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Assistant Professor in
COMPUTER SCIENCE & ENGINEERING / INFORMATION TECHNOLOGY

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Module I : General Knowledge and Current Affairs

Salient Features of Indian Constitution
Salient features of the Constitution - Preamble- Its significance and its place in the interpretation of the Constitution.
Fundamental Rights - Directive Principles of State Policy - Relation between Fundamental Rights and Directive Principles - Fundamental Duties.
Executive - Legislature - Judiciary - Both at Union and State Level. - Other Constitutional Authorities.
Centre-State Relations - Legislative - Administrative and Financial.
Services under the Union and the States.
Emergency Provisions.
Amendment Provisions of the Constitution.

Social Welfare Legislations and Programmes
Social Service Legislations like Right to Information Act, Prevention of atrocities against
Women & Children, Food Security Act, Environmental Acts etc. and Social Welfare Programmes like Employment Guarantee Programme, Organ and Blood Donation etc.

RENAISSANCE IN KERALA

Towards A New Society
Introduction to English education - various missionary organisations and their functioning- founding of educational institutions, factories.printing press etc.

Efforts To Reform The Society

(A) Socio-Religious reform Movements
SNDP Yogam, Nair Service Society, Yogakshema Sabha, Sadhu Jana Paripalana Sangham, Vaala Samudaya Parishkarani Sabha, Samathwa Samajam, Islam Dharma Paripalana Sangham, Prathyaksha Raksha Daiva Sabha, Sahodara Prasthanam etc.

(B) Struggles and Social Revolts
Upper cloth revolts.Channar agitation, Vaikom Sathyagraha, Guruvayoor Sathyagraha, Paliyam Sathyagraha. Kuttamkulam Sathyagraha, Temple Entry Proclamation, Temple Entry Act .Malyalee Memorial, Ezhava Memorial etc.
Malabar riots, Civil Disobedience Movement, Abstention movement etc.

Role Of Press In Renaissance
Malayalee, Swadeshabhimani, Vivekodayam, Mithavadi, Swaraj, Malayala Manorama, Bhashaposhini, Mathnubhoomi, Kerala Kaumudi, Samadarsi, Kesari, AI-Ameen, Prabhatham, Yukthivadi, etc

Awakening Through Literature
Novel, Drama, Poetry, *Purogamana Sahithya Prasthanam, Nataka Prashtanam,* Library movement etc

Women And Social Change

Parvathi Nenmenimangalam, Arya Pallam, A V Kuttimalu Amma, Lalitha Prabhu.Akkamma Cheriyan, Anna Chandi, Lalithambika Antharjanam and others

Leaders Of Renaissance

Thycaud Ayya Vaikundar, Sree Narayana Guru, Ayyan Kali.Chattampi Swamikal, Brahmananda Sivayogi, Vagbhadananda, Poikayil Yohannan(Kumara Guru) Dr Palpu, Palakkunnath Abraham Malpan, Mampuram Thangal, Sahodaran Ayyappan, Pandit K P Karuppan, Pampadi John Joseph, Mannathu Padmanabhan, V T Bhattathirippad, Vakkom Abdul Khadar Maulavi, Makthi Thangal, Blessed Elias Kuriakose Chaavra, Barrister G P Pillai, TK Madhavan, Moorkoth Kumaran, C. Krishnan, K P Kesava Menon, Dr.Ayyathan Gopalan, C V Kunjuraman, Kuroor Neelakantan Namboothiripad,
Velukkutty Arayan, K P Vellon, P K Chathan Master, K Kelappan, P. Krishna Pillai, A K Gopalan, T R Krishnaswami Iyer, C Kesavan. Swami Ananda Theerthan , M C Joseph, Kuttippuzha Krishnapillai and others

Literary Figures

Kodungallur Kunhikkuttan Thampuran, KeralaVarma Valiyakoyi Thampuran, Kandathil Varghese Mappila. Kumaran Asan, Vallathol Narayana Menon, Ulloor S Parameswara Iyer, G Sankara Kurup, Changampuzha Krishna Pillai, Chandu Menon, Vaikom Muhammad Basheer. Kesav Dev, Thakazhi Sivasankara Pillai, Ponkunnam Varky, S K Pottakkad and others

GENERAL KNOWLEDGE AND CURRENT AFFAIRS

General Knowledge and Current Affairs

Module II :

a) MATHEMATICS (ENGINEERING)

Matrices: Rank, systems of linear equations, consistency, eigen values, eigen vectors, Cayley Hamilton Theorem, diagonalisation, linear dependence and independence of vectors.

Partial Differentiation: Partial derivatives, Euler's theorem on homogeneous functions, total derivatives, Jacobians, Taylor's series (one and two variables) – Maxima and minima of functions of two variables – Lagrange' s method.

Vector Differentiation: Scalar and vector functions, differentiation of vector functions – velocity and acceleration – scalar and vector fields – operator – Gradient – Directional derivative – Divergence – Curl – irrotational and solenoidal fields – scalar potential.

Laplace Transforms: Transforms of elementary functions, shifting property – inverse transforms – transforms of derivatives and integrals – transform of functions multiplied by t and divided by t – convolution theorem, solution of ordinary differential equations with constant coefficients using Laplace transforms.

Ordinary Differential Equations: First Order ordinary differential equations, systems of linear first order ordinary differential equations, linear ordinary differential equations of higher order with constant coefficients, linear second order ordinary differential equations with variable coefficients (Cauchy and Legendre equations), Method of Laplace transforms for solving ordinary differential equations.

Complex Analysis: Analytic functions, conformal mappings, bilinear transformations, complex integration, Cauchy's integral theorem and formula, Taylor and Laurent's series, residue theorem.

Fourier Series: Fourier series of periodic functions of period 2π and 2ℓ, odd and even functions, Half range expansions.

b) BASIC CIVIL ENGINEEERING

Mechanics – statistics – Coplanar forces – conditions of equilibrium. Support reactions – Simply supported and overhanging beams. Friction – Laws of friction – applications. Centre of gravity and moment of inertia of plane areas. Dynamics – rectilinear motion – Newton's laws of motion – curvilinear motion.
Building materials – common building materials – stone, brick, cement, steel, aggregate, concrete, timber – properties, IS specification. Building construction – types and functions of the following structural components of buildings – foundations and superstructure.
Surveying – principle of surveying – linear measurements using chain – levelling work – reduction of levels.

c) BASIC MECHANICAL ENGINEERING

Zeroth, first and second laws of thermodynamics, CI and SI Engines, properties of steam. Centrifugal and reciprocating pumps, hydraulic turbines, refrigeration and air conditioning, hydro-electric, thermal and nuclear power plants, mechanical power transmission systems such as belt, rope, chain and gear, manufacturing process – casting, forging, rolling, brazing, soldering, and welding, machining process – turning, shaping, drilling, grinding and milling. Conic sections and miscellaneous curves, orthographic, isometric and perspective projections.

Module III :

a) BASIC ELECTRICAL ENGINEERING

Ohm's law, Kirchoff's laws – solution of series and parallel circuits with dc excitation.
Magnetic circuits: MMF, field strength, flux density, reluctance, electromagnetic induction, Faraday's laws, Lenz's law, statically and dynamically induced emfs, self and mutual induction, co-efficient of coupling.
Principle of generation of alternating current – waveforms – frequency, period, average and rms values, form factor.
Generation of 3 phase ac voltage, star and delta connections, voltage & current relationships in star and delta (balanced system only).

Principle of operation of dc motor & generator, single phase transformer and three phase induction motor.

Types of lamps, necessity of earthing.

b) BASIC ELECTRONICS ENGINEERING

Devices – working principle of PN junction, Zener diode and BJT.

Systems – Rectifiers : Half wave, Full wave and Bridge. Filters: Capacitors and Inductors.

Amplifiers & Oscillators – Common Emitter RC coupled amplifier and its frequency response. Principles of Wein-bridge oscillator. Op-amps: Basics, inverting and non-inverting amplifier.

Communication – Need for modulation, principles of AM and FM.

Measurements – Working principles of CRO and Multimeter.

c) BASIC COMPUTER SCIENCE

Functional units of a computer.

Programming in C – control structures, functions.

Module IV : Computer Organization & Architecture

Digital Logic: Logic functions, minimization, design and synthesis of combinational and sequential circuits, number representation and computer arithmetic (fixed and floating point).

Computer Organization: Machine instructions and addressing modes, ALU, CPU control design, memory interface, I/O interface, DMA, interrupts, pipelining, memory hierarchy, parallel computer models.

Microprocessors: Internal architecture of 8085 and 8086, interfacing with peripheral devices, microcontrollers.

Module V : Programming Languages & Information Systems

Object Oriented Programming: Object oriented design concepts, programming in C++, Java.

Databases: ER model, relational algebra, tuple calculus, database design, integrity constraints, normalization, SQL, B-trees, B+ - trees, transactions and concurrency control.

Software Engineering: Software process models, planning and managing a software project, design, implementation, software testing, quality models and maintenance.

Programming Language Concepts: Parameter passing, binding, scope, recursion, functional and logic languages.

Module VI : Data Structures & Algorithms

Data Structures: Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

Algorithms: Analysis, space and time complexity. Design – greedy approach, dynamic programming, divide-and-conquer, sorting and searching, complexity classes – P, NP, NP-hard, NP-complete.

Graph Theory: Connectivity, covering, colouring, planarity, isomorphism.

Computer Graphics: Line drawing, circle drawing, filling, hatching, 2D/3D transformations, projections, hidden surface removal.

Module VII : Computing and System Software

Set Theory: Sets, relations, functions, groups, partial orders, lattice, algebraic structures.

Theory of Computation: Regular languages and finite automata, context-free languages & pushdown automata, recursively enumerable sets & Turing machines, undecidability.

System Software: Compiler design, lexical analysis, parsing, syntax directed translation, code generation and optimization, Assemblers, linkers and loaders, macroprocessors, operating systems – processes, threads, inter-process communication, synchronization, deadlocks, CPU scheduling, memory management and virtual memory, file systems, I/O systems, protection & security.

Module VIII : Networking & Web Technology

Computer Networks: Layered architecture, LAN technologies, wireless LAN, flow and error control, routing algorithms, congestion control, TCP/UDP and sockets, IPv4, IPv6, ICMP, DNS, SMTP, POP, FTP, HTTP, MIME, Hubs, switches, routers and gateways, public key and private key cryptography, digital signature, firewalls, wireless networks, 2G and 3G networks, Bluetooth.

Web Technologies: HTML, XML, client-server computing, web server, proxy server, web application development, MVC architecture, e-commerce, web services.

Distributed Systems: Characteristics, inter-process communication, distributed file systems.