

**SCHOOL OF ENGINEERING**  
**COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY**



**REVISED NOTICE**

The Departmental Admission Test (DAT) – 2023 for admissions to the M.Tech. (Full Time and Part Time) programs of the School of Engineering will be conducted as detailed below. The examination will be of 2 hours duration consisting of 100 multiple choice questions. The details are as given below:-

Sl No.	Specialisation	Test Date & Time (From-To)
1	Computer Science and Engineering (Cyber Security)	22.06.2023 10 a.m-12 noon
2	Electrical and Electronics Engineering (Power Electronics)	22.06.2023 10 a.m-12 noon
3	Information Technology (Business Analytics and Intelligence)	22.06.2023 2 p.m- 4 p.m
4	Civil Engineering (Geotechnical Engineering/ Structural Engineering/ Construction Engineering and Management)	23.06.2023 10 a.m-12 noon
5	Mechanical Engineering (Thermal Engineering/ Production Engineering)	23.06.2023 10 a.m-12 noon
6	Industrial Safety (Health Safety and Environment Management)	23.06.2023 2 p.m-4 p.m

**Reporting Time:** 30 minutes before the commencement of the test.

**Venue:** School of Engineering, CUSAT, Kochi-22


**NB:** The Notice dated 12.06.2023 stands modified to this extent.

\*Applicants are requested to visit the website (<https://admissions.cusat.ac.in>) to know updated details, if any. For more details, contact **0484-2862035**.

\* Hall Tickets and soft copy of the corresponding syllabus will be emailed to the candidates at their registered email ids. The syllabus for DAT is also available in the University website.

13.06.2023



  
**PRINCIPAL**  
School of Engineering  
PRINCIPAL  
SCHOOL OF ENGINEERING  
COCHIN UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
KOCHI-682 022 KERALA

# Syllabus for M.Tech. DAT 2023 in Civil Engineering (SoE, CUSAT)

## Section 1: Engineering Mathematics

Linear Algebra: Matrix algebra; Systems of linear equations; Eigen values and Eigen vectors.

Calculus: Functions of single variable; Limit, continuity and differentiability; Mean value theorems, local maxima and minima; Taylor series; Evaluation of definite and indefinite integrals, application of definite integral to obtain area and volume; Partial derivatives; Total derivative; Gradient, Divergence and Curl, Vector identities; Directional derivatives; Line, Surface and Volume integrals.

Ordinary Differential Equation (ODE): First order (linear and non-linear) equations; higher order linear equations with constant coefficients; Euler-Cauchy equations; initial and boundary value problems.

Partial Differential Equation (PDE): Fourier series; separation of variables; solutions of one-dimensional diffusion equation; first and second order one-dimensional wave equation and two-dimensional Laplace equation.

Probability and Statistics: Sampling theorems; Conditional probability; Descriptive statistics – Mean, median, mode and standard deviation; Random Variables – Discrete and Continuous, Poisson and Normal Distribution; Linear regression.

Numerical Methods: Error analysis. Numerical solutions of linear and non-linear algebraic equations; Newton's and Lagrange polynomials; numerical differentiation; Integration by trapezoidal and Simpson's rule; Single and multi-step methods for first order differential equations.

## Section 2: Structural Engineering

Engineering Mechanics: System of forces, free-body diagrams, equilibrium equations; Internal

forces in structures; Frictions and its applications; Centre of mass; Free Vibrations of undamped SDOF system.

Solid Mechanics: Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, Transformation of stress; buckling of column, combined and direct bending stresses.

Structural Analysis: Statically determinate and indeterminate structures by force/energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis.

Construction Materials and Management: Construction Materials: Structural Steel – Composition, material properties and behaviour; Concrete - Constituents, mix design, short-term and long-term properties. Construction Management: Types of construction projects; Project planning and network analysis - PERT and CPM; Cost estimation.

Concrete Structures: Working stress and Limit state design concepts; Design of beams, slabs, columns; Bond and development length; Prestressed concrete beams.

Steel Structures: Working stress and Limit state design concepts; Design of tension and compression members, beams and beam-columns, column bases;



## Syllabus for M.Tech. DAT 2023 in Civil Engineering (SoE, CUSAT)

Connections- simple and eccentric, beam-column connections, plate girders and trusses; Concept of plastic analysis -beams and frames.

### Section 3: Geotechnical Engineering

Soil Mechanics: Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability - one dimensional flow, Seepage through soils – two - dimensional flow, flow nets, uplift pressure, piping, capillarity, seepage force; Principle of effective stress and quicksand condition; Compaction of soils; One- dimensional consolidation, time rate of consolidation; Shear Strength, Mohr's circle, effective and total shear strength parameters, Stress-Strain characteristics of clays and sand; Stress paths.

Foundation Engineering: Sub-surface investigations - Drilling bore holes, sampling, plate load

test, standard penetration and cone penetration tests; Earth pressure theories - Rankine and Coulomb; Stability of slopes – Finite and infinite slopes, Bishop's method; Stress distribution in soils – Boussinesq's theory; Pressure bulbs, Shallow foundations – Terzaghi's and Meyerhoff's bearing capacity theories, effect of water table; Combined footing and raft foundation; Contact pressure; Settlement analysis in sands and clays; Deep foundations – dynamic and static formulae, Axial load capacity of piles in sands and clays, pile load test, pile under lateral loading, pile group efficiency, negative skin friction.

### Section 4: Water Resources Engineering

Fluid Mechanics: Properties of fluids, fluid statics; Continuity, momentum and energy equations and their applications; Potential flow, Laminar and turbulent flow; Flow in pipes, pipe networks; Concept of boundary layer and its growth; Concept of lift and drag.

Hydraulics: Forces on immersed bodies; Flow measurement in channels and pipes; Dimensional analysis and hydraulic similitude; Channel Hydraulics - Energy-depth relationships, specific energy, critical flow, hydraulic jump, uniform flow, gradually varied flow and water surface profiles.

Hydrology: Hydrologic cycle, precipitation, evaporation, evapo-transpiration, watershed, infiltration, unit hydrographs, hydrograph analysis, reservoir capacity, flood estimation and routing, surface run-off models, ground water hydrology - steady state well hydraulics and aquifers; Application of Darcy's Law.

Irrigation: Types of irrigation systems and methods; Crop water requirements - Duty, delta, evapo-transpiration; Gravity Dams and Spillways; Lined and unlined canals, Design of weirs on permeable foundation; cross drainage structures.

### Section 5: Environmental Engineering

Water and Waste Water Quality and Treatment: Basics of water quality standards – Physical, chemical and biological parameters; Water quality index; Unit processes and operations; Water requirement; Water distribution system; Drinking water treatment.

Sewerage system design, quantity of domestic wastewater, primary and secondary treatment. Effluent discharge standards; Sludge disposal; Reuse of treated sewage for different applications. Air Pollution: Types of pollutants, their sources and impacts, air pollution control, air quality standards, Air quality Index and limits.



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Municipal Solid Wastes: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

### Section 6: Transportation Engineering

Transportation Infrastructure: Geometric design of highways - cross-sectional elements, sight distances, horizontal and vertical alignments.

Geometric design of railway Track – Speed and Cant.

Concept of airport runway length, calculations and corrections; taxiway and exit taxiway design.

Highway Pavements: Highway materials - desirable properties and tests; Desirable properties of bituminous paving mixes; Design factors for flexible and rigid pavements; Design of flexible and rigid pavement using IRC codes

Traffic Engineering: Traffic studies on flow and speed, peak hour factor, accident study, statistical analysis of traffic data; Microscopic and macroscopic parameters of traffic flow, fundamental relationships; Traffic signs; Signal design by Webster's method; Types of intersections; Highway capacity.

### Section 7: Geomatics Engineering

Principles of surveying; Errors and their adjustment; Maps - scale, coordinate system; Distance and angle measurement-Levelling and trigonometric levelling; Traversing and triangulation survey; Total station; Horizontal and vertical curves.

Photogrammetry and Remote Sensing - Scale, flying height; Basics of remote sensing and GIS.



### Section 1: Engineering Mathematics

Linear Algebra: Matrix algebra, systems of linear equations, eigenvalues and eigenvectors.

Calculus: Functions of single variable, limit, continuity and differentiability, mean value theorems, indeterminate forms; evaluation of definite and improper integrals; double and triple integrals; partial derivatives, total derivative, Taylor series (in one and two variables), maxima and minima, Fourier series; gradient, divergence and curl, vector identities, directional derivatives, line, surface and volume integrals, applications of Gauss, Stokes and Green's theorems.

Differential Equations: First order equations (linear and nonlinear); higher order linear differential equations with constant coefficients; Euler-Cauchy equation; initial and boundary value problems; Laplace transforms; solutions of heat, wave and Laplace's equations.

Complex Variables: Analytic functions; Cauchy-Riemann equations; Cauchy's integral theorem and integral formula; Taylor and Laurent series.

Probability and Statistics: Definitions of probability, sampling theorems, conditional probability; mean, median, mode and standard deviation; random variables, binomial, Poisson and normal distributions.

Numerical Methods: Numerical solutions of linear and non-linear algebraic equations; integration by trapezoidal and Simpson's rules; single and multi-step methods for differential equations.

### Section 2: Applied Mechanics and Design

Engineering Mechanics: Free-body diagrams and equilibrium; friction and its applications including rolling friction, belt-pulley, brakes, clutches, screw jack, wedge, vehicles, etc.; trusses and frames; virtual work; kinematics and dynamics of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations; Lagrange's equation.

Mechanics of Materials: Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; concept of shear centre; deflection of beams; torsion of circular shafts; Euler's theory of columns; energy methods; thermal stresses; strain gauges and rosettes; testing of materials with universal testing machine; testing of hardness and impact strength.

Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.

Vibrations: Free and forced vibration of single degree of freedom systems, effect of damping; vibration isolation; resonance; critical speeds of shafts.

Machine Design: Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.



  
HEAD  
Mechanical Engineer  
School of Engineering  
Cochin University of  
Science and Technology  
Kochi - 682 022, Kerala

MTC-5

### Section 3: Fluid Mechanics and Thermal Sciences

**Fluid Mechanics:** Fluid properties; fluid statics, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends and fittings; basics of compressible fluid flow.

**Heat-Transfer:** Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan-Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis

**Thermodynamics:** Thermodynamic systems and processes; properties of pure substances, behavior of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.

**Applications:** *Power Engineering:* Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. *I.C. Engines:* Air-standard Otto, Diesel and dual cycles. *Refrigeration and air-conditioning:* Vapour and gas refrigeration and heat pump cycles; properties of moist air, psychrometric chart, basic psychrometric processes. *Turbomachinery:* Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines; steam and gas turbines.

### Section 4: Materials, Manufacturing and Industrial Engineering

**Engineering Materials:** Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials.

**Casting, Forming and Joining Processes:** Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding.

**Machining and Machine Tool Operations:** Mechanics of machining; basic machine tools; single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, jigs and fixtures; abrasive machining processes; NC/CNC machines and CNC programming.

**Metrology and Inspection:** Limits, fits and tolerances; linear and angular measurements; comparators; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly; concepts of coordinate-measuring machine (CMM).

**Computer Integrated Manufacturing:** Basic concepts of CAD/CAM and their integration tools; additive manufacturing.



  
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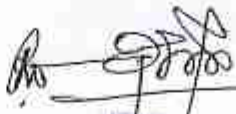
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Production Planning and Control: Forecasting models, aggregate production planning, scheduling, materials requirement planning; lean manufacturing.

Inventory Control: Deterministic models; safety stock inventory control systems.

Operations Research: Linear programming, simplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.



  
HEAD  
Mechanical Engineering,  
School of Engineering  
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Science and Technology  
Kochi - 682 022, Kerala

MACS

# Syllabus for M.Tech DAT in Electrical and Electronics Engineering (Power Electronics)

## EE: Electrical Engineering

### Section 1: Engineering Mathematics

Linear Algebra: Matrix Algebra, Systems of linear equations, Eigenvalues, Eigenvectors.

Calculus: Mean value theorems, Theorems of integral calculus, Evaluation of definite and improper integrals, Partial Derivatives, Maxima and minima, Multiple integrals, Fourier series, Vector identities, Directional derivatives, Line integral, Surface integral, Volume integral, Stokes's theorem, Gauss's theorem, Green's theorem.

Differential equations: First order equations (linear and nonlinear), Higher order linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's equation, Euler's equation, Initial and boundary value problems, Partial Differential Equations, Method of separation of variables.

Complex variables: Analytic functions, Cauchy's integral theorem, Cauchy's integral formula, Taylor series, Laurent series, Residue theorem, Solution integrals.

Probability and Statistics: Sampling theorems, Conditional probability, Mean, Median, Mode, Standard Deviation, Random variables, Discrete and Continuous distributions, Poisson distribution, Normal distribution, Binomial distribution, Correlation analysis, Regression analysis.

Numerical Methods: Solutions of nonlinear algebraic equations, Single and Multi-step methods for differential equations.

Transform Theory: Fourier Transform, Laplace Transform, z-Transform.

### Electrical Engineering

#### Section 2: Electric Circuits

Network graph, KCL, KVL, Node and Mesh analysis, Transient response of dc and ac networks, Sinusoidal steady-state analysis, Resonance, Passive filters, Ideal current and voltage sources, Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power transfer theorem, Two-port networks, Three phase circuits, Power and power factor in ac circuits.

#### Section 3: Electromagnetic Fields

Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric field and potential due to point, line, plane and spherical charge distributions, Effect of dielectric medium, Capacitance of simple configurations, Biot-Savart's law, Ampere's law, Curl, Faraday's law, Lorentz force, Inductance, Magnetomotive force, Reluctance, Magnetic circuits, Self and Mutual inductance of simple configurations.

#### Section 4: Signals and Systems

Representation of continuous and discrete-time signals, Shifting and scaling operations, Linear Time Invariant and Causal systems, Fourier series representation of continuous periodic signals, Sampling theorem, Applications of Fourier Transform, Laplace Transform and z-Transform.

#### Section 5: Electrical Machines

Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three phase transformers: connections, parallel operation; Auto-transformer, Electromechanical energy conversion principles, DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics, starting and speed control of dc motors; Three phase induction motors: principle of operation, types, performance, torque-speed characteristics, no-load and blocked rotor tests; equivalent circuit, starting and speed control; Operating principle of single phase induction motors; Synchronous machines: cylindrical and salient pole machines, performance, regulation and parallel operation of generators, starting of synchronous motor, characteristics; Types of losses and efficiency calculations of electric machines.

#### Section 6: Power Systems

Power generation concepts, ac and dc transmission concepts, Models and performance of transmission lines and cables, Series and shunt compensation, Electric field distribution and insulators, Distribution





systems, Per-unit quantities, Bus admittance matrix, Gauss-Seidel and Newton-Raphson load flow methods, Voltage and Frequency control, Power factor correction, Symmetrical components, Symmetrical and unsymmetrical fault analysis, Principles of over-current, differential and distance protection, Circuit breakers, System stability concepts, Equal area criterion.

#### Section 7: Control Systems

Mathematical modeling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady-state analysis of linear time invariant systems, Routh-Hurwitz and Nyquist criteria, Bode plots, Root loci, Stability analysis, Lag, Lead and Lead-Lag compensators, P, PI and PID controllers, State space model, State transition matrix.

#### Section 8: Electrical and Electronic Measurements

Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers, Digital voltmeters and multimeters, Phase, Time and Frequency measurement; Oscilloscopes, Error analysis.

#### Section 9: Analog and Digital Electronics

Characteristics of diodes, BJT, MOSFET; Simple diode circuits: clipping, clamping, rectifiers; Amplifiers: Biasing, Equivalent circuit and Frequency response; Oscillators and Feedback amplifiers; Operational amplifiers: Characteristics and applications; Simple active filters, VCOs and Timers; Combinational and Sequential logic circuits, Multiplexer, Demultiplexer, Schmitt trigger, Sample and hold circuits, A/D and D/A converters, 8085 Microprocessor: Architecture, Programming and Interfacing.

#### Section III: Power Electronics

Characteristics of semiconductor power devices: Diode, Thyristor, Triac, GTO, MOSFET, IGBT; DC to DC conversion: Buck, Boost and Buck-Boost converters; Single and three phase configuration of uncontrolled rectifiers, Line commutated thyristor based converters, Bidirectional ac to dc voltage source converters, Issues of line current harmonics, Power factor, Distortion factor of ac to dc converters, Single phase and three phase inverters, Sinusoidal pulse width modulation.



**SCHOOL OF ENGINEERING  
COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**Departmental Admission Test (DAT) for M-Tech (Full Time) Programmes**

**Syllabus for DAT for  
M.Tech. in Industrial Safety (HSE Management)**

**Linear Algebra:** Matrix Algebra, Systems of linear equations, Eigen values and eigen vectors.

**Calculus:** Mean value theorems, Theorems of integral calculus, Evaluation of definite and improper integrals, Partial Derivatives, Maxima and minima, Multiple integrals, Fourier series, Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.

**Differential equations:** First order equation (linear and nonlinear), Higher order linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's and Euler's equations, Initial and boundary value problems, Partial Differential Equations and variable separable method.

**Complex variables:** Analytic functions, Cauchy's integral theorem and integral formula, Taylor's and Laurent' series, Residue theorem, solution integrals.

**Probability and Statistics:** Sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Discrete and continuous distributions, Poisson, Normal and Binomial distribution, Correlation and regression analysis.

**Numerical Methods:** Solutions of non-linear algebraic equations, single and multi-step methods for differential equations, Transform Theory: Fourier transform, Laplace transform, Z-transform.

**Engineering Mechanics:** Free body diagrams and equilibrium; trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion, including impulse and momentum (linear and angular) and energy formulations; impact.

**Strength of Materials:** Stress and strain, stress-strain relationship and elastic constants, principal stresses, stress transformation, Mohr's circle for plane stress and plane strain, thin cylinders; Simple bending theory, unsymmetrical bending, shear force and bending moment diagrams; bending and shear stresses; deflection of beams; Thin walled pressure vessels, uniform torsion, combined and direct bending stresses, Torsion of circular shafts; Euler's theory of columns; strain energy methods; thermal stresses.

**Fluid Mechanics and Hydraulics:**

Properties of fluids, principle of conservation of mass, momentum, energy and corresponding equations, potential flow, applications of momentum and Bernoulli's equation, Viscous flow of incompressible fluids; laminar and turbulent flow, flow in pipes, head losses in pipes, bends etc., pipe networks, Concept of boundary layer and its growth, Uniform flow, critical flow and gradually varied flow in channels, specific energy concept, hydraulic jump, Forces on immersed bodies, flow measurements in channels, tanks and pipes, Dimensional analysis and hydraulic modelling, Kinematics of flow, velocity diagrams and specific speed of pumps and turbines.



### **Thermodynamics:**

Thermodynamic systems Zeroth, First and Second law of thermodynamics - Internal energy, enthalpy - Carnot Cycle - Refrigeration and Air conditioning systems - Petrol and Diesel engines, ignition, fuel, cooling and lubricating systems.

### **Environmental Science and Engineering:**

Natural resources - forest resources, water resources, mineral resources, food resources and energy resources - Concept of an ecosystem - structure and function - energy flow in the ecosystem - ecological succession - food chains, food webs and ecological pyramids - structure and functions of a forest ecosystem and an aquatic eco system. Biodiversity - genetic, species and ecosystem diversity. Air pollution, water pollution, soil pollution, noise pollution, marine pollution, thermal pollution and nuclear hazards - environmental legislations in India.

Sustainable development - rain water harvesting, water shed management - Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust - Population growth and population explosion,

### **Safety and Hazard Management:**

Safety - Need for safety, Safety and productivity, Definitions: Accident, Injury, Unsafe act, Unsafe Condition, Dangerous Occurrence, Reportable accidents,

Accident prevention Methods- Engineering, Education and Enforcement,

Work permit system- objectives, hot work and cold work permit

Hazards Identification: Process Hazards Checklists, Hazards Surveys, Hazards and Operability Studies, Safety Reviews,

Risk Assessment: Review of Probability Theory, Event Trees, Fault Trees, QRA and LOPA.

### **Occupational Health and Safety:**

Occupational and work-related disease - Industrial toxicology- threshold limit values - physical hazards - Biological effects of noise exposure- thermal stress and health effects, Ventilation systems - Standards on ventilation- occupational work capacity-aerobic and anaerobic work- Lighting and the work- Design of lighting installation - Standards on lighting and illuminations, Biological hazards- Recognition, evaluation and control of chemical hazards - Ionizing and non-ionizing radiation, Radiation protection,

### **Fire Protection:**

Fire detection- Heat detectors - Smoke detectors-Flame detectors - Flammable gas detection- Testing of fire detection devices as per relevant Indian standards(ISI) -Principles of Fire Extinguishments - Basic concept of fire fighting with water, carbon dioxide, powders, foams, inert gases halons -First aid fire protection - different types of portable fire extinguishers- Automatic water sprinkler system- Fixed fire fighting systems- Fire alarm system- classification of alarm system as per NBC.



## SCHOOL OF ENGINEERING

Departmental Admission Test -2023 for M-Tech (Full Time) Programmes  
Syllabus for M.Tech Computer Science and Engineering (Cyber Security)

### Probability and Statistics

Sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Discrete and continuous distributions, Poisson, Normal and Binomial distribution, Correlation and regression analysis.

### Data Structure and Operating Systems

Basic Data structures , Searching and sorting algorithms, Analysis of algorithms,. Basic operating system concepts, Memory management, process management , File system management , OS security and protection.

### Programming with C

Data types, syntax, input-output, pre-processor commands, operators , functions, arrays, strings, structures, pointers and expressions, control structures, memory management.

### Logic Design

Boolean algebra, minimization of Boolean functions; logic gates; digital IC families (DTL, TTL,ECL, MOS, CMOS). Combinatorial circuits: arithmetic circuits, code converters, multiplexers,decoders, PLDs. Sequential circuits: latches and flip-flops, counters and shift-registers. ADCs, DACs. Semiconductor memories.

### Computer Organisation and Architecture

Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage. 8086 Microprocessor: Architecture , Interfacing and Programming.

### Data Communication and Computer Networks

Communication model, Transmission media, Channel coding, Channel capacity, Modulation, Multiplexing,ISO/OSI stack, LAN technologies (Ethernet, Token ring), Flow and error control techniques, Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4), Application layer protocols (icmp, dns, smtp, pop, ftp, http); Basic concepts of hubs, switches, gateways, and routers.

### Data security

Basic concepts of public key and private key cryptography, digital signature, firewalls, Web security, Database security.

Head

Division of Computer Engineering



Principal

School of Engineering

## SCHOOL OF ENGINEERING

### Department Admission Test-2023 for M Tech (Full Time) Programme

#### Syllabus for M Tech in Information Technology (Business Analytics & Intelligence)

The DAT for admission to the Two-year in Business Analytics & Intelligence in the Academic Year 2023 will comprise of:

- a) Quantitative Aptitude Section
- b) Analytics Aptitude Section.

Entrance test will consist of multiple-choice questions from the following sections:

#### Section I :Quantitative Aptitude

*Quantitative Aptitude* - Number System, Geometry, Algebra, Mensuration, Time and Work, Profit, Loss and Discount etc.

*Logical Reasoning & Data Interpretation* -Seating Arrangement, Blood Relation, Syllogism, Tables, Graphs, Data Caselets, Logical Connectives, Statements and Conclusions, Matching, etc.

*Verbal Ability & Reading Comprehension*- Para-Jumbles & Para-Summary, Sentence Completion, Inferences, RC Passages Based Questions etc.

#### Section II : Analytics Aptitude

*Engineering Mathematics*: Linear Algebra, Numerical Analysis, Probability and Statistics ,Sets, Combinatorics, Basic Probability Theory, Algebra (Solutions of Quadratic Equations, Inequalities, Simultaneous Linear Equations, Binomial Theorem, Series, AP, GP, HP, Matrices), Euclidean Geometry, Coordinate Geometry (Lines, Circles, Conic Sections), Trigonometry (Triangles, Trigonometric Identities, Heights and Distances), Calculus (Functions, Limits, Continuity, Derivative, Maxima & Minima, Methods of Integration, Evaluation of Areas using Integration).

Assesses knowledge and problem-solving abilities related to Programming Concepts in C, Basic Data Structures (arrays, lists, stacks, and queues) and Computer systems, Computer Networks, Web Browsers, Storage Devices, Operating System, Database Management Systems.

  
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