

# **STATE ELIGIBILITY TEST**

## **SYLLABUS**



***LBS***

***Centre for Science and Technology***

***(A Government of Kerala Undertaking)***

***Palayam, Nandavanam, Thiruvananthapuram***





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*State Eligibility Test - Syllabus 2016* .....



# Paper I

## General Knowledge and Teaching Aptitude

### Unit I General Studies

#### Module 1.

- General Science –Mathematics, Statistics, Physics, Chemistry and Biology (Basics – Class X Level)

#### Module 2.

- Social Science –Economics, History, Geography and Indian Polity (Basics – Class X Level)

#### Module 3.

- Humanities- Literature (Classics and Masterpieces of World and Indian Literature), Art (Major art forms of India) and Culture (Life and Society in India)

#### Module 4.

- Kerala Studies – Social reforms, National Movements, Kerala Model of Development, Literature, Art and Culture

### Unit II Language and Reasoning

#### Module 1.

- Comprehension and Vocabulary

#### Module 2.

- Basic English Grammar

#### Module 3.

- Logical Reasoning and Analytical Ability

#### Module 4.

- Numeracy Skills - Pattern Recognition and Orders of Magnitude

### Unit III Current Affairs

#### Module 1.

- Technology –Inventions, Innovations and Discoveries

#### Module 2.

- Environmental Issues, Movements, Treaties and Legislations -National and International.

#### Module 3.

- UN and Global Affairs

#### Module 4.

- Institutions of Higher Learning and Research, Scholarships and New Initiatives (National and State level )

#### Module 5.

- Indian Constitution and Politics and Recent Legislations –Right to Information and Right to Education

#### Module 6.

- Events, Persons and Awards

#### Module 7.

- Sports and Games

#### Module 8.

- Culture (Films, Literature, Music and Performing Arts)

### Unit IV Foundations of education

#### Module 1. Philosophical Foundations

- Educational Philosophy - Relationship between Philosophy and Education - Major Philosophical divisions and its impact on aims, curriculum, and methods of teaching - Concept of teacher, freedom and Discipline
- Major philosophical systems in the East – Six Schools of Indian philosophy, Buddhism, Jainism, and Islamic thought
- Major philosophical systems in the West – Idealism, Naturalism, Pragmatism, Humanism and Realism, Democracy and Critical Pedagogy



- Eminent thinkers in Education – Gandhiji, Tagore, Vivekananda, Plato, Rousseau, Montessori, Froebel, John Dewey, Paulo Freire
- Value education – Classification of values, Significance of value education, Religious and moral education and development of values, Value crisis.

### **Module 2. Sociological Foundations**

- Relation between education and sociology, - Meaning and scope of education and sociology, and sociology of Education, Interactive role of education and society, The relationship between education and culture.
- Social functions of education- Various functions of education in society, functions of society towards education. Functions of education with regard to Culture– Preservation, Transformation and Transmission.
- Social change and education - Social Change – Factors influencing social changes- Role of Education . Social mobility. Factors hinder positive changes in the society, Characteristics of Indian Society –class, religion, ethnicity, language. Major changes occurred in Indian society Corruption, Terrorism, Antinational activities, Violence against women, Drug abuse and Alcoholism etc. Role of education to curb Social evils.
- Education and social institutions – Major social institutions, Role of various social institutions to inculcate values connected with Democracy and Secularism, National Integration, Concept of global village
- Education and socialization – Factors influencing socialization, education and socialization process, Acculturation, value orientation- Teacher as a Change agent and Nation builder, Cultural lag, cultural inertia, Cultural diffusion

### **Module 3. Psychological Foundations –**

- Educational Psychology- Meaning, scope, fields of psychology- Educational Psychology, School Psychology, Clinical Psychology. Applications of Psychology-

Guidance and Counselling, life skills education etc.

- Personality- Approaches- Psychoanalytic, Behaviouristic, Humanistic, Trait approaches. Motivation- Intrinsic and extrinsic. Approaches to motivation- behavioral, humanistic, cognitive, and socio-cultural.
- Intelligence- Factor theories, Multiple intelligence. Measurement of intelligence- Binet, Wechsler. Creativity
- Social and Cognitive development- Erikson, Piaget, Vygotsky, Language- structure and development. Memory and forgetting
- Adolescent characteristics- Cognitive, Emotional and Motivational aspects. Peer influence. Parenting difficulties

### **Module 4. History & policies of Education**

- History of Education in Kerala and India. Early education history of India, introduction of modern English Education, Government’s role in pre-Independence India, major reports & documents on education. Important personalities in Education in India and Kerala.
- Reports and Policies on Education in post independence period – NPE -first, second & third, BPEGEL, IEDSS
- Acts and Bills Relevant to higher education: Major Bills and Acts on Higher education promulgated by the Parliament of India and the Legislative Assembly of Kerala
- Programmes for Universalisation of Education - Saakshar Bharat, RTE, DPEP, SSA, RMSA, RUSA ,
- Institutions of Education at National and state level- MHRD, UGC, NCTE NCERT, NUEPA, SCERT, DIET, CTE, SIET, etc.

## **Unit V**

### **Teaching, Learning and Evaluation**

#### **Module 1. Teaching Aptitude**

- Teaching aptitude – Teacher characteristics, Teaching as a profession, Skill based



theoretical knowledge, Teacher competency and teacher accountability,

- Administrative aptitude - Administrative models, administrative roles of teachers, obligations to students, parents and society
- Reflective practices - components in reflective practice, innovative teaching, mechanisms of feedback to learners, self assessment.
- Professional development - Needs for professional development, technological advancement, professional associations, Pre-service and in-service training, cluster training, teacher rating & grading
- Teacher Characteristics - Essential characters for a quality teacher, professional qualities, teacher as an agent of social reformation.

#### Module 2. Teaching Methods

- Teaching skills - Essential teaching skills, quality teaching and teaching skills, Microteaching.
- Methods of teaching - Analysis of Major methods of teaching.
- Techniques and approaches to teaching - Individualized instruction, Group instruction, peer teaching, mentoring, facilitated instruction, Distance and online teaching,
- Instructional models of teaching - Significance of Models of teaching - Concept attainment, Advance organizer, cognitive growth, group investigation models of teaching.
- Teaching & Learning resources - Classification of Audio-visual aids, Dale's cone of experience, Community resources, Web resources. Improvisation of aids, Effective use of learning resources

#### Module 3. Learning -

- Learning theories- Behaviorist theories, cognitive learning, Constructivist view. Classroom learning. Approaches of Vygotsky, Piaget, Gagne, Bruner, Ausubel, & Bloom

- Applications of learning theories- Mastery learning, reinforcement, situated learning, problem-based learning, Building on students' thinking, activity and constructing knowledge, scaffolding, assisted learning, concept learning, setting learning objectives, etc.
- Learner characteristics- Heredity, personality, intelligence, SES, culture, gender, experience, motivation, goal orientation, cognitive styles, learning styles
- Learning environment- Class room climate, home environment. Teacher's personality. Individual learning and group learning. Group dynamics. Sociometry
- Learners with special needs - Students with mental retardation, learning disabilities, learning difficulties, behavioral problems, emotional problems; communication, visual and hearing impairments, under achievers. Strategies- inclusive classroom, strategy training. Gifted students

#### Module 4. Evaluation

- Tools and techniques for evaluation - Paper pencil Tests, Achievement and diagnostic tests, Performance tests, Cumulative records, Rating scale, Observation, Characteristics of a good test
- Continuous Evaluation - Measures for continuous evaluation- Unit test, Assignments, Seminar, Collection, Project, Experiments, Portfolio etc.
- Terminal evaluation - Teacher made tests and standardized tests, Public examination, Type of test items, Entrance examination, Online tests, Interview
- Grading - Principles of grading, types of grading, Absolute grading & relative grading, grading procedure, Merits and demerits of grading
- Feedback and remediation - Feedback to students, feedback to teachers, Institutional mechanism for feedback collection, Remedial measures



## **Unit VI**

### **Communication, Technology Research and Educational Administration**

#### **Module 1. Communication**

- Communication and Education –Meaning, concept & scope, Communication as a major life skill, Effective interaction in classrooms.
- Basic principles of communication – Components of communication, Communication cycle, communication process, sources of communication
- Types of communication – Oral, written, interpersonal, Non-verbal communication
- Barriers in communication – Major barriers, Interaction analysis, procedure for analysis
- Classroom application of communication – Communication and effective teaching, meaningful learning, and proper application.

#### **Module 2. Computer and ICT**

- Basics of Computer Knowledge: Basic parts of a computer - I/O Devices – Memory – Storage Devices – Operating System – Database – FOSS – Common Computer Abbreviations and Terminologies.
- Computer Networks &Internet: Basics of Computer Networks – Types of Networks – Internet – WWW – Browsers – Search Engines – E-mail – Virus – Anti-Virus Software – Cyber Security – Cyber Law – India IT Act 2000.
- Office Tools: Word Processing – Editing & Formatting Document – Printing – Inserting Tables & Pictures – Spreadsheet – Creating Worksheets – Working with Formula Bar – PowerPoint – Creating & Designing slides – Insertion of objects and functions.
- ICT Enabled Learning: e-Learning – e-Content Portals – Video Conferencing – Interactive Educational Tools – MOOC – Moodle – Smart Class Room – IT@School Project.
- General Applications: e-Commerce – e-Governance – e-banking – Mobile Apps – Social Networking Apps – Green Computing – Supercomputing – Cloud storage.

#### **Module 3. Research in Education –**

- Basic aspects of educational research – Meaning & Scope of research in education, Steps in educational research, Uses of statistics in educational research
- Types of research- Historical, Descriptive and Experimental, Quantitative and qualitative
- Methods, Tools & techniques of research – Surveys, Case study, Experimental, Document analysis, Questionnaire, Scales, Interview, Observation.
- Action research – steps in action research, significance of action research at school level
- Reporting of research – steps in writing research report, APA style, Plagiarism, ethics in educational research.

#### **Module 4. Educational Administration**

- Planning and administration at national level – National Curriculum Frameworks, National policy on education, Planning commission and education, National pattern of Education system. NUEPA
- Organisational structure of education in the state – Structure of School education, Higher secondary level education, Higher education system, Kerala State Higher Education Council, SIEMAT
- School administration – Role and functions of Head of the institution, school council, subject councils, school parliament, PTA, MPTA, School management committee
- Management & governance – Management of resources at various levels, Provisions for equal educational opportunities (free textbooks, free uniform, mid day meal, etc.), e-governance
- International agencies and education – UN and goals of education in India, Programmes for universal education in tune with international developments in the field of education. Privatization and education at various levels.



## Paper II

### Subjects

01. Anthropology	11. Geology	21. Mathematics	31. Statistics
02. Arabic	12. German	22. Music	32. Syriac
03. Botany	13. Hindi	23. Philosophy	33. Tamil
04. Chemistry	14. History	24. Physics	34. Urdu
05. Commerce	15. Home Science	25. Political Science	35. Zoology
06. Economics	16. Islamic History	26. Psychology	
07. English	17. Journalism	27. Russian	
08. French	18. Kannada	28. Sanskrit	
09. Gandhian Studies	19. Latin	29. Social Work	
10. Geography	20. Malayalam	30. Sociology	

### **01. Anthropology**

#### **Unit I Social and Cultural Anthropology**

##### **Module 1. Meaning and scope of social and cultural anthropology**

- Social-Cultural Anthropology: Nature, Scope and Subject matter.
- Branches of Anthropology.
- Relation with other Social Sciences - Economics, History, Sociology, Psychology, Archaeology, Linguistics, etc.
- Emerging trends and specializations in Anthropology.
- Uniqueness and Perspectives in Anthropology - Holism and Fieldwork.

##### **Module 2. Basic concepts**

- Culture, Society and Community
- Institution, Group and Association
- Social structure and Social Organization
- Status and Role

##### **Module 3. Nature and Configuration of Culture**

- Culture- Explicit and Implicit, Structure, Attributes and paradoxes
- Culture Processes- Enculturation, Acculturation, Diffusion, Cultural Pluralism

- Culture Perspectives: Ethnocentrism, Cultural Relativism, Emic and Etic.

##### **Module 4. Family**

- Concept, definitions, functions and universality; Family and household
- Typology of family - nuclear, joint, extended and others.
- Residence patterns -matrilocal, patrilocal, neolocal, bilocal and others.
- Stages of development of the family
- Joint family system in India; changing trends in family.

##### **Module 5. Marriage**

- Possibility of a universal definition.
- Forms and types of marriage.
- Marriage regulations: Incest, Exogamy, Endogamy, Hypergamy and Hypogamy.
- Marriage payments- Dowry and Bride price; Wealth and its relation to marriage stability.
- Mate Selection- Cross cultural perspectives.

##### **Module 6. Kinship**

- Concept of Kinship and its place in Social structure.
- Kinship system- Classificatory and Descriptive.
- Rules of descent and residence.
- Kin groups - Lineage, Clan, Phratry, Moiety and Tribe.
- Kinship Behaviour- Joking and avoidance behaviour, Couvade.



- Kinship Terminology - Eskimo, Omaha, Hawaiian, Crow, Iroquois, Sudanese.

#### **Module 7. Political Organization and Social Control**

- Types of political organization, Concepts of power, authority and legitimacy.
- Patterns of leadership in simple societies: Band, tribe, age-grade, chiefdom, rank-societies.
- Social control: Mechanisms of social control.
- Law and justice in simple societies; Customary and codified law.
- State and Stateless societies: The rise of State.

#### **Module 8. Social Stratification**

- Principles and bases. Estate, Class and Caste
- Social stratification and mobility in and outside the caste
- Approaches to the study of social stratification in India - functional and anthropological approach.

#### **Module 9. Religious Organization**

- Anthropological approaches to the study of religion: Evolutionary, psychological, and functional.
- Ritual, Myth, Belief: Sacred and profane; sacred complex; religion and life-cycle rituals.
- Forms of religion in tribal and peasant societies- animism, animatism, naturism and totemism.
- Magico-religious functionaries: Priest, shaman, sorcerer, witch.
- Distinction between magic religion and science.

#### **Module 10. Economic Organization**

- Tribal, peasant and other economies.
- Ownership and property concepts in simple societies
- Modes of exchange: Reciprocity, Distribution and Redistribution - Kula Ring and Potlatch. Market economy.
- Hunting-gathering, pastoral, shifting cultivation, agricultural and industrial economies.
- Economic change and adaptation in societies.

## **Unit II - Biological and Archaeological Anthropology**

#### **Module 1. Meaning and scope of Biological Anthropology**

- Concept, history, development and scope
- Important branches and its relation to other subfields of anthropology and medical sciences

#### **Module 2. Man's place in the animal kingdom**

- Principles of taxonomy
- Classification, distribution and features of living non-human primates (functional and adaptation significances)
- Anatomical comparison between human and non-human primates (with reference to erect posture and bipedalism)

#### **Module 3. Introduction to human evolution**

- Man as a primate
- Bio-cultural evolution of humans

#### **Module 4. Theories of Organic evolution**

- Historical overview of emergence of evolutionary thought
- Lamarckism and Neo-Lamarckism
- Darwinism and Neo Darwinism
- Mendelian laws of heredity
- Modern synthetic theory

#### **Module 5. Emergence of man-fossil evidence**

- Pongids and Hominids
- Australopithecines
- Pithecanthropines (Homo erectus)
- Homo sapiens Neanderthalensis
- Homo sapiens sapiens

#### **Module 6. Biological Basis of Life, Heredity and Variation**

- Cell structure and functions
- Cell divisions-mitosis and meiosis and genetic significance
- Importance of genetics in evolution and recent developments in human genome

#### **Module 7. Human genetics - basic concepts and principles**

- Chromosomes and genes
- Autosomal, dominant, recessive and Co-dominant



- Sex linked, sex limited and sex influenced
- Multiple alleles and polygenic inheritance (ABO blood groups, colour blindness, albinism, brachydactyly, Alkaptonuria)

#### **Module 8. Concept of Race, ethnicity and populations**

- Racial criteria and major divisions of man kind
- Concept of Racism
- Debate on ethnic groups and ethnicity

#### **Module 9. Biological anthropology in the service of human society**

- Family welfare and genetic counseling

#### **Module 10. Applications of Biological anthropology**

- In Industry, medico-legal problems, defense services, public health and nutrition

### **Unit III**

#### **Indian Society and Culture**

##### **Module 1. Culture, Society and Civilization**

- Concepts of culture, society and civilization
- Theories of Civilisation's Emergence
- Hydraulic theory, Trade Networks theory, Environmental and Social Circumscription theory, and Religion theory
- Indian culture: tribal, folk, peasant and urban dimensions

##### **Module 2. Hindu religious and philosophical tradition**

- Sacred books of India
- Indian social system: Purusharthas and Varnashramadharma
- Varna System, Caste System; Caste Fission, and Caste Fusion;
- Mobility in Caste System

##### **Module 3. Indian Education System**

- Evolution of Indian education system: Pre-British, British and Post-independence
- Contemporary educational pattern
- Non-formal education.

##### **Module 4. Composition of Indian Population**

- Racial/ethnic elements and demographic composition of Indian population.

- Linguistic diversity and language cultures of India.

##### **Module 5. Social Disabilities**

- The Problem of untouchability
- Social Reform Movements
- Sree Narayana Movement

##### **Module 6. Approaches to the study of Indian culture and civilization**

- Folk-Urban Continuum
- Little and Great Traditions; Universalisation and Parochialisation
- Sacred Complex. Tribe-Caste Continuum. Nature-Man -Spirit Complex

##### **Module 7. Processes of Social Change**

- Modernisation, Industrialisation, Urbanization, Westernisation
- Sanskritisation; Concept of Dominant Caste; Peculiarisation

##### **Module 8. The Tribes of India**

- Major Tribes of India and Tribes of Kerala
- Transformation of Tribes; Theories of transformation: Verrier Elwin to K.S Singh; Tribal movements.
- Tribal issues: Forest, land alienation, Indebtedness, Poverty, Illiteracy, Displacement.

##### **Module 9. Aesthetic and Creative Aspects of Indian Culture**

- Introduction to aesthetic and creative aspects of Indian culture
- Architecture, Sculpture, Theatre, Folk art, Music, Dance, Indian Cinema

##### **Module 10. Changing Village India**

- Changes in Indian Village Communities
- Study of a selected cultural region in India

### **Unit IV**

#### **Methodology of Anthropological Research**

##### **Module 1. Science and Scientific Research**

- Science, Objectivity, validity, testability
- Relation between theory and fact
- Social science, value, subjectivity, Inter subjective objectivity



- Social science research, Ethical, Experimental and Epistemological problems.

**Module 2. Construction of Research Design**

- Identification of broad area of research
- Review of literature, conceptual framing and concept mapping
- Formulation of research problem
- Hypotheses formulation
- Determination of sample frame and size
- The notion of control
- Construction of tools and techniques of data collection
- Mode of analysis and reporting

**Module 3. Fieldwork tradition in anthropology**

- Fieldwork tradition in anthropology
- Restudy and Reinterpretation

**Module 4. Ethnographic approach in anthropological research**

- Features of anthropological fieldwork
- Getting acquainted with the field
- Establishment of rapport
- Learning and using native language
- Informants/key informants
- Ethical dimensions of fieldwork
- Handling of sensitive and confidential information
- Distinction between Fieldwork and Survey
- Ethnography as a holistic documentation of culture

**Module 5. Basic Techniques of data collection I**

- Interview-structured and non-structured, open ended, focus group interview and key informant interview
- Observation-participant, non-participant and quasi participant
- Genealogy-technique and application, Pedigree

**Module 6. Basic Techniques of data collection II**

- Questionnaire and Schedule
- Case method
- Personal, official and historical documents and sacred texts.

**Module 7. Quantitative analysis: Basic statistics**

- Scrutiny and processing of data

- Classification, tabulation and presentation
- Frequency distribution, Graphs and Histograms
- Measures of central tendency, Mean, Mode, Median Measure of variation-Mean deviation and Standard deviation. Inter individual and Instrumental errors

**Module 8. Qualitative analysis-Introduction**

- Context based analysis
- Grounded theory approach
- Thematic analysis

**Module 9. Ethnographic approach in anthropology**

- Contributions of Malinowski
- Ethnographic study of Toda of Nilgiris - Nature of data, Interpretation and functional integration

**Module 10. Preparation of Anthropological research report**

- Structure, Steps and Procedure

**Unit V - Method and Theory in Socio-Cultural and Development Anthropology**

**Module 1. Introduction to Method and Theory**

- Anthropological Studies before and after Cultural relativism
- Anthropological thought and Theoretical Development in Anthropology
- Schools of thought
- Relationship between Theory and Method

**Module 2. Evolutionism**

- Meaning of evolution. Nineteenth century evolutionism and its basic assumptions
- Evolutionary school of thought
- The comparative method as used by the unilinear evolutionists

**Module 3. Diffusionism**

- Diffusionist School of Thought
- British and German- Austrian diffusionists and their main assumptions
- American distributionists

**Module 4. Functionalism**

- Malinowski's contributions to functionalism. Relevance of terms like manifest/ latent function and eufunction and dysfunction



### Module 5. Continuum

- Continuum of Robert Redfield and its turning point in anthropological studies

### Module 6. Structural Functionalism

- Structural functionalism
- Interrelation of function and structure: Radcliffe-Brown, Firth, Fortes and Nadel

### Module 7. Cultural Patterns and Culture and personality

- Ruth Benedicts Theory of Pattern
- Culture and personality: basic personality construct and model personality
- National character studies and studies of culture at a distance

### Module 8. Structuralism

- Structuralism in linguistics and in social-cultural anthropology
- Social structure as model: views of Levi-Strauss and Edmund Leach
- Structural analysis of myth and alliance

### Module 9. Post-structuralism

- Post-structuralism, Contributions of Jacques Derrida, Michel Foucault
- Ethno-science
- New Ethnography and Componential Analysis

### Module 10. Development anthropology and early thoughts on development

- Meaning and scope of Development Anthropology
- Development planning; Agencies or development: Government, Non-government and Voluntary.
- Nehruvian approach to planning and Gandhiji's vision of rural development
- Constitutional Safeguards and Legislative measures
- Concepts of Inclusion and Exclusion

## Unit VI - Ecological, Medical and Economic Anthropology

### Module 1. Ecological anthropology

- Meaning and Scope of Ecological anthropology
- Definition of ecology, Ecological community and Human ecological Niche
- Cultural ecology

### Module 2. Fundamental concepts and approaches

- Environmental determinism, Environmental Possibilism
- Population ecology, System ecology, Ethno-ecology
- Contribution of Wissler, Forde, Steward, Vayda and Rappaport

### Module 3. Medical anthropology

- Meaning and Scope of Medical anthropology
- Concept of health and disease in India-tribal, rural urban; Socio-cultural dimensions of illness.
- Ethnomedicine: Culturally appropriate medicine and health education. Regional variation in India. Magico-religious curative practices and indigenous medical care services

### Module 4. Health and Society

- Health care system and Health care services; Health education
- Psycho-somatic and mental disorders

### Module 5. Applications of medical anthropology

- Application of anthropological knowledge in promoting health care in tribal and rural communities. Programme, promotion and changing health behavior

### Module 6. Economic Anthropology

- Meaning and scope of economic anthropology
- Approaches to economic anthropology

### Module 7. Economic theories

- Fundamentals of modern economic theories and their relevance to non-market economies: formalist - substantivist controversy
- Marxist theories on economy and society

### Module 8. Habitat, Economy and Society

- Hunting, food gathering
- pastoralism
- Shifting (Sweden) cultivation
- Peasantry and urban-industrial economy

### Module 9. Exchange and Service

- Barter, ceremonial exchange, reciprocity, redistribution (Gift, Potlatch, Kula ring)
- Jajmani System



- Consumption pattern in subsistence economies.
- Wealth status and social differentiation

**Module 10. Organization of Subsistence production**

- Division of work: age, sex, specialization
- Property relations: right in resources
- Technology, capital, savings and investment

**02. Arabic**

**Unit I - Arabic Prose**

**Module 1. Muallaqath and Poets of Muallaqath**

(المعلقات وأصحابها)

- Imrul qais , Zuhair bin Abee Sulma, Labeed bin Rabeeh (Detailed study)

**Module 2. Poets of Prophet and Muharamoon**

(الشعراء المخضرمون وشعراء النبي صلى الله عليه وسلم)

- (Abdulla bin Rawaha, Hassanu bin Sabith, Al-khanzah, Kahab bin Zuhair)

**Module 3. Umayyath period**

- Nakayiz and Poets, Jareer, Farazdaq, Akthal, (التنقيض وأصحابها)
- Umaru bin Abee Rabeeha

**Module 4. Abaasid Period**

- Poets and new Poetic forms ( Gilmaniyath, Zuhdiyath, Khamriyath)
- (Bashar bin burd, abulathahiyyath, Abu nuwas, Muthanabbi)
- Hamasath(Abu thammam, Buhthuri)
- Muvashahath (Ibnu Zaidoon )

**Module 5. Modern Period**

- Shihab Ganim, Mahmood Darvesh, Nizar Qabbani, Adonis, Nizkaal Malika, Saleem Rumaidi
- Mahmood Sami Albaroodi, Ahmad Shauqi, Hafiz Ibraheem, Jameel Sidqi zahawi, Ma'roof Rusafi

**Unit II  
Arabic prose**

**Module 1**

- Al Hikamu val Amsal, Al Wasaya, AlKhuthubath in pre islamic period, Qussu bin Saida, Sahban wail

**Module 2. Islamic & Umayyath**

- Quran, Hadith, Compilation of Quran & Hadith, Speeches (Aboobakar, Aliyyubin Abu thalib, Hajjaj bin Yusuf Assaqafi, Umer bin Khathab) Nahjul Balagath

**Module 3.**

- Thafseer and authors (التفاسيرو المفسرون) , Sihahu sitha and other Hadith books (الحديث و المحدثون)
- Thabari, Ibnu Masudi, Ibnu Khalikan (History)
- Gazzali, Al Kindi, Ibnu Seena (Philosophy)

**Module 4.**

- Drama: Tawfiq AlHakeem, Gassan al kanafani
- Short Story: Musthafa Luthfi al manfaloothi, Mahmood Thaymoor, Yahya Haqi, Yusuf Idress, Abdul Khal
- Novel: Najeeb Mehfooz, Najeeb Keelaani, Saud al sanusi
- Essay & Biography: Thaha Hussain, Sayyid Quthub, Ahamd Ameen, Mahmood Abbas al Aqad
- Journalism: Arabic Newspapers and Magazines, Development of Arabic Journalism & Arab Channels

**Module 6. Contemporary Arab World (Political System, Capital City & Coin)**

- Kingdom of Saudi Arabia, Qatar, UAE, Egypt, Kuwaith, Iraq, Iran, Oman, Behrain, Libiya, Syria, Palestine, Jordan, Morocco, Sudan, Yaman, Algeria

**Module 7. Encyclopedic Works in Arabic**

- Major resources of Arabic language and literature
- Lexicons

**Unit III  
Grammar**

**Module 1. Arabic Grammar- All areas related in Arabic Grammar**

**Module 2. Rhetorics**

- Intoduction, Ilmul Ma'ni, Ilmul Badee'u, Ilmul Ravaan

**Module 3. Prosody**

- Fundamental and 16 meters

**Module 4. Linguistics**

- Development of Linguistics in Arabic and general awareness in Linguistics



### Unit IV Arabic Criticism

#### Module 1.

- Definition of Literature and Criticism,

#### Module 2.

- Development of criticism in Pre Islamic, Islamic and Umayyath Period, Nabigathu Dubyani

#### Module 3. Abbasid Period

- Ibnu Quthaiba, Qudamathu bin Jafar, Al Jahiz, Ibnu Sillamul Jumahi,

#### Module 4.

- Shauqi daif, Thaha Hussain, Sayyid Quthub, Anvarul Jundi

#### Module 5.

- Appollo Movement, Dewaan movement

#### Module 6.

- Mahjar Literature, Rabithathul Qalamiiyya, Usbathul Undulusiyya, Rabithathul Adabiyya, Jubran Khaleel Jubran, Mikhael Nuaima, Eliya Abu Madi, Naseeb Areeda, Mishaal Ma'loof

### Unit V Indo Arabic Literature

#### Module 1. Arabic Literature in India

- Development of Arabic literature in India, Arrival of Islam in India, Important works in Arabic
- Islamic Institutions Sha Valiyulla al-Dahlavi, Abul Hassan Ali Nadvi and Gulam Ali Azad Balgrami, Anwar Shah Kashmeeri

#### Module 2. Arabic Literature in Kerala

- Role of Makhdoom Family, Umar Qaazi, Abu Laila, Muhyudeen Aluvayil, N K Ahammed Moulavi

### Unit VI Translation

#### Module 1. Journal Arabic

- A passage from an Arabic newspaper followed by 5 questions to be answered.

#### Module 2. Modern Technology

- Match the following questions with Arabic Words related to modern information technology on one side and its translation on other side.

#### Module 3. Travel and Tourism

- Odd one out (2 questions)
- Select the correct translation (3 questions)

#### Module 4. Translation (English to Arabic)

- Select the most apt translation of the English phrases below: (English Phrases consisting of at least three words to be given)

#### Module 4. Translation (Arabic to English)

- Select the most apt translation of the Arabic phrases below: (Arabic Phrases consisting of at least three words to be given)

## 03. Botany

### Unit I Diversity of Life Forms I

#### Module 1. Bacteria

- Classification, Ultra structure of cell, flagella, pili, metabolism, growth, reproduction and genetic exchange - transformation, transduction and conjugation

#### Module 2. Viruses

- Classification, Structure, reproduction. Bacteriophages, lysogenic and lytic cycles. viroids, virions, prions, retroviruses.

#### Module 3. Phycology

- Classification of algae, General structure, reproduction and life cycle of different groups-Cyanophyceae, Chlorophyceae, Bacillariophyceae, Xanthophyceae, Phaeophyceae, Rhodophyceae. Economic importance of Algae

#### Module 4. Mycology

- Classification of fungi, General structure, reproduction and life cycle of different groups- Myxomycetes, Zygomycetes, Oomycetes, Ascomycetes, Basidiomycetes and Deuteromycetes. Economic importance

#### Module 5. Lichenology

- Classification, General structure and reproduction, Economic importance



### Module 6. Bryology

- Classification, General characters, reproduction and life cycle of different groups- Hepaticopsida, Anthocerotopsida and Bryopsida. Economic importance.

### Module 7. Pteridology

- Classification, General characters, reproduction and life cycle of different groups- Psilopsida, Lycopsida, Sphenopsida and Pteropsida, stelar evolution, telome concept Economic importance, Fossil Pteridophytes - Rhynia, Lepidodendron.

### Module 8. Gymnosperms

- Classification, General characters, reproduction and life cycle of different groups- Cycadales, Coniferales, Ginkgoales, Gnetales, Fossil Gymnosperms, Economic importance

## Unit II

### Diversity of Life Forms II

#### Module 1. Morphology

- Morphological variation in angiosperms with respect to stem, leaf, inflorescence, flower and fruit

#### Module 2. Taxonomy of Angiosperms

- Artificial (Linnaeus), Natural (Bentham & Hooker) and Phylogenetic (Bessey, Takhtajan), APG system of classification. Plant Nomenclature- Rules of ICBN, Author citation, Typification, Rule of Priority. Publication of names, Keys, autonym, homonym, basionym, and *nomen nudum*. Herbarium, Botanical survey of India, Botanical gardens and their roles in taxonomic studies. Modern trends in taxonomy - Anatomy, Embryology in relation to taxonomy, Chemotaxonomy, cytotaxonomy, numerical taxonomy, Molecular taxonomy. Origin and evolution of Angiosperms. Study the following families using morphological and floral features with economic importance- Annonaceae, Nymphyaceae, Polygalaceae, Brassicaceae, Portulacaceae, Dipterocarpaceae, Malvaceae, Fabaceae, Asteraceae, Rubiaceae,

Asclepiadaceae, Solanaceae, Verbenaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Urticaceae, Orchidaceae, Scitamineae, Arecaceae, Poaceae

#### Module 3. Economic Botany

- Study Binomial, family, morphology of useful parts and utility of,
- Cereals and millets (Rice and Maize), Pulses ( Soy bean, Cow pea, Green gram), Oil yielding plants ( Coconut, Ground nut, Oil palm), Sugar yielding plants (sugar cane, Sweet potato), Spices and condiments ( Turmeric, Cinnamomum, Pepper, Nutmeg and Ginger), Fibre ( Cotton, Jute), Dye yielding plants ( Indigo, Henna , Annatto), Tuber crops ( Tapioca, Potato), Gum and resins( Asafoetida, White dammar, Gum Arabic), Medicinal plants ( *Ocimum*, Neem, *Rauwolfia*), Timber yielding Plants ( Rose wood, Teak wood, Ailanthus), Narcotics (Opium, Cannabis), Vegetables ( Tomato, Brinjal, Cucumber), Rubber ( Para rubber)

#### Module 4. Ethnobotany

- Definition, History and scope of Ethnobotanical studies

#### Module 5. Histology

- Vascular cambium structure, origin and functions, Normal primary and secondary growth of stem and roots. Structure of wood- Heart, Sap wood, Hard and soft wood. Anomalous secondary growth in the stems of - *Boerhaavia*, *Bignonia* and *Dracaena*, Nodal anatomy and root stem transition, Floral anatomy

#### Module 6. Microtechnique and Histochemistry

- Killing, Fixing and staining of plant tissues- principles and purposes, Important fixatives and their properties, FAA, Carnoy's fluid and Flemmings fluid, Dehydrating agents. Microtome- rotary, sledge, cryotome and ultratome. Different types of stains, Tissue processing techniques for Scanning and transmission electron microscope, Types of micro slide preparations- Temporary, semi-



permanent, permanent- smears and squashes, Methods of embedding plant materials in Paraffin wax - TBA method, Double stained and serial section preparations, Histochemistry and Enzymology- Localization of carbohydrates ( PAS ) lipids ( Sudan Black) and proteins ( Coomassie Brilliant Blue) , Principle and protocol of Localization of peroxidase

### Module 7. Reproductive Biology

- Asexual reproduction-adventive embryony, nonrecurrent apomixis. Diplospory, apospory, parthenogenesis, androgenesis, apomixis ; Sexual reproduction - microsporogenesis, male gametophyte-pollen fertility, sterility; Megasporeogenesis, female gametophyte, types ; Pollination Biology-Primary and secondary attractants of pollination, ultra-structural and histochemical details of style and stigma, Pollen pistil interaction, Fertilization-barriers, incompatibility and methods to overcome it ( intra ovarian pollination and *in vitro* fertilization, embryo rescue technique; Embryo, endosperm and seed development, polyembryony and parthenocarpy, Recent advances in palynological studies, Pollen allergy, economic importance of pollen, Melissopalynology, role of apiaries in crop improvement

## Unit III

### Functional Plant Biology and Analysis Plant Physiology:

#### Module 1

- Water movements in plants and inorganic nutrition: Diffusion and facilitated diffusion-pressure driven bulk flow, Osmosis driven by water potential gradient, Role of aquaporins, cavitation and embolism, Soil-plant-atmosphere-continuum; physiology of stomatal function.
- Nutrient elements: Physiological roles. Nutrient uptake: diffusion, facilitated diffusion and apparent free space. Passive

and active transport. Transport proteins: carriers, Michaelis-Menten Kinetics. Channels: Voltage dependent K<sup>+</sup> channels, voltage gated channels, Calcium channels, Vacuolar malate channels. ATPase activity and electrogenic pumps. Patch clamp studies. Application of Nernst equation. Active transport and electrochemical potential gradients.

### Module 2. Metabolism

- Nitrogen metabolism: Nitrogen and biogeochemical cycle, nitrate and ammonia assimilation, biological nitrogen fixation, nitrogenase activity, pathways and enzymes - GS, GOGAT and GDH. Transport of amides and ureides.
- Photosynthesis : Light absorption, electron transfer in chloroplast membranes, ATP synthesis in chloroplast. Photosynthetic carbon reduction and photorespiratory cycles. C<sub>4</sub> and CAM metabolism. Starch and sucrose synthesis. Allocation and partitioning: Phloem loading and unloading. Concept of osmotically generated pressure flow. Importance of plasmodesmata in symplastic transport.
- Respiration: Glycolytic reactions, citric acid cycle, electron transfer system and ATP synthesis. unique electron transport enzymes of plant mitochondria: external NAD(P)H dehydrogenase, rotenone and cyanide insensitive respiration.

### Module 3. Growth, differentiation and development

- Analysis of plant growth: production of cells, growth velocity profile. Cytological and biochemical events. Differentiation: secondary cell wall formations, multinet growth hypothesis of cell wall. Development: initiation and regulation of development, genes involved in the control of development, role of protein kinases. Types of development: flowering-floral induction, evocation and morphogenesis. Floral organ identity genes. Biochemical signaling: Theories of flowering. Control of



flowering-phytochrome, cryptochrome and biological clock. Factors affecting flowering: Photoperiodism and thermoperiodism. Fruit development and ripening: physiology of ripening-cell wall architecture and softening, enzymes involved in biochemical changes.

- Seed development and germination physiology: deposition of reserves during seed development, desiccation of seeds: hormones involved, desiccation tolerance. Classification of seeds, seed dormancy. Seed germination and reserve mobilization-metabolism of carbohydrates, lipids, proteins and phytins; physiology of seed dormancy.
- Plant growth regulators: Auxins, Gibberellins, Cytokinin, Abscisic acid and Ethylene - biosynthesis, transport, physiological roles, mode of action, commercial uses.

#### **Module 4. Photoreceptors**

- Phytochromes - photochemical and biochemical properties, localisation in cells and tissues, phytochrome induced whole plant responses, Ecological functions. Mechanisms of phytochrome regulated differentiation. Signal transduction pathways, role in gene expression. Cryptochromes: blue light hormones photophysiology, effect on stem elongation, gene expression, stomatal opening, proton pumps, phototropism, role of carotenoids.
- Signal transduction. Classes of signals; receptors, signal perception, signal amplification and transduction reactions, role of  $Ca^{++}$  as second messengers, role of Calmodulin .

#### **Module 5. Stress physiology and senescence:**

- Water deficit and drought resistance, heat stress and heat shock, chilling and frost, salinity stress, high light stress and heavy-metal pollution stress. Genes associated with senescence, metabolism during senescence.

#### **Module 6. Chemical bonds**

- Concept of hybridization, bonding in organic molecules, effect of bonding on reactivity, polarity of bonds-bond length-bond angle-

hydrogen bond, dissociation and association constant.

- pH and buffers – Henderson-Hasselbalch equation, pH, pKa, Kw, proton hopping, buffers in living system, common buffers.

#### **Module 7. Carbohydrate**

- Specific categories and their properties, metabolism of starch, cellulose and glycogen. Glycolysis, TCA cycle, terminal oxidation, gluconeogenesis, glyoxylate pathway, PPP pathway, glycoproteins and proteoglycans, biosynthesis of peptidoglycan, metabolic mill.

#### **Module 8. Amino acids and proteins**

- amino acids - classification, properties, optical activity, unusual amino acids, ninhydrin reaction; basics of biosynthesis and breakdown of amino acids, classification and conformation of proteins, Ramachandran plot, Brief account on the biosynthesis of protein.

#### **Module 9. Lipids**

- classification, brief account on compound and derived lipids with examples, classification of fatty acids, biosynthesis of fatty acids (microbes, plants and animals), alpha, beta and omega oxidation of fatty acids, omega fatty acid and functional food, trans-fatty acids and their dangers.

#### **Module 10. Nucleic acid**

- : Biosynthesis and break down of purines and pyrimidines. Enzymes for synthesis and degradation; Vitamins: classification, structure, function and source of vitamins, vitamins as coenzymes

#### **Module 11. Enzymology**

- structure, function and classification of enzymes, coenzymes, substrate specificity, regulation of enzyme activity, active sites, inhibitors, allosteric enzymes, kinetics, negative and positive co-operativity, multienzyme, isoenzymes, ribozyme, abzyme



### Module 12. Energy metabolisms

- concept of free energy, entropy, enthalpy, chemical equilibria, principles of thermodynamics, thermodynamics of phosphate compounds, thermodynamics of life; thermodynamics, kinetics and mechanisms of membrane transport, energy rich bonds, redox reactions.
- Principles and application of tracer techniques in biology, Radio isotopes, radiation dosimetry, radioactive decay, Cerenkov radiation, radiations and their applications in biology.

### Module 13

- Principles and applications of light and electron microscopy, phase contrast, fluorescence, scanning and transmission electron microscopy, cytophotometry, flow cytometry, micrometry, camera lucida, photomicrography.
- Instrumentation, principles and functioning of: colorimetry and spectrophotometry, atomic absorption spectroscopy, plasma emission spectroscopy, ORD/CD, centrifugation, ultracentrifugation, electrophoresis, isoelectric focusing, autoradiography, chromatography (TLC, gel filtration, ion exchange, affinity, GC, GC-MS, HPLC, FPLC), NMR, X-ray crystallography, MRI, tools in nanotechnology (Atomic Force Microscopy, Scanning Tunneling Microscope, Scanning Probe Microscope), Fluorescent Microscopy, Flow cytometry, Liquid scintillation.

### Module 14

- Measures of central tendencies- mean, median and mode. Skewness and curtosis. Measures of variations- range, quartile deviation, mean deviation- variance and standard deviation. Standard error and Coefficient of variation; Probability: addition theorem and multiplication theorem, conditional probability; Theoretical distributions: binomial, poisson and Normal;

Tests of significance- z, t and  $\chi^2$  tests; F-distribution and Analysis of variance; Correlation and regression analysis; Factor analysis.

## Unit IV Molecular Cell Biology and Heredity

### Module 1. Cell

- Structural organization of cell membrane: chemical composition, structure and function of membrane proteins, lipids and carbohydrates, functions of cell membrane. Structure and functions of cell organelles and sub-cellular particles, Endosymbiont hypothesis, Structure, assembly and disassembly of filaments involved - actin filaments, microtubules and intermediate filaments. Molecular motors- kinesins, dyneins and myosins.

### Module 2. Organization of genetic material in eukaryotes

- Phases of cell cycle, cell cycle control mechanisms - extracellular and intracellular signals, cell cycle check points - DNA damage check points, centrosome duplication check points, spindle assembly check points, Cell Division -details of mitosis and meiosis, significance. Apoptosis - mechanism and regulation

### Module 3. Cell Cycle

- Structure of chromatin and chromosomes, histones and non-histone proteins, nucleosome structure, chromatin packaging, structure of metaphase chromosome, molecular structure of centromere and telomere, Chromosomal aberrations: Structural and numerical aberrations, Phenotypic effects of chromosomal aberrations, Special types of chromosomes: lamp brush and polytene chromosomes

### Module 4. Cell communication and signaling

- General principles of cell communication, signaling molecules and their receptors, cell surface receptors - ion channel linked



receptors, G-protein coupled receptors and Tyrosine Kinase Linked receptors, steroid hormone receptors, Signal transduction pathways, second messengers, regulation of signaling pathways

**Module 5. Genetic material: structure, replication and repair**

- Experiments which proved that DNA is the genetic material, Chargaff's rule, experiment which proved that DNA replication is semi conservative, Structure of the nitrogen bases, structure of nucleotides, Watson and Crick model of DNA: salient features, alternative forms of DNA, Transposons - types, transposition mechanism; DNA replication (in both prokaryotes and eukaryotes): process, proteins and enzymes involved, end replication problem and the role of telomerases; DNA repair: DNA proof reading, mismatch repair, nucleotide excision repair, base excision repair, direct repair, SOS response and error prone repair

**Module 6. Gene expression**

- Central dogma of molecular biology, concept of gene, one gene one enzyme hypothesis; Transcription in Prokaryotes: Promoters, RNA polymerase - structure and function, initiation complex, rho dependent and independent termination mechanisms; Transcription in eukaryotes: Promoters, enhancers, and silencers, different types of RNA polymerase and their function, transcription factors - structure and function, elongation factors, termination mechanism; Post transcriptional modification of RNA: Structure, formation and function of 5' cap and 3' tail, RNA splicing - types of introns, mechanisms of exon splicing, alternative splicing, exon shuffling, RNA editing; Translation: salient features of mRNA, tRNA and ribosomes (prokaryotic and eukaryotic), SD sequence and Kozak sequence, tRNA charging, process of translation (prokaryotic and eukaryotic), mRNA surveillance;

Genetic code: deciphering the genetic code, salient features of the genetic code, exceptions to the Universal code; Protein sorting and trafficking

**Module 7. Gene regulation**

- Gene regulation: objectives, different levels; Viral gene regulation: gene regulation in lysogenic repression and lytic cascade; Prokaryotic gene regulation: operon - general structure and types, structure and functioning of *lac* operon and *trp* operon, attenuation and antitermination; Eukaryotic gene regulation: Changes in chromatin and DNA structure, chromatin remodeling, heterochromatization and DNA methylation, RNA silencing, Epigenetics

**Module 8. Principles of inheritance**

- Mendel's experiments and laws of inheritance, monohybrid and dihybrid crosses - phenotypic and genotypic ratios, back cross and test cross, Mendelian traits in man, Extensions of Mendelism, co-dominance, incomplete dominance, epistasis, complementary interaction of genes, multiple alleles and their inheritance, penetrance and expressivity, cytoplasmic inheritance

**Module 9. Linkage and recombination**

- Linkage groups, double cross over and interference, two point and three point test crosses, construction of linkage map

**Module 10. Population Genetics**

- Gene pool, phenotype and genotype frequency, factors affecting gene frequency, Hardy-Weinberg equilibrium

**Module 11. Immunology**

- Innate and acquired immunity; Humoral and cellular immunity; antigens, epitopes, antigen processing and presentation; activation and differentiation of B cells, role; T cells, types, role; T cell receptors; MHC; monoclonal and polyclonal antibodies, vaccines



## Unit V

### Ecology and Environment

#### Module 1. Basic Principles of Ecology

- Basic ecological concepts and approaches – levels of organization – environment, habitat; basic ecological process – biogeochemical cycles, trophic levels, energy flow, ecological pyramids; ecological succession

#### Module 2. Ecological objects

- Population, community and ecosystems; Population characteristics – distribution, mortality, natality, carrying capacity, population structure and dynamics; genecology, ecads and ecotypes; Community characteristics – classification of plant communities – Clementsian concepts of climax, Raunkiaer's system, Vegetation concept of Gleason, Phytosociological methods; Ecosystem characteristics – food chain, food web, ecological niche, biodiversity – genetic, species and ecosystem diversity, alpha, beta and gamma diversity; major ecosystems of the world and their characteristics; Biomes and Biosphere characteristics – ecosystem degradation – deforestation and desertification

#### Module 3. Environmental Pollution

- Concept of pollution, Environmental quality parameters and standards, different categories of pollution – air, soil and water; air water and soil quality parameters; pollutants – primary and secondary pollutants – heavy metal pollution – biocide residues – biomagnification; prevention and control of pollution and pollution abatement – primary, secondary and tertiary water treatment

#### Module 4

- Global environmental issues – ozone depletion, acid rains, global warming and climate change – greenhouse gases and emission control – global conventions on carbon dioxide emissions; radiation fallout, noise pollution – occupational hazards

#### Module 5. Basic principles of conservation and preservation

- Conservation strategies – *in situ* and *ex situ* conservation – botanical gardens – wildlife sanctuaries, national parks and biosphere reserves – International conventions on biodiversity – role of IUCN and the criteria of species conservation, categories of species under conservation – threatened and endangered species – red data book – CITES

#### Module 6. Natural resources

- Conservation of natural resources – conservation agriculture – mixed farming, natural farming, ecofarming, organic farming, natural measures of pest control, biofertilizers, energy conservation – nonconventional energy resources – biomass energy – biogas – biofuels – biodiesel

#### Module 7. Phytogeography

- Basic concepts and significance – static and dynamic phytogeography geological history of plant distributions – theories of plant distributions – continental drift and glaciations – paleotropic and neotropic vegetation – different kinds of plant distributions – circumaustral – circumpolar – pantropic – cosmopolitan – floristic provinces and vegetational belts – soil, climate and vegetation of India

#### Module 8. Evolution

- Origin of the universe – big-bang theory – origin of life and origin of species – Oparin's theory – theories of evolution of life – *elan vitae* – comparative accounts of evolutionary concepts of Lamarck and Darwin – role of mutation in evolution – forces and mechanisms of evolution of life – speciation – isolation mechanisms – co-evolution of species into communities – molecular evolution



## Unit VI Applied Botany

### Module 1. Biotechnology

- Tissue culture techniques; Explants, culture media, differentiations, micropropagation, meristem culture, callus culture, shoot tip, nodal culture, organogenesis, cell suspension culture, cell line selection, hairy root culture; Somaclonal variation; Somatic embryogenesis- artificial seeds, protoplast culture, somatic hybridization; Haploid production- anther and ovule culture, dihaploids & polyploids, applications; Cryopreservation, Bioreactor technology, cell immobilization, Genomic and organelle DNA isolation, vector mediated and vectorless methods of gene transfer, PCR, restriction digestion, ligation, DNA sequencing, Genomic and cDNA libraries; Analysis and expression of cloned genes
- DNA markers, RFLP, RAPD, ISSR, SSR, SNPs, AFLP, LCR, Genetic engineering; Transgenic biology, allopheny, transformation techniques, gene targeting, RNAi technology
- Microbial biotechnology; Major products of industrial microbiology, compounds use in medicine, health- antibiotics, amino acids, organic acids, vitamins, sex hormones, Biopolymers, biosurfactants, biopesticides; Bioconversion processes- biotransformation, biodegradation and bioleaching; GMO- Bt plants, Herbicidal resistance, viral coat protein, satellite RNA, Flavr savr tomato, golden rice, Biofortification; Social ethical issues IPR, patents, biopiracy and bioregulations

### Module 2. Bioinformatics

- Biological databases ; EMBL, GEN BANK, DDBJ, Protein sequence data bases- PIR, SWISS-PROT, Secondary data bases (PROSITE); Protein structure databases (PDB), Data base mining, data bases similarity searches- comparing nucleotide and amino acid sequence – BLAST, FASTA, Sequence analysis- global alignment, local

alignment, pairwise analysis, scoring matrices, multiple sequence analysis , phylogenetic analysis, structure analysis tool – RASMOL, Molecular phylogenetic programmes- CLUSTAL, Pharmacogenomics; Application of Bioinformatics Transcriptomics, metabolomics, Pharmacogenomics, Genomics, types, structural and functional, genome annotation, gene finding, single nucleotide polymorphism.

### Module 3. Horticulture

- Plant growing structures-Green house, mist chambers, glass house; Plant propagation- seed, vegetative- natural and artificial; Artificial methods of vegetative propagation- cutting, layering, grafting, budding, Cultural practices – thinning, training, trimming and pruning; Commercial horticultural- nurseries, orchards, floriculture, indoor plants, arboriculture- pruning, bracing, transplanting; Bonsai: Principles and procedure

### Module 4. Plant Breeding

- Plant introduction, Vavilos centres of origin, genetic erosion, gene bank, NBPGR, selection (Mass and pureline and clonal) hybridization - interspecific and intergeneric
- Incompatibility and crop improvement, Backcross breeding, Inbreeding consequences, idiootype breeding Polyploidy breeding; auto and allopolyploid, chromosome addition and substitution, achievements, Mutation breeding; Objectives, procedures, chemical and physical mutations and achievements; Resistance breeding; Principles, methodology- structural, biochemical, physiological and genetic, vertical and horizontal resistance; Seed certification- Plant breeder's right act, National Biodiversity policy

### Module 5. Plant Diseases and Management

- Host parasite interactions, Etiology of the following diseases- False smut of Paddy, Powdery mildew of Rubber, Coffee rust, Red rust of tea, Leaf spot of Mango, Yellow vein



mosaic of ladies finger, quick wilt of pepper, Defense mechanism- systemic acquired resistance and induced systemic resistance, Quarantine., Plant disease controls-chemical, physical and biocontrol agents

## 04. Chemistry

### Unit I Inorganic Chemistry

#### Module 1. Periodicity and Chemistry of Main Group Elements

- Periodic properties of elements and periodic trends in physical and chemical properties. Anomalies in periodic properties of the nonmetals and post transition metals. Concepts of resonance and hybridization. VSEPR model. General discussion on main group elements. Noble gas compounds. Classification, Preparation, Properties, Application and Structure of borides, carbides, nitrides, silicates, silicones and fullerenes. Inter halogen and pseudo-halogen compounds. Boron hydrides and carboranes- Styx numbers and Wade's rule. Borazines, P-N compounds, S-N compounds and molecular sulfides of phosphorus.

#### Module 2. Chemistry of transition and inner transition elements

- Transition Elements - Electronic configuration, oxidation state and general characteristics. First, second and third rows of transition elements and their important compounds. Isopoly and heteropoly acids of Mo and W. Lanthanides and Actinides - Occurrence, electronic configuration, oxidation state, atomic and ionic radii, ions. Difference between 4f and 5f orbitals. Separation of Lanthanides and Actinides Lanthanide and Actinide contractions and their consequences. Use of Lanthanide complexes. NMR shift reagents. Magnetic and spectral properties. Applications of Lanthanides, Actinides and their

compounds. Trans actinide elements. Super heavy elements.

#### Module 3. Co-ordination chemistry

- Nomenclature of coordination compounds. Isomerism and stability. HSAB Principle. VB theory, Spectrochemical series and crystal field theory. Splitting of levels in Cubic, Td, Oh, TBP, square pyramidal and Tetragonal ligand fields, MO theory (Tetrahedral and Octahedral complexes with sigma and pi bonding). Reaction mechanism - Dissociative, Associative and Conjugate Base mechanisms. Electron transfer reactions- Inner sphere and outer sphere mechanisms. *Trans* -effect. Jahn- Teller effect and its consequences. Electronic spectra of transition metal complexes, selection rules, Term symbols, Orgel diagram, Racah parameters. Nephelauxetic effect. Charge- transfer spectra. Magnetic properties of transition metal complexes, Spin- only formula, quenching of orbital magnetic moment, Spin orbit coupling. Measurement of magnetic moment. Paramagnetism, diamagnetism, ferromagnetism, ferrimagnetism and antiferromagnetism.

#### Module 4. Organometallic chemistry

- Types of organometallic compounds, 18 electron rule and Hapticity. Metal carbonyls General properties, nature of bonding ,structure and shapes of metal carbonyls of V, Cr, Mn, Fe, Ru, Co, Rh, Ni, metal alkane and alkene complexes, metal sandwich compounds - ferrocene, dibenzene chromium. Fluxional organometallics. Metal carbenes. Metal clusters as catalysts. Applications of organometallic compounds Hydrogenation, hydroformylation, Wacker's process, Ziegler- Natta catalysis, Monsanto acetic acid process.

#### Module 5. Bioinorganic chemistry

- Metals and non- metals in biological systems. Metal ion excess and deficiency. Role of alkali- and alkaline earth metal ions in biological systems. Na/K pump. Ca pump. Role of Iron, Copper, Zinc, Manganese,



Cobalt and Molybdenum in biological systems. Iron storage and transport. Haemoglobin, Myoglobin, Hemoerythrin and Haemocyanines- structure and functions. Iron-sulfur proteins, Rubredoxin and Ferredoxins. Cytochromes, SOD's. Photosynthesis, PSI and PSII. Vitamin B12 structure and functions, Nitrogen fixation. Metal ions in medicine and therapy.

## Unit II Organic Chemistry

### Module 1. Electron displacement effects and Aromaticity

- Electron displacements - Inductive, Electromeric, Mesomeric and Hyper conjugative effects.
- Resonance. Reactive intermediates, formation and stability of carbocation, carbanion, carbenes, nitrene, benzyne and free radicals . Type of organic reactions - Substitution, Addition, Elimination and Rearrangement reactions. Free radical reactions. Huckel's rule. Homo, hetero and non benzenoid aromatic systems. Aromaticity of annulenes. Cyclic carbocations and carbanions. Antiaromaticity.

### Module 2. Reagents and Name Reactions

- Synthetic reagents: Synthetic applications of the following reagents. Grignard reagents, Alkyl lithiums, Gillmann reagent, NBS, Diazomethane, DCC, SeO<sub>2</sub>, MCPBA, DDQ, LDA, DiBAL, OsO<sub>4</sub>, NaBH<sub>4</sub>/LiBH<sub>4</sub> and NaBH<sub>4</sub>/ AlCl<sub>3</sub> only) Mannich, Reimer-Tiemann, Reformatsky, Ullmann, Stork enamine, Diels-Alder, Grignard and MPV reactions. Aldol, Cannizzaro, Perkin, Dieckmann, Thorpe and acyloin condensations. Birch, Wolff-Kishner and Clemmensen reductions. Hydroboration and Oppenauer oxidation. Rearrangements - 1,2, shifts 1,3, shifts, Pinacol-Pinacolone, Claisen, Cope, Wagner- Meerwin, Fries, Beckmann and Curtius, Hoffmann and Schmidt rearrangements.

### Module 3. Stereochemistry

- Molecular chirality-enantiomers, diastereomers, stereochemical nomenclature, optical activity. Racemisation, Resolution, Conformational analysis of cycloalkanes, Conformational analysis of disubstituted cyclohexane derivatives, stereoselective and stereospecific reactions. Assigning-configuration and conformation - R,S and E,Z nomenclature. Stereochemistry of chiral compounds, dissymmetry, asymmetry, simple and alternating axis of symmetry. Asymmetric synthesis.

### Module 4. Photochemistry and Pericyclic Reactions

- Laws of photochemistry, Radiative and non radiative transitions. Fluorescence and quenching. Photosensitisation, Photo-isomerisation and Photosubstitution reactions. Chemiluminescence. Fluorescence and Phosphorescence. IC and ISC. Cis-trans isomerization, Paterno-Buchi reaction, Norrish Type I and II reactions, di-pi methane rearrangement, photochemistry of arenes. Selection rules and stereochemistry of electrocyclic reactions, cycloaddition and sigmatropic shifts. Cope and Claisen rearrangements.

### Module 5. Natural Products and Biomolecules

- Terpenoids - classification, structure of alpha pinene and Camphor Alkaloids- classification - structure of papavarine and quinine, structure and synthesis of flavones and isoflavons, Lipids - classification and structure. Stereochemistry of steroids- cholesterol. Structure and synthesis of Vitamin A, C, B, K and biotin. Starch, Cellulose, Glycogen. Proteins - Structure, sequence determination in peptides and proteins. Edman degradation. Chemistry of nucleic acid, structure of RNA and DNA.

## Unit III Physical Chemistry

### Module 1. Solid, Liquid and Gaseous States

- Crystal systems and lattice types, crystal symmetry. Miller indices-BCC, FCC, HCP,



voids coordination numbers. Molecular, covalent, metallic and hydrogen bonded crystals. Principles of XRD techniques. Determination of lattice type and unit cell dimension of cubic crystals. Electronic structure of solids. Band theory, Electric, Magnetic and Dielectric properties of solids.

- Crystal defects: point, line and plane defects. Crystal structure- Rock salt, Zinc blende, KCl, CsCl, Diamond and Fluorite. Ionic conductors, Diffusion, Super ionic conductors, Phase transitions, Super conductivity. High  $T_c$  materials. Magnetic properties of solids. Liquid state - properties, Lennard - Jones theory of melting, Specific heat of liquids. Liquid crystals - types - theories - applications. The distribution of Molecular velocities. Maxwells equation. Average, RMS and Most probable velocities. Influence of temperature on molecular velocities. Mean free path, Effusion. Transport properties: Viscosity, Thermal conductivity and diffusion. Influence of temperature and pressure on transport properties.

### Module 2. Thermodynamics

- Laws of Thermodynamics. Thermodynamic properties -Internal energy, Enthalpy, Entropy, Free energy- their relation and significances. Maxwell relation. Joule-thomson effect. Joule Thomson coefficient. Properties of solutions - Raoult's law, Colligative properties. Thermodynamics of ideal solution. Partial molar quantities. Chemical potentials. Duhem-Margules equation. Excess thermodynamic properties. Fugacity and activity. Chemical Equilibrium - Le Chatelier principle, Homogeneous and Heterogeneous systems. Spontaneity of reactions. Free energy functions.
- Phase Equilibria. Derivation of phase rule. Two component and three component systems. Isothermal evaporation. Irreversible thermodynamics. General theory of non equilibrium processes. Entropy production from heat flow. The phenomenological relations. Onsagar reciprocal relations.

Microstates and ensembles, Maxwell - Boltzmann distribution. Quantum Statistics: Bose- Einstein statistics, Fermi - Dirac statistics. Fermi energy, Fermi condensation. Relations between Maxwell - Boltzmann, Bose - Einstein and Fermi-Dirac statistics. The partition functions - translational, vibrational, rotational and electronic. Partition functions and thermodynamics properties. Heat capacity of solids: Dulong-Petits law, Einstein's theory and its modification. Debye's theory.

### Module 3. Chemical Kinetics

- Rate laws. Order and molecularity. Determination of order of reactions. Types of reactions - simple & complex, Branching reactions - steady state treatment. Unimolecular reactions Lindemann treatment . Reaction like  $H_2 - Cl_2$ ,  $H_2 - Br_2$  and decomposition of ethane, acetaldehyde Influence of temperature on reaction rate-energy of activation. Theories of reaction rates. Collision theory and absolute reaction rate theory. Free energy of activation and volume of activation. Thermodynamic formulation of reaction rate. Reactions in solution: Comparison between reaction in gas phase and in solutions. Factors determining reaction rates in solution- primary and secondary kinetic salt effects. Influence of solvent on reaction rate. Hammett equation. Kinetics of fast reactions. Flash photolysis, flow techniques and relaxation methods.

### Module 4. Electrochemistry

- Ions in solution, ionic equilibrium and Electrolysis. Deviation from ideal behaviour, ionic activity ion - solvent interaction. Born equation. Ion - Ion interaction. Activity coefficient and its determination. Debye Huckel limiting law. Debye - Huckel treatment. Onsager equation. Conductance of high frequencies and high potentials. Types of electrodes. Electrochemical cells. Electrochemical series. Electrolytes. Concentration cell and activity coefficient



determination. Liquid junction potential. Evaluation of thermodynamic properties. Electrokinetic phenomena. Electrolysis, current potential curves. Dissolution, deposition and decomposition potentials. Different types of overpotentials. Hydrogen and Oxygen overvoltage. Theories of overvoltage. Corrosion. Anodic and cathodic protection. Galvanization. Tafel plots. Prevention of corrosion. Theories of Fuel cells.  $H_2$ - $O_2$  fuel cells. Fuel cells for high temperature applications.

#### Module 5. Surface Chemistry, Colloids and Catalysis

- Types of surfaces. Examination of surfaces using ESCA, Auger, SEM and STM.. Thermodynamics of surfaces. Surface tension. Surfactants and miscelles. Surface film. Surface pressure and Surface potential. Adsorption from solutions. Freundlich, Langmuir and BET adsorption isotherms. Physisorption and Chemisorption. Measurement of surface area.
- The colloidal state: Types of colloids. Stability and zeta potential. Properties of colloids. Kinetic, Optical and Electrokinetic. Electrophoresis, Electroosmosis. Donnan membrane equilibrium and its applicaitons. Catalysis: Homogeneous and Heterogenous catalysis. Acid - base catalysis. Langmuir Heinshelwood mechanism. Specific and general catalysis. Acidity function. Theories of catalysis. Langmuir-Hinshelwood and Mars Van Krevelin bonding of reactants to catalyst surfaces. Catalytic oxidation. Industrial applications. Enzyme Catalysis.

### Unit IV

#### Theoretical Chemistry

##### Module 1. Quantum Mechanics

- Black body radiation, photoelectric effect, Compton effect and atomic spectra. de Broglie hypothesis, Heisenberg uncertainty principle. Postulates of quantum mechanics.

Operators, wave function, Eigenfunction and eigenvalue. Orthogonality, normalization, probability and expectation value. Time dependent Schrodinger equation. Time independent Schrodinger equation for stationary states. Schrodinger wave equation for a free particle, particle in a one - dimensional box. Particle in a Three - dimensional box - Symmetry and degeneracy. Application of quantum mechanics to simple systems. Simple harmonic oscillator. Rigid rotor. Hydrogen - like atoms, Schrodinger wave equation in spherical polar coordinate. Separation of variables. Atomic orbitals, space quantisation, Perturbation theory and variation principle. Time dependant perturbation theory. Self consistent field method. Term symbols, Slater's rule. Slater orbitals. Hartee-Fock self consistent field method for atoms.

##### Module 2. Chemical Bonding

- Born- Oppenheimer approximation. MO theory of hydrogen molecule ion. MO treatment of homonuclear diatomic molecules-  $Li_2$ ,  $Be_2$ ,  $C_2$ ,  $N_2$ ,  $F_2$  and heteronuclear diatomic molecules like LiH, CO, NO, HF. Correlation diagrams. Non crossing rules. Spectroscopic Term symbols for diatomic molecules. VB theory of  $H_2$ . Resonance. Hybridization - Methane, Water, Ethylene and Acetylene. Types and shapes of polyatomic molecules, VSEPR theory. Semi empirical MO treatment of planar conjugated molecules. Huckel Molecular Orbital method for ethylene, butadiene and allyl systems. Charge distributions and bond orders from the coefficients of HMO, calculation of free valence, HMO theory of aromatic hydrocarbons; Frost-Huckel circle mnemonic device for cyclic polyenes. Intermolecular forces- ion-dipole, dipole-dipole, ion-induced dipole, dipole-induced dipole and dispersion interactions. Lennard - Jones potential.



### Module 3. Molecular Symmetry and Group Theory

- Symmetry elements and symmetry operations. Multiplication of operations. Conditions for a set of elements to form a group. Inversion and Improper rotation operation. Point groups and their determination. Abelian and Cyclic groups. Group multiplication table. Sub groups and classes in a group. Similarity transformation and classification of symmetry operations. Reducible and Irreducible representations. Molecular symmetry and Optical activity. Great Orthogonality theorem and rules derived from it. Setting up of character tables of simple groups such as  $C_{2v}$  and  $C_{3v}$ . The four areas of the character table. Direct product representations. Application of group theory to chemical bonding and molecular vibrations.

### Module 4. Molecular Spectroscopy

- Energy levels in molecules principle and selection rules. Born-Oppenheimer approximation. Microwave spectroscopy. Intensity of spectral lines. Calculation of internuclear distance. Rotational spectrum of polyatomic molecules. Vibrational spectroscopy-Harmonic and anharmonic diatomic molecules. Morse function Determination of force constant. Different branches of spectrum. Vibrational spectra of polyatomic molecules, classification of vibrations. Overtones, combination and Fermi resonance. Finger print and group frequencies. Raman Spectra. Polarisability and classical theory of Raman spectrum. Mutual exclusion principle - complementarity of Raman and IR spectra. Electronic Spectra Frank- Condon principle. Types of electronic transitions. Fortrat diagram. Predissociation.. Effect of conjugation on electronic absorption frequencies. Resonance spectroscopy. NMR spectrum. Nuclear spin. Proton NMR chemical shift Relaxation methods. Spin – Spin coupling. ESR spectrum. The 'g' factor.

Fine structure and hyperfine structure. Mossbauer spectroscopy.

### Module 5. Applications of Spectroscopic Techniques in Chemistry

- U.V.Electronic transition in enes, enones and arenes. Woodward-Fieser rules. Group frequencies. Identification of functional groups with IR. Mass spectrometry, NMR spectroscopy,  $^1\text{H}$  NMR and  $^{13}\text{C}$  NMR - chemical shifts, spin-spin-interactions, spectral interpretations. Applications of IR, NMR, ESR and Mossbauer spectroscopy in coordination chemistry.

## Unit V

### Analytical Chemistry

#### Module 1. Basic principles in Analytical Chemistry

- Evaluation of analytical data. Accuracy and precision, standard deviation, variance-confidence limit -Student 't' test, 'F' test. Errors - classification, distribution, propagation, causes and minimisation. Significant figures and computation rules. Titrimetric methods- general principles - Theory and applications of acid-base, redox and complexometric titrations. Theory of Indicators. Gravimetric methods of analysis. Formation of precipitates. Co-precipitation, Post precipitation and peptization. Homogeneous precipitation. Washing, drying and ignition of precipitates.

#### Module 2. Separation techniques

- Liquid-Liquid extraction, distribution laws. Successive extraction, Craig method. Chromatographic methods, Theory, classification- Column, TLC, PC, HPLC and GC. Detectors. Ion-exchange chromatography. Size exclusion- and Gel permeation chromatography. Affinity- and chiral columns. Normal- and Ultracentrifugation. Electrophoresis.

#### Module 3. Optical methods of Analysis

- Fundamental laws of Spectrophotometry, Nephelometry, Turbidimetry, Fluorimetry,



Phosphorimetry and AAS. Spectrophotometric titrations. Atomic Emission spectrometry. Excitation sources (flame, AC, DC, arc, spark, ICP, glow discharge and Laser microprobes). Atomisation techniques in AAS, Hollow cathode lamp. interferences back ground corrections. Atomic fluorescence spectrometry. Photoelectron spectroscopy. Analytical applications.

#### Module 4. Electroanalytical methods

- Basic theory. Conductometric- and Potentiometric titrations. Measurement of pH. Instrumentation and applications of Electrogravimetry, Coulometry, Polarography, Amperometry, Biamperometry, Cyclic Voltammetry, Chronopotentiometry and Stripping analysis.

#### Module 5. Thermal- and Radiochemical methods

- Theory and applications of Thermogravimetric analysis (TG), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC). Thermometric titrations. Radiometric methods, Measurement of radioactivity. Neutron Activation Analysis, Isotopic dilution techniques, Liquid scintillators. Radiometric titrations.

### Unit VI

#### Selected Topics in Chemistry

##### Module 1. Green Chemistry

- Principles of Green Chemistry, Tools of Green Chemistry. Green reagents and -solvents, Green reactions. Aldol condensation, Cannizzaro reaction, Grignard reactions, Green preparations, Phase transfer catalysts. Microwave organic synthesis. Applications of green chemistry. Biocatalysis.

##### Module 2. Material Chemistry

- Nanomaterials and Nanocomposites. Structure and synthesis. Properties of

nanomaterials.- magnetic, optical, electrical and mechanical properties. Applications of nanomaterial in telecommunication, digital technology, biomedical, biomimetics and drug delivery. Quantum dots. Ceramic and composite materials. Traditional ceramics, structure, types of bonds, phase equilibria in ceramic systems. Classification of composites, fibres and matrices. Ceramic matrix composite materials. Sol-gel process and vapour deposition techniques. Applications of composites.

##### Module 3. Environmental Chemistry

- Composition of atmosphere. Chemical processes in atmosphere. Photochemical smog. Ozone layer. Green House effect. Acid rain. Chemistry of processes in hydrosphere. Acid-base properties. Alkalinity. BOD and COD. Chemistry of processes in lithosphere. Redox status in soil. Acidity in soil. Ion speciation in soil pollution. Cation exchange capacity and exchange phase compositions. Air, water and soil pollution.

##### Module 4. Polymers

- Natural and synthetic polymers. Isoprene rule. Types of polymerisation. Change in physical and chemical properties. Molecular weight distribution. Polydispersity Index, Crystallinity and Glass transition temperature. Synthetic polymers- Polyethylene, Polypropylene, PVC, Teflon, Bakelite, Nylon 6 and Nylon 66. High temperature polymers. Degradation of polymers.

##### Module 5. Medicinal Chemistry

- Drug discovery and design. Classification of Drugs. Physicochemical factors and biological activities. Receptors and drug action. LD<sub>50</sub> and IC<sub>50</sub> values. Synthesis of Paracetamol, Phenobarbital, Diazepam, Sulphamethoxazole, Benzyl penicillin, Chloramphenicol.



## 05. Commerce

### Unit I Management concepts and strategies

#### Module 1. Basic concepts of management

- development of management taught- scientific management- functional management- Traditional Vs Modern management

#### Module 2.

- Planning, organizing, staffing, directing, communicating, motivating and controlling-

#### Module 3. OB

- basic concepts and theories-understanding individual and group behavior-OD.

#### Module 4. Strategic management

- basic concepts – approaches to strategic decision making – models of strategic management.

#### Module 5. Strategic planning

- strategic implementation and strategic control system. Michael Porter's competitive strategies.

### Unit II Business Environment, Policy and MIS

#### Module 1.

- Macro and micro environment of business- economic, political, technological, social, cultural and trade environment.

#### Module 2.

- Structure of Indian economy-economic systems- growth pattern of Indian economy- GDP, Per capita Income -economic planning. Problems of Indian economy –poverty, unemployment, regional imbalances- Globalization of Indian economy.

#### Module 3.

- Government and Business- WTO- World bank- FDI –Forms of trade co operations-

Free trade area, customs union, Common market and economic union.

#### Module 4.

- Investment policy, Exim policy- liberalization and privatization policy- disinvestment policy-PPP policy.

#### Module 5.

- MIS basic concepts, system concepts- data processing concept, data base management- System development and implementation.

### Unit III Financial and Corporate Accounting

#### Module 1.

- Accounting concepts, conventions, and standards. Trial balance, trading and profit and loss account and balance sheet.

#### Module 2.

- Accounting from in complete records and accounting of non trading firms.

#### Module 3.

- Company accounts-issue of shares and debentures- valuation good will and shares.

#### Module 4.

- Company Amalgamation, absorption and reconstruction.

#### Module 5.

- Accounting standards and reporting.

### Unit IV Quantitative Techniques & Research methods

#### Module 1.

- Business research need and importance- types of research- steps in research- research designs.

#### Module 2.

- Problem formulation-setting objectives, hypothesis formulation- scaling techniques- data collection- primary and secondary data, sampling design and sample size decision.



**Module 3.**

- Data analysis and interpretation- tools, Probability and theoretical distribution- statistical estimation and testing- parametric and non parametric tests.

**Module 4.**

- Basic concepts of OR and its uses in business decision making.

**Module 5.**

- Linear programming, transportation and assignment, Net work analysis- CPM and PERT. Statistical decision theory.

**Unit V  
Financial Management  
and Marketing**

**Module 1.**

- Basic concepts of financial management- goals of financial management- Traditional Vs Modern goal- scope of financial management- investment decision, financing decision and dividend decision- role of financial manager in modern business.

**Module 2.**

- Capital investment decision- cash flow estimation- methods of project evaluation, traditional and modern methods. Time value of money- Incorporation of risk in project evaluation.

**Module 3.**

- Financing decision, capital structure planning- operating and financial leverage- NI approach and NOI approach- optimum capital structure- Determinants of capital structure.

**Module 4.**

- Cost of capital and dividend policy. Individual components cost and weighted average cost of capital- Value of the firm and dividend policy. Theories of dividend. Basic concepts of working capital management.

**Module 5.**

- Basic concepts of marketing, need, want, demand, value, satisfaction- Marketing

concepts- Marketing planning, implementation and control system. Marketing mix.

**Unit VI  
Cost and Management  
Accounting**

**Module 1.**

- Cost accounting basic concepts- elements of cost, materials, labour and overheads. Activity based costing- Unit costing- process costing by product and joint product costing.

**Module 2.**

- Cost control and cost reduction - methods and techniques- value analysis- value engineering.

**Module 3.**

- Management accounting, basic concepts, Cost accounting Vs Management accounting.

**Module 4.**

- Financial statement analysis- ratio analysis, fund flow and cash flow analysis.

**Module 5.**

- Marginal costing, breakeven analysis and managerial decisions based on it.

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**06. Economics**

**Unit I  
Microeconomic Theory  
and Applications**

**Module 1. Theory of Consumer Behaviour**

- Theory of consumer behavior - utility functions - demand analysis - price, income and substitution effects - theory and applications of indifference curves - Hicks and Slutsky effects - revealed preference theory - choice under uncertainty - recent developments in the theory of demand - LES, CES demand functions - dynamic versions of demand - duality and indirect utility functions - Bandwagon, Snob and Veblen effects



### Module 2. Theory of Costs and Production

- Traditional and modern theories of costs – production function – Cobb- Douglas, CES, VES and translog production functions
- Producer's equilibrium using Isoquants - Isocost analysis - technical progress – Harrod and Hicks versions

### Module 3. Market Structure and Equilibrium Price and Output Determination

- Classification of markets – short- run and long-run equilibrium under perfect competition, monopoly and monopolistic competition – shut down and break-even analysis – monopoly power – different oligopoly markets – Cournot, Bertrand, Stackelberg, Chamberlin, Kinked demand curve – Cartels – price leadership – price discrimination – game theory and its applications – prisoner's dilemma

### Module 4. Theory of Distribution, General Equilibrium, Welfare Economics and Uncertainty

- Micro and macro theories of distribution - marginal productivity – Euler's theorem and adding up problem – contributions of Ricardo, Marx, Kalecky - partial and general equilibrium – contributions of Walras, Hicks – Kaldor – theory of Second-Best – Arrow's Impossibility theorem – theory of risk and uncertainty – moral hazard, adverse selection and externalities

## Unit II

### Macroeconomic Theory and Applications

#### Module 1. Macroeconomic Framework

- National income accounting - classical and Keynesian analysis of macro aggregates – IS-LM model – policy analysis in the closed and open systems – Mundell -Fleming Model – monetary approach to balance of payment – labour market analysis – search theories

#### Module 2. Behavioural Foundations of Macroeconomics

- Consumption functions and puzzle – absolute, relative, permanent and life cycle

hypotheses of consumption

- Investment functions – role of interest rate and expectations – neo-classical, Keynesian and accelerator theories of investment – user cost of capital – Tobin's 'q' ratio

### Module 3. Theory of Business Cycle, Inflation and Unemployment

- Business cycle facts - direction and timing of variables – aggregate demand and supply analysis of business cycles - theoretical contributions of Samuelson, Hicks and Kaldor – multiplier and accelerator – great depression and financial crisis – alternative views
- Classical, Keynesian and monetarist approaches to inflation and unemployment – Philip's curve – sacrifice ratio and Okun's law

### Module 4. Macroeconomic Schools and Policies

- Schools in macroeconomics – classical, Keynesian, Monetarists, new classicals, supply side - rational expectations – new Keynesian and new political macro economics
- Objectives of macroeconomic policy – monetary policy – instruments- rules vs discretion - Taylor's rule – dynamic time inconsistency models – fiscal policy – instruments- Barro Ricardo equivalence theorem – income policy

## Unit III

### Quantitative Methods for Economic Analysis

#### Module 1. Statistical Methods

- Measures of central tendency – mean, median, mode, geometric and harmonic mean – measures of dispersion – range, quartile deviation, mean deviation, variance and standard deviation- skewness and kurtosis – correlation – types and measurement – partial and multiple regression analysis - probability – various types of events – laws of addition and multiplication – Bayes' theorem –



distribution – binomial, poisson, and normal distributions and their properties

**Module 2. Mathematical Methods**

- Matrix operation – determinants – Cramer’s rule – static and dynamic input-output models – linear programming – graphical and simplex methods – duality and shadow prices
- Functions – rules of differentiation and integration – uses in economics – interpretation of revenue, cost, demand, supply functions, elasticities – market equilibrium – consumer’s and producer’s surplus

**Module 3. Econometric Methods**

- Methodology of econometric research – simple and general linear econometric models – assumptions – estimation of parameters – co-efficient of determination ( $R^2$ ) – Gauss Markov theorem – concepts of autocorrelation, multicollinearity and heteroscedasticity and their tests

**Module 4. Research Methodology**

- Sampling – types and techniques – hypothesis testing – null and alternative hypotheses – type I and type II error – theories of estimation – point and interval estimation – t, F, and chi-square tests
- Research design – collection, organization and analysis of data – presentation of research report

**Unit IV**

**Development Experiences of India and Kerala**

**Module 1. Growth and structural changes of Indian Economy**

- Growth and sector-wise contribution to GDP and employment – demographic features – Distribution of National Income among four factors of production – Regional disparity in growth and development – HDI related indicators in India – poverty and unemployment in India

**Module 2. Development Strategies in India**

- Economic Planning in India – objectives and achievements – development strategies in India – Mixed Economic Framework – Economic Reforms – recent developments

**Module 3. Economic Policy and Development in India**

- Issues and policies in Agriculture, Industry, Trade, Infrastructure – price movements and India’s monetary, fiscal and financial sector policies and reforms – recent developments

**Module 4. Kerala’s Economic Development**

- Kerala model of development – Sustainability issues – Poverty and Unemployment in Kerala – Structural changes in Kerala’s economy – performance of agriculture, industry, infrastructure and services – Issues of Migration, Urbanisation and Demographic features – Fiscal scenario in Kerala – Decentralisation and achievements – recent developments

**Unit V**

**Economic Development and Environmental Economics**

**Module 1. Concept and Measurement of Economic Development**

- Meaning of development – growth vs development – indicators of development – per capita income – PQLI – HDI – HPI – perpetuation of under development – vicious circle of poverty – circular causation – structural view of under development – inequalities in income distribution – Lorenz curve and Gini coefficient – Kuznet’s Inverted U-hypothesis.

**Module 2. Theories of Economic Growth**

- Classical theories – Marx – Schumpeter – Harrod-Domar model – Neo-classical growth theories – Solow – Meade – Mrs. Joan Robinson – Kaldor-Mirrlees Model – Technical progress function of Kaldor – Convergence Hypothesis – Endogenous theories of growth – Education – Research and Human Capital.



### Module 3. Partial Theories of Growth

- Dual Economies - Social dualism - Technological dualism - Geographical and financial dualism - Lewis theory of development with unlimited supply of labour - Fei-Ranis theory - Balanced growth - Rosenstein Rodan, Nurkse and Lewis - Unbalanced Growth - Low level equilibrium trap - Critical minimum effort thesis - Dependency theories of development.

### Module 4. Measurement of Environmental Values

- Use values; Option values and non-use values; Valuation methods – Methods based on observed market behavior - Hedonic property values and household production models (travel cost method and household health production function) - Methods based on response to hypothetical markets - contingent valuation and contingent ranking methods.

### Module 5. Environmental and Natural Resource Problems in India

- Mechanism for environment regulation in India - Environmental laws and their implementation - Policy instruments for controlling water and air pollution and forestry policy - People's participation in the management of common and forest lands - The institutions of joint forest management and the joint protected area management - Social forestry – rationale and benefits - Solid waste management - causes, effects and control measures (E-waste, Plastic waste, Industrial waste) - Pollution analysis and policy - causes, effects and control measures of pollution (air, water, noise and soil).

supply of money – mechanistic model – behavioural model and H-theory – money multiplier

- Commercial banking – functions - credit creation – central banking – functions – financial markets – structure, composition and instruments of capital markets – capital market reforms

### Module 2. Public Finance

- Difference between private goods, public goods and merit goods – public expenditure - Wagner's law of increasing state activities - principles of public expenditure – public revenue – sources – kinds and canons of taxation – taxable capacity – impact and incidence – public debt – classification and effects – Centre-State financial relations – Finance Commissions - recent developments

### Module 3. Theories of International Trade

- Theories of international trade - Smith, Ricardo, Heckscher-Ohlin – Leontief paradox – factor price equalization theorem – models based on imperfect competitions – free trade and protection – types and effects of tariffs and quotas – Stolper - Samuelson theorem – Metzler paradox

### Module 4. Balance of Payments / Economic Integration

- Balance of payment accounting – elasticity and absorption approaches – foreign exchange markets – flexible and floating exchange rates – IMF – IBRD – ADB
- Forms of economic integration – PTA – FTA – customs union – economic union – progress of SAARC / SAPTA / ASEAN – regionalism vs multilateralism – recent developments

## Unit VI

### Money, Banking, Public Finance and International Trade

#### Module 1. Money and Banking

- Money and finance – demand for money – contributions of Irving Fisher, J M Keynes, Milton Friedman, Baumol and Tobin –

## 07. English

### Unit I

#### Module 1. Chaucer's Age

- Socio-political background – Chaucer and his contemporaries Langland, Gower – General Prologue to the Canterbury Tales



**Module 2. Early Renaissance in England**

- Caxton – Malory – Songs and Ballads – Thomas More’s *Utopia*

**Module 3. Late Renaissance England**

- Wyatt and Surrey – Beginning of English Sonnet – Spenser “Prothalamion” – Spenserian Sonnet

**Module 4. Beginning of English Prose**

- – Sidney – “Apology for Poetry” – Bacon – Hobbes – Thomas Browne – University Wits

**Module 5. Rise of English drama**

- Mystery and Miracle plays, morality plays and Interludes – *Gorboduc* – *Ralph Roister Doister*

**Module 6. Revenge Tragedy**

- Thomas Kyd – Marlowe – *Dr. Faustus* – Blank Verse – Webster – Ben Jonson – Comedy of Humours

**Module 7. Elizabethan Theatre**

- Stage – Audience – Patronage – Theatres in London – Stage Conventions – soliloquy – Aside – Masque

**Module 8. Shakespeare**

- Comedies – Tragedies – Histories – Problem Plays – Sources

**Module 9.**

- Language – Folio – Quarto – Shakespearean Sonnets

**Module 10**

- Metaphysical Poetry – Donne – “the Canonization” – Herbert – Vaughan – Marvell – Metaphysical Conceit

**Module 11**

- Puritan England – Reformation – Oliver Cromwell – Commonwealth – John Bunyan – *Pilgrim’s Progress*

**Module 12. Milton**

- “Paradise Lost Book 1 – “Lycidas” – Sonnets – Prose – Pamphlets

**Module 13. The Restoration**

- Drama – Comedy of Manners – Congreve – Wycherley

**Module 14. Neoclassical age**

- Socio-political background

**Module 15. Heroic Drama**

- Anti-Sentimental Comedy – Sheridan – Goldsmith

**Module 16. Popular Prose Writing**

- Diaries – Samuel Pepys – Periodical Essay – Addison – Steele – Tatler – Spectator – Coffee Houses and Clubs

**Module 17. Dryden and Pope**

- Mock heroic and Mock epic – MacFlecknoe

**Module 18. Dr. Johnson**

- Swift – Burke – John Locke

**Module 19. Rise of the novel**

- Daniel Defoe – Samuel Richardson – Epistolary Novel – Smollet – Fielding – Picaresque Novel – Sterne

**Module 20. Transition Poetry**

- Gray – “An Elegy Written in a country Churchyard” – Collins – Cowper – Burns – Blake

**Unit II**

**Module 1. Beginning of Romanticism**

- Percy’s *Reliques* – French Revolution – Return to Nature – Subjectivity – Language

**Module 2. Preface to the Lyrical Ballads**

**Module 3. Early Romantics**

- Wordsworth and Coleridge – Lyric – Ode

**Module 4. Later Romantics**

- Byron – Shelley – Keats

**Module 5. Gothic Novel**

- Mary Shelley – Horace Walpole

**Module 6. Historical Novel**

- Walter Scott – Domestic Novel – Jane Austen

**Module 7. Prose**

- Lamb – Hazlitt – Leigh Hunt – Dequincy –

**Module 8. Early Feminist Writing**

- J.S. Mill – “Subjugation of Women” – Mary Wollstonecraft – “A Vindication of the Rights of Women.”

**Module 9. Beginnings of the Victorian Age**

- Sociopolitical background - Victorian compromise

**Module 10. Victorian Poetry**

- Tennyson, Dramatic Monologue - Browning, Arnold

**Module 11. Pre-Raphaelites**

- D.G. Rossetti - A.C. Swinburne - William Morris

**Module 12. Aestheticism**

- Walter Pater - Art for Arts Sake

**Module 13 Victorian Prose**

- Carlyle - Arnold - Cardinal Newman - Religious Prose

**Module 14. Victorian Biography**

- Autobiography - Ruskin - Lytton Strachey - Leslie Stephen

**Module 15. Victorian Novel**

- Victorian Reform Acts - Industrialization - the novels of Charles Dickens

**Module 16. Hardy**

- Wessex Novels

**Module 17. Victorian Women Novelists**

- Bronte Sisters - George Eliot - realistic Novels - Thackeray - George Meredith - R.L. Stevenson

**Module 18. Victorian Drama**

- Comedy of Manners - Oscar Wilde - Discussion Plays - Shaw

**Module 19. Transition**

- Hopkins - inscape - instress - Sprung Rhythm - "Windhover"

**Module 20. Victorian Age and the Colonial Enterprise**

- Macaulay's Minute - Arnold - "Culture and Anarchy" - Rudyard Kipling

**Unit III****20th Century and****Contemporary British Literature****Module 1. Edwardian period**

- World War I - socio-political background

**Module 2. War Poets**

- Rupert Brooke, Wilfred Owen, Siegfried Sassoon

**Module 3. Pink Poets**

- W.H Auden
- Cecil Day Lewis, Stephen Spender, Louis MacNeice

**Module 4. Avant**

- garde writing - Symbolist movement- W.B Yeats - Surrealism - Dylan Thomas

**Module 5. Modernist Poetry**

- High Modernists - Ezra Pound - T.S. Eliot

**Module 6. Verse drama**

- Christopher Fry - T.S. Eliot

**Module 7. World War II and its aftermath**

- Movement poetry- Philip Larkin - Thom Gunn

**Module 8. Ted Hughes**

- Seamus Heaney - Andrew Motion

**Module 9. Prose- G.K. Chesterton**

- Max Beerbohm - Bertrand Russell

**Module 10. 20<sup>th</sup> Century Novel**

- Virginia Woolf - "Modern Fiction" - Joseph Conrad

**Module 11. Early modernism**

- D.H Lawrence- psychological novel

**Module 12. Stream of consciousness**

- James Joyce - Virginia Woolf

**Module 13. Dystopian literature**

- Aldous Huxley - George Orwell

**Module 14. Post war fiction**

- William Golding - Kingsley Amis - John Wain - Allan Sillitoe,

**Module 15. Drama**

- the new drama - Ibsen and his influence- Bernard Shaw

**Module 16. Irish dramatic movement**

- Abbey Theatre- Celtic revival -Yeats, Synge, O'Casey

**Module 17. Post-war drama**

- kitchen sink drama- Arnold Wesker - Angry Young Men movement- John Osborne



**Module 18. Theatre of the Absurd**

- Samuel Beckett – Harold Pinter – Tom Stoppard – Epic Theatre – Edward Bond

**Module 19. Recent trends in British Writing**

- Doris Lessing – Iris Murdoch – Jeanette Winterson

**Module 20. Immigrant Writing**

- Kazuo Ishiguro – Hanif Kureishi

**Unit IV - American, Indian and New Literatures in English**

**Module 1. Pilgrim Fathers**

- Puritanism in America – Romanticism in America – Emerson – Thoreau – Hawthorne

**Module 2. 19<sup>th</sup> and 20<sup>th</sup> century American Poetry**

- Whitman, Dickinson – Emily Dickinson – Edgar Allan Poe

**Module 3. Robert Frost**

- Ezra Pound – ee cummings – Wallace Stevens – Robert Lowell – Anne Sexton

**Module 4. 19<sup>th</sup> century American Novel**

- Mark Twain – Melville – Harriet Beecher Stowe – William Faulkner – Henry James

**Module 5. 20<sup>th</sup> century American Novel**

- Hemingway – Steinbeck – Saul Bellow – Leslie Mormon Silko

**Module 6. Harlem Renaissance**

- Ralph Ellison – Alice Walker – Toni Morrison – Module 6 American Drama – Eugene O'Neill – Tennessee Williams – Arthur Miller – Lorraine Hansberry – Sam Shepard – Amiri Baraka

**Module 7. The beginnings of Indian Poetry in English**

- Western influence – Madhusudan Dutt – Sri Aurobindo – Tagore – Toru Dutt – Sarojini Naidu

**Module 8. Indian English Poetry today**

- Nissim Ezekeil – Keki Daruwalla – A.K. Ramanujan – Jayanta Mahapatra – Kamala Das – Dom Moraes – Gieve Patel – Arun Kolatkar

**Module 9. Indian English Novel Early Phase**

- Raja Rao – Talking back to the Empire – R.K. Narayan – Malgudi – Mulk Raj Anand – Khushwant Singh

**Module 10. Indian English Novel Today**

- Nayantara Sehgal – Anita Desai – Shashi Deshpande – Salman Rushdie – Jhumpa Lahiri – Arundhati Roy

**Module 11. Indian English Drama**

- Harindranath Chattopadhyay – T.P. Kailasam – Asif Currimbhoy – Badal Sircar – Girish Karnad – Manjula Padmanabhan

**Module 12. African Literature and Colonialism**

- Leopold Senghor – Christopher Okigbo – Chinua Achebe – Wole Soyinka

**Module 13. African Literature and Post Colonialism**

- Ngugi Wo Thiongo – John Pepper Clark – Ben Okri – Athol Fugard

**Module 14. Caribbean Intellectual Tradition**

- Aime Cesaire – Frantz Fanon – C.L.R. James

**Module 15. Caribbean Literary Tradition**

- V.S. Naipaul – George Lamming – Derek Walcott – Edward Brathwaite

**Module 16. Canadian literature**

- Modernism – E.J. Pratt – Realism – Sinclair Ross – Native Canadian – Tomson Highway – Prairie life – Margaret Laurence

**Module 17. Canadian Literature**

- Multiculturalism – Diaspora – Claire Harris – Rohinton Mistry – Joy Kogawa – Michael Ondaatje

**Module 18. Australian literary history**

- Bush poetry – A.D. Hope – Judith Wright – Les Murray

**Module 19. Patrick White**

- Sally Morgan – David Malouf – David Williamson

**Module 20. South Asian Literature**

- Lakdasa Wikramasinha – Romesh Gunesekeera – Edwin Thumboo – Alamgir Hashmi – Maki Kureishi – Taslima Nasreen



## Unit V

### History and Structure of English and English Language Teaching

#### Module 1. The Sound system of English

- Vowels and consonants

#### Module 2. English phonology

- Syllable structure- stress - words in connected speech - intonation - phonological rules - assimilation , elision, weak forms

#### Module3. English morphology

- Morphemes - processes of word building - affixation

#### Module 4. Semantics

- Types of meaning - semantic change

#### Module 5. The Indo-European family of languages

- The descent of English- Germanic family- Grimm's Law- Verner's Law

#### Module 6. Old English

- Old English dialects - Old English Grammar - Old English Pronunciation - Old English vocabulary - Old English Literature - Scandinavian influence on Old English

#### Module 7. Middle English

- The influence of Norman French - Middle English grammar - Middle English Pronunciation - Middle English vocabulary - Middle English Literature - Translations of the Bible

#### Module 8. English at the Renaissance

- Influence of Latin and Greek - Colonialism and English - Contribution of Shakespeare and Milton.

#### Module 9. English overseas

- American and Indian English - Pidgins and Creoles

#### Module 10. English in the postcolonial world

- English as the language of knowledge and global communication - many Englishes.

#### Module 11. Approaches to language learning

- Behaviourism - cognitivism - constructivism - social constructivism - critical pedagogy

#### Module 12. Theory of language

- Language as knowledge - language as skill - language as a set of structures - language as a set of behavioural patterns

#### Module 13. History of English Teaching in India

- Macaulay - English as a language of administration - English as a language of culture - English language teaching in Independent India - English as a language of opportunity.

#### Module 14. English as a Second language (ESL)

- English as a Foreign Language (EFL) - English for Specific Purposes (ESP) - English for communication

#### Module 15. Methods of language teaching

- Grammar translation method - direct method - audio lingual method - oral-situational method - the silent way - community language learning

#### Module 16. Learner factors

- Attitude - aptitude - motivation - age - Learning conditions and learning environment

#### Module 17. Classroom procedures

- Presentation - interaction - feedback - evaluation - lesson plans for teaching prose, poetry, fiction, grammar - for teaching of oral and written communication

#### Module 18. Teaching materials/aids

- Traditional and new - audio-visual aids - computer aided language learning (CALL)

#### Module 19. Tests and evaluation

- Internal and external evaluation - formative and summative evaluation - continuous and comprehensive evaluation - assessment of learning and assessment for Learning - types of tests - tools for evaluation - types of questions

#### Module 20. Keywords

- Bilingualism and multilingualism - learning vs. acquisition - L1 and L2 - code mixing and code switching - first language interference



**Unit VI**

**Literary Theory and Criticism**

**Module 1. Aristotle**

- Poetics - Tragedy - Catharsis - Longinus - Sublime - Apology for Poetry - Johnson - Preface to Shakespeare

**Module 2. Romanticism**

- Theory and criticism - Poetic diction and language - fancy and imagination - negative capability

**Module 3. Matthew Arnold**

- "Function of Criticism" - Eliot - "Tradition and Individual Talent" - Objective Correlative - Leavis - Practical criticism

**Module 4. William Empson**

- Ambiguity - Cleanth Brooks - "The Language of Paradox" - I.A. Richards - New Criticism - Frye - Archetypes

**Module 5. Liberal Humanism**

- Turn to Theory - Text, Identity, Language - Russian Formalism

**Module 6. Marxist Criticism**

- Capital - Base - Superstructure - Althusser - Gramsci - Neo Marxism

**Module 7. Saussure**

- Structuralism - Levi Strauss - Semiotics

**Module 8. Psychoanalysis**

- Freud - Id - Ego - Sexuality - Unconscious

**Module 9. Modernism**

- Habermas - Modernity - Postmodernism - Fredric Jameson

**Module 10. Post structuralism**

- Barthes - "The Death of the Author" - Derrida - Deconstruction - Structure - Sign - Play

**Module 11. Feminism**

- First Wave - Virginia Woolf - Simone de Beauvoir - Second Wave - Betty Friedan - Feminine Mystique - Elaine Showalter

**Module 12. Gender and Sexuality**

- Sex - Gender - Gender Play - Judith Butler

**Module 13. Postcolonialism**

- Edward Said - Bill Ashcroft - Empire Writing Back - Subaltern School - Race and Ethnicity - Homi Bhabha - Hybridity - Mimicry

**Module 14. Cultural Materialism and New Historicism**

- Dollimore - Political Shakespeare - Foucault - Power and Discourse

**Module 15. Dalit Aesthetics**

- Ambedkar - Namdeo Dhasal - Limbale -

**Module 16. Theories of Translation**

- Source Text - Target Text - Equivalence - Meaning - Untranslatability - Rewriting - Adaptation

**Module 17. Cultural Studies**

- Culture - Ideology - Hegemony - Frankfurt School - Birmingham School - 'Culture is Ordinary' - Raymond Williams - Representation - Media, Society, Popular Culture

**Module 18. Green Studies**

- Cheryl Glotfelty - Eric Fromm - Rachel Carson - Vandana Shiva

**Module 19. Indian Aesthetics**

- Bhava - Vakrokti - Rasa - Dhvani

**Module 20. Alamkara**

- Anumana - Riti - Sphota - Aucitya

**08. French**

**Unit I  
Literature**

**Module 1. Middle ages to 17th century**

- Works of François Villon, Joaquim Du Bellay, Pierre de Ronsard, Montagne, François Rabelais, Chrétien de Troyes, Pascal, Jean Racine, Pierre Corneille, Jean de la Fontaine, Boileau, Molière, La Rochefoucauld and Mme de Sevigne to be studied. Also emphasis to be given on the work 'Chansons de Geste', Roman de la Rose and Roman de Renard.

**Module 2. 18<sup>th</sup> and 19<sup>th</sup> century**

- Works of Chateaubriand, Diderot, Voltaire, Rousseau, Montesquieu, Marivaux, Chenier, Beaumarchais, Lamartine, Victor Hugo, Alfred de Vigny, Alfred de Musset, Gustave Flaubert, Charles Baudelaire, Paul Verlaine, Mallarme, Rimbaud, Jules Verne, Guy de Maupassant, Alexandre Dumas, Emile Zola, Stendhal and Marcel Proust to be studied.

**Module 3. 20<sup>th</sup> and 21<sup>st</sup> century**

- Works of Albert Camus, Jean Paul Sartre, Apollinaire, Jacques Pervert, Malraux, Saint Exupéry, André Gide, Samuel Beckett, Eugene Ionesco, Le clézio, Patrick Mondiano, Marguerite Duras, Simone de Beauvoir, Nathalie Sarraute and Marguerite Yourcenar to be studied.

**Module 4. Literary Criticism**

- Works of Jakobson, Renan, Sait-Beuve, Roland Beuve, Roland Barthe, Jacques Lacan, Philippe Sollers, Julia Kristeva, Gérard Genette and Derrida Foucault to be studied

## Unit II Culture and Civilisation

**Module 1. Geography****Module 2. History****Module 3. Heritage****Module 4. Art and Cuisine**

## Unit III Linguistics, Methodology & FLE

**Module 1. Translation**

- Translation of proverbs, idioms, expressions etc...

**Module 2. Different domains of linguistics**

- Phonetics & Phonology, Morphosyntax, lexicography, semantics etc....) History of linguistics (Jakobson, Saussure, Chomsky, Skinner etc....)

**Module 3. Different methods (including Indian)**

- Reference tools of FLE (FLE, CECR etc - Full form), critical approach of different methods

**Module 4.**

- Learning Activities in different methods including use of different documents

## Unit IV - Grammar

**Module 1. Moods and Tenses****Module 2. Substantives, Pronouns, Complements****Module 3. Articles, Adjectives, Adverbs****Module 4. Language Usage**

## Unit V - Francophone Literature, Culture and Civilisation

**Module 1. Canadian****Module 2. European****Module 3. Asian****Module 4. African**

## Unit VI - Contemporary France

**Module 1. Tourism and Hospitality****Module 2. Society****Module 3. Commerce and Industry****Module 4. Science and Technology**

## *09. Gandhian Studies*

### Unit I Making of the Mahatma

**Module 1. Early life and education**

- Family heritage and influence - Father, Mother and Maid

**Module 2. Education in England**

- Failed attempts to assimilate Western values. Acquaintance with Indian religions and traditions- association with London Vegetarian Society and conversion to vegetarianism. Influence of life in England- Indian influences on Gandhi's life and thought- Gita, Raichandbhai, Jainism, Buddhism



**Module 3. Gandhi as a lawyer in South Africa**

- Experience of racial discrimination- acquaintance with the problems of the Indian community- formation of the Natal Indian Congress- Boer War and Natal Indian Ambulance Corps- Phoenix Settlement- Indian Opinion, Vow of Brahmacharya

**Module 4. Western influences**

- New Testament, John Ruskin , Leo Tolstoy, Henry David Thoreau, Emerson, Carpenter

**Module 5. Advent of Satyagraha in South Africa**

- From passive resistance to Satyagraha – Different Satyagraha campaigns in South Africa – Tolstoy Farm - From M K Gandhi to Mahatma

**Unit II  
Fundamentals of  
Gandhian thought**

**Module 1. Concept of Human Nature and Perfectibility**

- interconnectedness and relational world view

**Module 2. Truth**

- Relative and absolute truth, God-Truth congruence- Nonviolence- Nonviolence as a creed as opposed to policy

**Module 3. Relationship between ends and means**

- notion of Dharma in the context of rights and duties & Karma – Nishkama Karma

**Module 4. Pursuit of Truth through nonviolent means**

- Satyagraha as soul force – Conscience as the final arbiter

**Module 5. Cardinal and Ashram Vows**

- Satya, Ahimsa, Asteya, Aparigraha, Brahmacharya, swadeshi, fearlessness, bread labour, untouchability, sarva dharma samabhava, control of palate.

**Unit III**

**Political and Economic Thought**

**Module 1.**

- Gandhi's critique of modern civilization and vision of true civilization

**Module 2.**

- Concept of Swaraj, Power and State- Spiritualisation of politics

**Module 3.**

- Critique of Parliamentary Democracy – Decentralisation of Power- Panchayati Raj - Concept of Ram Rajya – pluralist nationalism and internationalism

**Module 4.**

- Sources of Gandhian Economics , Ethics and economics- industrialization and technology, attitude towards machinery , trusteeship, swadeshi and international trade- production by the masses vs mass production - conservation of resources and limitation of wants

**Module 5.**

- Economy of permanence of J C Kumarappa- Influence of Gandhian ideas on economic policy in India , Contributions of Vinoba Bhave & E F Schumacher - appropriate technology – Importance of Khadi and Village Industries in Gandhian schema- Gandhian approach to development . Gandhian approach to rural development

**Unit IV**

**Social and Educational Ideas**

- Individual and society removal of untouchability- harijan uplift , communal harmony,
- Varnashrama dharma, prohibition, views on women, seven social sins
- Gandhian approach to health and sanitation- constructive programme:



importance and components- sarvodaya social order – Gandhian life style

- Gandhian experiments in education in South Africa and India- Basic Education (Nai Talim), Goals of education
- Importance of Crafts, medium of education, role of state in primary education, views on higher education, women's education

### Unit V Peace Studies and Conflict Resolution

- Origin and Meaning of Peace. Approaches to peace- Indian concept of peace. Peace in different cultures and religious traditions – Nature and scope of peace studies , Characteristic features of peace studies.
- Meaning of Violence – personal, structural and cultural violence. Importance of Peace education in promoting a culture of peace. Nature and goals of peace education
- Meaning and nature of conflict. Conflict analysis as a key step to conflict resolution. Approaches to conflict resolution- Negotiations, Facilitated Problem Solving, Mediation
- Conflict Transformation – Ideas of Galtung and John Paul Lederach, Culture and Conflict Resolution
- Gandhian approach to peace and conflict transformation, Learning from Gandhi's Satyagraha Campaigns ( Champaran, Salt Satyagraha, Kheda, Ahmedabad ), Role of Shanti Sena . Building peace from below- the role of reconciliation and forgiveness in conflict resolution. Examples of Truth and Reconciliation Commissions.

### Unit VI - Gandhi and the modern world

- Problems related to human survival - Ecological crisis- Depletion of resources sustainable energy – climate change, reckless urbanization, increase in violence , sanitation , nuclear arms races, piling up of court cases,

food security and Gandhian responses to such crises

- Gandhian legacy in India- Vinoba Bhave and Jayaprakash Narain's contributions, Panchayat Raj and the 73<sup>rd</sup> and 74<sup>th</sup> amendments, the emergence of voluntarism and cooperatives in India- Chipko & Apiko Movements, Narmada Bacchao Antholan, Baliapal Movement, Koodankulam movement, Ralegaon Siddhi, Hari Vallabh Parikh, Irom Sharmila, Nilpu Samaram
- Gandhi's global legacy : Martin Luther King Jr., Petra Kelly, Lanza Del Vasto, Cesar Chavez, Aung San Su Chi, Nelson Mandela
- Nonviolent Action worldwide: Khudai Kidmatgars, Tiannmensquare, Philippines, Arab Spring,
- Organic Farming movement, Gandhian insights on leadership and management, ADR movement

## 10. Geography

### Unit I Concepts in Geography

#### Module 1.

- Geography – meaning, definition, nature and scope –Concepts, theories, Laws and models in Geography- Branches and Approaches

#### Module 2.

- Development of Geographical thought – Classical, medieval and modern periods – Founders of modern geographical thought

#### Module 3.

- Traditions in Geography – Dualism and Dichotomies – Paradigms - Modern concepts and trends in Geography – Quantitative revolution – Spatial, Location and System Analysis.

#### Module 4.

- Foundation in Human Geography – Principles of Human Geography- Approaches; Determinism, Possibilism, Neo-determinism, man-environment relations;



Forms of human adaptation to the environment.

**Module 5.**

- Cultural regions - Stages of human development, major human races, major languages and religions of the world - cultural regions; Heartland and Rimland theories

**Unit II  
Physical Geography**

**Module 1.**

- Geomorphology: Origin of earth - theories and concepts, Geochronology and Geological timescale, Continental drift theory, Isostasy, Plate Tectonics, Sea floor spreading, Tetrahedron theory, Convection current hypothesis, Palaeomagnetism.
- Endogenic process -earthquake, volcanism, Mountain building theories - folding and faulting - Concept of slope- exogenic process - extra terrestrial process, Mass movements, Weathering and Denudation. Agents of denudation- river, glacier, sea, wind, ground water, Cycle of erosion- Concepts and theories of W.M. Davis and Penk.
- Formation and classification of rocks and soils.

**Module 2.**

- Oceanography: Major Oceans - bottom relief of major oceans, Composition of Sea Water, Salinity, Temperature and density - Movements of ocean Water- Waves, Tides, Currents, Ocean deposits.

**Module 3.**

- The composition and structure of atmosphere-distribution of temperature and pressure - insolation - heat budget of the earth - General circulation of atmosphere - planetary winds, seasonal winds, local winds, cyclones and anticyclones, jetstreams.
- Atmospheric moisture, humidity, condensation - clouds - types, fog-types, precipitation-types of precipitation, air masses and fronts-formation and classification.

- Climatic classification-Koppen and Thornthwaite, ozone depletion, Elnino, LaNino, southern oscillations, Climate change and global warming.

**Module 4.**

- Biogeography - Ecosystem, Habitat, Biomes, community, Ecotone and ecological niche. Energy: Energy sources, energy flow, food chains and food webs. Biodiversity-Hotspots, Major biomes- distribution and characteristics. Conservation of biodiversity. Conservation methods-national parks, sanctuaries, biosphere reserves.

**Unit III  
Resource Geography**

**Module 1.**

- Economic Geography - Resources, meaning, classification, Major resources - Natural and human resources.

**Module 2.**

- Economic activities - primary, secondary and tertiary, Industries - Industrial regions of the world - Industrial location theories Weber and Losch- Transport and Trade.

**Module 3.**

- Agricultural Geography - Origin and development of agriculture, Approaches, Factors affecting agriculture, Models in Agricultural geography - agricultural regionalization -techniques and methods - land use and land capability classification

**Module 4.**

- World agricultural regions - Agricultural regions of India - Revolutions in agriculture and recent trends - Problems and prospects of Indian agriculture

**Module 5.**

- Population Geography - sources of population data - components of population - Distribution and growth of population - population problems and policies.

**Module 6.**

- Population dynamics - Fertility, Mortality and Migration - laws of migration - Concepts of optimum, over and under population - Demographic transition theory - Theories of population (Malthus, Ricardo, Marx) - Population resource regions.

**Unit IV****Urban and Regional Planning****Module 1.**

- Regional Planning - concepts, types, regions and approaches.

**Module 2.**

- Growth Pole - polarisation and spread effect, growth foci concept in regional planning. levels and regional planning - district, block, panchayath, watershed planning and people's participation in planning.

**Module 3.**

- Regional Growth - economic base concept, inter intra regional planning, regional imbalance and levels of development. five year plans and urban development programmes.

**Module 4.**

- Definitions of Urban centers, process and factors of urbanization Classification of urban centers based on size and function.

**Module 5.**

- Urban morphology, Urban land use models - CBD - Christaller's central place theory and Losch theory. Urban housing, slums & fringe development

**Unit V****Geography of India****Module 1.**

- Location, Unity in Diversity, Physiography, Climate, Drainage, Soil and Natural Vegetation

**Module 2.**

- Major Crops and Irrigation - Irrigation and Types, Crops-Rice, Wheat, Sugarcane,

Cotton, Jute, Tea, Coffee, Groundnut, And Coconut.

**Module 3.**

- Fisheries, Mineral and Power Resources; Industries-Iron and Steel, Textiles, Sugar, Cement, Paper, Chemicals and Fertilizers, Industrial regions.

**Module 4.**

- Trade, Transportation and Demographic Characteristics.

**Module 5**

- Kerala-Physical Setting, Demography, Agriculture, Minerals, Industries, Tourism, Transportation.

**Unit VI****Geoinformatics****Module 1.**

- Cartography: Concept- Maps - Types - Uses, Characteristics, Map projection - Types.

**Module 2.**

- Phases of cartographic processes - Map compilation - Generalization - symbolization, map design and layout - Map reductions and enlargements.

**Module 3.**

- Remote sensing:- Process of Remote sensing - EMR characteristics, Electromagnetic spectrum, Atmospheric window, Spectral reflectance curves - Vegetation, soil and water, Types of remote sensing, Platforms.

**Module 4.**

- Aerial Remote Sensing - Photogrammetry - Aerial Photograph and Types- Scale - Camera - Lens - Film - Relief displacement and correction, Image parallax, Stereoscopic plotting instruments - orthophotos - Flight Planning.

**Module 5.**

- Satellite Remote Sensing -Satellites and their characteristics- Orbits, Swath, Nadir - Sensors and types, Sensor Resolutions- Scanning - Satellite programmes of USA, Russia, France and India.



**Module 6.**

- Elements of Image Interpretation, Digital Image Processing: Rectification, Geometric correction, Radiometric correction, Noise removal, Image enhancement and classification - Application - GPS.

**Module 7.**

- GIS; - Concepts and components of GIS, Analog and digital map, Sources of spatial data, Functions of GIS. Data model - Raster and vector - Spatial data structure - Database, DBMS and functions - Relational data base models - Concept of SQL and metadata - Linking of spatial and attribute data.

**Module 8.**

- Methods of data input- Data editing -Edge Matching and Rubber Sheeting. Data Analysis: Measurement of length, perimeter and area-Queries-Buffering-Neighbourhood functions - Overlay - Raster overlay and vector overlay-Surface and network analysis -Web GIS.

- Gravity of the earth - gravity measurements - gravity anomalies - concept of geoid and spheroid. Concept of Isostasy.
- Earthquakes - types, causes and effects. Prediction of earthquakes.

**Module 2. Geomorphology**

- Geomorphic principles and processes. Cascading process system - solar energy cascade. Theories of Uniformitarianism, Catastrophism and Gradualism. Denudation, sediment cascade, transported load in rivers, rate of erosion over space and time. Influence of climate and structure on geomorphic processes and landforms. Morphogenetic landforms.
- Evolution of landforms - Models of landscape evolution by Davis, Penck and King. Geographical cycle - Treppen concept - Pediplanation cycle.
- Landforms - relation of igneous activity, structure and lithology to landforms.
- Hill slopes - processes and evolution.
- Fluvial geomorphology: drainage basin - morphometric analysis of drainage basins - fluvial processes and landforms.
- Concept of rejuvenation and interruption in the evolution of landforms.
- Coastal geomorphology: Coastal processes and associated landforms.
- Desert geomorphology: Aeolian process and associated landforms.
- Glaciers and glacial processes - glacial landforms; Glaciation.
- Concepts of Monocyclic, Polycyclic and Polygenetic landforms.
- Coral reefs: types and significance.
- Soils: formation, classification, soil profile. Soils of India and Kerala.
- Brief idea of the geomorphic features of the Indian sub-continent and Kerala.

**Module 3. Planetary Geoscience**

- Milky Way and the solar system. Big bang theory and formation of the planetary systems. Members of the solar system. Orbital characteristics of planets. General

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## 11. Geology

### Unit I

**Module 1. Physical Geology**

- Earth and the Solar system - Origin of the Earth - Different popular hypotheses. Geochronology and Age of the earth - dimensions of the earth.
- Internal structure of the earth - Basic concepts of seismology - heterogeneity of the earth's crust - physico-chemical and seismic properties of the earth's interior - Density distribution within earth.
- Earth's magnetic field - changes in magnetic field - origin of geomagnetic field - Geomagnetism - Palaeomagnetism- Magnetic anomalies - Magnetic reversals.
- Thermal history of the earth-Heat within the earth - Geothermal gradient and heat flow.



- characteristics of the terrestrial planets - crust, surface features, volcanism.
- Moon: Selenology - definition, the Earth-Moon System, General physiography, Lunar atmosphere. Lunar rocks, soil and internal structure, Lunar phases and cycles, Lunar influence on Earth.
- Mars: Physiography, Atmosphere, Craters, Volcanism, Martian rock and soils.
- Meteorites: Chondrites, SNC meteorites, Refractory inclusions, Iron meteorites.
- Asteroids: Classification and composition, Surface features, Asteroid sources, Asteroid impacts on the earth.

#### Module 4. Marine Geology

- The ocean floor, general topography - Turbidity currents, Eustatic movements.
- Physical properties of sea water: distribution of temperature, pressure and density. Chemical composition and properties of sea water.
- Coastal processes: waves, currents and tides. Classification of Sea coasts and shorelines; Classification of shorelines and coasts, beach classification.
- Marine Sediments, their sources and transportation. Classification of marine sediments.
- Methods of exploring the ocean floor.

### Unit II

#### Module 1. Crystallography and Mineralogy

- Crystalline state - Lattices- Point, Line, Space; Repetition theory, Translational Periodicity and Rotational Symmetries.
- Symmetry elements and Crystal Systems; study of normal classes.
- Crystal projection - Stereographic and spherical projections.
- Optical Mineralogy: Relief, Pleochroism, Birefringence and Interference colours in minerals, Optical accessories, Indicatrices. Conoscopic study and interference figures. Optic orientation, extinction angle, optic axial angle, optic sign and optic anomalies. Dispersion - types and uses.

- Descriptive Mineralogy: Classification and structure of silicates.
- Distinctive physical and optical characters and chemical composition of the following groups: Olivine, epidote, garnet, aluminosilicates, pyroxene, amphibole, mica, feldspar and feldspathoid.
- Distinctive physical properties, chemical composition and mode of occurrence of the following groups of minerals: oxides, sulphides, carbonates, halides, phosphates, sulphates.
- Application of modern techniques in mineral studies - XRD, XRF, ICP, EPMA.

#### Module 2. Igneous Petrology

- Igneous process - Phase rule and its application in the study of silicate systems - phase diagrams, Eutectic crystallization - Solid solution series - Incongruent melting.
- Course of crystallization in typical binary systems. Reaction principle and reaction series. Mode and Norm. CIPW Norm. Textures and their genetic significance.
- Equilibrium crystallization and melting paths in ternary systems.
- Anorthite - Wollastonite - Silica
- Diopside - Anorthite - Albite
- Albite-Anorthite - Orthoclase
- MgO - Al<sub>2</sub>O<sub>3</sub> - SiO<sub>2</sub>.
- Basalt system - classification of basalts.
- Igneous process and diversity in igneous rocks. Compositional variation in magmas. Variation diagrams. Trace elements in igneous processes; application of trace elements to petrogenesis. Radiogenic tracers.
- Classification of igneous rocks. Granites and granitic rocks. Ultramafic rocks. Alkaline rocks. Kimberlites and ultra-potassic rocks. Anorthosite and carbonatite.

#### Module 3. Metamorphic Petrology

- Concepts of metamorphism: Limits, Types and Factors of metamorphism.
- Application of phase rule in metamorphic mineral paragenesis.
- Metamorphic structures and textures - their significance.



- Classification of metamorphic rocks: after Eskola, Barrow and Winkler.
- Graphical representation of metamorphic mineral assemblages - ACF, A'KF and AFM diagrams.
- Metamorphic differentiation; Metamorphism and plate tectonics; Ultra High Temperature (UHT) and Ultra High Pressure (UHP) metamorphism, Anatexis.
- Geothermobarometry.
- General characteristics of metamorphic domains - Contact metamorphism, Regional metamorphism, Paired metamorphic belts, Orogeny and Metamorphism, Retrograde and Prograde metamorphism.
- Metamorphism of carbonate rocks, pelites, mafic and ultramafic rocks.

#### **Module 4. Sedimentary Petrology**

- The Sedimentary Cycle, Grain shape, Sphericity, Roundness and surface textures.
- Sedimentary Structures: Physical, chemical, biogenic and deformation structures.
- Mineral Composition, texture and classification of sandstone, limestone, shale and argillite. The concept of Average shale.
- Depositional Systems and environments: Sedimentary environments, Marine-Transitional-Continental depositional systems, Sedimentary Facies. Allochthonous and Autochthonous sediments.
- Sedimentary Basins: Basin forming Mechanisms. Classification of sedimentary basins.

### **Unit III**

#### **Module 1. Stratigraphy**

- Contributions of the pioneers of Stratigraphy, Geologic Time Scale.
- Correlation in Stratigraphy: Types and methods. Basic stratigraphic principles.
- Unconformities: Types of unconformities, Concepts of Hiatus, Diastems. Geological significances of unconformities. Codes and Procedures for the establishment and description of stratigraphic units.

- Lithostratigraphic, Chronostratigraphic and Biostratigraphic classifications and units; Hierarchy.
- Reworked and leaked fossils. Concepts of death assemblage and living community. Concept of litho-bio facies.
- Basics of Magnetostratigraphy, cyclostratigraphy, pedostratigraphy, chemostratigraphy and sequence stratigraphy.

#### **Module 2. Quaternary Geology**

- Quaternary Glaciations: Cryosphere and the Pleistocene glaciation. Ice core records, Holocene glacier records, Causes of ice-sheet growth and decay, Patterns of glacial-interglacial cycles.
- Quaternary sea level changes: Evidences and causes of sea level changes. Recent and historic sea level fluctuations, Holocene transgression, Land bridges.
- Tools and evidences for Quaternary studies: Ocean Records - Microfossils, Oxygen isotopes, Trace element analysis, Pollen analysis, Ice-rafted materials. Fluvial Records - River characters, palaeochannels, base level change. Dendrochronology -Tree rings.
- Man in Quaternary: Anthropocene. The Miocene hominoids of Africa and Eurasia, the Pliocene hominids of Africa, Homo habilis, Homo erectus and their migration. Pleistocene faunal extinctions, Isotopic evidences of palaeodiet.

#### **Module 3. Palaeontology**

- The origin of life: Scientific models, the biochemical model, evidences for the origin of life, the great oxygen event, life during Precambrian, diversification of life. Evolution of life in the Palaeozoic, Mesozoic and Cenozoic eras.
- Fossil record and modes of evolution: Microevolution, Macroevolution and Tree of life. Patterns of evolution. Theory of organic evolution and the factors in the Darwinian theory. Theory of Punctuated Equilibria.
- Mass extinctions and biodiversity loss: Pattern and timing of extinctions, selectivity,



Periodicity of mass extinctions, the big five mass extinction events.

- General classification of microfossils.
- Classification, general morphology, ecology, evolution and geological history of Foraminifera, Ostracodes, Radiolaria and Diatoms.
- Evolutionary trends, Stratigraphic importance and Classification of the following invertebrates: Brachiopoda, Arthropoda and Mollusca.
- General characteristics, classification and evolution of Pisces, Amphibians, Reptiles, Birds and Mammals (Horse and Man).
- Plant fossils of Gondwana Age.

#### Module 4. Indian Geology

- Brief study of the physiographic divisions of India. Major geological divisions of India.
- Pre-Cambrian stratigraphy: Classification of Indian Pre-Cambrian with particular reference to Karnataka and Kerala. Greenstone belts and granulites of South India. Classification, lithology and ages of Sargur Group, Aravalli and Delhi Super Groups. Dharwar Supergroup, Cuddapah Supergroup and Vindhyan Supergroup. Intrusive rocks in Kerala.
- Major Phanerozoic Basins in India: General description, age, development, evolution, stratigraphy and classification of the following basins in India - Gondwana Basin, Kaveri Basin, Kerala Basin, Cambay Basin.
- Deccan traps: extent, distribution, classification, lithology, inter-trappeans and infra-trappeans. Age of Deccan Traps.
- Mesozoic Stratigraphy: Major Triassic, Jurassic and Cretaceous stratigraphic units in India.
- Cenozoic successions in India: Cenozoic succession of Assam, Siwalik Supergroup, Cuddalore, Quilon and Warkalli Formations, Karewa Group, Indo-Gangetic Alluvium.

## Unit IV

### Module 1. Structural Geology

- Faults and fractures: Brittle and shear failure - Fault geometry and nomenclature - Features of fault planes - Criteria for faulting. Joints - Analysis of fractures. Stress and strain ellipsoids and their use in the study of faults and joints.
- Folds: cylindrical, non-cylindrical and conical folds - Geometry and classification of cylindrical folds - Canoe fold and inverted canoe fold - Minor folds and their use in determining the major fold structures - Mechanics of folding - Fold classifications of Donath and Parker and Ramsay - Superposed folding - Fold interference patterns.
- Tectonites: classification, tectonic fabric. Foliation: types, classification and origin - Use of axial plane foliation and fracture cleavage in the determination of major structures.
- Lineation: types, classification and origin. Lineaments.
- Geologic bodies and scale, structural coordinates. Fundamentals of geometric analysis. Stereographic projections in Structural Geology.

### Module 2. Geotectonics

- Continental drift: geological and geophysical evidences, mechanism, objections, present status.
- Major tectonic features of the continental and oceanic crust - Shield, cratons, etc.; Concept of Rheology.
- Plate tectonics: types of plate margins; Island arcs, oceanic islands and volcanic arcs; Subduction zones and Deep sea trenches; Sea floor spreading - Mid-oceanic ridges; Polar wandering and polar reversals.
- Orogeny and Epeirogeny;
- Mountains - classification.
- Global seismic belts.
- Geodynamics of the Indian plate.



### Module 3. Engineering Geology

- Role of Geology in Civil Engineering.
- Engineering properties of rocks and soils.
- Rock as a building material - dimension and decorative stones - aggregates.
- Geologic criteria for selection and investigation of sites for dams, reservoirs and tunnels.
- Landslides: types, causes and mitigation.
- Influence of geological conditions on building foundations and design.

### Module 4. Hydrogeology

- Hydrology: Global distribution of fresh water, Hydrological cycle. Hydrometeorology, Soil moisture, Run off.
- Physical Hydrogeology: Vertical distribution of subsurface water, water table and potentiometric surfaces, Rock properties affecting groundwater, Darcy's law, Aquifer, Aquiclude, Aquitard, Aquifuge, Types of aquifers. Aquifer parameters. Flow nets; Baseflow, Effluent and Influent conditions.
- Groundwater Exploration: Electrical resistivity methods - Wenner and Schlumberger electrode arrangements. Well logging - Geological and Geophysical logging.
- Groundwater Quality: Chemical composition of groundwater, graphical representation of hydro-chemical data. Water quality criteria and standards for domestic and irrigation purposes, Saline water intrusion.
- Groundwater Management: Dynamic and Static resources, Concept of Rainwater Harvesting, Artificial recharge and recovery techniques. Use of isotopes in hydrological studies.
- National Groundwater Status: Groundwater provinces of India, Hydrogeochemical provinces of India, Groundwater conditions and quality problems in Kerala.

### Unit V

#### Module 1. Geochemistry

- Goldschmidt's geochemical classification of elements. Crustal abundance and concept of major, minor and trace elements.
- Geochemistry of important elements: Alkalis, alkaline earths, hydrogen, aluminium, carbon, silicon, nitrogen, oxygen and sulphur.
- Basic principles in geochemistry: Geochemical environment, surficial and deep seated environment, geochemical cycle, geochemical dispersion - primary and secondary dispersion, dispersion halos, geochemical mobility.
- Mineral stability, law of mass action, Le Chatelier's rule, influence of temperature and pressure. Enthalpy and change in enthalpy, free energy and free energies of formation. Eh-pH limits of natural environments.
- Isomorphism, Polymorphism, Solid solution, Exsolution.
- Isotopes: Physical and chemical properties of isotopes; stable and unstable isotopes. Principles of isotope dating. Isotope dating methods: U-Th-Pb methods. K-Ar, Rb-Sr, Sm-Nd methods. Fission track dating; <sup>14</sup>C dating.
- Stable Isotopes: Geochemistry, Notation. Theoretical Considerations. The Mass Spectrometer- principles and components. Characteristics and geological applications of Carbon, Nitrogen, Oxygen, Hydrogen and Sulfur isotopes.

#### Module 2. Economic Geology

- Ore mineral - definition; tenor, grade and specifications.
- Theories of ore genesis. Ore forming solutions and their migration. Wall-rock alteration -Controls of ore localization - Paragenetic sequence and zoning - Metallogenic epochs and provinces.
- Classification of ore deposits: Lindgren and Bateman. Processes of formation and characteristic features of various types of mineral deposits. Greisen deposits, skarn



deposits, disseminated sulphide, oxide and sulphate deposits of sedimentary and volcanic environments.

- Salient features of hydrothermal, sedimentary, residual and supergene sulphide ore deposits with examples. Stratabound and stratiform ore deposits.
- Ore deposits related to plate boundaries; ore deposits of metamorphic affiliations.
- Genesis, geological settings, mode of occurrence and distribution of deposits of iron, copper, lead, zinc, aluminium, magnesium, manganese, chromium and titanium in India. Major Indian occurrences of mica, asbestos, barite, graphite, gypsum, precious and semi-precious minerals. Indian occurrence of refractory minerals, abrasive minerals and minerals used in ceramic, glass, fertilizer, cement, paint and pigment industries.
- Coal Geology: classification, coal petrography, macroscopic and microscopic components of coal. Mode of origin of coal; Periods of coal formation. Distribution and nature of occurrence of coal deposits of India - Gondwana coal fields; Coal deposits of Raniganj and Jharia, Lignite deposits of Neyveli and Palana, Tertiary coal fields of Assam.
- Petroleum Geology: Physical properties and chemical composition of petroleum; Occurrence and origin of petroleum -Source rocks -process of transformation of organic matter to petroleum; Migration and accumulation of petroleum - Reservoir rocks: types -general, structural, stratigraphic, salt domes. Important petroliferous basins of India: Distribution of oil fields in India - Assam shelf basin, Bombay offshore basin, Cambay basin, Krishna-Godavari basin.
- Brief idea of gas hydrates; Coal bed methane; Natural gas - distribution and nature of occurrence in India.
- Atomic minerals: distribution and mode of occurrence in India.
- Mineral resources of the sea: sources of sea minerals, sea water, extraction of elements,

continental shelves, Deposits under the surficial sediments of the continental shelves, deposits in the deep sea floor. Law of the sea - UNCLOS - Exclusive Economic Zone, International sea bed area and authority - Indian strategy for future exploitation of seabed deposits.

- National Mineral Policy - MM (R&D) act - Procedures for Grant of Mineral Concessions in India - UNFC classification - Global mineral reserves and resources - Minerals and sustainable development.
- Strategic, Critical and Essential minerals: definition; distribution in India.
- State-wise share of mineral production in India.

### Module 3. Exploration Geology

- Methods of surface and subsurface exploration. Principles and methods of sampling and assaying.
- Methods of estimation of ore reserves. Field equipments and field tests used in exploration.
- Phases of geological exploration. Drilling: Methods and types of drilling. Logging of bore holes; preparation of sections and level plans, fence diagrams. Subsurface mapping.
- Sampling: sampling pattern of surface exposures, mine workings, trenches, pits, drill holes, channels, placers; Bulk sampling.
- Geochemical exploration: principles, methods of sampling. Geochemical anomalies, indicators and path finders; Materials for geochemical sampling - soil, stream sediment, water, vegetation and vapour.
- Geobotanical exploration: Biogeochemical exploration; methods of biogeochemical prospecting of ore deposits; Biogeochemical anomalies; Geobotanical indicators.
- Geophysical exploration: Principles, scope, chief methods and their applications. Electrical methods: principles and instruments; Self potential method. Gravity methods: Principles and applications; gravity anomalies - regional and local; Bouguer anomaly and corrections. Instrument used -



gravimeter - survey methods. Magnetic methods: Principles and applications; earth's magnetic field, survey methods; instrument used - magnetometer. Seismic methods: Principles and applications - seismic waves and their velocities in different geological materials; Field survey method -refraction and reflection survey; seismic instruments and records. Radiometric methods: Principles of radioactivity, methods; GM counters and scintillometers.

- Geophysical well logging: electrical, radiometric, sonic and thermal logging.

#### **Module 4. Mining Geology**

- Basic mining terminology - classification of mining methods: alluvial mining, open cast mining and underground mining.
- Coal mining - deep sea bed mining - petroleum mining.
- Methods of stoping- shaft sinking - mine supports - mine ventilation - mine hazards - principles of mine evaluation - role of geologists in operative mining.
- Mineral and ore beneficiation: Principles of ore dressing: crushing and grinding - comminution units - comminution practices - sizing - screening units.
- Classifying techniques - filtering and drying. Hydroclones: classifiers and gravity concentration units; Ore concentration methods: Froth floatation reagents and practices, magnetic and electrostatic separation methods.

### **Unit VI**

#### **Module 1. Remote Sensing**

- History and the developments of Aerial photography - Geometry and type of aerial photographs - Scale of photographs - Type of aerial cameras, films and filters - Multiband photography - Tilt and height displacement - Vertical exaggeration - Stereoscopy - Mosaics - Elements of photo interpretation, Use of Aerial photographs in photogrammetry, geology, geomorphology, mineral and groundwater exploration, land

use, forestry, agriculture, environmental studies.

- Basic principles of Satellite Remote Sensing: definition and components - Electromagnetic spectrum - Black body radiations - spectral reflectance of land covers - Atmospheric window - Platforms and sensors - Active and passive sensors - Sun synchronous and geosynchronous satellites - Payloads - Land coverage capability. Resolution concepts; Multi Spectral Scanners (MSS); Spectral signatures - data acquisition and format.
- Microwave remote sensing: SLR system - terrain characteristics influencing the RADAR return - Thermal Remote Sensing: Thermal radiometers and scanners - collection and interpretation of thermographic data - Introduction to hyperspectral remote sensing.
- Interpretation and Geological application of satellite remote sensing data - visual and digital - Basic concepts of digital image processing - use of satellite data in geological studies.

#### **Module 2. Geoinformatics**

- Geoinformatics: definition - history and development - geoinformatics and geomatics - Geographical Information System (GIS) - definition, components of a GIS - GIS softwares - Raster and Vector data - Spatial data - Maps and GIS - Layer concept in GIS - thematic characters of spatial data - Different sources of spatial data.
- Spatial data models - spatial data structures, modeling surfaces and networks - modeling the third and fourth dimensions.
- GIS database. Data input and editing - Integrated database - Digital Elevation Modeling and Integration of Remote Sensing and GIS. Tools in spatial analysis. Applications of GIS in Geosciences.
- Global Navigation Satellite System (GNSS) - GPS: Satellite constellation - signals and data



- receivers - Differential GPS. Glonass and Galileo systems -IRNSS - Application of GPS.

### Module 3. Environmental Geology

- Scope of environmental geosciences: Natural resources- Renewable resources, non-renewable resources - Sustainable management of resources - Alternative energy sources. Land, its uses and management - Resources of the ocean floor - Mineral Resources: Conservation, management and concept of sustainable development.
- Natural hazards: Effects, management and prediction of earthquakes, cyclones, tsunami, landslides, floods and droughts. Hazard Zonation maps. Concept and stages of disaster management.
- Waste Management: Changing concepts of wastes, types, management and their disposal. Waste disposal methods. Impacts of mining activities on land surface, air and water environment.
- Pollution: Air, water and soil pollution, causes, effects and managements. Greenhouse Effect and Ozone Layer Depletion. Global warming and climate change.
- Environmental problems associated with urbanization. Development of technology and human factors. Desertification - causes, symptoms and prevention. Accelerated soil erosion - causes, effects and control.
- EIA: Introduction, Definition, aim, principles and concept.

### Module 4. Field Geology

- Scope and importance of Field Geology - geologic map and mapping - types of mapping - map symbols - reconnaissance - preparation. Basic equipments necessary for geological mapping and their uses.
- Basic procedure in the field: Taking compass bearing - taping and pacing - locating the position in the map - use of GPS. Observation

in the field, interpretation of the outcrop - filed notes - drawing and photographing the outcrops - measuring the attitudes of planar and linear features - collecting fossils, rock samples - their identification and naming.

- Geological mapping of sedimentary, igneous and metamorphic terrains and structures.
- Preparation of final geological map and reports: Field study to report writing, major illustrations, photographs, drawings, diagrams, designing the report, format and specific parts of the report.

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## 12. German

### Unit I

### Linguistik / Deutsche Sprachgeschichte Basic Linguistics -

#### Module 1. Sprachliche Kommunikation

#### Module 2. Phonetik - Phonemik - Morphemik - Syntax

- Text Book: Basic Linguistics - Linguistik I hrsg. von Otmar Werner und Franz Hundsnurscher (Germanische Arbeitshefte)
- Jean Aitchison: Teach Yourself Linguistics
- History of German Language

#### Module 3. Vom Wesen der Sprache - Sprache und Rede - Sprache und Schrift

#### Module 4

- Sprachauffassung des Altertums - Einstellung des Mittelalters zur Sprache - Einstellung des Humanismus - Einstellung der Reformation - Einstellung des Barock - Einstellung der Aufklärung - Der sprachliche Wandel und seine Ursachen

#### Module 5

- Einteilung der Sprachen der Erde - Von der deutschen Sprache und ihrer Geschichte - Das Germanische - Germanische Neuerungen - Zweite Lautverschiebung - Zeitliche Gliederung des Deutschen - Die



neudeutsche Sprachperiode - Das Frühmittelalterliche Deutsch - Höfische Dichtersprache - Barocksprache

- Text Book: A. Hugo Moser Deutsche Sprachgeschichte

## Unit II

### Deutsche Literaturgeschichte

#### Module 1. (c.500-c.1500)

- Frühmittelalter - Hochmittelalter - Spätmittelalter

#### Module 2. (c.1500-c.1835)

- Humanismus - Renaissance und Reformation - Barock - Aufklärung - Empfindsamkeit/ Sturm und Drang - Klassik - Romantik

#### Module 3. (c.1815-c.1932)

- Biedermeier - Junges Deutschland und Vormärz - Realismus - Naturalismus - Expressionismus - Avantgarde/ Dadaismus - Literatur der Weimarer Republik - Neue Sachlichkeit

#### Module 4. (c.1933-)

- Exilliteratur - Nachkriegsliteratur/ Trümmerliteratur
- Literatur der DDR/ Literatur der BRD - Literatur Österreichs und der Schweiz
- Text Books: Eva-Maria Kabisch : Literaturgeschichte, Ernst Klett Schulbuchverlag, Leipzig 1997.
- Grabert und Mulot : Geschichte der deutschen Literatur

## Unit III

### Deutsche Literatur/ Literaturwissenschaft

#### The following primary works:

#### Module 1. Das Nibelungenlied

- Hartmann von Aue: Der Arme Heinrich
- Christian Reuter: Schelmuffsky

#### Module 2.

- Joseph von Eichendorf: Aus dem Leben eines Taugenichts
- Georg Büchner: Woyzeck
- Conrad Ferdinand Meyer: Das Amulett
- Rainer Maria Rilke: Herbsttag

#### Module 3.

- Bertolt Brecht: Der Kaukasische Kreidekreis
- Wolfgang Borchert: Nachts schlafen die Ratten doch
- Heinrich Böll: Wanderer, kommst du nach Spa...
- Heinrich Böll: Was ist Trümmerliteratur
- Luise Rinser: Die rote Katze
- Friedrich Dürrenmatt: Der Besuch der alten Dame

#### Module 4. Günter Grass: Katz und Maus

- Günter Grass: Kopfgeburten Oder die Deutschen Sterben aus
- Anna Seghers: Kleiner Bericht aus meiner Werkstatt
- Eva Strittmatter: Mein Land

#### Module 5. Reiner Kunze: Die Mauer -

- Heinz Kahlau: Tag der Einheit -
- Erika Runge: Bottroper Protokolle : Erna E Hausfrau
- Angela Stachowa: Ich bin ein Kumpel
- Christoph Hein: Kein Seeweg nach Indien
- Text Books: Juergen W Goette - Methoden der Literaturanalyse
- Philip Rice/Patricia Waugh - Double Reading; Postmodernism

#### Module 6.

- Positivist Method of Literary Analysis - Work centred method - Psychological Method - Racist Method - Sociological Method - Aesthetics of Reception



## Unit IV History of Western Philosophy and German Culture

### Module 1. Western Philosophy

#### Module 2. German Culture

- Text Book: Fueller Mc Murrin - A History of Philosophy
- Text Book: Klaus Schulz - Deutsche Geschichte und Kultur

## Unit V Politische Geschichte / Landeskunde

### Module 1.

- Von den Römern zu den Stauferkaisern 110 V.Chr - 1150 N.Chr
- Deutschland im Mittelalter 1150 - 1480

### Module 2.

- Das Zeitalter der Reformation und Gegenreformation 1450 - 1648
- Das Zeitalter des Absolutismus - vom Barock zur Aufklärung 1550 - 1770
- Das Zeitalter der Revolutionen / Frage nach der Deutschen Nation 1780 - -1850
- Der Weg Deutschlands zur Nationalstaat 1850 - 1914

### Module 3. Die Weltkriege 1914 - 1945

- Deutschland nach dem II. Weltkrieg

### Module 4. Entstehung und Wirtschaft der BRD

- Politische Parteien und Politische Kultur der BRD
- Regierung und Verwaltung
- Das Berlin-Problem
- Wiedervereinigung
- Die Entstehung der DDR
- Die Entnazifizierung
- Text Book: Klaus Schulz - Deutsche Geschichte und Kultur
- Kurt Sontheimer - Grundzuege des politischen Systems

### Module 5. Bundesrepublik Deutschland - Staat und Gesellschaft

- Österreich - Staat und Gesellschaft

- Die Schweiz - Staat und Gesellschaft
- Parteienlandschaft in Deutschland
- Massenmedien

## Unit VI Methods of Teaching German as a Foreign Language

### Module 1. Language and Linguistik

- Direct Method of Teaching
- Grammar-Translation Method
- Language and Culture
- Modern Theory of Language Learning

### Module 2. Principles of Language Teaching

- Intonation and Rhythm
- Pattern Practice
- Cultural Content and Literature

### Module 3. Language Testing

- Language Laboratory
- Visual Aids/Types
- Teaching Machines
- Programmed Learning
- MLA Qualifications

### Module 4. Live Words and their Meaning

- Bilingualism
- Lexicography
- Linguistic Ontogeny
- False Cliches
- Text Books: Robert Lado - Language Teaching

## 13. Hindi

### Unit I Hindi Sahity Ka Itihas-Aadikal Se Poorv Bharatendu Yug Tak

#### Module 1.

- Aadikaleen Kavy-Bhaktikaleen Kavy-Reetikaleen Kavy-Aadikaleen Bhasha-Madhyakaleen Bhasha-Aadikaleen Sanskriti-Madhyakaleen Sanskriti

#### Module 2 .

- Reetikaleen Paristitiyan-Reetikaleen Bhasha-Reetikal ka Soundary sastr-reetikaleen



Kavyadhara-Reetimukt-Reetibadh-Reetisidh-Reetikaleen Sringarikata-Prosody & Poetics of Ritikal

## Unit II

### Hindi sahyt ka itihās-bharatendu yug se unnees sou chalees tak

#### Module 1.

- Bharatendu se Dwivedi Yug Tak-Sahityik Prayog-Kavy-Natak-Kathasahity-Aalochana-Gady evum Anoodit Sahity-Sahityik Patrakarita Udbhav evam Vikas-NavJagaran-Pratham Swatantrata Aandolan-Shikhsha Sansthaon ki Bhoomika-Bhasha ka Manakeekaran-Khadiboli ka Vikas

#### Module 2.

- Chayavad-Darshanik Prishtabhoomi-Paschaty Prabhav-Pramukh Kavi evam Kavy-Chayavadi Sameeksha-Brajbhasha Kavy-Rashtriya Sanskritik Kavyadhara evum Pramukh Kavy-Halavad

#### Module 3.

- Premchand evum Pragativaadi Sahity-Sahity Prayog-Marxvad evum Pragativadi Andolan-Premchandkaleen Paristitiyan-Sahityik Prayog-Upanyas-Kahani-Alochana-Nibandh-Sansmaran-Rekhachitr-Reportaj-Yatrasahity-Premchadkaleen Patrakarita-Pramukh Patr-Patrikayen

## Unit III

### Aadhunik Kal- 1940 Se 2015 Tak

#### Module 1.

- Kathasahity evam Anya Gady Vidhayem-Kathasahity ki Pramukh Pravruttiyan- Nayi kavita ki Pravruttiyan- Samkaleen kavita ke vividh aayam-Natya Sahity aur Rangmanch-Vividh Prayog-Samasya Natak-Asangat Natak-Lokdharmi Natak - Pramukh Natya Manch

#### Module 2.

- Alochana ka Soundary Sastr-Beesvin sadi Alochana-Udbhav aur Vikas-Dr.Ramchandr Shukl Yug aur Shuklottar Yug-Aabhijatyavadi Sameeksha- Sanskritik Vimarsh-Manavatavadi Sameeksha-Manovaigyanik sameeksha-Marxvadi Sameeksha-Aadhunikavadi-Astitwvad - Yatharthvad-Prakritvad-Atiyatharthvad-Prateekvad-Bimbvad-Prabhavvad-Roopvad-Sanrachanaevad-UttarSanrachanaevad-Uttar Adhunikavadi - discourses - StreeVimarsh-ParstitikVimarsh - Dalit Vimarsh

## Unit IV

### History of Hindi Language & Structural Grammar

#### Module 1.

- Hindi ki Aithikasik Prushtabhumi-Bhashik Swaroop-Hindi ka Vyavaharik Kshetr-Lipi ka Udbhav aur Vikas-Devnagari Lipi Ka Vikas

#### Module 2.

- Hindi Vyakaran - sagya - Sarvnam - Visheshan - Avyay - Karak - Vachan - Ling-Kal-Vachya-Vakya ke Prakar-Sandhi-Samas-Hindi ke Pramukh Vaiyakaranik-Pramukh Vyakaran Granth

## Unit V

### Western and Eastern Literary Thoughts, Prosody & Poetics

#### Module 1.

- Paschatya Kavya Sastra-Plato- kala Satya-Kavya srijan-Kavya prasoot Bhav pravanata-Samaj par Natak ka Prabhav-Anukaran Sidhant -Arastu-Trasadi-Virechan (Katharsis) Swaroop evum Avadharana-Virechan aur Rasa-longinus-Udath Tatwa-Dante ka Sahityik Drishtikon-Sar Philip Sidney-Ben Johnson-Sastravadi Drishtikon-John Draidon-Abhijatyavadi-Alexander Pop-Navsastravadi Dr Samuel Johnson-Wordsworth-Prakriti ke Kavi-Colridge-



Kalpana ki Parikalpana- Walter peter- Saileegat Avdharana-Karl Marx-Froyed,Edler evum Yung-Kroche-Abhivyanjanavad-Mathew Arnold- T S Eliot

### Module 2.

- Bharateeya Kavya Sastra- -Pramukh Kavya Sidhant-Bharat ka Rassootra-vibhinn vidvanon ki Ras Sanbandhee Avdharana-Bhamah,Udbhat aur Rudrat ka Alankar Sidhant-Dandi ka Gun Sidhant-Vaman ka Reeti Sidhant-Kuntak ka Vakrokti Sidhant-Kshemendra Ka Aouchtya Sidhant-Anand Vardhan Ka Dwani Sidhant

### Module 3.

- Popular Chands -Doha-Choupayee-Rola-Soratta-Barvi-Indravajra Upendravajra-Vasantathilaka-Mandakranta-Popular Alankaras - Anupras - Yamak - Shlesh - Vakrokti - Upama - Roopak - Utpreksha - Vyatirek - Virodhabhas - Apahnuti-manvikaran - Visheshan - Viparyay - Kavya Sambandhee vividh avdharanayen-kavya ke vividh roop-Prabandh Kavya-Muktak Kavya

## Unit VI

### Functional Hindi, Translation & Linguistics

#### Module 1.

- Prayojanmoolak Hindi-Swaroop evum Avdharana-Hindi ke Vividh Roop-Rajbhasha-Rashtrbhasha-vyavaharik Bhasha-Rajbhasha Niyam-Paribhashik Shabdavali ke niyam-Hindi Computing-Hindi ke software packages-Hindi ke Internet Portals-Patrarakita Udbhav aur Vikas-Samachar-Sankalan-Avataran-Vishleshan

#### Module 2.

- Anuvad-Paribhasha-Anuvad ke Prakar-Anuvadak ke Gun-Dubhashiye ki Katinayian-Paribhashik shabdavali ke liye anivarya gun-Masheeni Anuvad-Medical Transription ki Avdharnayen

### Module 3.

- Sabdvigyan - Dhwanivigyan - Roopvigyan - Vakyavigyan - Arthvigyan-Sahitya ke Adhyayan mein Bhasha Vigyan ke Angon ki Upayogita-Vagyantra ke Avayav-Balaghat-Suraghat

## 14. History

### Unit I Historical Method

#### Module 1.

- History as an epistemology of the Past Meaning and scope – various definitions – A social science discipline or part of humanities ?

#### Module 2.

- Inter disciplinarity – The generation of ideology, subjectivity, objectivity and truth

#### Module 3.

- Basic tools and techniques of research. Sources (various kinds) – Methods of authentication – Criticism: internal, external – Textual analysis

#### Module 4.

- Conceptualization – Hypothesis – Presenting an argument – Causation – Generalization (different types) – Frameworks of analysis (Social and Political theories)

#### Module 5.

- Cauterization – citation of sources – Accessories: maps, diagrams, graphs, tables, illustrations – Glossary – Bibliography – Indices – appendices

### Unit II Historiography

#### Module 1.

- Historical writings in Ancient India : Vedic texts (Historical consciousness) – Buddhist and Jain Texts – Itihasa Purana – Prasasthis – Dynastic Chronicles – Vamsa Charitas



**Module 2.**

- Trends during the Medieval Period: Arab and Turko-Persian traditions - Regional historical writings - Mughal historiography

**Module 3.**

- Colonial construction of India - Ethnography - Census - Administrative History - Manuals - Surveys and Gazetteers

**Module 4.**

- Nationalist approaches - Neo Colonial writings (Elitist approach, Cambridge school) - Indian Marxist Historiography - Subaltern historiography

**Module 5.**

- Greco - Roman historiography - Medieval historiography - Developments during the Enlightenment

**Module 6.**

- Historical Materialism (Hegel, Karl Marx, Antonio Gramsci) - Structuralist approaches - The Annales School - Sociological theories (Weber, Durkheim, Pierre Bourdieu)

**Module 7.**

- Contemporary Trends : Michel Foucault (History as Discourse, History of Power) - Edward Said (Orientalism) - New Historicism - Post Modernism and History - Gender Studies - Dalit Studies in India.

**Unit III  
Kerala History**

**Module 1.**

- Geography of early Kerala - Patterns of Habitat and settlements - The Stone Ages, Megaliths, different phases - Iron Age.

**Module 2.**

- Society as represented in early Tamil writings - cattle raids and wars - chieftaincies - Ecozones (Tinai) - Nature of exchange - Foreign Trade

**Module 3.**

- Dissolution of early social systems - Expansion of organized agriculture, 32

Brahman settlements - Political consolidation under the Perumals - Autocracy or oligarchy? - Nature of land ownership (Dewaswam, Brahmaswam) - Karanmai systems - Adimai form of labour - Trade relations - guilds and emporia - various taxes - Language, literature and cultural contributions

**Module 4.**

- Breakup of kingdom and the rise of medieval principalities - Swarupam Polity - Economic production - The Jati System - Trade with European powers - Changing functions of temples and the rise of Bhakthi.

**Module 5.**

- Manipravala and growth of Malayalam literature - Temple Arts.

**Module 6.**

- European rivalry for supremacy - Mysorean invasions - Establishment of British Colonial power - Early resistance.

**Module 7.**

- Land revenue policies - Mistaken notions - Popular resistance and their suppression.

**Module 8.**

- Rise of new classes - spread of education - intellectual awakening - colonial modernity? Reforms: Social, religions - Increasing Social Mobility

**Module 9.**

- Towards Freedom: Struggle for Responsible government in Travancore and Cochin - National Movement in Malabar

**Module 10.**

- Nationality problem in Kerala - formation of state - Land reforms and end of Jenmy System - Expansion of education - Kerala's development experience": its historical roots, sustainability - Migrant labour and post liberalization scenario - Decline of agriculture

**Module 11.**

- Political experiments - coalition governments - Decentralisation and Panchayati Raj - Women in politics

**Module 12.**

- Movements of the marginalized - Debates about development and the environment - Ecological concerns (Silent Valley, Plachimada, Depletion of Marine resources) - Waste generation and its disposal - Debates on Western Ghats

### Unit IV Ancient and Medieval Indian History

**Module 1.**

- Stone Age Cultures - Harappan Civilization - State and Society in Harappa - City Planning - Craft and Technology - Trade - Religions beliefs - Debates about the decline of Harappan Civilization

**Module 2.**

- Vedic period - Genesis of the term Aryan, language or race? The PGW culture - NBPW - Political organization - Pastoral economy and its later changes - Upanishadic world

**Module 3.**

- Persian and Macedonian Invasions - Emergency of monarchy in North India - Mahajanapadas - The First Magadha Empire - Expansion of agriculture - The Nandas - Growth of Varna System - Gandhara Art

**Module 4.**

- Establishment of Mauryan empire - Nature of Mauryan State (Recent Interpretations) - Social functions of Asoka's Dharma - Debates about the decline of the Mauryan Empire - Growth of mercantile classes and urban centers - Buddhism and Jainism - Satavahanas

**Module 5.**

- Consolidation under the Guptas - System of Administration - Developments in Science

and Technology - Literature and Art - Bhagavatism - Devolution or decentralization?

**Module 6.**

- Political fragmentation after the Guptas - Harshavardhana - Land grants and agrarian expansion - Decline of trade and Urban decay - Social crisis and Kali - Indian Feudalism? - Foreign Military incursions to northern India

**Module 7.**

- Medieval India - Rise of Rajput states - Society and Culture - Establishment of Delhi Sultanate - the nobility - the Ulema - Bhakti movement - Sufism - Art and architecture

**Module 8.**

- Classification of land : Iqta, Jagir - Revenue settlement - Irrigation - Craft production - Trade and monetization of economy

**Module 9.**

- South Indian kingdoms - Nature of polity - Segmentary State? - Chalukyas of Vatapi - Pallavas of Kanchi - The Rashtrakutas - Land revenue system under the Chola - Tank irrigation - Pandy of Madura - Landlordisms and Tenurial relations under the Vijayanagara

**Module 10.**

- The Bahmani Kingdom - Accounts of foreign travelers - impact of Islam

**Module 11.**

- Establishment of Mughal empire - Administration and growth of a bureaucracy - Nature of State: Autocratic Patrimonial Bureaucratic, Military, Theocratic? - Agrarian Economy: Mansabdari, Jagirdari Systems - Guilds: craft and artisan - Banking and Monetary mechanisms - Art and Architecture - Historiography during the Mughal period - Centre Periphery thesis



## Unit V Modern Indian History

### Module 1.

- 18<sup>th</sup> Century India – Important states : The Marathas – The Rajputs – The Sikhs – Growth of British Power – British Economic Policies till 1857 – Civil Rebellions

### Module 2.

- 1857 uprising – various interpretations – Tribal and other resistance movements

### Module 3

- Colonial Modernity? 19<sup>th</sup> Century thinkers and their understanding of Indian reality – Social and Religious Reform – Ram Mohan Roy – Derozio – Jyotiba Phule – Arya Samaj – Veerasalingam – Ramakrishna Mission – Vivekananda – Aligarh Movement – Theosophical Society – Changing Notions of Womenhood.

### Module 4.

- Instruments of social change – Evangelical Agencies – Education – Growth of a ‘middle class’ – creation of a public sphere

### Module 5.

- Indian as a colonial economy – Growth of plantations – Commercialization of agriculture – Drain of wealth – Deindustrialization – Famines – Impact

### Module 6.

- Rise of National consciousness – Early political organizations – Indian National Congress – Constitutional methods of agitation, 1905-1920 – Different phases – Non Cooperation Movement – Gandhian techniques – Revolutionary Terrorism – Bhagat Singh – Civil Disobedience Movement – Growth of socialism – Peasant and working class movement – Dr. Ambedkar, EV Ramasamy Naicker – Growth of communalism.

### Module 7.

- British legislative interventions and their impact (Acts of 1909, 1919 and 1935).

### Module 8.

- The Second World War and the national movement – The Quit India Movement, Subash Chandra Bose and INA – Postwar developments – Cabinet Mission – Peasant struggles, popular pressure or transfer of power? – Historiographic debates – Legacies of the national movement.

### Module 9.

- Integration of Princely States – Nehruvian Model – Planning for a new India – Features of India’s Foreign Policy.

### Module 10.

- Industrialization – Growth of Agriculture and Green Revolution – Educational Progress – Science and Technology.

### Module 11.

- Political developments after Nehru – Indira Gandhi and the declaration of internal emergency – Rise of regional political parties – Coalition experiments.

### Module 12.

- New Education Policy – Economic Reforms since 1991 – The Adivasi question – Environmental struggles – Reservation policy and Mandal Commission – Communal mobilizations – changes in foreign policy.

## Unit VI Select Themes World History

### Module 1.

- Bronze Age Civilizations: Nature of Egyptian Political Power – Religious beliefs and rituals – Trade and Urban centers in ancient Sumeria – Judicial administration in ancient Babylonia – Hammurabi – Military organization in ancient Assyria – Phoenician trade.

**Module 2.**

- Greco-Roman and Judeo Christian foundations – Rise of Islam – Caliphate – Feudalism in Europe: Features – Debates about transition to capitalism – Christian church organizations – cultural legacies of medieval period.

**Module 3.**

- Rise of nation states – Voyage of exploration and discovery – Renaissance – Reformation – the new science

**Module 4.**

- Commercial revolution – Mercantilism – Instruments of Monetary transactions – changes in agriculture.

**Module 5.**

- Rise of capitalism – The Age of Reason – Enlightenment thinkers of the 18<sup>th</sup> century.

**Module 6.**

- Industrial and agrarian revolutions – Technological progress – Social consequences.

**Module 7.**

- Modern revolutions: English, American, French, Russian and Chinese.

**Module 8.**

- Imperialism and the struggle for colonies – scramble for Africa – the Far East, 1870-1918

**Module 9.**

- The first World War–League of Nations – Dictatorships in Europe.

**Module 10.**

- Anti colonial struggles: China, Vietnam, Africa, and Latin America – Different strategies .

**Module 11.**

- United Nations Organization – Post World War politics and the quest for Hegemony – Decolonization – Cold war –Dissarmament and arms control – Oil and geo politics -

Bipolar world to Unipolar world – Dominance of Finance Capital: The World Bank and the International Monetary Fund – Economic integration of Europe – North-South dialogue - Liberalization, Privatization and Globalization – BRICS – ‘Arab Spring’ – Post Cold war world.

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## 15. Home Science

**Unit I****Human Development and Family Relations****Module 1.**

- Child Development : definition, significance, scope, contemporary research., Methods of child study, Theories of child development, psychoanalytic theory, learning theory, conditioning, cognitive theory- Freud, Pavlov, Watson, Skinner, Piaget .
- Growth and development: definition, principles, stages/ life cycle, areas of development, influencing factors (heredity and environment), mile stones, developmental tasks, growth spurt, sensitive and critical periods in development.

**Module 2. Human Development**

- life cycle approach- period, stages, characteristics, significance, needs, care of each stage - Prenatal, natal, neonatal, infancy and babyhood, early childhood, late childhood, adolescence-( pre, early and late), youth, adulthood, middle age, elderly.

**Module 3.**

- Problems and hazards in each stage of life cycle- Health issues-Prenatal-genetic, maternal, congenital, birthdefects, infections
- Natal- neonatal, infancy and child hood At risk babies, LBW, premature, multiple births, child hood ailments, accidents, infections, communicable diseases, nutritional



deficiencies, Barker's hypothesis. Developmental delays, handicaps Behavioural problems,

- Issues and concerns in Adolescence.-Health issues- obesity, under weight, anaemia in girls, STD/ Reproductive health problems. Eating disorders bulimia, anorexia nervosa.
- Social issues- Substance abuse, peer pressure, bullying, sexual abuse, delinquency, truancy, anti- social behavior
- mental health issues- anxiety, depression, suicide, phobia, identity crisis, defense mechanisms, projection, regression, repression, inhibition, substitution, rationalisation, poor self concept, lack of self confidence, and motivation identity crisis, poor performance and academic achievement, insecurity, hierarchy of needs relationship with adults family and peers.
- Youth and Adulthood- life style related diseases, reproductive health problems.-infertility, PCOD., menopause related, osteoarthritis, osteoporosis, psychosomatic disorders, personality disorders,
- Problems in old age-, health problems-physical, lack of appetite, digestive problems, Arthritis poor muscular control/ co-ordination, sensory, , dementia, Alzhimers, ailments and diseases ,, lack of civic amenities- transportation, recreation, housing, retirement and related issues, poverty, economic crisis,. Psycho social-Abuse, neglect, abandonment loneliness, death and bereavement.

#### **Module 4.**

- Other Issues faced by children-Gender disparities, adverse sex ratio, female foeticide, infanticide, child poverty, child marriage, child labour, child abuse, refugee children, street children, children of migrant workers, orphan children, abandoned children, traffic children, children in conflict with law, children of prostitutes, child sex

tourism, child pronography, children in disasters (natural and man made), children in substance abuse situation.

#### **Module 5.**

- Care. Food- breast feeding, weaning, food for preschool children, growing children, adolescent, adults and old age- nutritional needs, requirements , characteristics, , types, selection, modification of foods and diets,. Good food habits, wrong habits, modern trends, foods to be avoided.
- Health care- breast feeding- exclusive, predominant, bottle feeding, artificial feeding, complementary feeding, weaning. Infant milk substitutes, breast feeding promotion network in India (BPN), (GOBIFFF), Growth monitoring ORT, breast feeding ,immunization, family welfare, family education and food supplements (GOBIFFF), BPHI Arogyakiran, RSBY, RCH - definition, components, child survival, safe motherhood, adolescent care.
- Physical and mental care- habit formation, discipline Exercise, yoga practices, play, Recreation, aerobics, - counselling, need for providing guidance to children, parents and teachers. Mental health in children- Mal adjustments at home and school , Neurotic and psychotic behavior. Stress- major stressors in life. Stress in different stages of life, areas of stress, stress management in home, school and work place.

#### **Module 6.**

- Education- Early childhood education- preschool education- significance, objectives,major contributors, types, principles, pre requisites for preschools,qualities of a good teacher.
- School going children - modern trends, learning objectives, skills, indoor and outdoor activities. Play- significance, types, values, selection of play materials.



- Adolescents-significance, coeducation, life skill development, vocational guidance and education, preparation for economic independence and emotional independence. Career clinics.sex role identification, preparation for marriage and family relationship.
- Sex education- need and importance, areas to impart sex education, approaches-deviation, STD.
- Value education- civic sense, aesthetic appreciation, creativity, role of parents, family and teachers in inculcating values, attitudes, behavior and personality in children.

#### Module 7.

- Differently abled children- changing terminology, definition, classification, characteristics, causes, diagnosis, detection, manifestations- psychosocial problems-physically and, sensory challenged- visually impaired, hearing impairment, speech impairment. Mental- retardation, gifted, autism, hyperactivity, learning disability, emotionally disturbed, socially maladjusted – Juvenile delinquency- truancy, antisocial elements ,prevention, care and treatment,special needs, special education as per need, protection and management methods.Theraputic guidance and counseling,preparation of parents,family members teachers and friends

#### Module 8. Marriage & Family Relations

- Marriage- significance, definition, functions,types, areas needing adjustments -family relationship, sex, parenthood, child care, finance, work participation, employment. Marital harmony, disharmony, crisis- divorce, separation, desertion, infidelity, infertility, mental illness.
- Family- definition, significance, types- family size, functions, roles of members-Traditional, modern and changing. Problems and crisis- illness, single parenthood, women headed family, family disintegration, children with problems. Parenthood-

responsibility, preparation, child caring and rearing practices, types, attitudes, methods, parental influence on children's behavior, value, attitude, outlook and personality,socialization in various family contexts in different cultures, population education.

#### Module 9. Advances & Assessment of children

- Detection- Foetal test, AGAR test, screening for abnormalities, ultra sound, amniocentesis, chronic villus sampling, test tube screening, stem cell assessment Ponderal index., Development assessment-growth monitoring, growth chart, Trivandrum developmental screening chart (TDSC), Eliz health path for adolescents and adults (EHP) protection- , cognitive test, Draw a man test, projective techniques-rorschach's ink blot, role play, sentence completion, , intellectual test, attitudinal test, aptitude tests achievement intervention, child apperception test.

#### Module 10.

- Supporting & Welfare programmes and organisations for care, protection and prevention- UIP, ICDS, CSSM, Minimum need programme. Twenty point programme, Immunisation programmes, pulse polio campaignings, IRDP, UBSP, Adult literacy Mission, IMCI, IMPCH, Nutritional supplementation- Midday meal, supplementation nutrition programmes, special nutritional supplementation- IDD, Vitamin A prophylaxis, anaemia control programme, Folic acid programme, IMCD, ASHA workers, anganwadi workers, NRHM, NPAG.RSBYS, Arogyakiranam, Programmes for differently abled, child guidance clinicschild help line, Helpage India, free education for school students ,special programmes for girl child, and girls of socially and economically backward children, FPAI, ICCW, KSCCW, NCERT, SCERT, ECCE, IAPE, NCPCR, CLF,



Intergrated programme for school chikdren  
Amma thotttil, Adoption programmes,  
NOAPS, National policy for older persons,  
Day care centres, mobile crèches, creative  
outletsm Prevention and protection through  
legislation for prenatal, after birth, childhood  
youth, adulthood, women, aged, Marriage,  
family, inheritance. Juvenile courts, Family  
courts.

## Unit II Food Science, Nutrition and Dietetics

### Module 1.

- History of food science, Basic five food groups (ICMR, 2011),. Nutritive value, composition, grading, selection, storage, products,. Beverages- alcoholic and non-alcoholic- energy contribution. Therapeutic contribution of spices and condiments. Pigments in foods. Recent advances in food science-Novel proteins, fabricated foods, textured foods, convenience foods, Ready to eat foods, sugar, fat and protein substitutes, rainbow nutrition. Anti nutritional factors in foods

### Module 2.

- Methods of cooking, Physical and physiochemical changes in food in relation to cookery- colloids, emulsions, stabilisers. Denaturation, gelatinization, dextrinization, rancidity. Hydrogenation, winterization, smoking. culinary roles and effect of heat on cereals, pulses, egg, meat, fish, poultry, fruits and vegetables Methods to improve nutritive value of foods- sprouting, malting, fermentation, roasting, browning, fortification, enrichment.. Transfats, Ageing, stages of sugar cookery, shortening agents, leavening agents.

### Module 3.

- Post harvest technology measures adopted by government to increase food production-

Green revolution, blue revolution, white revolution, yellow revolution, brown revolution, silver revolution. Agents causing food losses- physical and Role of Save Grain Campaign and FCI in preventing food losses. Food security bill, 2011. New packaging materials.

### Module 4.

- Food preservation -Methods- high temperature, low temperature, radiation, microwaves, preservation of cereals, pulses, egg, meat, fruits and vegetables. Food preservatives- natural and artificial, safe tolerance limits

### Module 5.

- Food adulteration - Types, adulterants, methods to detect adulteration, health hazards of adulteration, measures to prevent adulteration- FSSAI, New initiatives by Government of Kerala for having safe food - Operation Ruchi.

### Module 6.

- Food poisoning- Botulism, salmonellosis, Food spoilage by microbes, useful microbes- role of probiotics and prebiotics in health. Food fads and Fallacies. Food toxicants, Food additives, Food laws and standards, Food sanitation and quality control, nutrition labelling, misbranding, food testing laboratories.

### Module 7.

- History of nutrition. Macronutrients - Carbohydrate, Protein, Fat - classification, functions, metabolism, digestion, absorption, sources, RDA, deficiency. Inborn errors of carbohydrate, protein and fat metabolism. Micronutrients-
- Vitamins- Naming of vitamins, Fat soluble vitamins- Vitamin A, D, E, K. B complex vitamins- Vitamin B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, B<sub>5</sub>, B<sub>6</sub>, B<sub>8</sub>, B<sub>12</sub>, Folic acid, Biotin, Vitamin C - functions, sources, RDA, methods of assay, deficiency, toxicity, nutritional disorders and prevention.



- Minerals- calcium, phosphorus, iron.
- Trace elements - iodine, copper, zinc, selenium, cobalt, cadmium- historical background, functions, sources, deficiency, toxicity. Antioxidants, phyto chemicals.

#### Module 8.

- Fibre- classification, functions, sources, RDA, water in human nutrition.
- Water balance and imbalance.
- Electrolyte balance and imbalance.
- Energy balance, Total energy requirement- REE, BMR, Physical activity, SDA, Estimation of energy expenditure- calorimetry- direct and indirect. Aerobic exercises and health. Role of phytochemicals in health. Interrelationship between nutrients.

#### Module 9.

- Introduction to Dietetics- Registered dietitian, RDA (ICMR, 2011) for different age groups activities and socioeconomic status,. Normal diets for all age groups. Maternal and child nutrition. Food habits, eating disorders , Therapeutic & Hospital diets- Full fluid diet, clear fluid diet, soft diet. Tube feeding, Parenteral feeding. Nutrition, physical, biochemical changes and Medical nutrition therapy for febrile conditions, energy balance- obesity, underweight, PEM. Deficiency disorders, Infectious diseases, Upper gastrointestinal tract diseases- peptic ulcer, gastric surgery, lower gastrointestinal tract diseases- constipation, diarrhoea, steatorrhoea, Disease of large intestine- diverticular disease, irritable bowel syndrome. Hepato - biliary tract disease- hepatitis, cirrhosis, hepatic coma. Gall bladder and Pancreas- cholelithiasis, cholecystitis, pancreatitis. Kidney diseases- Nephritis, Nephrosis, Renal failure, Dialysis, Transplantation. Auto immune disorders, AIDS, Life style diseases- diabetes- IDDM, NIDDM, hypertension, cardiovascular

diseases. atherosclerosis, cancer. AIDS, food allergies, malabsorptive syndromes and intolerance.

#### Module 10.

- Paediatric Nutrition- LBW babies, premature babies- characteristics, complications, feeding pattern. Organ function test- Gastric, Liver and Kidney. Hemoglobiopathies. Assessment of nutritional status (ABCD) of adults (Direct and Indirect), infants. Subjective Global Assessment (SGA)

### Unit III

#### Family Resources Management

##### Module 1.

- Introduction to Home Management- concept and scope of home management. Steps in Management process. Goals, Values, Standards. Decision making- types and process. Conflict resolution.

##### Module 2.

- Family Resources- meaning, basic characteristics and classification. Demands upon resources- family life cycle approach. Factors influencing resources management. Methods of utilization of resources. Management of time and energy- Significance. Time Schedule. Fatigue- types, causative factors and alleviating techniques. Management of money- Family income- types and sources. Family budget- types, steps in making budget. Engel's Law of Consumption. Financial records- types, purpose. Savings and Investments- institutions and schemes.

##### Module 3.

- Work simplification- meaning and techniques. Mundell's classes of changes. Basics of Time and Motion study- Pathway chart, Process chart, Operation chart. Labour saving gadgets- importance, selection, use and care. Concept of Ergonomics-



importance and application of ergonomic principles in selected areas- kitchen design, for the differently abled.

**Module 4.**

- Common household equipments- major and small electrical equipments and non-electrical equipments- selection, use and care. Indigenous equipments- janatha refrigerator, hay box, smokeless chulah. Hi-tech equipments- trends and possibilities.

**Module 5.**

- Renewable energy – meaning, sources- solar, wind, wave, geothermal, biogas. Devices- solar cooker, biogas plants. Waste- types, management techniques- domestic, institutional and community. Five R’s of waste management.

**Module 6.**

- Housing-Principles of planning family houses, approaches to housing, low cost housing strategies, low cost building materials. Housing designs and Standards. Modular designs. Housing finance- sources, adequacy and limitations. Cost reduction techniques. Contemporary trends in housing.

**Module 7.**

- Home maker as a Consumer-problems, rights and responsibilities, redressal/ grievance cell and procedures. Consumer protection and pertaining laws. Consumer education. Functions of consumer forum and court. Standardisation and Labelling. Advertisement- importance, role and effect on the consumers.

**Module 8.**

- Interior Designing- Elements, Principles and Applications- house and apparels. Prang Colour Wheel- colour schemes, qualities of colour. Aspects of Interior decoration- furniture arrangement, soft furnishings, window decorations, accessories, flower arrangements- types and styles, home lighting- requirement, types.

**Module 9.**

- Space designing and space organisation- meaning, types. Creating a life space- personal life space, factors and goals in planning a space. Classification of life space. Internal and external space organisation. Principles of Architecture- types. Architectural forms of different periods- Egyptian, Greek, Gothic, Roman, Renaissance, Indian- ancient and modern, Kerala- ancient and modern.

**Module 10.**

- Land scaping- scope and importance of land scaping. Elements, principles and components of landscaping. Soil- texture, composition, types, pH, preparation of beds. Propagation of plants- methods, Potting, repotting and transplantation, Watering- methods and fertilizer use, After-care of plants. Indoor gardens. Contemporary trends in landscaping.

**Unit IV  
Textile Science  
and Fashion Designing**

**Module 1. Study of Fibres**

- Definition, primary, secondary and miscellaneous properties and classification. Production, properties and uses of Textile fibres- Cotton linen, wool, silk, rayon, nylon, and polyester. Methods of identification of textile fibres.

**Module 2. Study of yarns**

- Definition, process of making fibre in to yarn- Hand, Mechanical-Conventional-Ring spinning, Direct-open end spinning and chemical. Classification of yarns-Types - simple, complex, textured, bi-component, biconstituent and blends, Twist, 4Count .

**Module 3. Fabric structure**

- Weaving- Loom parts and its operations,  
• types of loom- projectile, rapier and jet loom.



- Basic weaves- Plain, twill and satin. Fancy Weaves-, Jacquard, dobby, lappet, clip spot, swivel, crepe and double cloth.
- Characteristics of woven fabrics –warp and weft, grain, selvedge, thread count and balance.
- Other methods of fabric construction- Knitting, Felting, Lace making, Laminating, bonding, and Braiding

#### Module 4. Dyeing, Printing and Finishes

- Classification of dyes Natural, Artificial-acid, basic, disperses, vat, naphthol, pigment, sulphur, and mordant. Methods of dyeing-stock, yarn, piece, product, cross and union dyeing-Types- beam, jig, winch, and jet.
- Printing:-Direct- Roller, Block, Screen, Stencil and Spray painting. Resist- Tie & dye, Batik and Discharge.
- Finishes:- Definition ,purpose, classification, and types-singeing, bleaching, mercerization, calendaring, shrinkage control, sanforizing, crabbing, beetling, sizing, weighting, shearing, fulling, schrienerizing, crepe, Special finishes-water proofing, flame proofing ,and anti bacterial finish.

#### Module 5. Testing and Care of fabrics

- Testing of fibres, yarns, and fabric and importance of quality control and research institutions. Textile labeling, brand names, quality marks, registered trademarks, eco-marks, aftercare characteristics, labels, symbols and applications. Care of clothes, laundering different types of clothes, cleaning agents-methods of removing different types of stains.

#### Module 6.

- Fashion:- Definition, concept, trend, style, classic, fad and silhouette. Principles, factors affecting fashion, fashion life cycle and Role of a fashion designer.

#### Module 7.

- Elements and Principles of garment designing:- Psychosocial aspect of clothing,

clothing and wears, Personality factors and clothing choices.

#### Module 8.

- **Traditional Textiles and Embroideries of India:-** Kashmiri shawl, Kashmiri Embroidery, Phulkari, Kanthas of Bengal, Jamdani, Brocades of Varanasi, Himru & Amru, Tancoi Silk, Chanderi saree, Kanchipuram silk, Chikankari of Uttar Pradesh, Ikat of Gujarat and Pochampally, Patola of Gujarat, Chamba roomal ,Tenia roomal, Paithani Srees, Kutch Embroidery, Mysore silk, Applique work of Andrapradesh, Kasuti Ebroidery of Karnataka and Banjara Embroidery.

#### Module 9.

- **Pattern making and Garment Construction:-** Knowledge of basic process of garment construction- Tools and equipment for measuring, marking, cutting, pressing and finishing. Sewing machine- parts, operation and care. Taking body measurements, Principles and techniques involved in pattern making - Drafting, Draping and Flat pattern- Lengthening and shortening, increase and decrease of waist line and bust line, problem figures- Broad and narrow shoulder and importance of pattern grading. Steps in garment construction- Preparing fabrics for construction- shrinking and finishing, Marking, Cutting and Stitching- Seams, plackets, fasteners, collars, sleeves bias and its application.

#### Module 10.

- **Fashion marketing and Merchandising:-** Definition, Fashion marketing concept, fashion consumer behavior, 4 p's in Marketing. Fashion business and Merchandising, Merchandising steps, Role of Merchandiser.



## Unit V Extension and Development Communication

### Module 1. Extension Education & Social Change

- Meaning, definition, principles, objectives, philosophy. Social change- Conceptual analysis of society, rural and urban communities, social groups – classification of groups, nature, meaning and directions of social change.

### Module 2.

- Rural basic institutions & Democratic decentralisation: - School as an agency of social change. School – community relationship. Co-operatives and its types, Panchayat- principles of democratic decentralization- 3 tier system of Panchyathi Raj- evolution, set up and function at central, state, district, block, village levels. 73<sup>rd</sup> and 74<sup>th</sup> Amendments in the Constitution.

### Module 3.

- **Rural Development** – Approaches- concept, nature and purpose of administration in extension – meaning, types, principles, organisation, control and supervision, co-ordination and training. Leadership – types of leaders, Training institutes in Extension & Rural development- ETC, SIRD, NIRD.

### Module 4.

- Programmes in action: Ongoing programmes and services for poverty alleviation, economic empowerment, nutrition, health and upliftment programmes for women and children. New initiatives of Govt of Kerala for the empowerment of youth, women, children and elderly.

### Module 5.

- Extension Programme Planning – need, principles of programme building. Programme Development Cycle and its

components. Plan of work- components of a plan of work.

### Module 6.

- Motivation in Extension – meaning and methods of motivation, need for motivating people in extension work. Evaluation and feedback – need, criteria and methods of evaluation.

### Module 7.

- Adoption- Diffusion in Extension: Adoption – Diffusion- Innovation process in Extension- Stages of adoption – adopter categories.

### Module 8.

- Adult Education in Extension- need for adult education, planning, implementation, evaluation of adult education programmes. Concepts of formal, informal, non-formal, continuing and social education in functional literacy. Role of IAEA, NLM, TLC, NCERT, UGC, Directorate of Extension, ECCE, Continuing Education Centres, SRC in imparting adult education programmes.

### Module 9.

- Development Communication – meaning, types, elements and models of communication. Barriers in communication. Extension Methods – Individual, Group and Mass. Audio Visual aids- types, its uses in classroom teaching. Cone of experience; preparation of different audio- visual aids- their individual advantages and disadvantages. Advanced methods of communication – ETV/ criteria for assessing ETV. Role of ICT in Communication and Rural development.

### Module 10.

- Social problems and issues – Population education- concepts and definitions, population explosion, illiteracy, unemployment, poverty. Social issues- alcoholism, prostitution, violence, suicide, drug abuse, RTI/STI, HIV/AIDS.



## Unit VI

### Research and Development in Family and Community Science

#### Module - 1. Research Methodology

- Types of research- basic, applied and action. Variables - independent and dependent, control and intervening. Sampling techniques- Random, systematic, stratified, purposive, cluster samplings. Methods and tools - Observation, Interview, Survey, Experimental, Clinical.
- Observation, Interview schedule, questionnaire, rating scales, attitude scale. Objectives - definition, significance, Hypothesis- meaning, importance, types- null and alternative.

#### Module 2. Statistics in Home Science

##### Research:

- Measures of central tendency - average, mean median, mode, quartile, percentile, range, SD. Data Collection - pilot study, primary and secondary data. Basic Statistical tools in data interpretation- t-test, ANOVA, chi square, Z test, correlation.

#### Module 3. Scientific Writing

- Different forms of scientific writing- articles in journals, research notes and reports, review articles, monographs, dissertations, bibliography, book chapters and articles. Parts of Research report- introduction, review of literature, methodology, result and discussion, summary and conclusion, abstract, reference. Graphs, tables, histograms, pie diagrams.

#### Module 4. Developmental trends and issues-

- Indicators of development in Kerala - Demographic profile- vital statistics, literacy rate, HDI, GDP, per capita income, poverty- BPL & APL families, environmental sanitation.
- Community health and nutritional status- life expectancy, morbidity, maternal and

child health, baby friendly hospitals, neonatal clinics, mental health clinics, adolescent clubs, RCH, adolescent health, youth, adult and geriatric health care .

- Women empowerment- Education, Employment- Organized and Unorganized sectors, economic independence, legal literacy, Organizational support- SHGs and Microcredit- Kudumbasree, Mahila Samakya Society, KSWDC.
- Entrepreneurship and its development- definition, types, characteristics, factors affecting entrepreneurial growth - economic, social, cultural and personal factors. Role of SIDCO, IDBI, KITCO, SEWA, KSIDC, SIETI, KVIC, SSI.
- Developmental Issues: -Unemployment, Migration from other places, decrease in agricultural production. Insufficient care homes and day care centres for children and elderly.

#### Module 5. New trends in Human development

- Management of differently abled children, Life skill education, guidance and counseling in schools., career clinics, school counselors, special and innovative approaches with children, Transactional analysis, play therapy, music therapy, art therapy, biblio therapy, horticultural therapy, yoga and meditation, stress management techniques, , aptitude tests, performance tests, advances in detection and assessment of problems ,stem cell detection and therapy

#### Module 6. New trends in Textiles

- Textile fibres- coolmax, thermostat, lycra, oasisfibre, tactel, lyorell, lencell. Eco friendly fibres - organic cotton, jute, bamboo, banana, flax, eco friendly dyes. Fabrics- Medicine / Ayur fabrics, Nano fabrics, Technical fabrics, Anti microbial fabrics.

#### Module 7. New trends in Communication

- Information kiosks, interactive video and tele conferencing, tele text, virtual learning, tech talks, pod cast, multimedia presentations,



smart classes, e-learning and e-resources. Cyber Extension – definition, advantages and limitations.

**Module 8. Nutritional Advances**

- Nano foods, Zero calorie foods, GM foods, Fortified foods, Nutrigenomics, Nutrigenetics, Neutraceuticals. Defence, High altitude nutrition, Space and Sports Nutrition.

**Module 9. New trends in Resource**

Management

- Modular kitchen, ergonomic furniture’s for home, school, institutions and community. Modern trends in landscaping, window decorations and furnishings and accessories. Recent trends in housing – green housing, geriatric housing.

**Module 10. Eco concerns and Management**

- Pollution- soil, land, air, water, noise. Waste- Unscientific Agricultural practices- Green house effect, global warming, major health hazard. Water management, Environmental protection- practices and programmes, Organic farming, safe food, environmental protection programmes.

**Module 3. Prophet at Madinah**

- Muhajirs and Ansars- Medinah Charter- Battles of the Prophet- Truce of Hudaibiyah- Victory over Makkah- Farewell Sermon- Prophet as a statesman

**Module 4. Principles of Islam**

- Articles of faith and Obligatory duties- Socio-political and Economic concepts-Principle of unity, equality and brotherhood- Status of Women in Islam

**Module 5. The caliphate**

- Evolution of Islamic republic -the caliphate- election of Abu Bakr-caliphal address- Apostasy movement and Riddah wars- Compilation of the Holy Qur’an

**Module 6. Caliph Umar**

- Nomination to caliphate- Political expansion at Byzantine and Persian provinces- Darul Sulh and treaty of Jerusalem- Administrative innovations - Consolidation of the republic

**Module 7. Caliph Uthman**

- Collegium and election to caliphate- Centrifugal tendencies- The Sabites and assassination of uthman- standardization of Qur’an- Formation of navy-

**Module 8. Caliph Ali**

- Assumption of caliphate – civil disturbances- Jamal and Siffin- Arbitration of Adhurh- origin of Kharijites-Shiism – Assassination of Ali

**Module 9. Political Philosophy of Islam**

- Caliph as the vicegerent of God- sovereignty of Allah- Bay’ath and Shurah council as democratic manifestation

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**16. Islamic History**

**Unit I**

**Islam Under the Prophet and Pious Caliphs**

**Module. I :- Arabia, the Cradle of Semites .**

- Geographical features of Arabia-Ayyam al Arab – The Jahiliyah days – The Bedouin Life-pre Islamic poetry-Mua’llaqat -Status of women - Makkah and Ka’aba-Arabs as Semites

**Module 2. Era of Prophet Muhammed**

- Ancestry- Early Life- Harb al Fijar- Reconstruction of Ka’aba- Commencement of the mission- Opposition- Hijrah

**Unit II**

**Muslim dynasties of the Middle Ages**

**Module 1. The Umayyads**

- Establishment of the dynasty- Mu’awiyah- period of political transition – administration



and achievements- Battle of Karbala- Abdul Malik and Arabicization policy- Walid I and political expansion- Umer Ibn Abdul Aziz- Battle of Zab

### Module 2. The Abbasids

- Emergence of the dynasty- Abul Abbas Assafah – Al Mansur and consolidation of the empire-
- Foundation of Baghdad- Harun al Rashid- Bermakids- Al Ma'mun- Baithul Hikmah- Mu'tazilites- Al Mutawakkil- social stratification- Ulema- Mawalis and dhimmis - Invasion of Hulagu and end of the dynasty

### Module 3. Petty dynasties

- The Aghlabids- Conquest of Sicily- Arab Norman Culture- Tahirids- Safarids – Samanids- Safavids -Gaznawids- Buwayhids- Seljuqs- Fatimids- Ayyubids- Crusades- Mamluks

### Module 4. Muslim rule in Europe

- Tariq Ibn Ziyad and conquest of Spain- Battle of Tours- Umayyad Amirate in Spain- Abdurrahman I, II & III, Hakkam II - Learning centres- Cordova- Seville- Toledo

### Module 5. Petty dynasties in Spain

- Muwahhids- Murabites- Nasrids- Fall of Granada -reconquista

### Module 6. The Ottomans

- Origin- Age of Ghazis- Muhammed II- Conquest of Constantinople- Salim I and assumption of caliphate- Suleiman the Magnificent- Mahmud II- Abdul Majid and Tanzimat Reforms- Abdul Hamid II and constitutional experiment -the Young Turks

### Module 7. The Ottoman systems and institutions

- Devsirme- Kapikulu- Yeni Cherri- Vakayi Hayriye- Top Kapu Saray- Rumeli Hizar- Sheikhul Islam- Beyler Beys- Koprulus- Millet administration-

## Unit III

### Intellectual contributions of Medieval Islam

#### Module 1. Religious Science

- Tafsir literature – Hadith literature – Sihah-sitta- Schools of Jurisprudence

#### Module 2. Language and literature

- Arabic grammar- Qitab al A'yn- Al Jahis- Arabian Nights- Qaleelah wa Dimnah- Shah namah- Ibn zaydun- Muwashshah- Al Burdah-

#### Module 3. Philosophy and Education

- Eminent Philosophers- Al Kindi- Al Farabi- Al Mawardi- Ibn Sina- Al Razi- Imam Gazzali- Ibn Rushd – Ibn Maymun- Ibn al Arabi- Nazeruddin Tusi- Jalaludhin Rumi
- Translation Bureau- Baithul Hikmah- Darul Hikmah- Madrassah Nizamiya- University of Cordova- Al Azhar university

#### Module 4. Mathematics and astronomy

- Algebra and Arabic numerals - Al Fazari- Thabith Ibn Qurrah- Al Battani- Al Beruni - Umar al Qayyam- Al Khawarizmi- Al Majriti- Al Zarqali-

#### Module 5. Medicine and Natural Science

- Gibriel Ibn Bakthishu- Ophthalmology- Hunayn Ibn Ishaq- Yuhanna Ibn Masawiyah- Ali al Tabari- Al Razi- Al Majusi- Ibn Sina- Al Zahrawi- Ibn Zuhr
- Botany- Ibn al Baythar and al Ghafiqi- Zoology- al Jahiz

#### Module 6. Physical Science and Geography

- Alchemy- Jabir Ibn Hayyan – Physics- Ibn al Haytam – father of Optics- Al- Jazari- Geography-
- World cupola – Al Maqrisi- Yaqut- Al Bakri- al Idrisi- Ibn Jubair- Al Mazini- Ibn Batutta-

#### Module 7. Historiography

- Forms of Muslim historiography- Khaber- Maghazi- Sirah- Hauliyyath- Tabaqat-
- Early historians- Ibn Ishaq- Ibn Hisham- Al Waqidi- Al Baladhuri- Al Tabari- Al Masudi-



Ibn Khaldun-Amir Khusrau- Al Barani-  
Abul Fazl-Badauni- Khafi Khan- Sheikh  
Zaynuddin Maqdoom

#### Module 8. Art and Architecture

- Mosque of Al Madinah- Dome of the rock-  
the Umayyad Mosque -Qaysr al Amrah-Bab  
al dahab- al Qubbah al Qadrah- The Rusafah  
Palace-Al Zahrah Palace- Al Cazar- Al  
hamrah- Al Azhar Mosque- Calligraphy-  
painting- Music-

### Unit IV

#### Reform and Revivalist Movements in Islam

##### Module 1. Reformers of West Asia and Magh'rib

- Ibn Taymiyah-Mohammed Abduh- Rashid  
Rida- Ayatullah Qumeini- Ali Shariati

##### Module 2. Reformers of Indian sub-continent

- Shah Waliyullah- Syed Ahmed Shahid- Sir  
Syed Ahmed Khan- Sir Mohammed Iqbal -

##### Module 3. Reform Movements

- Wahabi Movement-Pan Islamism-Sanusi  
Movement- Ikhawan al Muslimun- Darul  
Uloom Deoband-Tabligh Jamaat-Ahl e  
Hadith-Jamaat e Islami- - En Nahda

##### Module 4. Movements and Leaders in Kerala

- Makhdums of Ponnani- Mamburam  
Tangals- - Umar Qadi- Sana'ullah Makti  
tungal- Ali Musaliyar- Hamadani Tungal-  
Chalilakathu Kunjahammad Haji-Vakkom  
Abdul Khader Moulavi-Mohammed Abdul  
Rahman Sahib- E. Moidu moulavi- Vakkom  
Abdul Khader

##### Module 5. Islamic Feminism

- Debates on Male domination, Polygamy,  
divorce , Hijab,public and political  
participation of women- Qasim Amin-  
Fatima Mernissi- Amina Wadud

### Unit V Islam in India

#### Module 1. Advent of Islam in India

- Indo-Arab trade relations-Cheraman  
perumal Tradition- Malik Ibn Dinar-Early  
Mosques-Conquest of Sindh-

#### Module 2. The Sultanate Period

- Ghaznavids- Ghorids- Qutbudin Aibek-  
Balban -Alauddin Khilji- Muhammed bin  
Tughluq- Firoz Shah Tughluq- Ibrahim Lodi-  
Bahmani Kingdom- sufism and Bhakti  
movement

#### Module 3. The Mughals

- Battle of Panipat- Babur- Humayun- Sher  
Shah- Akbar- Shah Jahan- Aurangzeb-  
society and Polity under the Mughals-  
Mansabdari system - Art and Architecture-  
Impact of Islam on Indian society-Decline of  
the empire

#### Module 4. Muslims in anti-colonial struggle

- Battle of Plassey- Siraj ud dawlal- Battle of  
Buxar- Faraidi movement- Revolt of 1857-  
Bahadur Shah Zafar- Indian National  
Congress -Partition of Bengal- Muslim  
League- Muhammed Ali Jinnah -Lucknow  
Pact -Khilafat-non Co-operation Movement-  
Ali brothers -- Nehru Report and 14 Points-  
Khan Abdul Ghaffar Khan- Choudhari  
Rahmat Ali - Abul Kalam Azad -Lahore  
Resolution 1940- Cabinet Mission Plan-  
Indian Independence Act- Birth of Indian  
Union and Pakistan-

#### Module 5. Islam in Kerala

- The Portuguese , Zamorins , Ali Rajas and  
Kunjali Marakkars- The Mysorean interlude-  
British domination and Mappila outbreak-  
Malabar rebellion and Khilafat Movement-  
kerala Muslim Aikya Songhom- Islahi  
movement-Muslim League in Kerala  
Politics-

#### Module 6. Kerala Muslims- Cultural heritage

- Origin and development of Arabi-  
Malayalam- Mappila folk songs- Qazi



Mohammed- Moinkutty vaidyar- qur'an Translation –Mayankutty Ilayah- Mappila traditional art forms- Educational developments- Muslim initiatives in journalism

## Unit VI Modern and Contemporary Muslim World

### Module 1. Egypt

- Napoleon's invasion of Egypt- Mohammed Ali Pasha- Suez Canal- Egyptian Bankruptcy- British occupation of Egypt- Saad Zaghlul Pasha and Egyptian nationalism- Military coup of 1952- Formation of Republic – Jamal Abd al Nasser and Nationalization of Suez Canal- Anwar Sadat and Open Door policy- Hosni Mubaraq- Arab Spring

### Module 2. Palestine and Israel

- Zionism –Hussain-Mc Mohan Correspondence- Sykes-Picot agreement- Balfour declaration- First World War and mandate System- Establishment of Israel- Arab –Israeli wars- PLO and Yasser Arafat- Oslo Accord and PNA- Hamas and Intifadah

### Module 3. Iran

- Pahlavi Dynasty- Dr. Mohammed Mossadeq and nationalization of Oil industry- Iranian revolution of 1979- Ayatollah Qomeini- Islamic republic of Iran

### Module 4. Iraq

- Anglo-Iraqi treaty of 1922- Ba'ath party- military coup of 1958- Saddam Hussain- Iran- Iraq war- Gulf war- U S invasion on Iraq – fall of Saddam Hussain

### Module 5. Turkey

- First World War and Turkey- Dismemberment of Ottoman empire- Treaty of Sevres –Lausanne – Establishment of the republic- Mustafa Kemal and reforms- Post Kemalist Turkey-

### Module 6. Modern Arab States and organizations

- Formation of Trans-Jordan , Syria and Lebanon- establishment of the Kingdom of Saudi Arabia- Arab League- OIC- GCC- OPEC.

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## 17. Journalism

### Unit I Dimensions of Mass Communication

#### Module 1.

- Basics of Communication: Elements, Types and Process of Communication

#### Module 2

- Communication models of Aristotle, Lasswell, Shannon and Weaver, Osgood and Schramm, Dance, SMCR, Riley and Riley, Becker. Gate keeping /newsflow models.

#### Module 3

- Normative theories of the Press

#### Module 4

- Sociology of Communication, Individual differences, Social categories and Social relations perspectives

#### Module 5

- Psychology of Communication, Balance theories, Cognitive Dissonance theory

#### Module 6

- Theories on media effects, Cultivation theory; Stalagmite theory

#### Module 7

- Media Use patterns: Uses and gratifications theory; Ball-Rokeach and DeFluer's media system and dependency model

#### Module 8

- McCombs and Shaw's agenda-setting theory, Noelle-Nuemann's spiral of silence theory



**Module 9**

- Basic Theories of Learning

**Module 10**

- Definition of Development Communication, Concepts and perspectives of development, Basic indicators of development, Characteristics of developing societies.

**Module 11**

- Sustainable development. Ethical perspective of development.

**Module 12**

- Models of development: Adam Smith, Ricardo, Malthus, Rostow, Marx, Mahatma Gandhi, Dominant paradigm of development.

**Module 13**

- Development communication models of Lerner, Schramm, Rogers

**Module 14**

- Role of media in development communication

**Module 15**

- Development Communication in India: Indian experiments and experiences

**Module 16**

- Five year plans, decentralization of power, welfare projects, women empowerment

**Module 17**

- Role of traditional and folk media in development communication

**Module 18**

- Inter-cultural communication: definition-process-philosophical and functional dimensions

**Module 19**

- Cultural symbols in verbal and non-verbal communication

**Module 20**

- Contemporary communication issues at national and international levels

**Unit II  
Media History & Laws**

**Module 1**

- Origin and development of mass media in India

**Module 2**

- The Press in British India

**Module 3**

- Role of the Press in the freedom movement

**Module 4**

- Gandhi as a journalist

**Module 5**

- Pioneers of Indian journalism

**Module 6**

- Press in the independent India- press commissions and committees

**Module 7**

- Pioneers of Malayalam journalism

**Module 8**

- Brief history of mass media in Kerala

**Module 9**

- Constitution of India; fundamental rights-freedom of speech and expression and their limits

**Module 10**

- Brief history of press laws in India

**Module 11**

- Contempt of Courts Act 1971- Civil and Criminal law of defamation - relevant provisions of Indian Penal Code with reference to sedition, crime against women and children; laws dealing with obscenity

**Module 12**

- Official Secrets Act, 1923, Right to Information- Press and Registration of Books Act, 1867.

**Module 13**

- Working Journalists and other Newspaper Employees (Conditions of Service & Miscellaneous Provisions), Wage Boards

**Module14**

- Intellectual Property Right legislations including Copyright Act, Trade Marks Act and Patent Act;

**Module15.**

- Cyber Laws

**Module16.**

- Laws related to film and television

**Module 17.**

- Media ethics and related issues.

**Module 18. International organizations and initiatives**

- UNESCO, McBride Commission, NANA Pool,
- NWICO, WanIFRA, IPI,ABC etc.

**Module 19. Indian organizations**

- IIMC, Press Council, INS, PII, RIND, RNI, PIB, Editors Guild, IFWJ
- KUWJ, Kerala Media Academy

**Module 20**

- Media and human rights: Issues and concerns

### Unit III Reporting and Editing

**Module 1. Understanding News**

- Definitions, elements, news values, types of news: hard news and soft news.

**Module 2. Reporting personnel**

- Hierarchy, qualities and qualifications; duties and responsibilities; speed vs accuracy; objectivity and ethics; news bureau operations.

**Module 3. Writing News Story**

- Structure of a news story-inverted pyramid, hour glass and other narrative style

**Module 4. Lead and body**

- Different kinds of leads; changing styles of news writing. Influence of technology on news writing

**Module 5. News Gathering**

- News sources, techniques of gathering news-interviews; speeches; news beats; press releases from govt. and non-govt. institutions;

**Module 6**

- News agencies and handling wire copies.

**Module 7**

- Electronic news gathering.

**Module 8**

- Specialized Reporting: Skills and methods, significance, target audience

**Module 9. Different categories of news**

- investigative and interpretative news, obits, etc.

**Module 10**

- Reporting court/parliament proceedings, business, sports, development, disasters, science and technology, environment, women and children, rural life and the deprived.

**Module 11. Trends in journalism**

- Citizen journalism, precision journalism; intimate journalism; planted stories and cheque book journalism; laid-back journalism; service journalism, embedded journalism, paid news, sting operation, data journalism, advocacy journalism, Influence of technology on reporting. s

**Module 12. Basic concepts and principles of editing****Module 13. News Room Management:**

- News room hierarchy, Functions and responsibilities of Chief Editor, Associate Editor, Assistant Editor, News Editor, Chief Sub Editor, Sub Editor etc

**Module14.**

- Copy tasting, Rewriting techniques, Running stories, space saving, Style sheet; Readability formulae, headline writing

**Module 15**

- Electronic editing and related software



**Module 16. Introduction to typography**

- Kinds of typefaces; classification and measurements setting styles.

**Module 17**

- Layout and Design, Textual and visual elements in newspaper papers.

**Module 18. Basics of Photography/Digital Photography**

- Selection of pictures, Photo Editing; writing cutline and caption writing

**Module 19 .**

- Glossary of Reporting

**Module 20**

- Glossary of Editing

**Unit IV**

**Advertising, Public Relations,  
Corporate Communication &  
Media Management**

**Module 1**

- History and evolution of advertising; Role of advertising in the marketing process; Functions of advertising

**Module 2**

- Types of advertising. Advertising agencies; Present trends in Indian advertising

**Module 3**

- Media laws concerning advertising

**Module 4**

- Ad organizations: Professional organisations in ad world: ASCI and its code of conduct

**Module 5**

- Elements of Advertisement

**Module 6**

- Structure of an advertisement/commercial; Types of headlines and body copy, copy appeals; Copywriting techniques; Layout and design; Visualisation

**Module 7. Ad Campaigns**

- Campaign planning; Rationale, goals and planning process; Evaluation of advertising campaigns

**Module 8. Advertising Research**

- Scope and objectives, research as a decision making tool

**Module 9. Public Relations Concepts and definitions**

- Evolution and growth of public relations

**Module 10**

- Propaganda, publicity, public opinion, lobbying

**Module 11**

- Functions of public relations, Target audience and publics of PR

**Module 12**

- Characteristics and qualifications of PR personnel

**Module 13:**

- Public Relations Campaigns and Tools, Press release, handouts, house journals, open house, exhibitions and demos.

**Module 14**

- PR campaign stages and planning - Organisation setup of PR departments/agencies;

**Module 15**

- PR in public / private sectors, Central and State PR Govt depts.

**Module 16**

- Public Relations organizations : PRSI, IPRA, PR as a management function, PR and crisis management, Functions of PR agency, PR counseling and Consultancy-Corporate Social Responsibility, PR and social auditing

**Module 17**

- Corporate communication: Definition, historical perspective, contemporary relevance. Facets of corporate communication-organizational communication,



marketing communication, management communication.

#### Module 18

- Functions of corporate communication - Employee Relations (ER) Investor Relations (IR), Media Relations (MR), Government Relations (GR), Customer relations (CR)

#### Module 19

- Media Management and ownership patterns, media policy formulation, organizational structure of media departments- advertising, business, circulation, personnel, production, news room etc. Media economics- budgeting, production, promotion, competition strategies.

#### Module 20

- Glossary of Advertising, Public Relations, Corporate Communication and Media Management

### Unit V

#### Electronic and Digital Media

##### Module 1. Radio

- Broadcasting-Origin and growth, All India Radio. FM Radio stations, bands, Radio jockeys

##### Module 2.

- Programs News talks, interviews, documentaries and advertisements,

##### Module 3.

- Radio programme production tools

##### Module 4. Television

- Origin and Growth of Television, Television in India, An overview of television industry, measurement and rating techniques

##### Module 5. Formats of TV News packaging, Programs

- Structure and format in the new era, live talks, and Represented talk, Gossip Sitcoms and Soap Operas, Piece to camera

##### Module 6 . Writing for Radio and Television Broadcast Language

- Clarity, Brevity & Simplicity, The local identity, Rewriting, Basic Style rules, Voice of the station, Attributions, Headlines, Writing for visuals.

##### Module 7. Non-news programmes in radio

- formats, genres and language. Preparation of commentary, Research, Narrative devices, Debates, radio drama, radio interview, discussions, music and phone-ins

##### Module 8. Non news programmes in television

- TV production techniques, tools and formats, genres and language, Television interview

##### Module 9.

- Writing for TV Magazine Shows and Reality Television.

##### Module 10.

- Origin and growth of films, Milestones in cinema, Different genres of films

##### Module 11. Film movements

- German expressionist film, French surrealist film, Italian neorealism, French new wave

##### Module 12.

- Asian films and Eastern Europe films

##### Module 13.

- Indian and Malayalam Films

##### Module 14. Basic New Media Technologies

- LAN, MAN, WAN, World Wide Web etc. Origin and development of the Web. E-mail, Web, ownership and administration of Internet, types of Internet connection, internet protocols, Introduction to HTTP, HTML, XML, java script, jQuery, PHP, . browsing and browsers, bookmarks, searching through directory, search engine

##### Module 15.

- Web design tools/software, Content Management System, Apache, Joomla etc.



**Module 16.**

- Security issues on the Internet- social, political, legal and ethical issues.,

**Module 17**

- Online Journalism- definition, origin, development, and contemporary relevance;

**Module 18.**

- Differences from traditional journalistic practices

**Module 19.**

- Social media and journalism, Future of online journalism.

**Module 20.**

- Glossary of Radio, Television, Film and digital media

**Unit VI  
Communication Research**

**Module 1.**

- Concepts of Communication Research

**Module 2.**

- Nature and scope of communication research

**Module 3.**

- Development of mass media research

**Module 4.**

- Evaluation of communication research in India.

**Module 5.**

- Types of research

**Module 6.**

- Qualitative Research methods

**Module 7.**

- Quantitative Research methods

**Module 8.**

- Topic selection - Relevance of the topic, Statement of problem

**Module 9.**

- Literature review

**Module 10.**

- Setting hypothesis and research questions

**Module 11.**

- Sampling procedure

**Module 12.**

- Data collection tools: development procedures

**Module 13.**

- Data analysis and interpretation

**Module 14. Introduction to research statistics**

- Basic statistical procedure, Measures of central tendencies

**Module 15.**

- Frequency distribution

**Module 16.**

- Tests of significance

**Module 17.**

- Research Reporting, Writing with style, avoiding common writing errors, readability of the manuscript, writing a research report, concluding the research report, writing exercises

**Module 18.**

- Indexing, abstracting, citation and citation styles - APA & MLA

**Module 19.**

- Current trends in mass communication research

**Module 20.**

- Glossary of communication research.

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**18. Kannada**

**Unit I  
Modern Literature**

**Module 1.**

- Kannada Sahithya - important movements - Navodaya, Prgathisheela, Navya, Dalitha, Bandaya, Mahila - Important forms - Kavya, Sannakathe, Kadambari, Nataka, Vimarshe.



### Module 2.

- Kannada Kavya - Pramukha kavigalu - B.M. Shree, Govinda Pai, Panje Mangesha Rao, Madhura Chenna, Kuvempu, Bendre, D.V.G., Pu.thi.na, K. S. Narasimhaswamy, G.P. Rajarathnam, V.K. Gokak, Gopalakrishna Adiga, G.S. Shivarudrappa, Chennaveera Kanavi, K.S. Nisar Ahammad, Siddalingayya, Aravinda Malagatti, Jambanna Amarachintha, Kadengodlu Shankara Bhat, Kayyara Kinhanna Rai, H.S. Venkateshmurthy, Baraguru Ramachandrappa, Ramjaan darga, Sathyananda Pathrota.
- Pramukha prakaragalu - Bhavageethe, Sonet, Pragatha, Kathanakavana, Khandakavya, Mahakavya.
- Pramukha Krithigalu - English Geethegalu, Gilivindu, Pakshikashi, Gari, Madriya chithe, Theredabagilu, Bhumigeetha, Savirarunadigalu, Nettaralli nenda hoo, Koraga mattu itara kavanagalu.

### Module 3.

- Kannadadalli Sannakatheya Ugama mattu belavanige - Pramukha Sannakathegararu - Panje Mangesha Rao, Masthi Venkatesha Ayyangar, Niranjana, Ashwatha, Yashavantha Chithala, U.R. Ananthamurthy, Chaduranga, Shanthinatha Desai, Mogalli Ganesh, Ameresh Nugadoni, Kum. Veerabhadrappa, Kodagina Gowramma, Vaidehi, Jayantha Kaikini, Veena Shantheshwara, Besagarahalli Ramanna, Boluvaru Mohammadkunhi, M. Vyasa.

### Module 4.

- Kannadalli Kadambariya huttu mattu belavanige - Pramukha Kadambarikararu - Gulvadi Venkata Rao, Keruru Vasudevacharya, Mirji Annaraya, M.S. Puttanna, K.V. Ayyar, Shivarama Karantha, Kuvempu, A.N. Krishnaraya, Tha. Ra. Subbaraya, Basavaraja Katteemani, Thriveni, Niranjana, U.R. Ananthamurthy, Poornachandra Thejaswi, S. L. Bairappa, Vyasaraya Ballala, Anupama Niranjana,

Srikrishna Alanahalli, Devanuru Mahadeva, Kum. Veerabhadrappa, Geetha Nagabhushana, Sara Aboobackar, Na. Mogasale, K.T. Gatti.

- Pramukha krithigalu - Indirabai, Mukajjiya Kanasugalu, Kanuru Subbamma Heggadithi, Nisarga, Shanthala, Samskara, Bekkinakannu, Kshitija, Chirasmarane, Kaadu, Baduku, Yaana, Kusumabaale, Chandragiriya theeradalli, Abrahmana.

### Module 5.

- Kannadadalli Nataka - Ugama mattu belavanige - Singararya, Basavappa Shastri, M.L. Srikantegowda, Samsa, Kailasam, Shreeranga, Parvathavani, Pu.thi.na, Girish Karnad, Chandrashekhara Kambara, Chandrashekhara Pateela, H. S. Shivaprakash, Chandrakantha Kusanura, P. Lankesh, Venugopala Kasaragodu.
- Pramukha krithigalu - Karnataka Abhijnana Shakunthala, Shurasena Charithe, Vigada Vikramaraya, Tollugatti, Shokachakra, Keechaka, Gokula nirgamana, Tughalak, Sankranthi, Sirisampige, Mahachaithra, Kodegalu, Drushti.

### Module 6.

- Kannadadalli Vimarshe - Kuvempu, R.S. Mugali, Pu.thi.na, G.S. Shivarudrappa, D.R. Nagaraj, G.H. Nayak, Giraddi Govindaraj, Keerthinatha Kurthakoti, L.S. Sheshagiri Rao, G.S. Amooru, V.M. Inamdaar, Vijayadabbe, C.N. Ramachandran, C. Veeranna, Balasubrahmanya Kanjarpane.
- Pramukha Krithigalu - Droupadiya Shreemudi, Kaavyakuthuhala, Soundrayasameekshe, Shaktisharadeyamela, Yugadharmu hagu Sahithya darshana, Navya vimarshe, Rakthirupane, Nijadani.

### Module 7.

- Kannadadalli anuvaada sahithya - Pramukha anuvaditha krithigalu - Anatha pakshi, Choukattinamane, Agnisaakshi, Berige neeru, Neeli chandira, Rajanagara, Ondu peeligeaya telugu kathegalu, Tamilu Sannakathegalu, Ayda maleyala sannakathegalu, Kannadi.



## Unit II Ancient and Medieval Literature

### Module 1.

- Shasana Sahithya - Halmidi Shasana, Baadami Shasana, Shravana Belagolada Bukkarayana Shasana, Gangadharam Shasana, Athimabbeya Lakkundi Shasana, Dekabbeya Belathuru Shasana, Talangare Shasana.

### Module 2.

- Champu Sahithya - Ugama mattu Vikasa - Swarupa mattu Lakshana - Pramukha Kavigalu - Pampa, Ponna, Ranna, Janna, Nagavarma I, Durgasimha, Nayasena, Nagachandra, Rudrabhatta, Nemichandra, Nagavarma II, Karnaparya, Andayya.
- Pramukha krithigalu - Adipurana, Sahasabheema Vijaya, Karnataka Kadambari, Pampa Ramayana, Ananthanatha Purana, Jagannatha Vijaya, Kabbigara Kava.

### Module 3.

- Lakshana Granthagalu mattu Gadya Sahitya - Kavirajamarga, Vaddaradshane, Chandombudhi, Chavundarayapurana, Kavyaavalokana, Shabdamanidarpana, Shabdanushasana, Apratimaveeracharite, Mudramanjusha, Ramashvamedha.

### Module 4.

- Vachana mattu Keertane - Swarupa mattu Lakshana - Pramukha Vachanakararu mattu Keerthanakararu - Jedara Dasimayya, Allamaprabhu, Basavanna, Chennabasavanna, Siddarama, Akkamahadevi, Mukthayakka, Vyasraya, Shripadaraya, Purandaradasa, Kanakadasa, Sarvajna.

### Module 5.

- Ragale, Shatpadi, Tripadi mattu Sangatya - Pramukha Kavigalu - Harihara, Raghavanka, Chamarasa, Kumaravyasa, Lakshmeesha, Kumaravalmiki, Chatuvittalana, Nanjundakavi, Devaraja, Sanchiya Honnamma, Rathnakaravarni.

- Pramukha Kritigalu - Basavarajadevara Ragale, Girija Kalyana, Harishchandra Kavya, Prabhulingaleele, Karnatabharatha Kathamanjari, Jaimini Bharatha, Thorave Ramayana, Kannada Bhagavatha, Kumara Rama Sangathya, Sobagina Sone, Hadibadeya Dharma, Bharathesha Vaibhava.

## Unit III Folklore and Cultural Studies

### Module 1.

- Janapada Swarupa - Vyapti - Vargeekarana - Karnatakadalli Janapada Adhyayanada Pravritthigalu - Swatantryapurva mattu Swatantryottara.

### Module 2.

- Janapada Siddanthagalu - Puranamula, Bharathamula, Manavashastreeya, Manovishleshanathmaka, Charithrika, Bougolika, Rachanika, Sandarbha, pradarshana.

### Module 3.

- Pramukha Janapada Vidwamsaru - B.L. Rice, Kittel, Peter J. Clause, Parthi Subba, Ha.Ma.Na, Halasangi Sahodararu, Gaddagimattha. Ambalike Hiriyanna, Ji.Sham.Pa, Go.Ru. Chennabasappa, Geleyara Gumpu, Ka.Ra., Kru, H.L. Nagegowda, Matighatta Krishnamurthy, Ti.Nam. Shankaranarayana, Viveka Rai, Vamana Nandavara, Chinnappa Gowda, P.K. Rajashekar, Gayatri Navada, Purushottama Bilimale.

### Module 4.

- Janapada Sahitya mattu Kale - Mahakavya, Kategalu, Lavanigalu, Geethegalu, Yakshagana Prasanga Sahitya - Yakshagana Bayalatta - Moodalapaya, Paduvalapaaya - Doddaata, Sannata, Krishnaparijata, Bombayata, Janapada Kunitagalu - Dollu Kunita, Veeragaase, Kamsaale, Pooja Kunita, Kolaatta, Huttari Kunita, Aatikalanja.

**Module 5.**

- Samskruti - Artha mattu Vyakhye - Bhaashe , Dharma , Kale mattu Samskruti, Bharateeya Parampareyalli Samskrutiya Grahike - Samskrutiya Chintanegalu - Naadu, Nudi, Dharma, Vyakti mattu Samaja kendrita nelegalu, Adhunikottara yugadalli Samskrutika Adhyana swarupa - Vismruti, Upasamskruti, Pratisamskruti, Cyber Samskruti - Samskrutika Vairudhyagala Adhyayana - Shishta - Janapada, Kappu-Biluppu, Sthree-Purusha, Mathu-Baraha.

**Unit IV****Prosody and Literary Criticism****Module 1.**

- Gana swarupa - Varnagana, Mathragana, Amshagana prabhedagalu.
- Prasabhedagalu - Laya - Yathi - Varnavithagalu - Khyathakarnatakagalu - Shikharini, Mandakrantha, Mallikamaale.
- Mathrachandassu - Kanda - Lakshana. Ragale - Ragaleya ugama, lakshana, ithihasa.
- Shatpadi - Ugama, Lakshana mattu Vikasa - Shatpadiya Prabhedagalu.

**Module 2.**

- Amsha chandassu - Karnataka Vishaya jathi Chandorupagalu - Thripadiya ugama, lakshana, ithihasa.
- Hosagannada Chandassu - Swarupa, belavanige, mukhya layagalu - Mudi, Padmagana, Anagatha, Ganaparivriti.
- Hosagannada chandorupagalu - Sarala Ragale, Mahachandassu, Sonnet, Pragatha, Muktha Chandassu.

**Module 3.**

- Bharatheeya Kavya Meemamse - Parikalpanegalu - Alankara - Reethi - Guna - Rasa - Dhvani - Vakrokthi - Ouchithya.
- Kavya lakshanagalu - Kavya kaarana mattu Prayojana, Shabdārtha swarupa - Rasa siddantha, Bharathana rasasuthra, Dhvani siddantha - Pramukha Alankarikaru - Bharatha, Bhamaha, Dandi, Vamana, Rudrata, Kunthaka, Mammata, Jagannatha

Panditha, Rajashekhara, Vishwanatha, Anandavardhana, Abhinavaguptha, Kshemendra, Shreevijaya, Nagavarma II, Thirumalarya.

**Module 4 .**

- Pashchathya Kavya Meemamse - Parikalpanegalu - Anukarana, Ketharsis, Bhavyathe (Sublime), Imagination, Fancy, Intuition, Manasika Doora (Psychical distance), Vasthu prathirupa, Parampare mattu Vyakthiprathibhe, Abhivyakthi, Vyakthitva Nirasana.
- Pramukha meemamsakaru - Plato, Aristotle, Horace, Loginus, Chroche, Samuel Jhonson, Wordsworth, Colridge, Shelly, Arnold, Ejrappound, T.S. Eliot, I.A. Richards, F.R. Levies, Ramond Williams, Brect, Simon de Bova, Kate Millet, Edward Sayd.
- Sahithya vimarsheya pramukha vidhanagalu - Romantic, Rupanishta, Prayogika, Rachanika, Manovishleshnathmaka, charithrika, Marxvadi, Sthreevadi, Vasahathothara.

**Unit V****History of Kannada Language and Linguistics (General and Dravidian)****Module 1.**

- Kannada bhasheya prachinathe - Shasanagalalli ullekha, Karnataka padada nishpathi - Kannada bhasheya vividha hanthagalu - Poorvada Halagannada, Halagannada, Nadugannada, Hosagannada.
- Kannadada pradeshika mattu Samajika Prabhedagalu - Kannada sampradayika Varnamaale, Dhwanimagalu mattu Akraithimagalu.

**Module 2.**

- Namapada, Linga - Mahat, Amahat, Pullinga, Sthreelinga, Napumsaka linga, Vachana, Vibhakthi, Elu vibhakthigala swarupa.
- Sarvanamagalalu - Bagegalu, Abhivyapaka, Vyavarthaka, Athmarthaka - Entu



Samasagalu - Kriyapada - Kaalavachakagalu, Nishedharthaka, Vidhyarthaka, Karmani prayoga, Kridantha, Thadhitha, Kannada bhasheya belavanige - Deshya, anyadeshya, Kannada Bhasheyalli kandubaruva anyadeshyagalu, Samskrutha, Hindi, Urdu, Portuguese, Arabic, English padagalu.

### Module 3.

- Language - Definition - Language and Linguistics - the nature and scope of Linguistics, Braches of Linguistics.
- Phonology - Morphology - Syntax - Dialectology - language, Dialect, Idiolect.
- Classification of languages - morphological, Geneological, linguistic changes, types of linguistic borrowings, syntactic changes.

### Module 4.

- Origin and development of term 'Dravidic' - History of Dravidian linguistics with special reference to Kannada - Classification of Dravidian languages - the relationship between Dravidian language and Sanskrit - Characteristics of Dravidian Languages - Proto-Dravidian sounds - mutation of i/e and u/o- Palatalisation of 'k', convertibility of surds and sonants.
- Noun morphology - gender - number - case makers - adjectives - numerals - pronouns, Verb - verb root - tense - pronominal suffixes, Verbal nouns - development of Dravidian script.

## Unit VI

### Research Methodology, Textual Criticism, Journalism and Computer knowledge

#### Module 1.

- Samshodhane - nirvachana - samshodhane mattu vimarshe - samshodhaka - Uhana parikalpane - dathamsha sangraha - kshetrakaarya - vishleshane - samshodhana vinyasa - samshodhana lekhana - samprabandha - mahaprabandha - bhashe

mattu shyli - aditippani - saralekha - paramarshana granthasuchi - anubandha.

#### Module 2.

- Kannada samshodhaneya ithihasa - Shambha Joshi, Govinda Pai, Muliya Thimmappayya, K.G. Kundanagara, A. Venkatasubbayya, R. Narasimhachar, D.L. Narasimhachar, T.N. Shreekantayya, D.S. Karki, Sediyaipu Krishna Bhat, M. Mariyappa Bhat, Chidanandamurthy, T.V. Venkatachala Shastri, Hampana, M.M. Kalburgi, Kushalappa Gowda, Prabhushankara, Rahamath Thareekere, G. Venkatasubbayya, Venkataraja Punichathaya.

#### Module 3.

- Granthasampadane - Lekhana samagri - Lipikaararu - Hasthaprathigala swarupa - Granthasampadakana arhathe - Patanthara sankalana - Skhalithyagalu - Pata parishkarane - Unnatha Vimarshe - Pramukha grantha sampadakaruru - R. Narasimhachar, D.L. Narasimhachar, S.S. Basavanala, R.C. Hirematta, L. Basavaraju, M. Mariyappa Bhat, K.V. Raghavachar, G. Varadaraj Rao, M.M. Kalburgi, Venkataraja Punichathaya.

#### Module 4.

- Kannada Pathrikodyamada samkshiptha ithihasa - Mangaluru Samachara - Kaavyakalanidhi, Kavyakalpadruma, Suvasini, Vagbhushana, Jayanthi, Jeevana, Lankesha Pathrika.
- Kannada Pathrikodyamada pramukha vyakthigalu - Herman Mogling, D.V.G, Betageri Krishna Sharma, D.R. Bendre, Masthi Venkatesh Ayyangar, Gopalakrishna Adiga, U.R. Anathamurthy, Chandrashekhara Pateela.
- Lankesha Pathrika baravanigegalu - Sampadakeeya, Suddi baravanige,



Nudichithra, Ankanabara, Pathrika  
lekhana.

#### Module 5.

- Computer - Computarina Bhagagalu - Monitor, CPU, Printer, Scanner, Pen drive, CD, DVD, Speaker.
- Softwaregalu - Microsoft Word, Excel, Pagemaker, Photoshop, Antivirus - Kannada Thanthramshagalu - Nudi, Baraha.
- Internet, Website, Blog, Browser, Email, Social Network.

## 19. Latin

### Unit I Grammar

#### Module 1.

- Declensions of Nouns.

#### Module 2.

- Declensions of Pronouns.

#### Module 3.

- Declensions of Adjectives.

#### Module 4.

- Conjugation of Regular Verbs.

#### Module 5.

- Conjugation of Irregular Verbs.

#### Module 6.

- Conjugation of Deponent Verbs.

#### Module 7.

- The subject and concords of nouns, verbs, adjectives and pronouns.

#### Module 8.

- Government of nouns, adjectives and verbs.

#### Module 9.

- Degrees of Comparison.

#### Module 10.

- Adverbial expressions of time & place.

#### Module 11.

- Reference Text: *Latin Grammar* by J. Van Bogaert, S.J. Ranchi: Satya Bharati, 1990.

### Unit II History

#### Module 1.

- "English in its Latin Context" by Prof. James W. Earl.

#### Module 2.

- "Latin: The Universal Language of the Church" by Archbishop M. Soosa Pakiam.

#### Module 3.

- "Latin and Legal Language" by Dr. Sebastian Paul.

#### Module 4.

- "Influence of Latin on English Language and Administration" by Prof. P. L. Josey.

### Unit III Prose

#### Module 1.

- "Abhrami Supremum Sacrificium" from Liber Genesis of *Biblia Sacra Vulgate*.

#### Module 2.

- "Samaritanus Bonus" from Evangelium Secundum Lucam of *Biblia Sacra Vulgate*.

#### Module 3.

- "Caritas Patiensest" from Epistola Beati Pauli Apostoli ad Corinthos Prima of *Biblia Sacra Vulgate*.

#### Module 4.

- "O Tempora, O Mores" by Marcus Tullius Cicero from *Latin* by Doug Julius. New York: Broadway Books, 2006.

#### Module 5.

- "Proelium Marathonium" from *Latin* by Doug Julius. New York: Broadway Books, 2006.



## Unit IV Poetry

### Module 1.

- “Dominus Regit Me” from Liber Psalmorum of *Biblia Sacra Vulgate*.

### Module 2.

- “Stabat Mater” from *Latin* by Doug Julius. New York: Broadway Books, 2006.

### Module 3.

- “Mahatma Gandhi” by Paulus Lanthaparambil from *CanticaCycni*

### Module 4.

- “De Amore Coniugali” by Giovanni GiovianoPontano from *Reading Latin Poetry Aloud* by Clive Brooks. Cambridge: Cambridge University Press, 2007.

### Module 5.

- “Apologus De Rustico Et Hero” by John Milton from *Reading Latin Poetry Aloud* by Clive Brooks. Cambridge: Cambridge University Press, 2007.

## Unit V Short Story & Drama

### Module 1.

- “David et Goliath” from Liber Primus Samuelis of *Biblia Sacra Vulgate*.

### Module 2.

- “Phedrus” from *Latin* by Doug Julius. New York: Broadway Books, 2006.

### Module 3.

- “Canis et ImegoEius” from *Latin Exercises: Part II* by J. Van Bogaert, S.J. Ranchi: SatyaBharati, 1990.

### Module 4.

- “Vulpes et Leo” from *Latin Exercises: Part II* by J. Van Bogaert, S.J. Ranchi: SatyaBharati, 1990.

### Module 5.

- “Plautus’ Amphitruo, Section 3C” from

*Reading Latin* by Peter V. Jones and Keith C. Sidwell. Cambridge: Cambridge University Press, 2007.

## Unit VI - Translation (Latin to English and English to Latin)

### Module 1.

- Declensions 1 – 5: Exercises Number 4 – 11, 18 – 30 & 41 – 43 (Both A & B)

### Module 2.

- Adjectives of the First & Second Class: Exercises Number 12 -17 & 34 -38 (Both A & B)

### Module 3.

- Comparison of Adjectives: Exercises Number 44 – 49 (Both A & B)

### Module 4.

- Numeral Adjectives: Exercises Number 50 – 52 (Both A & B)

### Module 5.

- Pronouns: Exercises Number 53 – 58 (Both A & B)

### Module 6.

- Adjectives Used as Nouns: Exercises Number 59 (Both A & B)

### Module 7.

- Infinitives Used as Nouns: Exercises Number 60 (Both A & B)

### Module 8.

- Active Voice, Subjunctive Mood: Exercises Number 61 – 67 (Both A & B)

### Module 9.

- Passive Voice, Indicative Mood: Exercises Number 68 – 75 (Both A & B)

### Module 10.

- Passive Voice, Subjunctive Mood: Exercises Number 76 – 79 (Both A & B).



**20. Malayalam**

**യൂണിറ്റ് I. പദ്യം**

**Module 1.**

- നാടൻപാട്ടുകൾ - സവിശേഷതകൾ - ധർമ്മം-വർഗ്ഗീകരണം - ചരിത്രപശ്ചാത്തലം - സാമൂഹികത

**Module 2.**

- പാട്ട് - നിർവചനം - തമിഴ്സാധാരണ - ഭാഷ - ഇതിവൃത്ത സവിശേഷതകൾ - രാമചരിതം - തിരുനിഴൽമാല - രാമകഥപ്പാട്ട് - കണ്ണശ്ശകൃതികൾ - ഗാഥാപ്രസ്ഥാനം - ചെറുശ്ശേരി.

**Module 3.**

- മണിപ്രവാളം - നിർവചനം - ആദ്യകാലമണിപ്രവാളകൃതികൾ - പ്രാചീനചമ്പുക്കൾ - സന്ദേശകാവ്യങ്ങൾ - മധ്യകാലമണിപ്രവാള കൃതികൾ - മധ്യകാലചമ്പുക്കൾ.

**Module 4.**

- കിളിപ്പാട്ടുപ്രസ്ഥാനം - എഴുത്തച്ഛൻകൃതികൾ - ഭാഷാസവിശേഷതകൾ - പുന്താനം - രാമപുരത്തുവാദ്യം.

**Module 5.**

- കേരളവർമ്മപ്രസ്ഥാനം - നിയോ-ക്ലാസ്സിക്കൽപ്രവണതകൾ - പ്രാസവാദം - മഹാകാവ്യപ്രസ്ഥാനം - വെണ്ണണിപ്രസ്ഥാനം - പച്ചമലയാള പ്രസ്ഥാനം - സംഭാവനകൾ - സവിശേഷതകൾ.

**Module 6.**

- കാല്പനികതയുടെ വികാസപരിണാമങ്ങൾ - കാവ്യസങ്കല്പത്തിൽ വന്ന വ്യതിയാനം - ഖണ്ഡകാവ്യങ്ങൾ - ഭാവഗീതം - ആശാൻ - ഉള്ളൂർ - വള്ളത്തോൾ തുടങ്ങിയവരുടെ സംഭാവനകൾ.

**Module 7.**

- കാല്പനികതയുടെ പരിണാമം - ചങ്ങമ്പുഴ - ഇടപ്പള്ളി - വൈലോപ്പിള്ളി - ഇടശ്ശേരി - ജി. ശങ്കരക്കുറുപ്പ് തുടങ്ങിയവർ പ്രതികാല്പനികത - എൻ. വി. കുഷ്ണവാദ്യർ - കവിതയുടെ ജനകീയത - വയലാർ, പി. ഭാസ്കരൻ, ഒ. എൻ. വി. തുടങ്ങിയവർ.

കീയത - വയലാർ, പി. ഭാസ്കരൻ, ഒ. എൻ. വി. തുടങ്ങിയവർ.

**Module 8.**

- കവിതയിലെ ആധുനികപ്രവണതകൾ - കാഴ്ചപ്പാടുകളിൽ വന്ന മാറ്റം - ഭാവുകത്വപരിണാമം - അക്കിത്തം - ഒളപ്പമണ്ണ - അയ്യപ്പപ്പണിക്കർ - മാധവൻ അയ്യപ്പത്ത് - എൻ. എൻ. കക്കാട് - കടമ്മനിട്ട - എം. ഗോവിന്ദൻ - ആറ്റൂർ - സച്ചിദാനന്ദൻ തുടങ്ങിയവർ.

**Module 9.**

- ആധുനികതയുടെ പരിണാമം - കെ. ജി. ശങ്കരപ്പിള്ള - ഡി. വിനയചന്ദ്രൻ - ബാലചന്ദ്രൻ ചുള്ളിക്കാട് - എ. അയ്യപ്പൻ - ദേശമംഗലം രാമകൃഷ്ണൻ - സാവിത്രിരാജീവൻ - വിജയലക്ഷ്മി തുടങ്ങിയവർ.

**Module 10.**

- സമകാലമലയാളകവിത - രൂപഭാവസവിശേഷതകൾ - ടി. പി. രാജീവൻ - പി. പി. രാമചന്ദ്രൻ - എസ്. ജോസഫ് - അൻവർഅലി - റഫീക്ക് അഹമ്മദ് - എം. ബി. മനോജ് - അനിതാതമ്പി - കെ. ആർ. ടോണി തുടങ്ങിയവർ.

**യൂണിറ്റ് II ഗദ്യം**

**Module 1.**

- പ്രാചീനഗദ്യം - ശാസനങ്ങൾ - ഭാഷാകൗടലീയം ഉൾപ്പെടെയുള്ള കൃതികൾ - മിഷണറിമാരുടെ സംഭാവനകൾ - ആനുകാലികങ്ങൾ.

**Module 2.**

- ഇതരഗദ്യസാഹിത്യരൂപങ്ങൾ - ജീവചരിത്രം - ആത്മകഥ - സഞ്ചാര സാഹിത്യം - വൈജ്ഞാനിക കൃതികൾ - വളർച്ച - പരിണാമം.

**Module 3.**

- നോവൽ - സാഹിത്യരൂപമെന്ന നിലയിൽ - മലയാളനോവലിന്റെ പൂർവ്വ മാതൃകകൾ - ആദ്യകാലനോവലുകൾ - ചത്തുമേനോൻ - ചരിത്രനോവൽ - സി. വി. തുടങ്ങിയവർ.



**Module 4.**

- നോവൽ - നവോത്ഥാന പ്രവണതകൾ - തകഴി, കേശവദേവ്, ബഷീർ, എസ്. കെ. പൊറ്റക്കാട് തുടങ്ങിയവർ - പ്രമേയത്തിലും ആഖ്യാനത്തിലും വന്ന മാറ്റങ്ങൾ - ലളിതാംബികാ അന്തർജ്ജനം, ചെറുകാട്, ഉറുബ്, എം. ടി. കോവിലൻ, പാറപ്പുറം, നന്ദനാർ, രാജലക്ഷ്മി, എൻ. പി. മുഹമ്മദ് തുടങ്ങിയവർ.

**Module 5.**

- നോവലിലെ ആധുനിക പ്രവണതകൾ - ഒ. വി. വിജയൻ, ആനന്ദ്, മുകുന്ദൻ, കാക്കനാടൻ, സേതു, മാധവിക്കുട്ടി, വിലാസിനി, വി. കെ. എൻ പുനത്തിൽ കുഞ്ഞബ്ദുള്ള, യു. എ. ഖാദർ, പി. വൽസല തുടങ്ങിയവർ.

**Module 6.**

- നോവലിലെ സമകാലിക പ്രവണതകൾ - എൻ. പ്രഭാകരൻ, സാറാജോസഫ്, കെ. പി. രാമനൂണ്ണി, അംബികാസുതൻ, യു.കെ. കുമാരൻ, ടി. ഡി. രാമകൃഷ്ണൻ, വി. ജെ. ജയിംസ്, സുഭാഷ്ചന്ദ്രൻ, കെ. ആർ. മീര, ഇ. സന്തോഷ്കുമാർ, സുസ്മേഷ് ചന്ദ്രോത്ത് തുടങ്ങിയവർ - ജനപ്രിയനോവൽ - വിവർത്തനങ്ങൾ

**Module 7.**

- ചെറുകഥ - ആദ്യകാല കഥാകൃത്തുക്കൾ - സംഭാവനകൾ - വേങ്ങയിൽ കുഞ്ഞിരാമൻ നായനാർ - അമ്പാടി നാരായണ പൊതുവാൾ - എം. ആർ. കെ. സി - മുർക്കോത്ത് കുമാരൻ - കെ. സുകുമാരൻ - ഇ. വി. കൃഷ്ണപിള്ള തുടങ്ങിയവർ.

**Module 8.**

- ചെറുകഥയുടെ നവോത്ഥാനകാലം - തകഴി - ദേവ്, ബഷീർ, പൊറ്റക്കാട്, ലളിതാംബിക അന്തർജ്ജനം, കെ. സരസ്വതിഅമ്മ, പൊൻകുന്നം വർക്കി, കാരൂർ, ഉറുബ് തുടങ്ങിയവർ.

**Module 9.**

- ചെറുകഥ - ആധുനികകാലം - എം. ടി, ടി. പത്മനാഭൻ, മാധവിക്കുട്ടി, സി. വി. ശ്രീരാമൻ, ഒ. വി. വിജയൻ, മുകുന്ദൻ, കാക്കനാടൻ, വി. കെ. എൻ, എം. സുകുമാരൻ, സാറാജോസഫ്, സക്കറിയ,

പത്മരാജൻ, ഗ്രേസി, ചന്ദ്രമതി, അഷിത തുടങ്ങിയവർ.

**Module 10.**

- ചെറുകഥ - സമകാലികം - കൊച്ചുബാവ, അക്ബർ കക്കട്ടിൽ, ശിഹാബുദ്ദീൻ, കെ. പി. രാമനൂണ്ണി, അശോകൻ ചരുവിൽ, സന്തോഷ് ഏച്ചിക്കാനം, പ്രിയ എ. എസ്, സിതാര, പി. വി. ഷാജി കുമാർ, ഉണ്ണി ആർ, എസ്. ഹരീഷ് തുടങ്ങിയവർ

**യൂണിറ്റ് III  
ദൃശ്യകലാ - സാഹിത്യപഠനം**

**Module 1.**

- നാടോടിരംഗകലകൾ - സവിശേഷതകൾ - ധർമ്മം

**Module 2.**

- അനുഷ്ഠാന - അനുഷ്ഠാനേതര നാടോടിക്കലകൾ - വർഗ്ഗീകരണം - സാഹിത്യം - തോറ്റംപാട്ടുകൾ - നാടോടി നാടകം തുടങ്ങിയവ.

**Module 3.**

- ക്ലാസ്സിക്കൽ ദൃശ്യകലകൾ - നാട്യധർമ്മി - ലോകധർമ്മി - തൗര്യത്രികം.

**Module 4.**

- കുടിയാട്ടം - നങ്ങൂർകുത്ത് - ചാക്യാർകുത്ത് - കൃഷ്ണനാട്ടം - രാമനാട്ടം - കഥകളി - മോഹിനിയാട്ടം - ചരിത്രം - ഉത്ഭവവികാസപരിണാമങ്ങൾ - സാഹിത്യം - സംഗീതം - വാദ്യോപകരണങ്ങൾ.

**Module 5.**

- തുള്ളൽ - ചരിത്രം - വിഭജനം - കുഞ്ചൻനമ്പ്യാർ - സംഭാവനകൾ - സാമൂഹികപ്രസക്തി - വികാസപരിണാമം.

**Module 6.**

- മലയാളനാടകം - ചരിത്രം - സംഗീതനാടകം - പ്രഹസനം - വിവർത്തനനാടകങ്ങൾ.

**Module 7.**

- പാശ്ചാത്യസാഹിത്യം മലയാളനാടകത്തിൽ - പ്രവണതകൾ - സ്വതന്ത്രനാടകങ്ങൾ - സാമൂഹിക - സാമുദായിക നാടകങ്ങൾ.



**Module 8.**

- മലയാളനാടകത്തിലെ സമകാലിക പ്രവണതകൾ - തനത് - ദളിത് - സ്ത്രീ നാടകവേദി

**Module 9.**

- മലയാളസിനിമ - ചരിത്രം - സാഹിത്യവും സിനിമയും - തിരക്കഥ

**Module 10.**

- ടെലിവിഷൻ - പരമ്പരകൾ - ഷോർട്ട്ഫിലിം - ഡോക്യുമെന്ററി - തിരക്കഥകൾ

നാട്ടുരാജ്യങ്ങൾ - രേഖാപട്ടണാനം - പതിനെട്ടരക്കവികൾ - മാമാങ്കം തുടങ്ങിയവ.

**Module 6.**

- ആര്യാധിനിവേശം - ക്ഷേത്രകേന്ദ്രീകൃതഹൃദയവ്യവസ്ഥ - ജന്മിസമ്പ്രദായം - മരുമക്കത്തായം - ജാതിവ്യവസ്ഥ.

**Module 7.**

- വൈദേശികാധിനിവേശം - അറബ്, പോർച്ചുഗീസ്, ഡച്ച്, ഫ്രഞ്ച്, ബ്രിട്ടീഷ്, മൈസൂർ ആധിപത്യം - ഫലങ്ങൾ.

**Module 8.**

- നവോത്ഥാനവും സാമൂഹികമുന്നേറ്റവും - സാമൂഹികപരിഷ്കരണപ്രസ്ഥാനങ്ങൾ - അവകാശപ്രക്ഷോഭങ്ങൾ - കർഷകമുന്നേറ്റം - സ്വാതന്ത്ര്യസമരം - കേരളസംസ്ഥാനരൂപീകരണം.

**Module 9.**

- കേരളീയകലകൾ - ചിത്രരചന-ശില്പകല - വാസ്തുവിദ്യ - കേരളീയ സംഗീതം - ആയോധനകലകൾ - ചരിത്രവും സവിശേഷതകളും - ഫോക്ലോർ - ധർമ്മങ്ങൾ - സവിശേഷതകൾ - പരിണാമം.

**Module 10.**

- കേരളപ്പിറവിക്കുശേഷമുള്ള സാംസ്കാരികസ്ഥാപനങ്ങളും പ്രസ്ഥാനങ്ങളും സാംസ്കാരികമുന്നേറ്റത്തിൽവഹിച്ചപങ്ക്.

**യൂണിറ്റ് IV - സംസ്കാര പഠനം**

**Module 1.**

- സംസ്കാരം - പരികല്പനയും നിർവചനവും - സംസ്കാര പഠനത്തിന്റെ രൂപപ്പെടൽ - മാതൃ ആർനോൾഡ്, എഫ്. ആർ. ലെവീസ്, റിച്ചാർഡ് ഹോഗാർട്ട്, ഇ. പി. തോംസൺ, സ്റ്റുവർട്ട് ഹാൾ തുടങ്ങിയവരുടെ വിശകലനങ്ങൾ.

**Module 2.**

- സാംസ്കാരികരാഷ്ട്രീയം - സാംസ്കരികഭൗതികവാദം - പ്രത്യയശാസ്ത്രം - വിവിധനിലപാടുകൾ - (ഗ്രാഷി, ഫുക്കോ, അൾത്തൂസർ, ഫ്രോയിഡ്) - സംസ്കാരവ്യവസായം - മാധ്യമപഠനം - ജനപ്രിയസംസ്കാരം.

**Module 3.**

- ഉപസംസ്കാരങ്ങൾ - ബഹുസംസ്കാരവാദം - ബഹുദേശീയത - ബഹുവാംശീയത - ജാതി, മത, വർഗ്ഗ, ലിംഗസമൂഹങ്ങൾ, കീഴാള, സ്ത്രീ, മൂന്നാം ലിംഗപഠനങ്ങൾ - കേരളീയസാഹചര്യങ്ങൾ.

**Module 4.**

- കേരളസംസ്കാരം - സാംസ്കാരികബഹുത്വം - ആചാരം - വിശ്വാസം, - ഭക്ഷണശീലങ്ങൾ - സാമൂഹികബന്ധങ്ങൾ, കൃഷി, ഉത്സവങ്ങൾ തുടങ്ങിയവയിലെ പ്രാദേശികവും സാമൂഹികവുമായ ബഹുസ്വരത.

**Module 5.**

- കേരളചരിത്രവും സംസ്കാരവും - സംഘകാലം - കുലശേഖരന്മാർ, അധിനിവേശപൂർവകാലം -

**യൂണിറ്റ് V**

**സാഹിത്യസിദ്ധാന്തങ്ങൾ, മലയാള വിമർശനം**

**Module 1.**

- പുരസ്കൃതസാഹിത്യസിദ്ധാന്തങ്ങൾ - കവി - കാവ്യം - സഹൃദയൻ - കാവ്യഹേതുകൾ - കാവ്യപ്രയോജനം.

**Module 2.**

- വിമർശനസമ്പ്രദായങ്ങൾ - രസം - ധ്വനി - രീതി - വക്രോക്തി - ഔചിത്യം - അനുമാനം.



**Module 3.**

- അലങ്കാരം - ശബ്ദാലങ്കാരം - അർത്ഥാലങ്കാരം വൃത്തം - സംസ്കൃതവൃത്തം - ദ്രാവിഡവൃത്തം - ദ്രാവിഡസൗന്ദര്യശാസ്ത്രം - തൊൽക്കാപ്പിയം - തിന്നസങ്കല്പം.

**Module 4.**

- പാശ്ചാത്യസാഹിത്യസിദ്ധാന്തങ്ങൾ - സാഹിത്യ രൂപങ്ങളും പ്രസ്ഥാനങ്ങളും - പ്ലേറ്റോ - അരിസ്റ്റോ ട്രിൽലോംഗിനസ് - വേർഡ്സ്വർത്ത് - കോളറിഡ്ജ് എന്നിവരുടെ സിദ്ധാന്തങ്ങൾ.

**Module 5.**

- കല കലയ്ക്കുവേണ്ടി - ടോൾസ്റ്റോയ് - ക്രോച്ചെ - മാത്യുഅർനോൾഡ് - ടി.എസ്.എലിയറ്റ് - ആധുനികത - ആധുനികോത്തരത.

**Module 6.**

- ഇസങ്ങൾ - ക്ലാസിസം - നിയോക്ലാസ്സിസം - റിയലിസം - റൊമാന്റിസിസം - ഇമേജിസം - എക്സ്പ്രഷനിസം - എക്സിസ്റ്റൻഷ്യലിസം - സ്ക്രച്ചറലിസം - പോസ്റ്റ്സ്ക്രച്ചറലിസം തുടങ്ങിയവ.

**Module 7.**

- മലയാളനിരൂപണം - രൂപവത്കരണസാഹചര്യവും പത്രമാസികകളുടെ സ്വാധീനതയും മറ്റു ഘടകങ്ങൾ- ആദ്യകാലനിരൂപകർ - കേരളവർമ്മ വലിയകോയിത്തമ്പുരാൻ - സി. പി. അച്യുതമേനോൻ - എ. ആർ. രാജരാജവർമ്മ തുടങ്ങിയവർ.

**Module 8.**

- മലയാളനിരൂപണം - നവചിന്തകൾ - കേസരി എ.ബാലകൃഷ്ണപിള്ള - എം. പി.പോൾ - കുട്ടിക്കൃഷ്ണമാരാർ - ജോസഫ് മുണ്ടശ്ശേരി - കുറ്റിപ്പുഴകൃഷ്ണപിള്ള എന്നിവരുടെ സംഭാവനകൾ - പുരോഗമനസാഹിത്യപ്രസ്ഥാനം - എം. ലീലാവതി തുടങ്ങിയവർ.

**Module 9.**

- വിമർശനത്തിലെ ആധുനികപ്രവണതകൾ - കെ. പി. അപ്പൻ - നരേന്ദ്രപ്രസാദ് - വി. രാജകൃഷ്ണൻ - ആഷാമേനോൻ - ബി. രാജീവൻ തുടങ്ങിയവരുടെ സംഭാവനകൾ

**Module 10.**

- മലയാളവിമർശനത്തിന്റെ പുതിയമുഖം - പരിസ്ഥിതി - ദളിത് - സ്ത്രീപക്ഷനിരൂപണസമീപനങ്ങൾ - നവചരിത്രവാദം.

**യൂണിറ്റ് VI  
ഭാഷാശാസ്ത്രം -**

**ഭാഷാചരിത്രം - വ്യാകരണം**

**Module 1.**

- ഭാഷ - ഭാഷാശാസ്ത്രം - ഭാഷാപഗ്രഥനരീതികൾ - ഭാഷയുടെ വർഗ്ഗീകരണം - ഭാഷാഗോത്രങ്ങൾ - കക്ഷ്യാവിഭജനം - ഉപഭാഷ - സഗോത്രഭാഷ - ഭാഷാമേഖല.

**Module 2.**

- സ്വനവിജ്ഞാനം - അവാന്തരവിഭാഗങ്ങൾ - വർഗ്ഗീകരണം - സ്വനിമവിജ്ഞാനം - സ്വനിമനിർണ്ണയനരീതി - ഉപസ്വനം - മലയാളത്തിലെ സ്വനിമങ്ങൾ - അക്ഷരം - ലിപി.

**Module 3.**

- രൂപിമവിജ്ഞാനം - സ്വനിമ - രൂപിമ വ്യത്യാസം - രൂപിമവിഭാഗങ്ങൾ - നിഷ്പാദനസമ്പ്രദായം - അർത്ഥവിജ്ഞാനീയം - അർത്ഥഭേദനീയാമകങ്ങൾ.

**Module 4.**

- വാക്യവിജ്ഞാനം - ഘടനാത്മകസമീപനം - ചോംസ്കിയൻദർശനം, സൊസ്യൂറിന്റെ തത്ത്വങ്ങൾ - ഭാഷാവിനിമയസിദ്ധാന്തങ്ങൾ.

**Module 5.**

- ഭാഷാഭേദവിജ്ഞാനം - ഭാഷയും സമൂഹവും - വ്യക്തിഭാഷ - മാനകഭാഷ - ഭാഷാഭേദഭൂപടം തുടങ്ങിയവ. സാമൂഹികഭാഷാവിജ്ഞാനം - കമ്പ്യൂട്ടേഷണൽ ഭാഷാശാസ്ത്രം.

**Module 6.**

- മലയാളഭാഷയുടെ ഉല്പത്തി - വിവിധാഭിപ്രായങ്ങൾ - കേരളപാണിനിയുടെ ആറുനയങ്ങൾ - ലീലാതിലകത്തിലെ ഒന്നാംശില്പം - കുന്തൽവാദം - ഘട്ടവിഭജനം.



**Module 7.**

- മലയാളവ്യാകരണപഠനത്തിന്റെ ചരിത്രം - വർണ്ണം - വർണ്ണവികാരം - അക്ഷരം - അക്ഷരമാലയുടെ സവിശേഷപഠനം - പദം - ലീലാതിലകത്തിലെയും കേരളപാണിനീയത്തിലെയും സന്ധിനിയമങ്ങൾ.

**Module 8.**

- നാമം - നാമവിഭാഗങ്ങൾ - ലിംഗം - വചനം - വിഭക്തി - കാരകം - തദ്ധിതം.

**Module 9.**

- { കിയ - നിർവചനം - വർഗ്ഗീകരണം - കാലപ്രത്യയങ്ങൾ - പ്രകാരം പ്രയോഗം - നിഷേധം - കൃത്ത്.

**Module 10.**

- വാക്യഘടന - പദക്രമം - പൊരുത്തം - വാക്യവിഭാഗങ്ങൾ - സമാസം

algebraic properties of their equations. Direction cosines and direction ratios of a line in space. Coplanar and non-coplanar lines. Equations of lines, planes and spheres in both cartesian and vector forms.

**Module 3. Elementary calculus**

- Limits of functions, differentiability, and derivative as slope. Derivatives of polynomial functions, exponential function and trigonometric functions. Derivatives of sums, products, composite and inverse functions. Increasing and decreasing functions, local extrema, and simple applications. Integration as anti-differentiation, integral as sum. Length of curves, area under curves and volume of solids of revolution using integration.

**Module 4. Probability**

- Basic Combinatorics - Pigeonhole principle, permutations and combinations. Random experiment, sample space, events, probability, discrete Probability, conditional probability and independent events.

**21. Mathematics**

**Unit I**

**Fundamental Concepts**

**Module 1. Sets and functions**

- General ideas of sets, sets of numbers and operations on sets. Countable and uncountable sets. Properties of relations and functions. Domain, codomain and range of functions. Injective and surjective functions, bijections and inverses. Graphs of polynomials, trigonometric functions and other elementary real valued functions. Composition of functions. Polynomials and polynomial equations - remainder and factor theorems. Relation between roots and coefficients of a polynomial of degree up to three.

**Module 2. Analytic geometry**

- Coordinates of points in plane and space. Distance in terms of coordinates. Determination of coordinates of points on a line in terms of two points. Slope of a line. Representation of curves in a plane as equations - straight lines, circles and conics. Geometric and

**Unit II**

**Real and Complex Analysis**

**Module 1. Basic concepts in Real Analysis**

- Convergence and limits of sequences and series of real numbers. Geometric and harmonic series. Sequences and series of real functions, point-wise and uniform convergence. The exponential series. Limits, continuity, directional and total derivatives of functions of several variables.

**Module 2. Integration and basic Measure Theory**

- Functions of bounded variations. Riemann integrals and Riemann-Stieltjes integrals of real valued functions. The concepts of Lebesgue measure and Lebesgue integral of real valued functions. Lebesgue measurable sets, measurable functions and simple functions.

**Module 3. Basic concepts in Complex Analysis**

- Basic properties of complex numbers. Absolute value. Polar form of a complex



number. De Moivre's theorem and  $n$ th roots of unity and  $n$ th roots of complex numbers. Properties of complex analytic functions- Cauchy Reimann equations, infinite differentiability, Harmonic conjugates. Conformal mappings. Mobius transformations and cross ratio.

#### Module 4. Complex Integration

- Power series of functions, Radius of convergence of power series. Zeros, poles and singularities of functions. Liouville's Theorem. Open Mapping Theorem. Maximum Modulus Theorem. Line integrals of complex valued functions, Cauchy's Theorem and Cauchy's integral formula for complex functions. Contour integration and residue theorem

### Unit III Abstract Algebra

#### Module 1. Groups

- Groups and subgroups, Groups of permutations. Abelian and non-abelian groups. Cyclic groups. Finite and infinite groups. Normal subgroups and quotients. Homomorphisms and isomorphisms. Homomorphic images and quotients. Lagrange's theorem. Order of an element. Groups of prime order and prime-square order. Direct products and direct sums of groups. Sylow's theorem.

#### Module 2. Rings

- Ring of integers and ring of polynomials. Ring of integers modulo  $n$ . Finite rings. Commutative and non-commutative rings. Ideals, maximal ideals and prime ideals. Quotient Rings. Homomorphisms and isomorphisms. Homomorphic images and quotients. Zero divisors. Integral domains. Euclidean domains. Units, associates and primes in a ring. Groups of units of rings.

#### Module 3. Fields

- Field of rational numbers, real numbers and complex numbers. Integers modulo a prime number. Finite fields. Finite integral domains. Polynomials over fields, reducibility and irreducibility. Algebraic and transcendental extensions of fields. Degree of extension and irreducible polynomial of an element, Splitting fields, groups of automorphisms and fixed fields.

### Unit IV Linear Algebra and Matrix Theory

#### Module 1. Matrix Theory

- Algebra of matrices - Types of matrices, nilpotent matrices, invertible matrices. Determinants of square matrices. Echelon matrices and rank of a matrix. Systems of linear equations and solutions and matrix methods for checking consistency.

#### Module 2. Vector spaces

- Vector spaces over an arbitrary field, real numbers and complex numbers. Linear independence and dependence. Basis and dimension. Subspaces and quotients. Direct sums of vector spaces. Geometry of points, lines and planes in  $R^2$  and  $R^3$  in terms of subspaces.

#### Module 3. Linear Transformation

- Linear maps. Differentiation and integration as linear maps. Range, null space and dimensional relations. Invertible transformations. Representation of linear maps between finite dimensional vector spaces as matrices and vice-versa. Dependence of matrix of a linear transformation on the basis and relation with change of basis. Linear functional and dual basis. Linear functionals on  $R^2$ . Eigenvalues and eigenvectors. Minimal polynomial, characteristic polynomial and Cayley-Hamilton theorem, Diagonalization.



## Unit V

### Number Theory and Differential Equations

#### Module 1. Number theory

- Principle of Mathematical Induction. Prime factorization. Properties of divisibility. Coprime numbers. G C D and L C M of numbers. Eulers totient function and its multiplicative property. Congruences. Chinese remainder theorem. Fermats little theorem. Wilsons theorem.

#### Module 2. Ordinary Differential Equations

- Order and degree of differential equations. Formation of differential equation and different types of differential equations of first order. Representation of family of curves by differential equations. Orthogonal trajectories. Existence and uniqueness of solutions of initial value problems for first order ordinary differential equations, Method of variation of parameters, Wronskian. Power series solutions of differential equations. Bessel and Legendre polynomials.

#### Module 3. Partial Differential Equations

- Solution of the equation of the form  $Pdx+Qdy+Rdz=0$ . Charpits and Jacobis method for solving first order PDEs, Classification of higher order PDEs (parabolic, elliptic and hyperbolic types). General solution of higher order PDEs with constant coefficients. Method of separation of variables. Wave equation, Heat equation and Laplace equation.

## Unit VI

### Topology and Functional Analysis

#### Module 1. Metric Topology

- Metric spaces. Discrete metric. Euclidean metric on  $R^n$  and  $C^n$ . Supremum metric on the set of real valued functions and complex valued functions on a closed interval. Limit points and convergence of sequences in a metric space. Cauchy sequences. Complete metric spaces. Completion of a metric space.

Cantors intersection theorem and Baires category theorem. Compact subsets and connected subsets of  $R$  and  $C$ . Heine-Borel theorem for  $R^n$

#### Module 2. General Topology

- Topological spaces, open sets and closed sets. Usual topology on  $R$  and  $C$ . Base and subbase for a topology. Closure, interior and boundary of subsets. Compactness and connectedness. Convergence of sequences in a topological space. Non-uniqueness of limits. Hausdorff Spaces and separation axioms. Continuity of functions between topological spaces. Preservation of compactness and connectedness under continuous functions. Homeomorphisms. Product topology.

#### Module 3. Normed linear spaces

- Norm on linear spaces. Euclidean norm on  $R^n$  and  $C^n$ . Finite and infinite dimensional  $p$  spaces.  $L_p$  spaces. Closed and non-closed linear subspaces. Closure and interior of linear subspaces. Continuous linear maps between normed linear spaces. Bounded operators and operator norm. Banach spaces. Open mapping theorem and closed graph theorem.

#### Module 4. Inner product spaces

- Inner products. Examples of norms arising from inner products and not arising from any inner product. Parallelogram law. Orthogonality in inner product spaces. Orthonormal bases. Fourier Expansion. Bessels inequality. Hilbert spaces. Parsevals identity. Continuous linear maps between Hilbert spaces. Projection map, Riesz representation theorem.

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## 22. Music

### Unit I

#### Module 1. History of music

- Period I – Natya Sastra to Sangita Ratnakara
- Period II – Chaturdandi prakasika onwards



**Module 2. Vedic Music**

- Sama gana and its characteristics

**Module 3. Lakshana grandhas**

- Natya Sastra
- Brihaddesi
- Swaramela Kalanidhi
- Chaturdandi Prakasika
- Sangita sampradya pradarsini
- Sangita Chandrika
- Chilappathikaram

**Module 4.**

- Different mela systems propounded by various Lakshanakaras

**Module 5. 72 Sampurna melakarta scheme**

- Asampoorna mela paddathi
- Katapayadi formula
- Bhoota sankhya
- Model shift of tonic
- Vivadi melas

**Module 6. Composers and Vaggeyakaras of pre-Tyagaraja period**

- Annamacharya
- Bhadrachalam Ramadas
- Purandara dasar
- Narayana thirthar
- Kshetrajna
- Jayadeva
- Arunchala kavi
- Arunagiri nathar
- Sadasiva brahmendra
- Uttukkad Venkatasubhayya

**Module 7. Raga lakshanas of the melakartas**

- Todi
- Mayamalava gaula
- Chakravakam
- Natabhairavi
- Keeravani
- Kharaharapriya
- Gaurimanohari
- Charukesi
- Harikamboji
- Sankarabharanam
- Subhapantavarali
- Dhenuka
- Ramapriya

- Pantuvarali
- Shanmughapriya
- Lathangi
- Vachaspathi
- Kalyani
- Dharmavati
- Simhendramadhyamam
- Hemavati

**Module 8.**

- Detailed knowledge of the classification of the instruments in general.

**Unit II**

**Module 1. Music and Temples**

- Role of music in temples
- Ritualistic music
- Musical Iconography
- Musical stone pillars

**Module 2. Musical inscriptions in Kudumiamalai and thirumayam**

**Module 3. Talas**

- Sapta talas
- Shadanagas
- 35 talas
- Shodasangas
- Scheme of 108 talas
- 175 talas
- Navasandhi talas
- Sarabhanandana tala

**Module 4. Origin and evolution of musical forms**

- Prabandhas - Geethaprabandhas and Vadyaprabandhas
- Study of the structure of the musical forms Jathisvaram,
- Svarajathi, Varnam, Kriti, Ragamalika, Padam, Javali, Thillana
- Dance musical forms

**Module 5. Evolution of musical concerts**

**Module 6. Composers and Vaggeyakaras of Tyagaraja period**

- Tyagaraja
- Dikshitar
- Syama Sastri



- Subharaya Sastri
- Gopala Krishna Bharati
- Swathi Thirunal
- Irayimman Thampi
- Kuttikunji thankachi
- Veena Kuppayyar
- Marga Darsi Sesha iyangar

#### Module 7. Raga lakshanas

- Mohanam
- Hamsadhvani
- Kambooji
- Bilahari
- Neelambari
- Kedaragaula
- Devagandhari
- Nattakurinji
- Hindolam
- Malayamarutham
- Reetigaula
- Ananda bhairavi

#### Module 8. Detailed knowledge of the stringed instruments of South and North with playing technique

- Tamburu
- Ektar
- Veena
- Violin
- Gottuvadyam
- Sarangi
- Sitar
- Sarod

### Unit - III

#### Module 1. Manodharma Sangeetha

- Raga Alapana
- Tanam
- Niraval
- Kalpanasvara

#### Module 2. Exposition of pallavi

#### Module 3. Advance knowledge of musical prosody

- Padacheda
- Varities of prasa
- Yamaka

- Yati
- Svarakshara

#### Module 4. Group kritis of Tyagaraja, Dikshitar, Syama Sastri and Swathithirunal

#### Module 5. Treatment of music in geyanataka, nrityanataka, bhagavatamelanataka, yakshagana and kathakalakshepam

#### Module 6. Composers and Vaggeyakaras of post Tyagaraja period

- Pattanam Subrahmanya Iyer
- Ramanad Sriviniasa Iyengar
- Mahavaidyanatha Iyer
- Neelakantha Sivan
- Chengalvaraya Sastri
- Mysore Vasudevacharya
- Periyaranithooran
- Ambujam Krishna
- Muthuthandavar
- Koteesvara Iyer

#### Module7. Raga lakshana

- Abhogi
- Natta
- Gaula
- Arabhi
- Varali
- Sri
- Poorvikalyani
- Bahudhari
- Sahana
- Saveri
- Bhairavi
- Manirangu
- Valachi
- Kannada
- Saraswathi

#### Module 8. Detailed knowledge of the wind instruments of North and South with playing technique

- Flute
- Nagaswaram
- Ottu
- Harmonium



- Clarinet
- Shehnai
- Saxophone

### **Unit - IV**

**Module 1. Bharata's experiment dhruva veena and chala veena, cycle of 4<sup>th</sup> and cycle of 5<sup>th</sup>**

**Module 2. Music and mathematics**

**Module 3. Geographical factors and their influence**

**Module 4. Music and physiology - Larynx and Ear**

**Module 5. Yazh - its origin evolution and decline**

**Module 6. Composers and Vaggeyakaras of modern period**

- G.N. Balasubrahmaniam
- Muthayya Bhagavatar
- Papanasam Sivan
- T. Lakshmana Pillai
- K.C. Kesava Pillai
- Ennapadam Venkitarama Bhagavatar
- Mysore Maharaja

**Module 7. Ragalakshana**

- Saranga
- Chenchurtti
- Lalitha
- Surutti
- Navarasa Kannada
- Bhoopalam
- Sudha Saveri
- Kanada
- Nagasvaravali
- Amrita Varshini
- Bhowli
- Hameerkalyani
- Ranjini
- Athana
- Behag
- Kapi

**Module 8. Detailed knowledge of the percussion instruments of South and North**

- Mridangam
- Tabala

- Pakhwaj
- Ghatom
- Morsing
- Taval
- Kanchira

### **Unit - V**

**Module 1. Raga Classification in ancient Tamil music**

**Module 2. Musical aspects of tevaram, thiruvachakam, thirupagazh and divyaprabandham**

**Module 3. Raga classification of Hindustani music -**

**Raga ragini parivara system**

**Module 4. Time theory of ragas**

**Module 5. Raga and rasa Madura bhakti and Navavidha bhakti**

**Module 6. Varieties of folk concerts - folk games and festival songs**

- Kuravanji natakam
- Bommalattam
- Kummi
- Kolattam
- Thiruvathirakkali
- Chinamelam
- Periyamelam
- Marriage songs

**Module 7. Sopana sangeetham and its characteristics, difference**

**between sopana sangeetham and classical music**

**Module 8. Music in kathakali -**

- instruments used in it
- Panchavadya, tayambaka
- Talas used in it

### **Unit - VI**

**Module 1. Modern trends in Music**

- Style of performing
- Digital recording system
- Modern technologies
- Electronic media
- Modern requirements for an acoustical auditorium



## Module 2. Music and Yoga

### Module 3. Research

- Journals and e-journals
- Books
- Periodicals

### Module 4. Value of Music

- spiritual, intellectual, emotional & Cultural

### Module 5. Musical honours and titles

### Module 6. Music Education

- Gurukula System
- Curriculum System

### Module 7. Music appreciation and criticism

### Module 8. Music Therapy

- Śuddhadvaita of Vallabha and Dvaitadvaita of Nimbarka - textual sources.

### Module 4.

- Systems - Lokayata - Materialism, denial of Atman and God, Concept of mind - epiphenomenalism.
- Jainism-Tirthankaras, Anēkāvāda, Syādvāda.
- Buddhism - Ārya Satyas , Aṣṭāṅgamārga, Pratītyasamutpāda, Kṣāṇikāvāda, Nairātmyavāda, Nirvāṇa and Mōksa - comparison.

### Module 5.

- Nyaya Vaisesika - Primary textual sources , concept of pramāṇas, doctrine of causation, Vaisesika doctrine of padārthas.
- Samkhya Yoga - Nature and scope of dualism , concept of evolution , comparison between prakṛtipariṇāmavāda and vivartavāda.
- Aṣṭāṅgayoga - Structure of Patanjali's Yogasutras, Samādhi pāda, Sādhana pāda, Vibhūti pāda, Kaivalya pāda.
- Purva Mimamsa - Textual sources , dharma, epistemological realism, pramāṇas accepted by Prabhakara and Kumarila Bhatta.

### Module 6.

- Aesthetics - Two segments of Samaveda Samhita - Adhāra and Gāna. Natyasastra - Rasa theory - Navarasas, Sthāyībhāvas, Vibhāvas, Anubhāvas, Sancāribhāvas.
- Anandavardhana - Threefold classification of dhvani - vastu, alamkāra and rasa (definition)

## 23. Philosophy

### Unit I Classical Indian Philosophy

#### Module 1. The Vedas

- Evolution from polytheism to monism , Vedic deities- concepts and names , journey to monism-intermediary concepts like R̥ta and Tad Ēkam.

#### Module 2. Prasthāna traya

- The Upanishads- Ekātma vāda, Brahman-Atman identity, The four Mahāvākyas and their sources - Aham Brahmāsmi, Tattvamasī, Prajñānam Brahma, Ayamātma Brahma.
- Brahmasutras - Structure of the text - pāda, adhyaya, adhikaraṇa.
- Bhagavad Gita - Karma Yoga, Sthitaprajña as the concept of self-management, Lōkasamgraha as an ethical concept.

#### Module 3.

- Vedānta darśana - Advaita - Recognition of Śabda Pramāṇa, Satta traya (only definition), Saprāpancavāda, Nisprāpancavāda, Māya, Adhyāsa, Jīvanmukti.
- Viśiṣṭadvaita - Cit and Acit - relationship and distinction, Aprtakṣiddhi (definition).
- Dvaita - Nature and scope of dualism, Concept of Pancabhēdas, Vidēhamukti.

### Unit II Contemporary Indian Philosophy

#### Module 1.

- Indian Renaissance Movement - background, concerns and goals, prominent leaders and organizations.

#### Module 2.

- Swami Vivekananda -Neo-Vedānta, Four Yogas, The ideal of universal religion. Sri Aurobindo- Evolution and involution, Gnostic being, Integral Yoga.
- Ramana Maharshi - Concept of Jñānavichara.



**Module 3.**

- Rabindranath Tagore- Poet's religion, the ideal of creative unity, the concept of *Jeevandeavata*.
- Dr.S. Radhakrishnan- Nature of reality, intellect and intuition.

**Module 4.**

- MK Gandhi - Truth and non-violence - end and means relationship, the economic and ethical bases of Sarvodaya, Satyagraha as the victory of soul-force over physical force.
- J Krishnamurti - Freedom from the known, truth is a pathless land.
- MN Roy- New Humanism, The biological basis of human rationality and freedom.

**Module 5.**

- BR Ambedkar - Caste as an unnatural institution - Sree Narayana Guru and Chattampi Swamikal - Critique of caste on the basis of Vedanta Darsana.

**Unit III  
Western Philosophy**

**Module 1.**

- Greek Philosophy - Pre-Socratic Age - the problem of being and becoming/substance and change with reference to Parmenides and Heraclitus.
- Socrates - Characteristics and aim of Socratic Method.
- Plato- Idealism, object-idea distinction, concept of reality, Cardinal Virtues, Concept of social organization - comparison with Indian Varna System.
- Aristotle- form and matter, doctrine of fourfold causation.

**Module 2.**

- Medieval Philosophy - St. Anselm - Faith and reason, St. Thomas Aquinas - Proofs for the existence of God, Occam's razor - definition and application.

**Module 3.**

- Modern Thinkers - Francis Bacon - The four idols.
- Descartes - Cartesian method - characteristics, substance dualism, interactionism and occasionalism.

- Spinoza - Monism, psychophysical parallelism, substance and modes.
- Leibniz - pluralism, Monadology, Pre-established harmony.
- John Locke - Arguments for the rejection of innate ideas.
- Berkeley - subjective idealism, *ess est percipii*.
- David Hume - skepticism, denial of substance and causality, epistemological doubt of Hume in comparison with methodological doubt of Descartes.

**Module 4.**

- Immanuel Kant - Original works, Transcendental Aesthetics - metaphysical exposition of space and time, twelve principal categories and judgments, phenomena-noumena distinction, Kant's agnosticism compared with *Anirvachaniya* concept.
- Hegel - Dialectical explanation of reality, Absolute Idea, comparison between the dialectics of Hegel and Plato.
- Marxism - dialectics of history, concept of class struggle and the dictatorship of proletariat.

**Unit IV  
Contemporary Western Philosophy**

**Module 1.**

- Edmund Husserl - Intentionality of consciousness, Phenomenological reduction

**Module 2.**

- Existentialism of Kierkegaard - three stages of existence, subjectivity of truth, freedom and choice.
- Gabriel Marcel - Freedom - positive and negative sense, concept of creative fidelity, distinction between problem and mystery.
- Sartre - Important works, existence precedes essence, the three levels of Being, freedom and responsibility.
- Nietzsche - major works, will to power, master - slave morality, concept of Superman.

**Module 3.**

- Martin Heidegger - Major works, Dasein.

**Module 4.**

- Gottlieb Frege - Concept-script distinction, sense and reference.



- Bertrand Russell - Theory of Description, Logical atomism.
- Ludwig Wittgenstein - Major works, Picture theory and use theory of meaning, Concept of language games.
- Logical positivism - Important figures and basic texts, critique of metaphysics, Verification theory of meaning - weak and strong sense, Unification of sciences.

#### Module 5.

- Karl Popper - Major works, Falsificationism - definition, the demarcation between science and non-science.
- Feyerabend - Epistemological anarchy, incommensurability thesis.

#### Module 6.

- Ordinary language philosophers - Gilbert Ryle - major works, category mistake. J. L. Austin - performatives, speech act theory.

#### Module 7.

- Structuralism - Saussure - signifier/signified, synchronic/diachronic langue/parole distinction.
- Post-structuralism and Postmodernism - Derrida - decentering, fluidity of meaning, Deconstructive style of reading, critique of logocentrism, différance.

#### Module 8.

- New Left Critical Theory - Antonio Gramsci - important works, concept of hegemony, critique of 'economism'.
- Althusser- Repressive state apparatus (RSA) and Ideological state apparatus (ISA).

### Unit V Logic

#### Module 1.

- Logic as normative science of reasoning, induction and deduction-relationship and differences.
- Inference - immediate and mediate.
- Relations of opposition of propositions based on the Square.
- Education- Conversion, Obversion, Contraposition -definition and exercises.

#### Module 2.

- Syllogism - Types - categorical, hypothetical, disjunctive and dilemma - rules and fallacies, exercises to identify violation of rules and resulting fallacies.

#### Module 3.

- Induction - induction - deduction correlation in scientific method.
- Hypothesis - formation, verification and testing, qualities of a good hypothesis, canons of the experimental methods of J. S Mill.
- Analogy - Weak and strong, primary and secondary analogues.

#### Module 4.

- Symbolic Logic - Variables and Constants - definition and symbols, Truth and validity, Statements forms - tautology, contradictory and contingent forms.
- Basic truth - tables - Nine rules of inference, De Morgan's theorems.

### Unit VI Ethics

#### Module 1.

- Axiology - Definition, concept of value, value/virtue distinction, intrinsic and instrumental values.

#### Module 2.

- Ethical theories - Virtue ethics - Arete and Eudemonia - definition.
- Deontological and Teleological approaches - Kant's concept of categorical imperative, necessity of God as a postulate of morality.
- Hedonism - Psychological and ethical hedonism - Utilitarianism of J. S. Mill, F. H. Bradley - My Station and its duties.
- Pragmatism - Prominent representatives, workability as the criterion of truth/good, instrumentalism.

#### Module 3.

- Metaethical Theories - Intuitionism, Emotivism, Prescriptivism and Descriptivism (definition and prominent representatives).
- Naturalism- non- naturalism distinction, G. E. Moore's concept of good, naturalistic fallacy.



- Three features of moral discourse (C. L. Stevenson), Three characteristics of moral judgment (R. M. Hare) - Concept of prescriptivity, supervenience and universalisability.
- Ethical skepticism - Logical positivist conception of moral judgments - Russell, Ayer and Carnap.

**Module 4.**

- Biomedical ethics - core issues - Doctor-patient relationship, concept of informed consent, debate on ethical issues of abortion, euthanasia, surrogacy and artificial reproductive techniques.

**Module 5.**

- Environmental ethics - Why environmental ethics is significant today? Critique of Anthropocentrism and technocentrism.
- Deep ecology of Arne Naess - differences between deep and shallow ecology, Ecosophy - T, biospherical egalitarianism.
- Ecological resistance movements in India - Chipko and Narmada Bachao Andolan - inspirations and goals.

**Module 6.**

- Cyberethics -The Ten Commandments of Computer Ethics proposed by the Computer Ethics Institute, the problem of personal privacy in cyber world.

residues and evaluation of integrals. Special functions (Hermite, Bessel, Laguerre and Legendre). Elementary probability theory, random variables, binomial, Poisson and normal distributions. Central limit theorem.

**Module 2. Classical Mechanics**

- Newton's laws, Dynamical systems, Phase space dynamics, stability analysis. Central force motions. Two body Collisions-scattering in laboratory and Centre of mass frames. Rigid body dynamics - moment of inertia tensor. Non-inertial frames and pseudoforces. Variational principle. Generalized coordinates. Lagrangian and Hamiltonian formalism and equations of motion. Conservation laws and cyclic coordinates. Periodic motion: small oscillations, normal modes. Special theory of relativity- Lorentz transformations, relativistic kinematics and mass-energy equivalence, Poisson brackets and canonical transformations. Hamiltonian-Jacobi theory.

**Unit II**

**Module 1. Quantum Mechanics**

- Wave-particle duality. Schrodinger equation (time dependent and time- independent). Eigenvalue problems (particle in a box, harmonic oscillator). Tunneling through a barrier. Wave-function in coordinate and momentum representations. Commutators and Heisenberg uncertainty principle. Dirac notation for state vectors. Motion in certain potential: orbital angular momentum, angular momentum algebra, spin, addition

**24. Physics**

**Unit I**

**Module 1. Mathematical physics**

- Dimensional analysis, Vector algebra and vector calculus, Linear algebra, matrices, Cayley- Hamilton Theorem, Eigen values and eigen vectors. Linear differential equations of first and second order. Fourier-series, Fourier and Laplace transforms. Elementary complex analysis, analytic functions; Taylor & Laurent series; poles,



of angular momenta. Hydrogen atom. Stern-Gerlach experiment. Time-independent perturbation theory and applications. Variational method. Time dependent perturbation theory and Fermi's golden rule, selection rules. Identical particles, Pauli exclusion principle, spin-statistics connection, WKB approximation. Elementary theory of scattering: phase shifts, partial waves, Born approximation. .

### Module 2. Statistical Mechanics

- Thermodynamic potentials, Maxwell relations, chemical potential, phase equilibria. Phase space, micro and macro states. Micro- canonical, canonical and grand-canonical ensembles and partition functions. Free energy and its connection with thermodynamic quantities. Classical and quantum statistics. Ideal Bose and Fermi gases. Blackbody radiation and Planck's distribution law, Bose- Einstein condensation.

### Unit III

#### Module 1. Electromagnetic Theory

- Electrostatics: Gauss's law and its applications, Laplace and Poisson's equations, boundary value problems. Magnetostatics: Biot-Savart law, Ampere's theorem. Electromagnetic induction. Maxwell's equations in free space and linear isotropic media; boundary conditions on the fields at interfaces. Scalar and vector potentials, gauge invariance. electromagnetic waves in free space. Dielectrics and

conductors. Reflection and refraction, polarization, Fresnel's law, interference, coherence and diffraction. Dynamics of charged particles in static and uniform electromagnetic fields, Dispersion relations in plasma. Lorentz invariance of Maxwell's equations. Transmission lines and wave guides. Radiation - from moving charges and dipoles and retarded potentials.

### Module 2. Atomic and Molecular Physics

- Quantum states of an electron in an atom. Electron spin. Spectrum of helium and alkali atom. Relativistic corrections for energy levels of hydrogen atom, hyperfine structure and isotopic shift, width of spectrum lines, LS & JJ couplings. Zeeman, Paschen -Bach & Stark effects. Electron spin resonance. Nuclear magnetic resonance, chemical shift. Frank-Condon principle. Born-Oppenheimer approximation. Electronic, Rotational, Vibrational and Raman spectra of diatomic molecules, selection rules. Lasers: spontaneous and stimulated emission, Einstein A & B coefficients. Optical pumping, population inversion, rate equation. Modes of resonators and coherence length.

### Unit IV

#### Nuclear and Particle Physics

- Basic nuclear properties: size, shape and charge distribution, spin and parity. Binding energy, semi-empirical mass formula, liquid drop model. Nature of the nuclear force, form of nucleon-nucleon potential, charge-independence and charge- symmetry of



nuclear forces. Deuteron problem. Evidence of shell structure, single-particle shell model, its validity and limitations. Rotational spectra. Elementary ideas of alpha, beta and gamma decays and their selection rules. Fission and Fusion. Nuclear reactions, reaction mechanisms, compound nuclei and direct reactions. Classification of fundamental forces. Elementary particles and their quantum numbers(charge, spin, parity, isospin, strangeness, etc.). Gellmann-Nishijima formula. Quark model, baryons and mesons. C, P and T invariance. Application of symmetry arguments to particle reactions. Parity non- conservation in weak interaction. Relativistic kinematics.

### Unit V

#### Condensed Matter Physics

- Bravais Lattices, Reciprocal lattice, Diffraction and the structure factor. Bonding of solids, Elastic properties, phonons, lattice specific heat. Free electron theory and electronic specific heat. Response and relaxation phenomena. Drude model of electrical and thermal conductivity. Hall effect and thermoelectric power. Electron motion in a periodic potential, band theory of solids: metals, insulators and semiconductors, First and second order phase transitions. Diamagnetism, Paramagnetism and ferromagnetism, Superconductivity: type 1 and type 2 superconductors, Josephson junctions. Superfluidity. Defects and dislocations Ordered phases of matter: translational and orientational order, kinds of liquid crystalline order. Quasi crystals.

### Unit VI

#### Electronics

- Semiconductor devices (diodes, junctions, transistors, field effect devices, homo and

hetero- junction devices). Transistor amplifiers and oscillators, device structure, device characteristics, frequency dependence and applications. Opto-electronic devices (solar cells, photo-detectors, LEDs). Operational amplifiers and their applications. Digital techniques and applications (registers, counters, comparators and similar circuits). A/D and D/A converters. Microprocessor and microcontroller basics. Data interpretation and analysis. Precision and accuracy. Error analysis, propagation of errors. Least squares fitting.

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## 25. Political Sciences

### Unit I

#### Modern Political Analysis

##### Module 1. Political Science : Nature and Development

- Evolution of Political Science as a Discipline –Ancient, Modern and Contemporary Developments
- Classical and Normative Approaches
- Positivism [ Behavioralism and Post - behaviouralism]
- Liberal and Neo-liberal -Marxian and Post/ Neo-marxian approaches

##### Module 2. Substance of Political Science

- State, Power, Authority, Legitimacy, Civil Society, Identity Politics [Caste, Gender and Religion]

##### Module 3. Positivist Theories

- System Analysis [David Easton]-Structural Functional Analysis [Gabriel Almond]- Communication Theory [Karl Deutsch]

##### Module 4. Theories of Democracy

- Elite Theory [Pareto, Mosca, Michels and Sartori]-Pluralism [Dahl]-
- Participatory and Deliberative Democracy - Public Sphere [Habermas]

##### Module 5. Political Culture and Political Socialization

*State Eligibility Test - Syllabus 2016*



## Module 6. Political Development, Modernization and Political Decay

### Unit II Political Thought

#### Module 1. Ancient Greek Political Thought

- Plato and Aristotle

#### Module 2. Political Liberalism

- Machiavelli, Thomas Hobbes, John Locke, J.J.Rousseau, Jeremy Bentham, J.S.Mill, G.W.F. Hegel and T.H.Green

#### Module 3. Contemporary Liberalism

- John Rawls and Robert Nozick

#### Module 4. Marxian Tradition

- Karl Marx, V.I. Lenin, Mao Tse - tung and Antonio Gramsci

#### Module 5. Contemporary Marxism

- Louis Althusser and Nicos Paulantzas

#### Module 6. Critical Theory

- Theodore Adorno and Jürgen Habermas

#### Module 7. Indian Political Thought

- Kautilya, M.K.Gandhi, M.N. Roy, Ram Manohar Lohia and B.R.Ambedkar

### Unit III Indian Government and Politics

#### Module 1. Historical Antecedents and Ideological Base of Indian Constitution

- National Movement-Constitutional Developments-Nature and Composition of the Constituent Assembly-Ideological Base: Preamble, Fundamental Rights and Directive Principles.

#### Module 2. State and Individual

- Fundamental Rights – Directive Principles of State Policy-Globalization and Changing Nature of State-Individual Relationship

#### Module 3. Structure and Power

- Union Executive and Legislature: President-Prime Minister-Council of Ministers-Parliament

- State Executive and Legislature: Governor-Chief Minister – Council of Ministers-Legislature.

#### Module 4. Federalism and Issues in Centre-State Relations

- Nature and Constitutional Provisions of Indian Federalism-Centre State Relations
- Contentious Areas -Demand for State Autonomy-Emerging Trends-Need for Restructuring Centre – State Relations

#### Module 5. Secularism : Theory and Practice

- Secularism: Nature- Constitutional Provisions-Challenges
- Communalism and Communal Politics

#### Module 6. Party System and Electoral Politics

- Evolution, Nature and Growth of Indian Party System – Ideology, Social Base and Electoral Performance of B.J.P, Indian National Congress, Left Parties: CPI (M) and CPI-Emergence and Growth of Regional Parties- Coalition Politics- Election Commission-Electoral Behavior-Trends in Participation –Electoral Reforms

#### Module 7. Judiciary

- Nature and Structure: High Courts –Supreme Court-Judicial Independence-Judicial Review-Judicial Activism and Public Interest Litigation-Judicial Reforms

#### Module 8. Caste, Class, Gender and the Quest for Social Justice

- Caste and Identity Politics- Class and Politics: Changing Nature
- Marginalized Social Groups: Women-Children-Minorities-Scheduled Castes and Scheduled Tribes

#### Module 9. State and Political Economy of Development

- State and Development –Nehruvian Model of Development-Planning-Agrarian Issues-Economic Liberalization and Emerging Paradigm of Development-Changing Nature of Indian State



**Module 10. Grass root Democracy**

- Evolution and Growth-73<sup>rd</sup> and 74<sup>th</sup> Constitutional Amendments –Structure, Powers and Functions –Role of PRIs in Democratization and Rural Development

**Unit IV  
Comparative Politics**

**Module 1. Comparative Politics: Nature and Theories**

- Meaning, Nature and Evolution
- System Theories, Cultural Theories, Modernisation Theory, Dependency Theories and Class Theories

**Module 2. Constitutionalism and Forms of Political Systems**

- U.K, U.S.A, France,China,Canada and India
- Comparative Federalism (U.S.A, Canada and India)

**Module 3. Political Structures and Governance (U.K, U.S.A, France, China, and India)**

- Legislature-Judiciary- Executive- Bureaucracy - Separation of Powers - Checks and Balances

**Module 4. State and Individual**

- Rights and Liberties - Comparative Analysis (U.S.A, China and India)
- Multiculturalism (U.S.A, India and France)

**Module 5. Party System and Electoral Process**

- Political Participation, Parties and Party Systems- Interest Groups

**Module 6. Problems of Nation Building in Developing Countries**

- Socio Economic Issues in Nation Building (India, Brazil and Nigeria)

**Unit V  
International Relations**

**Module 1. Theories and Approaches to the Study of International Relations**

- Realism-Neo-realism - Structural Realism – Offensive and Defensive Realism- Idealism/ Liberalism- Neo-liberalism – Institutional Liberalism –Constructivism-System Theory- Game Theory- Communication Theory- Decision Making Theory and Dependency Theory.

**Module 2. Changing Nature of Nation State**

- Westphalia to contemporary times- Impact of Globalization and Information Revolution on State – Non-state Actors- Global Civil Society- International System and Global Governance.

**Module 3. Power: National Interest, Ideology, and Foreign Policy**

- Elements and Determinants of Power- Acquisition, use and Limitations of Power- Formulation and Promotion of National Interest- Meaning and Relevance of Ideology in International Relations- Determinants of Foreign Policy

**Module 4. War and Conflict**

- Types and Significance of War- Arms race- Arms control and Disarmament- NPT, CTBT, FMCT

**Module 5. Approaches to Peace**

- Conflict Resolution- Diplomacy- Balance of Power- Collective Security- International Law and Treaties.

**Module 6. International and Regional Institutions**

- UN- Origin, Growth, Provisions and Practices – Power Struggle within the UN- Reform of the UN- Regional Organizations: SAARC- ASEAN- BRICS

**Module 7. International Political Economy**

- North-South and South-South Cooperation, IMF, WTO and Asian Infrastructure Investment Bank (AIIB)

**Module 8. Contemporary Issues in International Relations**



- Terrorism- Religious - Fundamentalism- Environment and Climate Change- Human Rights- Problems of Democratic Transition (Arab Spring) - Maritime Security and Cyber Security

#### **Module 9. Emerging World Order**

- Post-cold War Developments and the Changing role of USA and China

#### **Module 10. India in International Relations**

- India as a Rising Power- Basic Features, Strategies and New orientations of Foreign Policy- Relationship with Neighbors and Big powers- USA, China and Russia.

### **Unit VI**

#### **Public Administration**

##### **Module 1. Introduction to Public Administration**

- Meaning, Nature, Scope and Significance of Public Administration-Evolution of Public Administration- New Public Administration-New Public and Private Management

##### **Module 2. Theories of Administration**

- Scientific Management - Classical - Bureaucratic - Human Relations - Decision Making

##### **Module 3. Approaches to Public Administration**

- Structural- Functional - Behavioural - Systems - Public Choice - Ecological

##### **Module 4. Contemporary Discourse in Public Administration**

- Entrepreneurial Government- Theories of Governance - Concept of People's Participation in Administration- Development Policy and Administration

##### **Module 5. Personnel Administration**

- Recruitment- Training- Promotion- Discipline- Morale-
- Employer- Employee Relationship
- UPSC-Structures, Powers and Functions

##### **Module 6. Principles of Organization**

- Line and Staff- Unity of Command- Hierarchy - Span of Control-Centralization and Decentralization-Types of Organization- Formal and Informal Forms of Organization- Department-Public Corporation and Board

##### **Module 7. Bureaucracy**

- Theories, Types and Role- Max Weber and his Critics- Civil Servant-Minister relationship

##### **Module 8. Financial administration**

- Principles of Budget- Types of Budget- Budgetary Process- Audit- Control over Finance with Special Reference to India.

##### **Module 9. Good governance**

- Transparency and Accountability- Right to Information, ICT and Good Governance - Grievances and Redressal institutions: Ombudsman- Lokpal and lokayukta

## **26. Psychology**

### **Unit I**

#### **Cognitive Processes**

##### **Module 1. Attention**

- Consciousness and attention: Preconscious processing; Controlled and Automatic processes
- Functions of attention: Signal detection, Vigilance, Selective attention, Divided attention, Sustained attention and Alternating attention
- Models of attention: Selection models of attention (Early filtertheory, Attenuated filtertheory, Late filter theory, Multimode theory); Capacity model (Attention resources theory, Multiple resource model).
- Physiological basis of attention

##### **Module 2. Perception**

- Nature of perception: Perceptual organization and constancies; Depth perception; Viewer, Person and Landmark centered approaches to form perception



- Bottom up approach: Direct perception; Template and Prototype theory; Feature theory
- Top down approach and Computational theory
- Physiological basis of perception

### Module 3. Memory and Forgetting

- Models of memory: Atkinson-Shiffin model, Levels of processing model, Nature of memory model, Working Memory model, PDP or connectionist model
- Why we forget: Consolidation theory, Interference theory, Decay theory, Cue dependent forgetting, Displacement theory, Repression, Amnesia.
- Testing memory: Components of memory tests; WMS and PGI memory test
- Physiological basis of memory

### Module 4 . Intelligence and Creativity

- Traditional theories: Two factor theory (Spearman and Cattell); Multifactor theory; Hierarchical model; Primary mental abilities or Group factor theory; Structure of intellect model
- Contemporary theories: Triarchic theory; Multiple intelligence theory; Emotional intelligence theory; PASS model
- Nature of creativity; Divergent and Convergent thinking; Little c and Big C; Stages of creative thinking; Types of Creative contributions

### Module 5 . Thinking

- Problem solving: Types of problem; Approaches to problem solving; Types of heuristics, Reproductive and productive problem solving; Obstacles to problem solving
- Decision making: Classical or rational man theory; Subjective expected utility theory; Bounded rationality; Elimination by aspects; Biases and heuristics
- Reasoning: Deductive reasoning (Conditional - Types or Propositional calculus and Errors), Syllogistic - Linear, Conditional and Errors); Inductive reasoning

## Unit II Motivation, Emotion and Learning

### Module 1. Biological aspects of motivation

- Instinct theory and Ethology; Homeostasis and arousal theory; Biological needs and drive reduction

### Module 2. Psychological aspects of motivation

- Locus of control and motivation; John Hollands theory of motivation; Psychoanalytic theory and unconscious motivation; Activation theory, Theories of Erikson, Murray, and Maslow, Motivation in behaviouristic theory

### Module 3. Social aspects of motivation

- Intrinsic and extrinsic motivation; Level of aspiration; Social needs; Knowledge of result; Prestige suggestion; Humanistic model; Frustration aggression model

### Module 4. Motivation and emotion

- Types of emotion, Theories of emotion (James-Lange theory, Cannon-Bard theory, Schachter-Singer theory, Cognitive mediational theory, Facial feedback theory); Stress and coping. The concept of cortical arousal and ARAS; Biological basis of motivation and emotion

### Module 5. Motivation and learning

- Motivation in learning: Self efficacy; Zone of proximal development; Discovery learning; Gange's theory
- Learning by association: Classical conditioning; One shot learning; Conditioned emotional reaction
- Learning as effect of behaviour: Operant conditioning; Connectionism; Systematic behaviour theory or mathematical model
- Cognitive theories of learning: Latent learning; Insight learning; Expectancy theory
- Verbal learning
- Neurological basis of learning and memory



### Unit III

## Psychometry and Research Methodology

#### Module 1. Psychological Measurement

- Qualitative Vs. quantitative approach in the study of behavior
- Scales of measurement : Nominal, Ordinal, Interval, and Ratio Scales
- Classification of Psychological tests : Individual and group tests, Speed and Power tests, Verbal and Non-verbal tests, Paper and pencil tests and Performance tests, Culture free and culture fair
- Psychometric assessment
  - Intelligence tests: The Stanford-Binet Tests, The Wechsler Scales
  - Aptitude tests: Tests of special abilities, Differential aptitude tests
  - Achievement test : General achievement batteries, Special achievement test
  - Tests of Creativity : Guilford, Torrance
  - Personality test : Interviews, observation, Situational tests, Self-reports, inventories, questionnaires, rating scales, forced choice methods, check-lists, Q-sorts, Semantic differential, sociometry, content analysis, projective techniques

#### Module 2 . Test Construction

- Test conceptualization : Item preparation, Item analysis, Estimation of reliability, validity, and norms, Preparation of test manual
- Reliability: Concept, reliability estimate, types: test-re-test, parallel forms, split -half, other methods of estimating internal consistency, inter-scorer reliability, purpose of reliability co-efficient
- Validity : Concept, types: face, content, criterion, construct, convergent, divergent, relationship between validity to reliability
- Norms : Meaning of norm-referencing and criterion referencing Steps in developing norms
- Types: age-equivalent norms, grade-equivalent norms, percentile norms, standard score norms

#### Module 3. Quantitative research methods

- Nature of quantitative data
- The concept of variance : Partitioning of variance, controlling error variance through research designs
- Different kinds of quantitative research methods : Experimental research methods-Characteristic features of experimental research methods Between group designs : Two group designs, ANOVA designs, Factorial designs Within group designs,
- Quasi-Experimental research methods, Time series, equivalent time-samples, on-equivalent control group designs, counterbalanced design, separate-sample pretest-posttest design, patched -up, design, longitudinal design, cross-sectional design, cohort design.
- Ex-post-facto research : Correlational design, criterion-group design - Non-experimental designs : Observational research, Archival research, Case study research
- Small N designs : Advantages and disadvantages of small N designs, Different kinds of small N designs

#### Module 4. Qualitative Research Methods

- Nature of qualitative data
- Different kinds of qualitative research : Action research, Case study research, Ethnography, Grounded theory, Phenomenology. Historical research
- Techniques to collect qualitative data : Interview, Narrative and metaphor, Observation, Focus group discussion
- Techniques to analyze qualitative data : Hermeneutics, Semiotics

#### Module 5. Sampling and Data Processing

- Different sampling techniques - Probability sampling methods, Non-probability sampling methods
- Data processing - Tabulation and coding, Statistical analysis of the data, Estimating differences among the groups : t-tests, Anova, Manova, Discriminant analysis, non-



parametric methods. Estimating relationships among variables : Pearson r, Rank correlation, Multiple correlations, Factor Analyses.

## Unit IV Personality and Social Psychology

### Module 1. Describing Personality

- Philosophical perspectives, personality research: True experiments, Quasi experiments, Correlational studies, Case and epidemiological studies, Personality assessment: objective methods, projective methods, behavioural assessment methods.

### Module 2. Perspectives of personality

- Biological and evolutionary perspective : Social Darwinism and Eugenics. The genetic dimension of evolution, Contributions of Darwin , Lamarck, Mendel, Evolutionary Psychology : Natural selection of psychological mechanisms, Genes and behavior, Eysenck's Model of nervous system temperament
- Psychodynamic perspective : Classical Psychoanalysis: Sigmund Freud, Neo-analytic theories: Carl Jung, Alfred Adler, Karen Horney, Eric Fromm, Harry Stack Sullivan, Erik Erikson, Henry Murray's Personology, Object relations and attachment theories: Margaret Mahler, Bowlby, Melanie Klein, Heinz Kohut, Winnicott, Otto Kernberg.
- Behavioural Perspective: Dollard & Miller, B.F. Skinner
- Trait Perspective : G.W. Allport, R. B. Cattell
- Cognitive and social cognitive perspective: Lewin's Field theory, Kelley's Personal Construct Theory, Rotter's locus of control approach , Bandura's Social Cognitive learning theory
- Humanistic Existential Perspective: Carl Rogers, Rollo May, Victor Frankl, Abraham Maslow
- Eastern Perspective: Yoga, The Bhagavad Gita, Sufism, Buddhism, Jainism, Taoism

### Module 3. Social perception

- Social self : Sources of self-knowledge, Aspects of self-knowledge: self-schemas, self-discrepancies, Self-regulation, The self-concept, Self-esteem, Self-presentation
- Perceiving persons : Impression formation and impression management , Attribution: attribution theories, attribution biases, culture and attribution, motivational biases, Information integration
- Confirmation biases: Perseverance of beliefs, confirmatory hypothesis testing, the self-fulfilling prophecy
- Stereotypes, prejudice, and discrimination : Nature and origin-social categories and intergroup conflict, social identity theory, culture and social identity, culture and socialization, how stereotypes distort perceptions and resist change, automatic stereotype activation, prejudice : origin, sources, targets and consequences, Reducing stereotypes, prejudice, and discrimination, intergroup contact, intergroup friendships and extended contact

### Module 4. Social Influence

- Attitudes: Measurement, formation, attitudes and behavior, persuasion by communication, persuasion by our own actions, role playing, cognitive dissonance theory, changing attitudes
- Conformity : Classical studies, compliance, obedience: Milgram's research, social impact theory
- Groups: fundamentals of groups, individuals in groups, social facilitation, social loafing, group performance, brain storming, group polarization, group think, escalation effects
- Conflict: Mixed motives and social dilemmas, conflict escalation and reduction, negotiation.

### Module 5. Social relations

- Need to belong, the initial attraction, close relationships, interdependent relationships, romantic relationships
- Pro-social behaviour, evolutionary and motivational factors, situational influence,



bystander effect, time pressure, location and helping, culture, moods, pro-social media effects, role models and social norms

- Altruistic personality, interpersonal influences: perceived characteristic of the person in need, gender and helping
- Aggression-culture, gender and individual difference, causes of human aggression, the frustration-aggression hypothesis, negative affect, prevention and control of aggression

## Unit V Psychopathology

### Module 1. Diagnosis and classification of Mental disorders:

- DSM & ICD classifications.
- case taking practices- MSE, MMSE, clinical interview, case study, common signs and symptoms of mental disorders.

### Module 2. Neurodevelopmental disorders:

- Intellectual disabilities, pervasive and specific developmental disorders, communication disorders, autism spectrum disorders, specific learning disorders, behavioural and emotional disorders with onset in childhood and adolescence.

### Module 3. Major Mental Disorders

- Schizophrenia spectrum and other psychotic disorders- schizophrenia, schizo-typal, delusional, and other non-psychotic disorders, affective disorders- bipolar - depressive disorders

### Module 4.

- Personality disorders, sexual dysfunctions, gender dysphoria, mental and behavioural disorders due to psycho active substance use

### Module 5.

- Anxiety disorders, dissociative disorders, trauma - stress related, somatoform disorders, obsessive - compulsive related disorders.

### Module 6.

- Neurocognitive disorders organic mental disorders, vascular dementia, amnesic disorder, delirium, personality and

behavioural disorders due to known physiological conditions, unspecified organic mental disorders.

## Unit VI Applied Psychology

### Module 1. Psychology in Organizational Setting

- Approaches to organizational behaviour - Training for Organizational Managers - Sensitivity training, Cultural diversity training, protection against sexual harassment training, 360 degree feedback, Mentoring, Organizational Counseling - Chronic absentees, accident prone employee, alcoholism and drug addition, indiscipline employees.

### Module 2. Psychology in School Setting

- Approaches to Behavioral Management - Reality Model, Decisive discipline, Assertive Discipline - Class room management - Dealing with problem behavior, Communication strategies, Positive behaviors support - School counseling - Therapeutic intervention - Home & School, Psychosocial implication of disabilities, Special education.

### Module 3. Psychology in clinical setting

- Psychodynamic Psychotherapies - Supportive Psychotherapies, Crisis intervention, Hypnosis, Group Therapies
- Behaviour Therapies - Relaxation and Systematic Desensitization - Progressive muscular relaxation, Guided - Somato - Psychic relaxation, Assertive training, Modeling, Contingency Management, Response elimination and Extinction procedure, punishment and aversion procedures, applied behavior analysis.
- CBT, Beck cognitive Therapy, RET, Biofeedback, Stress inoculation.

### Module 4. Psychology of health and well-being

- Bio-psychosocial approaches - Promotion of psychological, social and physical well being,



health related beliefs and attitudes, health enhancing behavior, health compromising behaviour, Type A and Type B personalities, Psycho-neuro-immunology, Pain & its management

**Module 5. Emerging trends in Psychology**

- Sports -Personality profile of athletes – Team cohesion – Combating drug abuse in Sports Persons
- Forensic – Biological evidence: DNA finger printing, Brain mapping; Detection of deception; Interrogation, Polygraph, Narcoanalysis
- Environmental Psychology – Psychological roots of Environmental Psychology – Climate and well being – Pollution and its effect on human being – Disaster management

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**27. Russian**

**Unit I  
Russian Grammar**

**Module 1.**

- The Noun – Gender, number, declensions

**Module 2.**

- The Pronouns

**Module 3.**

- The Adjectives

**Module 4.**

- Use of Cases with and without prepositions

**Module 5.**

- The Verb – aspects of verbs, verbs of motion and actions with and without prefixes

**Module 6.**

- The Participles, The verbal adverbs

**Module 7.**

- Active and passive voice

**Module 8.**

- Compound and complex sentences

**Module 9.**

- Direct and Indirect Speech

**Unit II  
Modern Russian Language:  
Phonetics and Lexicology**

**Module 1.**

- Sound system of Russian, Classification of Russian Sounds, Change of Sounds

**Module 2.**

- Stress and types of intonations

**Module 3.**

- Russian Vowels, Classification of Vowels, Reduction of Vowels

**Module 4.**

- The Russian Consonants: Classification, Palatalized and Non-Palatalized consonants, Voiced & Voiceless Consonants, Assimilation rules, voicing and devoicing of consonants, regressive palatalization

**Module 5.**

- Russian vocabulary and phraseology

**Module 6.**

- Synonym, Polysemy, Homonymy,

**Unit III  
Morphology and Syntax**

**Module 1.**

- Parts of speech in Russian

**Module 2.**

- Syntax as a subject of study, Syntax of the word combination

**Module 3. Types of sentences**

- Simple sentence: Affirmative, Declarative, Exclamatory sentences
- Compound Sentences and Complex Sentences
- Direct and Indirect Sentences

**Unit IV  
Russian Cultural History**

**Module 1.**

- Geographical features of Russia

**Module 2.**

- The Slav people, Kievan Rus

**Module 3.**

- Mongol Tatar Invasion

**Module 4.**

- Rise of Moscow, Ivan-IV

**Module 5.**

- Peter's Reforms

**Module 6.**

- Peasant revolt

**Module 7.**

- Catherine-II

**Module 8.**

- Patriotic War of 1812, The Decembrists

**Module 9.**

- Emancipation of Serfs, Norodniki and other groups and their role

**Module 10.**

- Lenin and October Revolution, Civil War

**Module 11.**

- Building of Socialism and five Year Plans, NEP

**Module 12.**

- Disintegration of USSR

**Module 13.**

- Contemporary Russian society and culture

**Unit V****Russian Literature: Prose Fiction****Module 1.**

- General study of Russian Literary Movements and Criticism: Classicism, Sentimentalism, Romanticism, Realism, Modernism, Socialist Realism, Magic Realism et al.

**Module 2.**

- Lomonosov and Classicism

**Module 3.**

- Radischev - *A journey From Petersburg to Moscow*

**Module 4.**

- Pushkin - *The Tales of Ivan Belkin, The Captain's Daughter*

**Module 5.**

- Lermontov - *The Hero of Our Time*

**Module 6.**

- Gogol - *Dead Souls*

**Module 7.**

- Turgenev - *Fathers and Sons*

**Module 8.**

- Dostoyevsky - *Crime and Punishment, The Karamazov Brothers*

**Module 9.**

- Tolstoy - *Anna Karenina, Resurrection, War and Peace*

**Module 10.**

- Chekhov - *Death of a Clerk, Man in a Case, Ward No.6*

**Module 11.**

- Gorky - *Mother, Makar Chudra*

**Module 12.**

- Nikolai Ostrovsky - *How the Steel was Tempered*

**Module 13.**

- Sholokhov - *And Quite Flows the Don*

**Module 14.**

- Pasternak - *Doctor Zhivago*

**Module 15.**

- Solzhenitsyn - *One Day in the Life of Ivan Denisovich*

**Module 16.**

- Bulgakov - *Master and Margarita*

**Module 17.**

- Rybakov - *Children of Arbat*

**Module 18.**

- General study of contemporary Russian authors: Tat'yana Tolstaya, Valimir Sorokin, Evgeny Popov

**Unit VI****Russian Literature:  
Poetry and Drama****Module 1. Russian Poetry**

- Zhukovsky and Romanticism



- Pushkin – Evgenii Onegin
- Lermontov – Death of the Poet, The Sail
- Nekrasov – Komu na Rusi Zhit' Khorosho
- Blok – The Twelve
- Akhmatova – Requiem
- Esenin – Rus Ukhodyashaya, Shagane ty moya Shagane
- Mayakovsky – Poem about Soviet Passport, Vladimir Illich Lenin, Khorosho

### Module 2. Russian Drama

- Pushkin – Boris Godunov
- Aleksandr Ostrovsky – The Storm
- Gogol – The Government Inspector
- Chekhov – The Cherry Orchard
- Gorky – Na Dne (Lower Depth)
- Bulgakov – The Days of Turbins

- Phonetic changes and their causes
- Semantic changes - types and causes

## Unit II Sāhitya

### Module 1. Poetry

- Raghuvamśa Canto II
- Naiṣadhiyacarita, Canto III
- Dhvanyāloka, Ānanaś I & II
- Vakroktijivita- Six Vakratās only (I&II)
- Kavyaprakāśa Ullāsa I to IV

### Module 2. Drama

- Āścaryacūḍāmaṇi
- Abhijñānaśākuntala
- Svapnavāsavadatta

## Unit III Jyotiṣa

### Module 1.

- Bṛhājāta of Varāhamihira, chapters I & II (horā)

### Module 2. Muhūrttapadavi of Mattoor Nampoothiri

- Vivāha, Annaprāśa, Vidyārambha, Grhārambha ṣaḍdoṣa

### Module 3. Gaṇakatarāṅgiṇī of Sudhakara Dvivedi

- Āryabhaṭa, Varāhamihira, Kamalākara, Kalyāṇavarmā,
- Keśava, Gaṇeśa, Brahmagupta, Bhāskara, Śrīpati, Lalla

## Unit IV Vyākaraṇa

### Module 1. Laghu siddhāntakaumudī

- Acsandhi, Halsandhi, Visargasandhi - Samāsa - Avyayayibhāva, Tatpuruṣa, Bahuvrihi, Dvandva - Padavyavasthā- Ātmanepada, Parasmaipada, - Siddharūpa - Declension of the following in Vidvas, idam (in all three genders), asmā, maghavat, diś

- Dhātūrūpa - Conjugation of the following verbs in all lakāras ada bhakṣaṇe, dukṛṇ karaṇe, cura steye

## 28. Sanskrit

### Unit I General

#### Module 1. History of Sanskrit Literature

- Vedic Literature
- Classical Literature
- Kerala Sanskrit Literature
- Technical Literature

#### Module 2. Vṛtta and Alaṅkāra

- Definitions, and Illustrations of the following twelve Vṛttas - 1) Āryā, Giti, Indravajrā, Śalini, Vaṃśastha, 2) Bhujāṅgaprayāta, Mālini, Vasantatilaka, Śikhariṇī, 3) Mandākrāntā, Śārdūlavikrīḍita, Sragdharā
- Division, Definitions, and Illustrations of the following twelve Alaṅkāras - 1) Upamā, Rūpaka, Ullekha, Utprekṣā, Atiśayokti, 2) Dipaka, Vyatireka, Samāsokti, Aprastutaprasaṃsā, 3) Śleṣa, Kāvyaṅga, Arthāntaranyāsa

#### Module 3. Linguistics

- Classification of languages
- Indo-European Family of Languages - General Characteristics, Major members, divisions
- Indo-Iranian branch - Vedic Sanskrit & Avesta; Classical Sanskrit, Prakṛts
- Primitive/ Proto- IE languages, Phonetic laws: Grimm's, Grassmann's, Verner's;


**Module 2. Mahābhāṣya, paspaśāhnika**
**Module 3. Siddhāntakaumudī**

- Kāraṅkaraṅa
- Strīpratyayaprakaraṅa
- Prakriyā of Roots bhū and edha only, in all lakāras

**Unit V**
**Nyāya**
**Module 1. Tarkasaṅgraha with dīpikā (Whole)**
**Module 2. Nyāyasiddhāntamuktāvalī  
(pratyakṣakhaṅḍa only)**
**Unit VI**
**Vedānta**
**Module 1 Vedāntasāra**
**Module 2 Bhagavadgītā - Chapter -2**
**Module 3 Brahmasūtra - {catussūtrī }**
**Module 4 Kaṭhōpaniṣad (whole)**
**Module 2. Social Legislations**

- Indian Constitution : history, fundamental rights, duties and directive principles of state policy, constitutional remedies
- Laws related to social defense : IPC, Code of Criminal Procedure, Courts and Judiciary; Police, prisons, probation, parole and custody.
- Personal Laws : Hindu, Muslim and Christian. Special Marriage Act, Laws related to adoption and guardianship.
- Human Rights, UDHR, NHRC and Right to Information Act

**Unit II**
**Module 1. Sociology**

- Concept and types - society, community, association, and social institutions
- Concept: social structure, social system social processes - conjunctive (cooperation, assimilation, accommodation, acculturation) - disjunctive (competition, conflict) - social disorganization
- Socialization-meaning, stages, process, agents and theories
- Social stratification
- Social control and social change - concept, agencies
- Social Movements - Bhoodaan, Chipko, Apiko, Narmada BachaoAndolan, Muthanga, Plachimada, Koodumkulam,

**Module 2. Economics**

- Economics basic concepts - demand-supply, production-consumption, productivity & utility, production - factors and means
- Economic systems (types)
- Development: concept and indicators - HDI, GDP, GNP, PI, PQLI
- Economic Planning: Five Year Plans - Decentralisation - Panchayati Raj institutions (PRI)
- Globalisation: concept - New Economic Policy (LPG,1991) - Economic Instruments: GATT, WTO, TRIPS, SAPS - Economic Institutions: World Bank, IMF, ADB, G20, MDGs

## 29. Social Work

**Unit I**
**Module 1. History and Philosophy of Social Work**

- Social work : Definition, meaning, objectives, principles, skills and techniques.
- Social work related concepts : Social service, social welfare, social security, social reform, social policy, social defense, social development, social justice, and social health.
- Evolution of social work profession
- Primary and secondary methods of social work
- Fields (settings) of social work : Clinical, school, correction, community development, child rights
- Approaches to social work practice : Charity, Welfare, Development, Participatory, Sustainability, Right-based, etc.
- NASW and Code Ethics.



### Unit - III

#### Module 1. Developmental Psychology

- Concepts: sensation, perception, cognition, memory, intelligence
- Growth and development - influence of heredity and environment - developmental tasks - defense mechanisms
- Theories of development - Psychoanalytic, Psychosocial, Cognitive and Morality
- Development and hazards - prenatal and childhood
- Development and hazards - adolescence and young adulthood
- Development and hazards - middle adulthood and old age

#### Module 2. Counselling

- Counseling: definition, objectives, principles - types of counseling - qualities of a good counselor
- Counseling: process, skills and techniques, relationship (transference)
- Therapeutic approaches to counseling: psychoanalytical, humanistic, Transnational Analysis, Gestalt, existential and behavioural
- Allied fields of counselling - Life Skills Education, Family Life Education, Sex Education, Genetic Counselling, HIV, Trauma/Crisis Counselling, Geriatric Counselling.

### Unit - IV

#### Module 1. Social Case Work

- Social case work- definition, history, concept, objectives and principles
- Social case work process- exploration, multi-dimensional assessment, social diagnosis, treatment (negotiating goals and formulating a contract, implementation and goal attainment), prognosis, evaluation, termination, follow-up
- Approaches in case work- psychoanalytical, psycho-social, problem-solving, behaviour modifications, crisis intervention, eclectic approach
- Techniques and skills in social case work- interviews, home visits, resource

mobilization, referral, environmental modification, case work relationship and communication.

- Types of recordings in case work

#### Module 2. Social Group Work

- Concept of Group Work - definition, history, principles, skills and goals of social group work.
- Groups: types of social groups, stages of group development and group processes
- Group dynamics - Group Work process - competition, conflict, cooperation, cohesion, coercion and accommodation.
- Approaches and models in group work practice - therapeutic/social treatment, development group and task-oriented group.
- Types of recordings in social group work

### Unit - V

#### Module 1. Community Organization

- Community Organization: concept, principles, objectives, phases, steps - differentiating community development and community organization - skills and roles of a community organizer
- Power structure and Leadership: types, participatory process and empowerment
- Models (Jack Rothman) in community organization
- Social action - concept, principles and strategies - approaches to social action - Freire, Gandhi and Alinsky.

#### Module 2. Administration of Human Service Organizations

- Concepts: Public Administration and Social Welfare Administration.
- Types of Organisation
- Approaches to understanding organizations: Bureaucracy (Max Weber), Administrative Theory (Henry Fayol), Scientific Management (Frederick Taylor), Human Relations Approach (Elton Mayo) and System Approach (Chester Bernard), Theory X and Theory Y
- Registration of Societies and Trusts - Distinctive nature Non-profit (HSO)



administration and its challenges in organizational development -FCRA

- Management: concept, approaches and principles
- Administrative Processes: Planning, Organizing, Staffing (Human Resources Planning, Recruitment, Selection and Induction), Directing, Controlling, Reporting and Budgeting - Evaluation
- Job Description, Job Analysis and Job Evaluation, Performance Appraisal system.

### Unit - VI

#### Module 1. Social Work Research and Statistics

- Social Work Research - types of research
- Research process
- Research designs - Cross-sectional, Experimental, Longitudinal, Case Study and Comparative
- Sampling designs
- Pretest and Pilot Study
- Data collection: methods and tools
- Data analysis and data presentation
- Hypothesis: concept, formulation, and testing
- Statistics: definition, functions, uses and limitations - statistical tests - Measures of central tendency and dispersion, Correlation and regression
- Report Writing: APA Formatting, bibliography

#### Module 2. Project Planning

- Basic concept- plan, programme, project, activity
- Project Cycle: Planning: Need identification: PRA/PLA. Designing: Log Frame Analysis (LFA): stakeholder analysis, problem tree analysis, object analysis, alternate analysis - LFA Matrix. Project appraisal- technical appraisal, marketing appraisal, environment appraisal, management appraisal and profitability appraisal. Social Cost-Benefit Analysis(SCBA). Project Implementation - CPM, PERT, Activity Calendar, Budgeting (Types of Cost). Project Monitoring - input, output, outcome, impact & PMIS. Project Review-

variance analysis and performance analysis. Project Evaluation - Types.

- Project administration: financial management, personnel management

## 30. Sociology

### Unit I

#### Sociology: Discipline, Concepts and Processes

##### Module 1: Sociology as a discipline

- Social and intellectual forces, Philosophical foundations - rationalism & empiricism; Reflexive Sociology, Public Sociology, Development of Sociology in India

##### Module 2. Concepts in Sociology

- Society, Community, Association, Status, Role, Culture, Norms and Values, Socialization, Groups, Social Control, Social Change, Social stratification - Caste, Class, Power

##### Module 3. Socio-cultural processes

- Accommodation, Assimilation, Cooperation, Competition, Conflict, Contravention, Evolution, Diffusion, Acculturation, Ethnocentrism

##### Module 4: Social institutions

- Family, Marriage, Kinship, Religion, Education, Polity, Economy

### Unit II

#### Sociological Theories

##### Module 1. Classical

- August Comte, Herbert Spencer, Karl Marx, Max Weber, Emile Durkheim, Vilfredo Pareto

##### Module 2. Advanced

- Functionalism - Postulates, Talcott Parsons, Radcliff-Brown, Bronislaw Malinowski,
- Robert K. Merton
- Conflict Theory - Lewis Coser, Ralf Dahrendorf



- Exchange Theory: Peter Blau, George Homans
- Phenomenology: Alfred Schutz, Peter Berger & Thomas Luckman
- Symbolic Interactionism: G.H. Mead, C.H. Cooley
- Dramaturgy: Irving Goffman
- Ethnomethodology - Harold Garfinkel

### **Module 3. Recent Trends**

- Critical theory - Jurgen Habermas, Louis Althusser, Antonio Gramsci
- Postmodernism and Post structuralism: Foucault - discourse analysis, knowledge and power; Jacques Derrida: deconstruction

### **Module 4: Integrative efforts**

- Anthony Giddens - agency-structure, structuration; George Ritzer - micro-macro, integrative paradigm; Pierre Bourdieu - habitus-field, capital, civil society

## **Unit III Social Research Methods and Statistics**

### **Module 1. Social Research**

- Epistemological basis - positivism, interpretivism, critical; Quantitative and Qualitative, Types - basic, applied, action; Objectivity, Validity, Reliability, Ethics and Value basis in social research

### **Module 2. Research Process**

- Problem formulation, Literature review, Research Design - longitudinal and cross-sectional; Concepts, Hypothesis, Variables, Universe, Unit, Pilot study, Sampling - probability and non-probability

### **Module 3. Methods, Tools and Techniques**

- Quantitative - social survey, interview schedule, questionnaire; Attitude scale - Likert, Thurston
- Qualitative: observation - participant & non-participant; ethnography, case study, oral history, narratives, triangulation

### **Module 4. Social statistics**

- Measures of central tendency and dispersion, Levels of measurement - nominal, ordinal, interval, ratio; test of significance - chi-square, t-test, measures of correlation - Karl Pearson's, Spearman's Rank

## **Unit IV Sociology of India**

### **Module 1. India as a plural society**

- Diversities in India - ethnic, caste, demographic, regional, religious, linguistic

### **Module 2. Approaches to the study of Indian Society**

- Indology - G.S. Ghurye, Louis Dumont
- Structural-functional - M.N. Srinivas, S.C. Dube
- Marxian - A.R. Desai, D.P. Mukherji
- Subaltern - B.R. Ambedkar, Kancha Illaiah

### **Module 3. Socio-economic challenges and welfare measures**

- Poverty, Inequality, Marginalized groups - Scheduled castes, Tribes, OBCs, Minorities;
- Women and Child - atrocities against women, health
- Child rights, Issues of Elderly and Differently-abled
- Constitutional and legislative measures for marginalized groups
- Social movements in India: Agrarian, Backward class, Women

### **Module 4. Contemporary issues**

- Problems of nation-building - secularism, communalism, sub-nationalism, terrorism, ethnic conflict, caste and religious conflict, regionalism, corruption

## **Unit V Theory and Practice of Development**

### **Module 1. Concepts in development**

- Growth, Progress, Evolution, Social change, Social development, Economic development, Human development, Sustainable



development, Gender Development Index, Human Development Index

### Module 2. Theories in development

- Modernization – W.W. Rostow
- Dependency theory – Samir Amin
- World System – Immanuel Wallerstein
- Alternative development – M.K. Gandhi, E.F. Schumacher

### Module 3. Rural and Urban development

- Rural social structure, Agrarian relations, Green revolution, Urbanism, Urbanization, Suburb, Metropolis, Cities, Towns, Slums, Rural and Urban development programmes in India, Population dynamics and Challenges – fertility, morality, migration, demographic transition

### Module 4. Development Experience in Kerala

- Land reforms, Socio-political movements in Kerala, Land struggles, Kerala development model – education, health, social security
- Decentralization process – 73<sup>rd</sup> & 74<sup>th</sup> amendment, peoples planning and emergence of local governance in Kerala
- Migration and Kerala diaspora

## Unit VI

### Globalization and Emerging Challenges

#### Module 1. Understanding Globalization

- History and characteristics, Agencies of globalization, Global village, Consumerism, McDonaldization, Effects of globalization on marginalized communities, Development induced displacement, New Social Movements in the context of globalization

#### Module 2. Media and Communication

- Mass media in a globalized world, Corporate media, Globalization of news, Cultural imperialism through media
- Information, Communication and Technologies (ICTs) – digital media, digital divide, social media, cyber media, net neutrality, social networks and virtual

communities

### Module 3. Changes in Industry and Industrial management

- Industry in a globalized world, MNCs and outsourcing and its impact, New management principles, Corporate Social responsibility (CSR), Industrial pollution, e-waste and waste management

### Module 4. Impact on environment

- Environmental degradation, Climate change and its impact, Global warming, Ozone depletion, Global movements and discourses, Initiatives of state and International agencies – Stockholm, Rio and Kyoto Summits

## 31. Statistics

### Unit I

#### Mathematical Methods for Statistics

##### Module 1.

- Sets, set of real numbers, functions, sequences and series of real numbers, their limits and convergences. Continuous functions, discontinuities of functions, bounded functions, conditions for differentiability of functions, Riemann integrals and properties.

##### Module 2.

- Cartesian product of sets, metric space, open and closed sets, limit points, closure of a set, complete metric space, Heine-Borel theorem.

##### Module 3.

- Linear space, subspaces, linear dependence and independence of vectors, basis and dimension, linear transformation in vector space, normed linear space.

##### Module 4.

- Matrices, different types of matrices, algebra of matrices, adjoint of a matrix, inverse of non-singular matrices, g-inverse, rank and determinant of matrices, solving linear



equations by matrix method, eigen values and eigen vectors, Cayley-Hamilton theorem. Quadratic forms and their definiteness.

**Module 5.**

- Classes of sets, limit superior, limit inferior and convergence of sequence of sets, ring, monotone class, field and sigma field of sets, general definition of measure, Lebesgue and Lebesgue-Stieltjes measures. Measurable sets and measurable functions, definition of integral, Lebesgue and Lebesgue-Stieltjes integrals, properties, convergence theorems, applications of Radon-Nikodyn theorem.

**Unit II  
Probability Theory**

**Module 1.**

- Definitions of probability (classical, frequency ratio and axiomatic approaches), classes of events, probability measure and properties, independence of events, pairwise and mutual independence of events, addition theorem of probability.

**Module 2.**

- Conditional probability, multiplication theorem, Bayes' theorem and applications.

**Module 3.**

- Random variables, cumulative distribution function and properties (both univariate and bivariate cases), decomposition of a distribution function, probability density function and probability mass function, discrete and continuous random variables, independence of random variables, connection between distribution function of a random variable and Lebesgue-Stieltjes measure.

**Module 4.**

- Expectation and moments of random variables, properties, moment generating function, cumulant generating function, characteristic function, probability

generating function and their properties, inversion theorem on characteristic functions.

**Module 5.**

- Chebychev and Liapunov inequalities, Borel-Cantelli lemma, Borel zero-one law. Convergence of sequences of random variables: weak convergence, convergence in probability, convergence in  $r^{\text{th}}$  mean and almost sure convergence, and their mutual implications. Laws of large numbers and central limit theorems.

**Unit III  
Distributions in Statistics**

**Module 1.**

- Bernoulli, binomial, Poisson, geometric, negative-binomial, discrete uniform, hypergeometric, multinomial and power series distributions - properties and characteristics of these distributions.

**Module 2.**

- Rectangular, exponential, gamma, beta (type I and type II), normal, log normal, logistic, Laplace, Pareto, Weibull and Cauchy distributions-properties and characteristics of these distributions.

**Module 3.**

- Functions of random variables and their distributions, distributions of sum, product and ratio of independent random variables. Order statistics, basic distribution theory, joint and conditional distribution of order statistics, distribution of order statistics arising from uniform and exponential distributions-properties.

**Module 4.**

- Sampling distributions - standard error, distribution of mean and variance of samples from normal populations. Exact sampling distributions- chi-square, t and F (central and non-central), inter relationships between these distributions and their applications (including significance tests).

**Module 5.**

- Bivariate distributions: discrete, continuous and mixed forms, marginal and conditional distributions. Bivariate normal distribution and its characteristics, simple correlation and regression, their properties and tests.

### Unit IV Estimation and Testing of Hypotheses

**Module 1.**

- Point estimate, properties of estimators: unbiasedness, consistency, sufficiency and efficiency, Cramer-Rao inequality, estimators attaining minimum variance bound, Rao-Blackwell and Lehmann-Scheffe theorems, minimum variance unbiased estimation.

**Module 2.**

- Methods of estimation: maximum likelihood, method of moments and least-squares method and their properties, comparison of these estimates in normal population. Minimum chi-square and modified minimum chi-square methods.

**Module 3.**

- Basic concepts of hypothesis testing, type I and type II errors, critical region, power of a test, Neyman-Pearson lemma, MP and UMP tests, likelihood ratio test, MLR property, asymptotic distribution of likelihood ratio, tests for mean and variance of normal populations, tests for proportions.

**Module 4.**

- Non parametric tests: advantages and disadvantages of non parametric tests, binomial, sign, Wilcoxon signed-rank, one and two sample Wald-Wolfowitz run, median, Kolmogorov-Smirnov (both on sample and two sample), Mann-Whitney U, Kruskal-Wallis tests and Friedman's two way analysis of variance test. Sequential probability ratio tests: basic concepts, testing single parameter case for normal, point

binomial and exponential distributions.

**Module 5.**

- Interval estimation: basic concepts of interval estimation, shortest length confidence interval, interval estimates of parameters based on normal distribution, connection between interval estimation and testing of hypotheses. Bayesian estimation: prior and posterior distributions, conjugate priors, loss and risk functions, Bayes estimation of the parameters under squared-error and absolute error loss functions.

### Unit V Sample Surveys and Design of Experiments

**Module 1.**

- Planning and execution of sample surveys, sampling and non sampling errors, simple random, stratified random, systematic and cluster sampling methods, estimation of the population characteristics by these sampling methods. Sample size determination.

**Module 2.**

- Unequal probability sampling methods, PPS sampling with and without replacement. Des Raj ordered, Murthy's unordered and Horvitz-Thompson estimators and their standard errors. Ratio and regression methods of estimation.

**Module 3.**

- Linear models, estimability of linear parametric functions, Gauss-Markoff theorem, tests of linear hypotheses, Analysis of variance, criteria for connectedness, orthogonality and balance.

**Module 4.**

- Basic principles of experimentation, standard designs-CRD, RBD, LSD and GLSD, analysis and efficiency comparisons. Analysis of covariance in CRD, RBD and LSD, missing plot techniques.



**Module 5.**

- Factorial experiments: 2<sup>n</sup> and 3<sup>n</sup> experiments, partial and total confounding in the above experiments. Incomplete block designs: BIBD, analysis with and without recovery of inter-block information.

**Unit VI**  
**Multivariate Analysis,**  
**Stochastic Processes and**  
**Index Numbers**

**Module 1.**

- Multivariate normal distribution, marginal and conditional distributions, characteristic functions, distribution of quadratic forms in normal variables, Partial and multiple correlation, multiple regression technique.

**Module 2.**

- Samples from multivariate normal distribution, maximum likelihood estimators of the parameters and their distributions. Hotelling's T<sup>2</sup> and Mahalanobis D<sup>2</sup>. Testing the mean vector of a multivariate normal distribution and the equality of means of two multivariate normal distributions.

**Module 3.**

- Stochastic processes-Definition and classification of stochastic processes based on state and time spaces, Processes with stationary independent increments, Markov processes, Gaussian processes. Markov chains: transition probability matrices and Chapman-Kolmogorov equation, classification of states: periodicity, recurrence, ergodicity and stationarity.

**Module 4.**

- Continuous time Markov processes: Poisson process, pure birth process, birth and death process. Principles of queuing theory- M/M/1 and M/M/s models.

**Module 5.**

- Time series analysis: components of time series, measurement of secular trend and

seasonal components. Index numbers-simple and weighted index numbers, tests for an ideal index number, cost of living index.

**32. Syriac**

**Unit I**  
**Syriac Grammar,**  
**History and Structure of**  
**Syriac Language**

- Syriac Scripts: Estrangela, East Syriac and Serto
- Orthography
- Vowel expression by vowel letters and other signs.
- Consonants: Rukakka, Qussaya
- Loan words in Syriac
- Syntax in comparison with Indian languages.
- Jacob of Edessa's letter on Syriac Orthography
- Gregory Bar Hebraeus: Syriac Accents
- Grammatical Terminology in Syriac
- Syriac Calligraphy
- Phonology
- Morphology
- Syntax
- Parts of Speech
- Semantics
- Grammar and Grammatical categories

**Unit II**  
**Syriac Poetry and**  
**Liturgical Literature**

- Early Syriac poetry
- Main categories of Syriac poetry
- Hymnody: Kinds of Hymns (West Syriac): (Mimre, - Madrosho, - Qole, - Onitha, - Mazmure, Zmirto, - Tesbehoto, - Sebloto, - Bothe, - Bo'oto, - Takshepto, - Quqoyo, - qonuno Yawnoyo)
- Hymnody: Kinds of Hymns (East Syriac): (Barrek(u), Basaliqe, Bauta, ba'wata, B-rasit, Gazza, Giyyora, Hepakta, Hullala, Hallelayn(i),



Laku Mara, Le bakta, Madrasa, Marmita, Mawtba, Memra, Nemar, Nuhra, 'Onita, Pshita, Qala, Qalyata, Qalta, Qanona, Res mawtba, Resqala, Rukkaba, Sogita, Suyyake, Shubha, Suhlapa, Suraya, Tawdi l taba, Tesbohta, Tu'yay, 'udrana, 'ullama, 'unaya, Zumara)

- Metres
- Strophes
- Rhyme
- Acrostic
- Beth - Gazo / 'Eqara
- Musical terminology in Syriac
- Hymnographers
- Anaphora literature - West Syriac & East Syriac
- Commentaries and commentators of Anaphorae
- Shehimo' and 'Penqito'; Hudra (Weekday Office and Festal Hymnody).
- Manuscripts of Liturgical Hymns and Choral books

### Unit III Secular, Biblical and Monastic Literature

- Secular literature: Popular and Learned
- Natural Sciences and Philosophy in Syriac
- Syriac Manuscripts of the British Museum on Medicine, Ethics, Agriculture, Chemistry, Philosophy, Logic and Rhetoric, Grammar and Lexicography, Natural History.
- Legal thought in Syriac tradition.
- Biblical Interpretation
- Syriac Bible: its use in the liturgy
- Syriac commentators of the Psalms
- Versions of the Syriac Bible: O.T.: Peshitta; Syro Hexapla
- N.T.: Diatessaron, Old Syriac, Peshitta, Philoxenian, and Harclean
- Syriac names of the books of the Bible
- Lectionaries
- Printed Editions

- Translations based on the Syriac Bible
- Malayalam translations of the Syriac Bible
- Syriac Apocrypha
- History of Asceticism in the Syrian Orient
- Protomonasticism
- Syriac monastic terminology
- Different monastic centers and monasteries
- Monastic writers and works

### Unit IV India and Syriac Literature

- Syriac Manuscripts burnt at Diamper Synod
- Collections of Syriac manuscripts.
- Main centers and persons (Malpanate)
- Syriac inscriptions
- Malayalam Carshuni
- Syriac books published in India / Press
- Syriac Words in Malayalam
- Syriac in Schools and Universities
- Syriac heritage of the different denominations of the Syriac Churches of Kerala.

### Unit V History of Syriac Churches

- Origins of Syriac Christianity
- St. Thomas Tradition in India
- The Church in the Sasanian Empire
- The theological schools, especially Nisibis
- The separation of the different Churches in the 5-7 centuries.
- The expansion of the Syriac Ch Emergence of the Syriac Eastern Rite Catholic Churches in West Asia
- The Syriac Communities under the Ottoman Empire.
- The Catholic and Protestant Missions to the Syriac Churches
- The Syriac Churches and Ecumenism
- Current problems of the Syriac Churches.
- The renaissance of the 12<sup>th</sup> / 13<sup>th</sup> centuries



**Unit VI**  
**Current affairs**

- Catalogue of Syriac manuscripts.
- Catalogues of Syriac printed books and related literature
- Codicology
- Grammars: elementary and reference grammars.
- Lexica
- Series of Texts, Journals & Periodicals
- Bibliographical aids
- The delights of Manuscripts
- Why study Syriac
- Scope of Syriac literature
- Use of computer in Syriac
- Contemporary trends and trend setters
- Modern centers of Syriac study

**33. Tamil**

**அலகு 1 - இலக்கியம் -1**  
**சங்கம்), நீதி , காப்பியம் , பக்தி**  
**இலக்கியங்கள்**

1. எட்டுத்தொகை  
குறுந்தொகை (100 -125 பாடல்கள்)  
பதிற்றுப்பத்து ( 7 -ஆம் பத்து)
2. பத்துப்பாட்டு  
நெடுநல்வாடை, குறிஞ்சிப்பாட்டு
3. நீதி இலக்கியம் - திருக்குறள்,  
(அறம்இன்பம்,பொருள், - முதல் 10  
அதிகாரங்கள் வதம்) - திரிகடுகம்- முதல்  
25 அதிகாரங்கள்)
4. பக்தி இலக்கியம் - அப்பர் தேவாரம்-  
திருவெண்காடு பதிகம் திருப்பாவை  
(முழுவதும்)- தேம்பாவணி-வளன்  
செனித்த படலம் - சீறாப்புராணம் - நபி  
பட்டம் பெற்ற படலம்

5. காப்பிய இலக்கியம் - சிலப்பதிகாரம் -  
வழக்குரைக்காதை, ஆய்ச்சியர் குரவை ,  
கம்பராமாயணம் - சுந்தரகாண்டம்  
(முதல்3 படலங்கள்)

**அலகு 2**

**இலக்கியம் -2**

**(சிறுநிலக்கியம் , தற்கால இலக்கியம்)**

1. சிறுநிலக்கியம் - குற்றாலக்குறவஞ்சி  
(முழுவதும்) - கலிங்கத்துப்பரணி-காடு  
பாடியது - நந்திக்கலம்பகம் -முதல் 10  
பாடல்கள் - மீனாட்சியம்மை  
பிள்ளைத்தமிழ்-அம்புலிப், பருவம்
2. கவிதை - குயில் பாட்டு - பாரதியார் -  
கமிடிச்சியின் கக்கி-பாாகிகாசன் ஓந்  
கிராமத்து நதி - சிற்பி பாலசுப்பிரமணியம்  
- ஆலாபனை - அப்துல்ரகுமான்
3. உரைநடை -அக்னிச்சிறகுகள் - எ.பி.ஜெ  
அப்துல்கலாம், காலந்தோறும் பெண் -  
ராஜம் கிருஷ்ணன்
4. கதை இலக்கியம் - அளம்- சு.  
மிழ்செல்வி - ஒரு மாமரமும் கொஞ்சம்  
பறவைகளும்- தோப்பில் முகமது மீரான்
5. நாடகம் - மனோன்மணியம்- பேரா.  
பெ.சுந்தரம்பிள்ளை, அவ்வை -  
இன்குலாப்

**அலகு 3**

**இலக்கணம் , மொழியியல்**

1. தொல்காப்பியம்- பிறப்பியல் , புணரியல்,  
பெயரியல், வினையியல்,  
அகத்திணையியல், புறத்திணையியல்
2. யாப்பருங்கலக்காரிகை, - அசை,சீர்,தளை  
தண்டியலங்காரம் - உவமைஅணி,  
உருவகஅணி,தீவகஅணி, தற்குறிப்பேற்ற  
அணி, பின்வரு நிலையணி
3. மொழியியல்-  
ஒலியியல்,ஒலியனியல்,உருபனியல்,  
தொடரியல்
4. ஒப்பிலக்கணம் - திராவிட  
மொழிப்பாகுபாடுகள்



5. அகராதியியல் - தமிழ் நிகண்டுகளும் ,அகராதிகளும்

#### அலகு 4

#### திறனாய்வு , இலக்கியக்கோட்பாடு

1. திறனாய்வு - திறனாய்வு வகைகள் - இலக்கியக் கோட்பாடுகள்
2. ஒப்பிலக்கியம் - ஒப்பிலக்கிய ஆய்வு நெறிகள்,ஒப்பிலக்கியக் கோட்பாடுகள்
3. இலக்கிய இசங்கள் - நவீனத்துவம்,பின்நவீனத்துவம், பெண்ணியம்,தலித்தியம்
4. மொழிபெயர்ப்பியல் - வகைகள்,சிக்கல்கள், பயன்கள், மொழிபெயர்ப்புப் பணிகள்
5. ஆராய்ச்சி நெறிமுறைகள் - ஆய்வு அறிமுகம்ஆய்வேட்டின் , அமைப்பு

#### அலகு 5

#### வரலாறு

- தமிழ் இலக்கிய வரலாறு
- மலையாள இலக்கிய வரலாறு
- தமிழக வரலாறும் பண்பாடும்
- தமிழ் மொழி வரலாறு
- சுவடியியல்

#### அலகு 6

#### பிறதுறைகள்

1. தகவல் தொடர்பியல் - இதழ்கள், வானொலி, தொலைக்காட்சி, கணினி,இணையம்
2. சுற்றுலாவியல் - கேரளம், தமிழகச் சுற்றுலாத்தலங்கள்
3. நாட்டுப்புறவியல் - நாட்டுப்புற இலக்கியவகைகள், நாட்டுப்புறக்கலைகள், நாட்டுப்புற நம்பிக்கைகள்
4. மானிடவியல் - பண்பாட்டுப் பரவல், பண்பாட்டுப் படிமலர்ச்சி
5. தத்துவ இயல் - சைவ சித்தாந்தம், வேதங்கள், உபநிடதங்கள்

## 34. Urdu

### UNIT I

- اردو زبان و ادب - آغاز و ارتقاء:  
 (1) اردو زبان کی ابتدا اور مختلف نظریات:  
 خصوصی مطالعہ  
 محمد حسین آزاد، محمود شیرانی، سلیمان ندوی، محی الدین عابدی، زور، شوکت بہزاد، نسیم الدین ہاشمی، مسعود حسین خان
- (2) صوفیائے کرام کی خدمات:  
 خصوصی مطالعہ  
 خواجہ بندہ نواز، میراں جی شمس المصباح، برہان الدین جامی
- (3) پہلی دور : نظامی بیدی
- (4) عادل شاہی : ابراہیم عادل شاہ، صرغی، رتھی
- (5) قطب شاہی دور : محمد علی قطب شاہ، منو، غوجی، غوامی، ابن کٹالی
- (6) دبستان دہلی اور اس کی خصوصیات
- (7) دبستان لکنؤ اور اس کی خصوصیات

### UNIT II

#### اصناف سخن

#### خصوصی مطالعہ

- (1) مثنوی :

سحر الہیان میر حسن

- گلزار نسیم دیا شکر نسیم  
 زیر عشق مرزا شوق
- (2) مرثیہ : انیس و دہری کی مرثیہ نگاری  
 شخصی مرثیہ : مرثیہ غالب حالی  
 مرثیہ داغ اقبال
- (3) فزل : دلی، میر درد، مومن، غالب، ذوق، ظفر، بکر، فراق
- (4) قصیدہ : سودا اور ذوق کی قصیدہ نگاری
- (5) رباعی : امجد حیدر آبادی، آئبرالہ آبادی، اختر انصاری، ملک چند محروم
- (6) نظم : نظیر اکبر آبادی، سعدی، بخش، مرثی، مشت و غیرہ
- (7) ہنگو، مایا، سانیٹ، دوہے



UNIT III

اردو شاعری میں جدید رجحانات

- (۱) انجمن پنجاب : حالی اور آزاد کی خدمات، موضوعاتی نظموں کا آغاز
- (۲) منتخب نظمیں : برکھارت، حب وطن، رسم و انصاف
- (۳) جدید شعرا : اکبر الہ آبادی، اہلسبیل میرٹھی، چکسٹ، اقبال
- (۴) ترقی پسند تحریک اور جدیدیت
- (۵) ترقی پسند اور جدیدیت کے شعرا  
فیض، مجاز، خدوم، سقّی اٹنسی، جان نثار اختر، علی سردار جعفری، سائر لدھیانوی، جوش،  
ن م راشد، میراجی
- (۶) نئی شاعری : نظم معرٹی، نظم آزاد، نثری نظم
- (۷) جدید نثر گو شعرا : حسرت موہانی، شاد، فائق معنی کھنوی، امیر گوٹوی

UNIT IV

اردو نثر کی نشوونما

- (۱) فورٹ ولیم کالج کی ادبی خدمات :
- (۲) میرامن، شیر علی افسوس، میر بہادر علی حیدر حسنی، حیدر بخش حیدری، مرزا علی لطف، لٹوال لال جی  
دلی کالج : ماسٹر رام چندر اور مولانا سہیلانی کی ادبی خدمات
- (۳) علی گڑھ تحریک : سرسید، آزاد، ذمیر احمد، حالی، شبلی، وحید الدین سلیم، ذکا، اللہ
- (۴) خاکہ : فرحت اللہ بیگ، رشید احمد صدیقی، مشتاق احمد یوسفی، عبدالحق،  
خواجہ احمد فاروقی
- (۵) انشائیہ اور طنز و مزاح : بطرس بناری، کشملا لال کپور، ملا رموزی
- (۶) تنقید : حالی، شبلی، بھٹون گوکھپوری، اہتاشام حسین، آل احمد سرور، کلیم الدین احمد،  
عظمت اللہ خان، شمس الرحمن فاروقی
- (۷) خطوط : غالب، ابوالکلام آزاد، اقبال

UNIT V

افسانوی ادب

خصوصی مطالعہ

- (۱) داستان : ملا وجہی، میرامن، رجب علی بیگ سرور
- (۲) ناول نگار : نذیر احمد، رسوا، مرثاد، شرر، پریم چند، کرشن چندر، قرۃ العین حیدر
- (۳) ناولوں کا خصوصی مطالعہ : توہتہ الصغیر، امراء جان ادا، گودان
- (۴) افسانہ نگار : پریم چند، بیڈی، منٹو، عصمت چغتائی، خواجہ احمد عباس،  
حیات اللہ انصاری
- (۵) افسانوں کا خصوصی مطالعہ : نمک کا داروغہ، گرہن، ٹوبہ ٹیک سنگھ، کالو بھنگلی

- (۶) ڈراما نگار : محمد حسن، حبیب الرحمن
- (۷) ڈراموں کا خصوصی مطالعہ : رسم و سراب، خانہ جنگی

UNIT VI

قواعد

- (۱) اسم اور اس کی قسمیں، واحد جمع، تدکیر و تانیث، حالت
- (۲) صفت اور اس کی قسمیں
- (۳) ضمیر اور اس کی قسمیں
- (۴) فعل : حال، ماضی، مستقبل، لازم، متعری، ناقص، معروف، مجہول
- (۵) مشابہ و فصل
- (۶) حروف اور اس کی قسمیں : حروف ربط، حروف عطف، حروف جار، حروف فجائیہ
- (۷) تشبیہ، استعارہ، مجاز اور کنایہ

35. Zoology

Unit I

Taxonomy, Animal Diversity  
and Applied Zoology

Module 1. Taxonomy

- Classical taxonomy; Modern trends in taxonomy (numerical, cladistics, molecular taxonomy); phylogenetic tree.
- Scientific classification of organisms (five kingdom and three-domain systems);
- Biological nomenclature; ICZN. Homonymy and Synonymy ; Law of priority.
- Concepts of species and hierarchical taxa.
- Molecular Systematics (Mitochondrial DNA and Ancestral Polymorphisms, RFLP,
- RAPD, AFLP & VNTR, Alternate Molecular Approaches, Allozyme polymorphism, Microsatellite Loci.) DNA barcoding and tree of life.

Module 2. Animal Diversity

- Prokaryotes and Eukaryotes.
- Levels of organization-cellular, tissue and organ. Symmetry, Coelom and Metamerism.
- Broad classification of animal kingdom: Mesozoa, Parazoa and Eumetazoa (Radiata, Bilateria); Protostomia (Acoelomata, Pseudocoelomata and Eucoelomata), Deuterostomia.



- Salient features of the phyla: Mesozoa, Porifera, Cnidaria, Ctenophora, Platyhelminthes, Nematoda, Nematomorpha, Rotifera, Annelida, Echiurida, Mollusca, Onychophora, Arthropoda, Echinodermata, Chaetognatha, Phoronida, Hemichordata,
- Chordata : Cephalochordates and Urochordates, Pisces, Amphibians, Reptiles, Birds and Mammals-origin, adaptive radiation and distribution.

### Module 3. Applied Zoology

- Insect pests: Pests of crops (coconut, paddy, rubber, sugar cane), Pests of stored food grains, Pest control - chemical, biological and Integrated Pest Management.
- Sericulture, Species of silkworms, Composition of silk, Silkworm rearing techniques.
- Apiculture, Species of honey bees, Beekeeping methods, Useful products from honey bees.
- Fisheries and aquaculture: Marine and Fresh water fishes, Fish breeding techniques, Finfish and Shell Fish culture, Different types of fish farming, Ornamental fishes and Aquarium keeping, Fishing crafts and gears.

## Unit II

### Evolution, Ecology, Biodiversity and Ethology

#### Module 1. Evolution

- Origin and evolution of life
- Evolutionary time scale
- Theories and modern concepts of organic evolution: Classical and synthetic theories of evolution.
- Mechanisms of evolution, Micro and Macro evolution, Co- evolution.
- Genetic drift; Bottle-neck effect; Punctuated equilibrium, Neutral theory, Molecular Clock.
- Species and speciation, Adaptive radiation and Animal distribution.
- Human Evolution-hominid fossils and cultural evolution.

#### Module 2. Ecology

- Ecosystem: Characteristics of ecosystem, Concepts of Habitat and Niche.
- Structure and Stability of ecosystem.
- Food chain and food web; Biological magnification and its effects.
- Energy flow, Productivity and Ecological pyramids.
- Biogeochemical cycles: gaseous cycles and sedimentary cycles.
- Ecological succession: Types, changes involved in succession, concept of climax.
- Population ecology: characteristics of populations and population growth curves.
- Community ecology: community structure and attributes; edge effects and ecotone.
- Animal interactions: Positive, negative and neutral interactions.
- Pollution: Water, Air, Soil, Noise, and Radioactive pollution- causes and consequences.
- Solid waste management.
- Major Environmental Issues: Green house effect, Acid rain, Ozone depletion, Global warming and Climate change; causes and consequences.
- Conventional and Non-Conventional Energy Resources.
- Environmental Impact Assessment; ecosystem monitoring and applications of remote sensing in environment management.
- Major international environmental conventions/ treatises and organisations

#### Module 3. Biodiversity

- Concepts and levels of biodiversity.
- Measurement of biodiversity and biodiversity hotspots.
- Values and threats to biodiversity.
- Conservation strategies (*in-situ* and *ex-situ* conservation).
- Forest conservation, Wildlife management, Sustainable Development.

#### Module 4. Ethology

- Motivation and Learning: Imprinting, habituation, imitation, classical conditioning,



instrumental/operant conditioning, cognitive learning, latent learning, insight learning.

- Complex Behaviour: Orientation, Navigation and Homing, Migration (Fishes and Birds), Biological rhythms-biological clock, Circadian, Circannual, Lunar, Tidal and Seasonal periodicities. Pheromones and chemical communication.

### **Unit III**

## **Physiology, Immunology and Developmental Biology**

### **Module 1. Physiology**

- Nutrition: Types of nutrition, Digestion: mechanical and chemical digestion, Digestive glands and enzymes. Neural and hormonal control of digestion, Absorption of sugars, amino acids and fats.
- Respiration: Respiratory pigments, Transport of O<sub>2</sub> and CO<sub>2</sub>, Bohr Effect, chloride shift. Neural and chemical respiratory disturbances.
- Body fluids and Circulation: Types of heart, hear beat, conducting system and pace makers. Common cardiovascular diseases. Composition of blood and Blood groups, Physiology of blood clotting, Control of cardiac activity. Lymph and lymphatic system
- Excretion: Patterns of nitrogen excretion, Structure of kidney, Ultrastructure of nephron, Mechanism of urine formation, Normal and Abnormal constituents of urine and renal disorders. Osmoregulation and regulation of kidney function.
- Muscle physiology: Types of muscles, Ultrastructure of skeletal muscle, Muscle contraction and properties of cardiac and smooth muscles. Simple muscle twitch, summation, tetanus, tonus and fatigue.
- Neurophysiology- Structure of neuron, Generation and transmission of nerve impulse, Synapses, Synaptic transmission and Neurotransmitters, Reflex action.

- Endocrine system: Endocrine glands and hormones, classification of hormones, Mode of action of hormones, Hormone disorders and Feedback control.
- Sense organs: Structure of eye, Physiology of vision, Visual elements and pigments; Eye defects. Structure of ear, mechanisms of hearing and balancing. Hearing impairments. Olfactory, gustatory and tactile senses.
- Reproductive Physiology: Male and female reproductive organs, Puberty, Adolescence, Menstrual cycle, Pregnancy, Parturition, Lactation and Birth control. Hormonal control of reproduction.

### **Module 2. Immunology**

- Organs and tissues of immune system.
- Types of immunity: Innate, acquired, Humoral and cell-mediated immunity.
- Antigens and antibodies: Structure of antibodies, Antigen-antibody interactions.
- Complement system, General features, MHC, General organization and inheritance of MHC.
- Hypersensitivity, Immunodeficiency and Autoimmunity.

### **Module 3. Developmental Biology**

- Gametes and gametogenesis, Types of eggs, Fertilization and Fertilization events.
- Cleavage, Blastulation and Gastrulation: Types of cleavage, Cleavage patterns, Types of blastula, Fate map, Cell movements and Organogenesis.
- Basic concepts of development: Potency of embryonic cells, Competence, determination and differentiation, Genomic equivalence, Cytoplasmic control of nuclear activity, Primary embryonic induction, Nieukoop centre and mesodermal polarity.
- Different types of Placenta.
- Parthenogenesis: Natural and artificial parthenogenesis, Factors inducing parthenogenesis.
- Experimental embryology: Constriction experiments, Experiments on embryonic induction and competence, Cloning



experiments in animals, Medically assisted reproductive techniques.

- Prenatal diagnosis and Teratogenesis.
- Basic biology of stem cells: Types and sources of stem cells with characteristics; Induced pluripotent stem cells and stem cell therapy.

## Unit IV Biochemistry, Biophysics and Biostatistics

### Module 1. Biochemistry

- Water as a biological solvent: Biological importance, pH and Acid - base balance. Buffers and its biological significance.
- Classification and Structure of Carbohydrates.
- Metabolism of Carbohydrates: Glycolysis, Krebs cycle, electron transport chain, Pentose phosphate pathway, Gluconeogenesis, Glycogenolysis, Glycogenesis, biological significance.
- Classification, Structure and Biological Importance of Lipids.
- Metabolism of Lipids: Beta-oxidation of fatty acids, Biosynthesis of fatty acids. Biologically important Steroids, Prostaglandins.
- Proteins: Structure, classification and properties of amino acids, Proteins: Structure and Classification-Primary, Secondary and tertiary structure, Ramachandran plot.
- Metabolism of Amino acids and Proteins: Metabolism of Amino acids, Urea cycle, regulation of urea cycle, Deamination, Transamination and Decarboxylation.
- Vitamins: Classification, Function and Deficiency disorders.
- Enzymes: Classification and Nomenclature, Enzyme Kinetics, Regulation of enzyme activity, Enzyme inhibition, Zymogenes, Isozymes, Coenzymes and Ribozymes,

### Module 2. Biophysics

- Diffusion, Osmosis and Viscosity
- Bioenergetics: Laws of Thermodynamics (Entropy, Enthalpy, Concept of Free energy, ATP as a free energy carrier)
- Radiation Biology: Ionizing radiation, units

and measurement, exposure and radiation dosimeter, autoradiography, Liquid Scintillation counter.

- Microscopy, Light, Phase Contrast, Fluorescent Microscopes, Transmission and Scanning electron microscopes.
- Chromatography: Principles and Application, Column, Ion exchange, TLC, HPLC, Gas and Affinity chromatography.
- Electrophoresis: Paper, SDS -PAGE and Agarose Gel electrophoresis.
- Colorimeter, Spectrophotometer, Flame photometer, Atomic absorption spectrophotometer, Infra-red spectrophotometry, NMR and EMR spectroscopy
- Centrifuge: Ordinary, high speed centrifuges, Density gradient centrifugation, Ultracentrifugation
- Radioimmunoassay: ELISA, Electrophysiological methods: ECG, EEG, MRI

### Module 3: Biostatistics

- Measures of central tendency: Arithmetic mean, median and mode
- Measures of dispersion : Mean and Standard deviation, Standard error
- Testing of hypotheses: Concepts of Normal, Binomial and Poisson distribution; Student's -t test, One-way ANOVA, Concepts and applications of correlation and regression, Chi-square test.

## Unit V Genetics, Biotechnology and Microbiology

### Module 1. Genetics

- Mendelian principles: critical evaluation.
- Interaction of genes: Allelic interactions: incomplete dominance, codominance, Non-allelic interactions: complementary gene action, epistasis, duplicate gene and polygenes.
- Multiple alleles: coat colour in rabbits, Rh blood group inheritance.
- Linkage and crossing over: Linkage groups,



complete and partial linkage, Crossing over and recombination –Mechanisms of crossing over, kinds of crossing over.

- Mutation- Chromosomal aberrations and gene mutations, molecular basis, causes and significance.
- Extra chromosomal inheritance: Characteristics; maternal inheritance of cytoplasm, plastid genome, mitochondrial genome, Kappa particles in *Paramecium*, Maternal effects.
- Sex linked inheritance: characteristics, examples: haemophilia, colour blindness;

#### holandric genes.

- Sex determination: Chromosomal basis and genic balance theory, Types of chromosomal mechanism, Dosage compensation, Barr bodies, Lyon hypothesis.
- Human genetics: Genetic disorders in man, Chromosomal anomalies (autosomal and sex chromosomal), Single gene disorders (autosomal and sex linked, inborn errors in metabolism).
- Human genome project.

#### Module 2. Biotechnology

- History and concept of biotechnology, Vectors, Plasmids, Bacteriophage, Cosmids, Shuttle vectors, Yeast vectors, Minichromosomes, Artificial chromosomes, Probes and molecular markers,
- Properties and type of Isozymes, RFLP, RAPD, AFLP, VNTR, Minisatellites, Microsatellites
- Techniques in Genetic Engineering: Selection and isolation of desired genes, Gene splicing, Introduction of rDNA into host, Selection of clone containing DNA insert, DNA Finger printing, DNA sequencing, Chromosome jumping, Genomic library, cDNA library.
- Gene cloning: Cloning techniques in animals, cloning in bacteria and eukaryotes, Amplification of DNA by PCR, gene transfer technology, and expression of induced genes, Restriction enzymes its applications and ligases.

- Applications of Biotechnology: Blotting techniques (Southern, Northern, Western), Genetic engineering and its applications. Diagnosis of diseases, Detection of genetic disorders, Gene therapy, Metabolites production, Bio controls agents, Biofuel, biogas Transgenic animals- Production and use; Ethics in biotechnology, Patenting, biological materials and IPR.

#### Module 3. Microbiology

- Diversity and Ultra structure of Bacteria.
- Microbial Nutrition and Growth, Use of microbes in medical, biotechnological, industrial and agricultural fields.
- Antibiotics and antimicrobial drugs.
- Virology : classifications, structure and replication, Strategies, Viral pathogens, infections, symptoms, Anti-viral strategies- prevention and control of viral diseases.

### Unit VI

#### Cell Biology, Molecular Biology and Bioinformatics

##### Module 1. Cell biology

- Cell and cell theory, Structure and function of cell membrane, Organization based on fluid mosaic model.
- Membrane transport - diffusion, active transport, ion pumps, bulk transport.
- Differentiation of cell membrane: microvilli, tight junctions, belt and spot desmosomes, gap junctions.
- Cell organelles: Structure and function, Nucleus - nuclear envelope, nuclear pore complex, Mitochondria , Golgi apparatus, Ribosomes, Lysosomes, Endoplasmic reticulum, Peroxisomes and Centriole.
- Cytoskeleton: Microtubules, microfilaments and intermediate filaments; molecular motors.
- Cell Division- Mitosis, meiosis, Cell cycle and regulation of cell cycle, Cancer – Types and causes, Oncogenes and Tumour suppresser genes.
- Cell signalling, signalling molecules, second messengers, ligands and receptors.



- Chromosome-Structure, types, Euchromatin, heterochromatin, Nucleosome, condensation and coiling.

### Module 2. Molecular biology

- Nucleic acids: DNA - structure and Conformations of DNA
- DNA replication in prokaryotes and eukaryotes, replication machinery, mechanisms and repair.
- RNA - Types of RNA and functions.
- Genome organisation- Exons, introns, overlapping genes and transposons.
- Genetic code- characteristic features, deciphering genetic code, reading frame and frame shift.
- Protein synthesis: Central dogma, Transcription, Transcription factors, Transcription activators and repressors, RNA polymerases, capping, elongation and termination. Post-transcriptional processing in eukaryotes. Translation: Mechanism, initiation complex, elongation and termination, Post-translational modifications of proteins.

- Regulation of gene expression in bacteria. Operon model: lac operon, constitutive mutants, Catabolite repression.
- Regulation of gene expression in eukaryotes. Transcription factors, histones, acetylation and de acetylation. Regulation at transcriptional and translational level. Antisense RNA strategies- siRNA, miRNA.

### Module 3. Bioinformatics

- Nature and scope of Bioinformatics: Biological databases-DNA, RNA and Proteins- PDB, Swiss-PROT, GenBank, EMBL, NCBI and Entrez.
- Sequence alignment and use of BLAST, FASTA and CLUSTALW; Homology modeling, molecular phylogenetics and tree construction. Searching of database for sequence similarity.
- Introduction to genomics and proteomics- DNA and protein Microarrays.
- Computational tools for gene finding, protein structure prediction, RNA structure prediction; computational drug discovery.