്റൂർ രവിവർമ്മ - കെ.ജി. ശങ്കരപ്പിള്ള - ബാലാമണിയമ്മ - സുഗതകുമാരി - സച്ചിദാനന്ദൻ - ബാലചന്ദ്രൻ ചുള്ളിക്കാട് - ഡി.വിനയചന്ദ്രൻ - രാജലക്ഷ്മി പുതുകവിതയും ഭാവുകത്വവും - പി.പി. രാമചന്ദ്രൻ - റഫീഖ് അഹമ്മദ് - എസ്. ജോസഫ് - പി.രാമൻ - ആശാലത - വി.എം. ഗിരിജ - അൻവർ അലി - അനിത തമ്പി - എം.ബി. മനോജ്

ആധുനികോത്തര കവിത - ദലിത് - ഗോത്രകവിത - കടൽക്കവിത - സൈബർ കവിത - പൊയടി ഇൻസ്റ്റലേഷൻ - എസ്. കലേഷ് - എം.ആർ. വിഷ്ണുപ്രസാദ് - വിജില - ആർ. സംഗീത - സുകുമാരൻ ചാലിഗല - അശോകൻ മറയൂർ - സുധീഷ് കോട്ടേമ്പ്രം - ഒ . അരുൺ കുമാർ - കളത്തറ ഗോപൻ - ബി.എസ്. രാജീവ് എന്നിവരുടെ കവിതകൾ സമകാലിക കവിതകളുടെ ഉദാഹരണമായി സ്വീകരിക്കാം.

Unit 3

കഥാസാഹിത്യം

മൊഡ്യൂൾ 1

ചെറുകഥ - ആദ്യകാലവും നവോത്ഥാനവും - നാടോടി കഥാപാരമ്പര്യം - വേദകഥകൾ - ജാതകകഥകൾ - പഞ്ചതന്ത്രം - പാശ്ചാത്യചെറുകഥകളുടെ സ്വാധീനം - ആദ്യകാല മലയാള ചെറുകഥകൾ - ചെറുകഥയുടെ സുവർണ്ണദശ - കാൽപ്പനികതയും റിയലിസവും മാർക്സിസവും മലയാളചെറുകഥയും - പുരോഗമന സാഹിത്യ പ്രസ്ഥാനം.

മൊഡ്യൂൾ 2

ചെറുകഥയും ആധുനികതയും - വ്യക്തിയും മനസും - ബോധധാര പ്രസ്ഥാനം - നാഗരികത - പ്രവാസം - അസ്തിത്വവ്യഥ - ആധുനികതാവാദം - ഏകാന്തത - നായകസങ്കല്പം.

മൊഡ്യൂൾ 3

ചെറുകഥ: ആധുനികതയും ആധുനികോത്തരതയും
രാഷ്ട്രീയാധുനികത - പരീക്ഷണസ്വഭാവം - തീവ്രഇടതുപക്ഷം - പരിസ്ഥിതി - സ്ത്രീ ആഖ്യാനങ്ങൾ

മൊഡ്യൂൾ 4

ആധുനികോത്തരകഥകളും സമകാലികതയും - മാധ്യമസ്വാധീനം - ശരീരരാഷ്ട്രീയം - സത്യാനന്തരകാല സങ്കല്പങ്ങളും ചെറുകഥയും - സൈബർ സ്വാധീനം - സോഷ്യൽ മീഡിയ ആഖ്യാനങ്ങളും ചെറുകഥയും - റോഡ് മൂവി ആഖ്യാനങ്ങൾ - വിഷ്ണു ആഖ്യാനങ്ങൾ.

Unit 4

ദൃശ്യകലയും സാഹിത്യവും

മൊഡ്യൂൾ 1.

കേരളത്തിന്റെ നാടോടിനാടകപാരമ്പര്യത്തെയും അതിന്റെ സാഹിത്യത്തെയും അനുഷ്ഠാനപരമായ വിവിധ കലാരൂപങ്ങളെയും പരിചയപ്പെടുത്തുകയാണ് ഇവിടെ ലക്ഷ്യം. പടേനി, പുലിക്കളി, പൂരക്കളി, തെയ്യം, മുടിയേറ്റ്, പൊറാട്ട്നാടകം, സീതക്കളി, ചവിട്ടുനാടകം, ഒപ്പന തുടങ്ങിയവയുടെ സാമാന്യപരിശോധന ഇവിടെ ഉണ്ടാവണം.

മൊഡ്യൂൾ 2

കൂടിയാട്ടം, കഥകളി, ഓട്ടൻതുളുൽ തുടങ്ങിയ കലാരൂപങ്ങളുടെയും അവയുടെ സാഹിത്യത്തിന്റെയും സവിശേഷതകൾ ഇവിടെ പരിചയപ്പെടുത്തണം.

മൊഡ്യൂൾ 3

മലയാളനാടകത്തിന്റെ ആവിർഭാവവും വികാസവും പരിചയപ്പെടുത്തുന്ന യൂണിറ്റാണിത്. ആദ്യകാല പരിഭാഷകൾ, തമിഴ് സംഗീതനാടകങ്ങൾ, പ്രഹസനങ്ങൾ, പ്രശ്നനാടകങ്ങൾ, കെ. പി. എ.സി എന്നിവയുടെയും മറ്റും സാമൂഹികരാഷ്ട്രീയ നാടകങ്ങൾ.

മൊഡ്യൂൾ 4

മലയാളത്തിലെ രംഗകലാമണ്ഡലത്തിലുണ്ടായ ശക്തമായ പരിവർത്തനത്തെയും അവയുടെ സാഹിത്യത്തെയും പരിചയപ്പെടുത്തുന്ന യൂണിറ്റ് ആണിത്. പരീക്ഷണ നാടകങ്ങൾ, സ്ത്രീപക്ഷ നാടകങ്ങൾ, ഏകാങ്ക നാടകങ്ങൾ തുടങ്ങിയവ പരിശോധിക്കുന്നു.

മൊഡ്യൂൾ 5

സിനിമ, തിരക്കഥ, പ്രൊഡക്ഷൻ, സ്ക്രിപ്റ്റ്, സാങ്കേതികവിദ്യയും സാഹിത്യഭാഷയും, ഫിക്ഷൻ, ഫീച്ചർ ഫിലിം, പരസ്യ ചിത്രങ്ങൾ ഇവയുടെ ഭാഷാസവിശേഷതകൾ തുടങ്ങിയവയുടെ പരിചയപ്പെടുത്തൽ.

Unit 5

നാടോടിവിജ്ഞാനീയം

ഫോക്ലോർ നിർവചനം- ഇന്ത്യയിൽ ഫോക്ലോറിന്റെ വികാസവും പഠനവും എങ്ങനെ ആയിരുന്നു എന്ന അന്വേഷണം. നരവംശശാസ്ത്രവും ഫോക്ലോറും എങ്ങനെ ബന്ധപ്പെട്ടിരിക്കുന്നു എന്നിങ്ങനെയുള്ള നിരീക്ഷണങ്ങൾ പഠിക്കുകയാണ് ഈ യൂണിറ്റിന്റെ ലക്ഷ്യം.

മൊഡ്യൂൾ 1.

കേരളത്തിന്റെ ഫോക്സംസ്കാരം എന്താണ്? തനത് കലകൾ, ആചാര അനുഷ്ഠാനകലകളുടെ സാമാന്യപഠനം എന്നിവ.

മൊഡ്യൂൾ 2.

തെയ്യം , തിറയാട്ടം, പടയണി, മുടിയേറ്റ് എന്നിവയെപ്പറ്റിയുള്ള ധാരണ ഉണ്ടാക്കുക.

Unit 6

മലയാളനിരൂപണം

മൊഡ്യൂൾ 1

ആദ്യകാലനിരൂപണവും മലയാള സാഹിത്യവും- പുസ്തക നിരൂപണം - വിദ്യാവിനോദിനി - സാഹിത്യവിമർശനവും വിവാദങ്ങളും- എ.ആർ. രാജരാജവർമ്മയുടെ നളിനിയുടെ അവതാരിക - സി.പി. അച്യുതമേനോന്റെ സരസ്വതീ വിജയം വിമർശനം - ജീവചരിത്ര വിമർശനം – സാഹിത്യപഞ്ചാനനന്റെ വിമർശനങ്ങൾ.

മൊഡ്യൂൾ 2

പുരോഗമന സാഹിത്യ പ്രസ്ഥാനവും മലയാള വിമർശനവും - കേരളത്തിലെ ജീവത്സാഹിത്യ പ്രസ്ഥാനം - ഇ.എം.എസ്. നമ്പൂതിരിപ്പാട് - പ്രസ്ഥാന വിമർശനം - എസ്. ഗുപ്തൻ നായർ - പാശ്ചാത്യ വിമർശനത്തിന്റെ സ്വാധീനം - കേസരി ബാലകൃഷ്ണപിള്ള - ജോസഫ് മുണ്ടശ്ശേരി - എം.പി. പോൾ - ഫ്യൂച്ചറിസം - മാറ്റൊലി - കുട്ടികൃഷ്ണമാരാരുടെ വിമർശനരീതി - പൗരസ്ത്യസിദ്ധാന്തങ്ങളുടെ സ്വാധീനം.

മൊഡ്യൂൾ 3

ആധുനികതാവാദവും വിമർശനവും - അസ്തിത്വവാദം - കെ.പി. അപ്പന്റെ വിമർശനം - ക്ഷോഭിക്കുന്നവരുടെ സുവിശേഷം - വി.രാജകൃഷ്ണൻ - നരേന്ദ്രപ്രസാദ് - ആധുനികതയുടെ മധ്യാഹ്നം - ആഷാമേനോന്റെ വിമർശനം - ഹരിതനിരൂപണത്തിന്റെ വഴികൾ - ഹെർബേറിയം - എം. ഗംഗാധരന്റെ കവിതാപഠനങ്ങൾ - കടമ്മനിട്ട - ബാലചന്ദ്രൻ ചുള്ളിക്കാട് എന്നിവരുടെ കവിതകൾക്ക് എഴുതിയ അവതാരികകൾ.

മൊഡ്യൂൾ 4

ആധുനികോത്തരതയും മലയാളനിരൂപണവും - ഉത്തരാധുനികത വംശാവലിയും വർത്തമാനവും - കെ.പി. അപ്പൻ - അക്ഷരവും ആധുനികതയും - ഇ.വി. രാമകൃഷ്ണൻ - കഥാനിരൂപണം - കെ.എസ്. രവികുമാർ , പി.കെ. രാജശേഖരൻ - വി.സി. ശ്രീജൻ- കെ.എം. നരേന്ദ്രൻ - ദലിത് - സ്ത്രീ വിമർശനം - കെ.കെ. കൊച്ചു - കെ.കെ. ബാബുരാജ് - ജി. ഉഷാകുമാരി - ജെ. ദേവിക - കെ.വി. ശശി - രാഹുൽ രാധാകൃഷ്ണൻ - പാരിസ്ഥിതിക വിമർശനം - ജി. മധുസൂദനൻ - സൈബർ പഠനങ്ങൾ

Unit 7

ആത്മകഥ

മൊഡ്യൂൾ 1

ദൃശ്യശ്രാവ്യവിഷ്കാരം സാധ്യമാകുന്ന നാടകത്തിലും സ്വന്തം ജീവിതത്തിന്റെ ഇടപെടലുകൾ പകർത്തുന്ന ആത്മകഥയിലും നവോത്ഥാനാശയം പ്രകടമാകുന്നത് മനസ്സിലാക്കേണ്ടതുണ്ട്. ആശയവും അനുഭവവും പ്രചരിപ്പിക്കുവാനുള്ള മാധ്യമമെന്ന നിലയിൽ ആത്മകഥാവരണം നടത്തുമ്പോൾ ഒരു സമൂഹമാകെ ഉദ്ബോധിപ്പിക്കപ്പെടുന്നു എന്നതാണ് വസ്തുത. സാമൂഹ്യരംഗത്ത് നവോത്ഥാനാശയവുമായി പ്രവർത്തിക്കുന്ന വ്യക്തികളുടെ ആത്മകഥകളിൽ കാലദേശവും സാമൂഹ്യാവസ്ഥയും അതിജീവനവുമൊക്കെ ഉണ്ടായിരിക്കും. ഇത്തരം കൃതികൾ കണ്ടെത്തുകയും സാംസ്കാരികമായി അടയാളപ്പെടുത്തുകയും ചെയ്യേണ്ടത് പഠിതാക്കളുടെ കർത്തവ്യമാണ്.

Unit 8

വ്യാകരണവും ഭാഷാശാസ്ത്രവും

മൊഡ്യൂൾ 1

വാക്യം- കർത്തരിപ്രയോഗം- കർമ്മണിപ്രയോഗം- വ്യാക്ഷേപകം- ഈണം- നാമം- നാമവർഗീകരണം- നാമവിശേഷണം- സർവനാമം- സർവനാമവർഗീകരണം- ക്രിയ- ക്രിയാവർഗീകരണം- കേവലം- പ്രയോജകം- അകർമ്മകം- സകർമ്മകം- പൂർണ്ണക്രിയ- അപൂർണ്ണക്രിയ- കാരിതം- അകാരിതം- വിനയെച്ചം- മുൻ-പിൻ-നടു-തൻ-പാക്ഷികവിനയെച്ചരൂപങ്ങൾ. പേരച്ചം- പ്രകാരം- പ്രകാരവർഗീകരണം- സംയോജികക്രിയ- സഹായക്രിയ- നിഷേധക്രിയാരൂപവത്കരണം - സമാസം.

മൊഡ്യൂൾ 2

സ്വനവിജ്ഞാനം- സ്വനിമവിജ്ഞാനം- രൂപിമവിജ്ഞാനം- അർഥവിചാരം- വാക്യഘടന- ചോംസ്കിയൻ വാക്യവിചാരം- പ്രയുക്തഭാഷാശാസ്ത്രം- ധൈഷണികഭാഷാശാസ്ത്രം- സാമൂഹികഭാഷാശാസ്ത്രം- ഹരിതഭാഷാശാസ്ത്രം- വിമർശനാത്മകവ്യവഹാരപഗ്രഥനം.

Unit 9

സാഹിത്യസിദ്ധാന്തവും സൗന്ദര്യശാസ്ത്രവും

മൊഡ്യൂൾ 1

പൗരസ്ത്യകാവ്യസിദ്ധാന്തം- കാവ്യം- കവി- കാവ്യപ്രയോജനം- കാവ്യഹേതുക്കൾ- അലങ്കാരം- രീതിദർശനം- ധ്വനിസിദ്ധാന്തം- രസസിദ്ധാന്തം. തിണസിദ്ധാന്തം.

മൊഡ്യൂൾ 2

പാശ്ചാത്യസിദ്ധാന്തം - പ്ലേറ്റോ-അരിസ്റ്റോട്ടിൽ- ലോംഗനീസ് - വേർഡ്സ്വർത് - കോൾറിഡ്ജ് - മാത്യൂ ആർനോൾഡ് - ടോൾസ്റ്റോയി - ടി. എസ്. എലിയറ്റ് - ഐ. എ. റിച്ചാർഡ്സ്.

മൊഡ്യൂൾ 3

ശൈലീവിജ്ഞാനം- ഘടനാവാദം- അപനിർമാണം- പരിസ്ഥിതിസൗന്ദര്യശാസ്ത്രം

Unit 10

കേരളസംസ്കാരം

മൊഡ്യൂൾ 1

കേരളചരിത്രപഠനം - കേരളചരിത്രവിജ്ഞാനീയം - ബഹുജന ചരിത്രത്തിന്റെ വഴികൾ - ഭൂമിശാസ്ത്രവും സംസ്കാരരൂപീകരണവും സംഘകാലം - കൃഷി - സമ്പദ് വ്യവസ്ഥ - ആചാരാനുഷ്ഠാനങ്ങൾ - സാഹിത്യം - ഐതിഹ്യങ്ങൾ- ദ്രാവിഡമതം

മൊഡ്യൂൾ 2

വിവിധ മതങ്ങളും വിശ്വാസധാരകളും - ബുദ്ധമതം - ജൈനമതം - ഹിന്ദുമതം- ക്രിസ്തുമതം - ഇസ്ലാംമതം - ഭക്തിപ്രസ്ഥാനം - മതങ്ങളും സാഹിത്യവും - കലയും വ്യത്യസ്ത മതങ്ങളും - ക്ഷേത്രങ്ങൾ - പള്ളികൾ - ബുദ്ധവിഹാരങ്ങൾ - കലയും വാസ്തുവിദ്യയും - മതസൗഹാർദ്ദത്തിന്റെ സൂചനകൾ - സംഘർഷങ്ങൾ - ഉദയംപേരൂർ സൂനഹദോസ് - കൂനൻ കുരിശു സത്യം - ബൗദ്ധസംസ്കാരത്തിന്റെ ആദേശവും ഹൈന്ദവസംസ്കാരവും - വ്യത്യസ്തങ്ങളായ ദാർശനികവഴികൾ - ചാർവാകം- ശൈവം - വൈഷ്ണവം - അദ്വൈതവും പിൻക്കാല സംവാദങ്ങളും

മൊഡ്യൂൾ 3

രാജവംശങ്ങളും അധികാരവും - ചേര -ചോള- പാണ്ഡ്യസംഘർഷങ്ങൾ - പി.കെ. ബാലകൃഷ്ണന്റെ ചരിത്ര വീക്ഷണം - കൊല്ലവർഷം - പെരുമാൾ വാഴ്ച - ശാസനങ്ങൾ - ചെപ്പേട് എന്നിവയിലെ സംസ്കാര വീക്ഷണം - ക്ഷേത്രകേന്ദ്രിത അധികാരവും ആദ്യവൽക്കരണവും - ജന്മിത്തത്തിന്റെ ഉദയം - ദേവസ്വം - ബ്രഹ്മസ്വം - കച്ചങ്ങൾ - സാമൂതിരി - കൊച്ചിരാജവംശം - മാമാങ്കം - രേവതി പട്ടത്താനം - സംഗീത- ദാർശനിക - സാഹിത്യ ഗ്രന്ഥങ്ങൾ - ക്ലാസിക്കൽ കലകളുടെ വികാസം - രാമനാട്ടം - കൃഷ്ണനാട്ടം - കഥകളി - തുള്ളൽ - ഇവയുടെ സാഹിത്യരൂപങ്ങൾ - ഫോക് കലകളുടെ വൈവിധ്യങ്ങൾ - കാക്കാരശ്മി നാടകം - നാടോടിപ്പാട്ടുകൾ.

മൊഡ്യൂൾ 4

വൈദേശികാധിപത്യവും അധികാര ബന്ധങ്ങളും - പോർച്ചുഗീസ് - ഫ്രഞ്ച് - ബ്രിട്ടീഷ് അധിനിവേശങ്ങൾ - ആദ്യകാല കച്ചവടകേന്ദ്രങ്ങൾ - തുറമുഖങ്ങൾ - കപ്പൽസഞ്ചാരം - മതപരിവർത്തനം - അടിമത്തം - അടിമവ്യാപാരം - നാട്ടുരാജ്യങ്ങൾ തമ്മിലുള്ള സംഘർഷങ്ങൾ - നീക്കിതിവ്യവസ്ഥ - ആധുനികരണത്തിന്റെ സൂചനകൾ - അച്ചടിയും ആധുനികതയും - ഗദ്യസാഹിത്യത്തിന്റെ വികാസം - ശാസ്ത്രം - യുക്തി - മാധ്യമവ്യാപനം - ജാതിയും സാമൂഹികരൂപീകരണവും - വൈദേശികമേധാവിത്വത്തിനെതിരെയുള്ള പ്രതിഷേധങ്ങൾ - കീഴാളസമുദായങ്ങളുടെ നിലപാടുകൾ - ഹോർത്തൂസ് മലബാറിക്കസ് - മിഷണറി ആധുനികത

മൊഡ്യൂൾ 5

സാമൂഹികപരിവർത്തനങ്ങളും ജനാധിപത്യകേരളവും - കേരളീയനവോത്ഥാനം - സാമൂഹ്യ പരിഷ്കർത്താക്കൾ - വൈകുണ്ഠ സ്വാമികളും സമത്വസമാജവും - ശ്രീനാരായണഗുരു- അയ്യൻകാളി - പൊയ്ക്കയിൽ അപ്പച്ചൻ - ബ്രഹ്മാനന്ദ ശിവയോഗി - ചട്ടമ്പിസ്വാമികൾ - വി.ടി.ഭട്ടതിരിപ്പാട് - പണ്ഡിറ്റ് കെ.പി. കുറുപ്പൻ - സഹോദരൻ അയ്യപ്പൻ - കെ.പി. വള്ളോൻ - വൈക്കം സത്യാഗ്രഹം - ഗുരുവായൂർ സത്യാഗ്രഹം - ക്ഷേത്രപ്രവേശന വിളംബരം - ഐക്യകേരളമെന്ന ആശയം കേരളപ്പിറവി - സാഹിത്യ- സാമൂഹിക പ്രസ്ഥാനങ്ങൾ - ജീവത്സാഹിത്യ സംഘം- ലൈബ്രറി പ്രസ്ഥാനം - പത്രം - മാസികകളുടെ വികാസം - സാംസ്കാരികസ്ഥാപനങ്ങൾ - ഭാഷാപോഷിണി സഭ - സമസ്തകേരള സാഹിത്യപരിഷത്ത് - ജനാധിപത്യകേരളവും സാംസ്കാരിക പരിവർത്തനങ്ങളും - ആദ്യകാല സർക്കാറുകൾ - ബില്ലുകളും സാമൂഹ്യ പ്രത്യാഘാതങ്ങളും

SUBJECT : URDU
SYLLABUS

UNIT-1

اردو کی شعری اصناف

Forms of Urdu Poetry

1- مثنوی: ۱- مثنوی کافن

۲- مثنوی کی تاریخ

۳- اردو کے اہم مثنوی نگار اور ان کی مثنویاں

(الف)۔ میر حسن: سحر البیان

(ب)۔ دیانتگر نسیم: گلزار نسیم

2- مرثیہ:

۱- مرثیہ کافن

۲- مرثیہ کی تاریخ

۳- اردو کے اہم مرثیہ نگار اور ان کے مرثیے:

(الف) میر برب علی انیس

نمک خوان تکلم ہے فصاحت میری

(ب) مرزا سلامت علی دبیر

ضیغ ڈکارتا ہوا نکلا کچھار سے

3- قصیدہ:

۱- قصیدہ کافن

۲- قصیدہ کی تاریخ

۳- اردو کے اہم قصیدہ گو اور ان کے قصائد:

(الف) مرزا محمد رفیع سودا

: تضحیک روزگار

UNIT-2

اردو نظم

Urdu Nazm

- 1- اردو نظم کا فن
 - 2- اردو نظم کی تاریخ
 - 3- اردو کے اہم نظم نگار اور ان کی نظمیں:
- ۱- نظیر اکبر آبادی: آدمی نامہ
 - ۲- الطاف حسین حالی: برکھارت
 - ۳- علامہ اقبال: ساقی نامہ
 - ۴- فیض احمد فیض: صبح آزادی
 - ۵- ساحر لدھیانوی: تاج محل

UNIT-3

اردو غزل

Urdu Ghazal

- 1- اردو غزل کا فن
 - 2- اردو غزل کی تاریخ
 - 3- اردو کے اہم غزل گو شعرا اور ان کا کلام:
- ۱- ولی: ”کلیات ولی“
 - (ردیف الف اور ب کی ابتدائی دو دو غزلیں)
 - ۲- میر: ”انتخاب میر“ از مولوی عبدالحق
 - (ابتدائی پانچ غزلیں)
 - ۳- غالب: ”دیوان غالب“؛ مطبوعہ غالب انسٹی ٹیوٹ

(ردیف الف اور ب کی ابتدائی دو دو غزلیں)

۵۔ جگر مراد آبادی: ”آتش گل“ کی ابتدائی پانچ غزلیں

UNIT-4

داستان اور ڈراما

Dastan aur Drama

- 1- اردو داستان کا فن
- 2- اردو داستان کی تاریخ
- 3- اردو کے اہم داستان گو اور ان کی داستانیں:
۱۔ میرامن : باغ و بہار
۲۔ رجب علی بیگ سرور: فسانہ عجائب
- 4- اردو ڈرامے کا فن
- 5- اردو ڈرامے کی تاریخ
- 6- اردو کے اہم ڈراما نگار اور ان کے ڈرامے:
۱۔ امتیاز علی تاج: انارکلی

UNIT-5

غیر افسانوی ادب

Urdu Non-fiction Literature

- 1- سوانح اور خودنوشت سوانح نگاری کا فن اور تاریخ
- 2- اردو کے اہم سوانح نگار اور ان کی سوانح:
۱۔ الطاف حسین حالی: حیات جاوید
- 3- اردو میں مکتوب نگاری کا فن۔ اردو میں مکتوب نگاری کی تاریخ
- 4- اردو کے اہم مکتوب نگار:
۱۔ مرزا غالب : اردوئے معلیٰ

UNIT-6

تاریخ ادب اردو

Tareekh-e-Adab-e-Urdu

- 1- اردو کا ابتدائی دور
- 2- اردو کی ابتداء کے بارے میں مختلف نظریات
- 3- دکنی اردو کی تاریخ
- 4- اردو قواعد
 - 1- اسم اور اس کی قسمیں
 - 2- ضمیر اور اس کی قسمیں
 - 3- فعل اور اس کی قسمیں
 - 4- جنس
 - 5- حروف کی اقسام
 - 6- جملے کی اقسام

UNIT-7

اردو مضمون نگاری

Urdu Essay Writing

- 1- اردو میں مضمون نگاری کا فن اور تاریخ
- 2- اردو کے اہم مضمون نگار:
 - 1- سر سید احمد خان: مضامین سر سید
- 3- اردو میں انشائیہ نگاری کا فن اور تاریخ
- 4- اردو کے اہم انشائیہ نگار اور ان کے انشائیے:
 - 1- رشید احمد صدیقی - چارپائی

۲۔ پطرس بخاری- سائیکل کی سواری

UNIT -8

اردو ناول

Urdu Novel

- 1- اردو ناول کا فن
- 2- اردو ناول کی تاریخ
- 3- اردو کے اہم ناول نگار اور ان کے ناول:
 - 1- ڈپٹی نذیر احمد: توبتہ النصح
 - 2- پریم چند: نرملہ
 - 3- راجندر سنگھ بیدی: ایک چادر میلی سی
 - 4- مرزا ہادی رسوا: امر او جان ادا

UNIT -9

اردو افسانہ

Urdu Short Stories

- 1- اردو افسانے کا فن
- 2- اردو افسانے کی تاریخ
- 3- اردو کے اہم افسانہ نگار اور ان کے افسانے:

(الف)	پریم چند:	کفن
(ب)	سعادت حسن منٹو:	ٹھنڈا گوشت
(ج)	کرشن چندر:	جامن کا پیڑ
(د)	علی اکبر آمبوری	خوش نصیب
(ه)	شبیب احمد کاف	آٹھواں پنکھا

UNIT -10

تمل ناڈوکا شعر و ادب

Urdu Literature of Tamilnadu

- 1- تمل ناڈو میں اردو شاعری
- ۱- خطیب قادر بادشاہ
- ۲- شاکر وانم باڑی
- ۳- دانش فرازی
- ۴- کاوش بدری
- ۵- شاکر ناطی
- 2- تمل ناڈو میں اردو نثر
- ۱- باقر آگاہ
- ۲- ادیب بھارتی
- ۳- مہر طلعت آمبوری
- ۴- عابد صفی
- ۵- یعقوب اسلم
- 3- تمل ناڈو میں اردو صحافت



SUBJECT : ARABIC**SYLLABUS****Unit-1**

الشعراء الجاهليون

1. إمرؤ القيس
2. أعشى
3. عمرو بن كلثوم
4. حاتم الطائي
5. كعب بن زهير
6. النابغة الذبياني
7. عنتره بن شداد
8. الحارث بن حلزة
9. أميه بن أبي صلت
10. زهير بن أبي سلمى

Unit-2

الشعراء المخضرميون

1. الخنساء
 2. الحطيئة
 3. حسان بن ثابت
- الشعراء الإسلاميون
4. عمر بن أبي ربيعة
 5. الأختل
 6. فرزدق
 7. جرير
 8. الطرماح

Unit-3

الخطباء في دور الإسلام

1. سيدنا رسول الله صلى الله عليه وسلم
2. علي بن أبي طالب رضى الله عنه
3. زياد بن أبيه
4. عمر بن الخطاب رضى الله عنه
5. سحبان وائل
6. حجاج بن يوسف

Unit-4

العصر العباسي

1. الجاحظ
2. ابن المقفع
3. ابن العميد
4. قاضي الفاضل
5. بديع الزمان الهمداني
6. مطيع بن اياس
7. منصور - مهدي - رشيد مامون
8. الخوارزمي
9. الحريري

Unit-5

الشعراء المولدون

1. أبو العتاهية
2. بشار بن برد
3. أبي نواس
4. ابن رومي
5. أبو تمام

6. المتنبي
7. أبو العلاء المعري
8. ابن عبد ربه
9. ابن زيدون
10. الشريف الرضي

Unit-6

الشعراء في الشام

1. البحتري
2. أبو فراس الحمداني

الشعراء في الأندلس

3. ابن خفاجة الأندلسي
4. أبو الأسود الدولي
5. هارون بن سيوييه
6. ابن هاني الأندلسي
7. ابن حمديس الصقلي
8. لسان بن الخطيب
9. ابن إسحاق الحضرمي
10. عيسى بن عمر

Unit-7

المحافظون

1. أحمد شوقي
2. حافظ إبراهيم
3. خليل مطران

المجددون

4. عباس محمود العقاد
5. إبراهيم المازني
6. عبد الرحمن شكري

الشعراء في مصر

7. محمود سامي البارودي
8. حافظ إبراهيم
9. خليل مطران
10. عباس محمود العقاد

Unit-8

الكتاب في مصر

1. مصطفى لطفى المنفلوطي
2. محمود تيمور
3. أحمد لطفى السيد
4. إبراهيم عبد القادر المازني
5. طه حسين
6. محمد عبده
7. محمد حسين هيكل
8. توفيق الحكيم
9. أحمد زكي أبو شادي

Unit-9

شعراء المهجر شعراء الرابطة القلمية في المهجر الشمالي

1. رشيد أيوب
2. أمين الريحاني
3. نسيب عريضة
4. جبران خليل جبران
5. ميخائيل نعيمة
6. إلييا أبو ماضي
7. يوسف الخال

شعراء العصبة الأندلسية في المهجر الجنوبي

8. رشيد سليم الخورى

9. إلياس فرحات

10. جورج صيدح

11. شفيق معلوف

12. عبد اللطيف الخشن

Unit-10

Indo- Arabic Literature

1. الشيخ عبد الحق محدث الدهلوى

2. ملا محمد الجونفورى

3. شاه ولى الله الدهلوى

4. عبد الحى الحسنى

5. سيد أبو الحسن على الندوى

6. غلام على آزاد البلغرامى

S. MADUMATHI,
Secretary to Government.