



SRI SATHYA SAI INSTITUTE OF HIGHER LEARNING

(Deemed to be University)

Vidyagiri, Prasanthi Nilayam – 515 134, A.P.

Admission Test Syllabus

M.B.A./M.B.A.(Finance):

Admission to M.B.A./M.B.A.(Finance) Programme of the Institute will be based on performance in the Admission Test, Group Discussion and Interview.

There will be three written tests of 3 hours total duration. They would be of a pattern similar to CAT, GMAT and MAT. The details of various tests are as follows:

1. **English:** This test is designed to test the candidate's command over English and Grammar, his vocabulary, and his ability to use words and phrases effectively. This test is also designed to test the ability of the candidate to read and rapidly digest literature, his ability to extract qualitative and quantitative information, and his ability to communicate precisely.
2. **Quantitative Analysis & Logical Reasoning:** This test is intended to assess the candidate's ability to handle quantitative information with speed and accuracy. This test is also designed to determine the candidate's ability to draw valid inferences from available information, using logical reasoning and simple mathematical formulae.
3. **Management Aptitude:** The purpose of this test is to assess the candidate's aptitude for Management profession and his ability to comprehend facts, and analyse given situation. The purpose of this test is also to assess the awareness of the candidate pertaining to national and international issues.

NOTE: The Institute reserves the right to allocate successful candidates of these two courses as it deems fit, notwithstanding the preference indicated by the applicant.

Reference Books: Galogotia Publications, CAT/MAT Admission Books, GMAT.

M.Tech. (Computer Science):

Admission Test will have three Components.

1. Written Test: a) Computer Science (75%) b) Mathematics (25%)

Duration of the test will be 2 hours and it will contain multiple choice, short answer and problem solving type questions.

The syllabus is as follows:

- i. Data Structures and Simple Algorithms, Computer Organization and Architecture, Data Communication and Networks, Data Base Systems, Operating Systems and Artificial Intelligence.

- ii. Calculus of One and Several Variables, Sequence and Series, Linear Algebra and Matrix Theory, Differential Equations and Transforms, Mathematical Logic.

Level of knowledge expected as in

- 1) An introduction to Computer Science: An Algorithmic Approach by Jean Paul Trembley and Richard B Bunt, McGraw Hill Pub.
- 2) Computer Organization and Architecture by William Stalling, PHI Pub.
- 3) Data and Computer Communication by William Stalling, PHI Pub.
- 4) Data Base System Concepts by Silberchatz, Korth and Studarshan, Tata McGraw Hill Pub.
- 5) Artificial Intelligence by Elaina Rich and Kevin Knight, TMH pub.
- 6) Calculus by Stanley I. Gossman, Academic Press Pub.
- 7) Linear Algebra by Lary Smith Springer – Verlang Pub.
- 8) Mathematical Logic by M.Ben Ari, Prentice Hall Pub.
- 9) Advanced Engineering Mathematics by Kreyszig, Wiley Eastern Pub.
- 10) Differential Equations by Shapley L. Ross John Wiley and Sons Pub.

2. Practical and Oral Test. This test will be given to those who qualify in Written Test-I:

- a. Practical Test will be of 2 hours duration. It will test proficiency in designing, coding and debugging abilities in OOPS, CORE JAVA and C/C++ on UNIX/LINUX platforms.
- b. Oral Test will examine the comprehension of basics and analytical abilities.

3. Interview:

An Interview will be conducted for candidates who qualify in the Practical and Oral test for final selection.

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M.Tech. (Applied Optics):

Duration of the test will be 2 hours and it will contain multiple choice, short answer and problem solving type questions.

1) Common for B.E. / B.Tech. / M.Sc.(Physics):

Linear Algebra: Determinates, System of linear equations, Eigenvalues and eigenvectors, Diagonalization of matrices.

Calculus: limit, continuity and differentiability, 'Hospital rule, Maxima and minima, Taylor's series, Evaluation integrals, Lagrange multipliers, Power series, Fourier Series.

Complex variable: Analytic functions, Taylor's and Laurent' series, Residue theorem, Cauchy's theorem.

Vector Calculus: Gradient, Divergence and Curl, Line, surface and volume integrals, Stokes, Gauss and Green's theorems.

Ordinary and Partial Differential Equations: ODEs with constant coefficients, variation of parameters, Initial and boundary value problems (BVPs), Power Series solutions, Legendre, Hermite and Bessel's functions, Variables separable method, Solutions heat, wave and Laplace equations.

Programming & Numerical Methods: Data Types & Declarations, Program Organization, Arithmetic Statements, Flow of Control-Iterative Statement, Conditional statement, Unconditional branching, arrays, functions and procedures, pointers, classes, file handling.

Errors, Interpolation, curve fitting, root finding, solutions of algebraic system, Eigen values – Power method, Numerical integration, Numerical Differentiation, Solution of ODEs and BVPs – RK Methods, Shooting & Crank-Nicholson methods.

2 A) Section for B. E. / B. Tech Applicants only

Networks: Network graphs: matrices of graphs; Solution methods, Nodal and mesh analysis, Network theorems, Thevenin's and Norton's, Wye-Delta transformation. Steady state analysis, Time and Frequency domain analysis, Solution using Laplace transform, 2port network parameters: transfer functions and state equations.

Electronic Devices: Energy bands, Carrier transport, diffusion, drift, mobility, resistivity, Diodes: p-n junction, Zener, BJTs, FETs, JFETs, MOSFETs, PIN and Avalanche; LEDs, LASERS,

Analog Circuits: Equivalent circuits of diodes, BJTs, JFETs, and MOSFETs. Simple diode circuits, Single-and multi-stage, differential, operational, feedback and power amplifiers, Frequency response of amplifiers; Op-amp circuits, Filters, Oscillators;

Digital circuits: Boolean algebra, logic gates, Digital IC families (DTL, TTL, ECL, MOS, CMOS), Combinational circuits, arithmetic circuits, code converters, multiplexers and decoders. latches and flip-flops, counters and shift-registers. Sample and hold circuits, ADCs, DACs, Memories, Microprocessor(8085): architecture, programming, memory and I/O interfacing.

Signals and Systems: Laplace transform, continuous-time and discrete-time Fourier series and transforms, Z-transform. Sampling theorems. L TI Systems: analysis and signal transmission, Random signals and noise: probability, random variables, probability density function, autocorrelation, power spectral density.

Control Systems: Feedback; transfer function; steady-state errors; Stability criteria; Bode plots; Elementary state variable formulation; Transition matrix and response for L TI systems. On-off, cascade, P, PI, PID and feed-forward controls. Controller tuning and general frequency response.

Communications: Analog systems: modulation and demodulation systems, spectral analysis, superheterodyne receivers; hardware, realizations of analog communication systems; signal-to-noise ratio (SNR) AM, FM. Digital systems: PCM, DPCM, DM; ASK, PSK, FSK; matched filter receivers, bandwidth consideration and probability of error calculations for these schemes.

Electromagnetics: Maxwell's equations, Wave equation, Poynting vector. Plane waves: propagation, reflection and refraction; phase and group velocity; skin depth; Transmission lines: characteristic impedance; impedance transformation; Smith chart; Waveguides: modes in rectangular waveguides; boundary conditions; cut-off frequencies; dispersion relations. Antennas: Dipole antennas; antenna arrays; radiation pattern; reciprocity theorem, antenna gain.

2 B) Section for M.Sc. (Physics) Applicants only:

Classical Mechanics: Lagrange's and Hamilton's formalisms; Equation of motion, Poisson bracket; small oscillations, normal modes; wave equation; Special theory of relativity – Lorentz transformations, relativistic kinematics, mass-energy equivalence.

Electromagnetic Theory: Laplace and Poisson equations; conductors and dielectrics; boundary value problems; Ampere's and Biot-Savart's laws; Faraday's law; Maxwell's equations; boundary conditions; electromagnetic waves; radiation from moving charges.

Quantum Mechanics: Schrodinger equation; Bound state problems, hydrogen atom; angular momentum and spin; addition of angular momentum; matrix formulation, time independent perturbation theory; elementary scattering theory.

Atomic and Molecular Physics: Spectra of one-and many-electron atoms; LS and jj coupling; Zeeman and Stark effects; X-ray spectra; rotational and vibrational spectra of diatomic molecules; electronic transition in diatomic molecules, Franck-Condon principle; Raman effect; NMR and ESR;

Thermodynamics and Statistical Physics: Laws of thermodynamics; calculation of thermodynamic quantities; microstates, macrostates, phase space; partition function, free energy, classical and quantum statistics; Fermi gas; Black body radiation; Bose-Einstein condensation; first and second order phase transitions, critical point.

Solid State Physics: Elements of X-crystallography; structure determination; bonding, elastic properties, defects, lattice vibrations and thermal properties, free electron theory; band theory of solids; metals, semiconductors and insulators; transport properties; optical, dielectric and magnetic properties of solids; elements of superconductivity.

Nuclear and Particle Physics: Rutherford scattering; basic properties of nuclei; radioactive decay; nuclear forces; two nucleon problem; nuclear reactions; conservation laws; fission and fusion; nuclear models; particle accelerators, detectors; elementary particles; photons, baryons, mesons and leptons; Quark model.

Electronics: Network analysis; semiconductor devices; bipolar transistors; FETs; power supplies, amplifier, oscillators; operational amplifiers; elements of digital electronics; logic circuits.

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Post Graduate Programmes:

General English (Compulsory) for all M.A./ M.Sc. Programmes:

1. Comprehension (Unseen Passage). 2. Vocabulary: Pair of words often confused on word substitutes. 3. Grammar: Propositions, tenses, structural items, voices etc., reported speech, phrasal verbs, word formation. 4. Compositions: Expansion of a proverb or paragraph writing (150-200). 5. Compositions: Expansion of a proverb or paragraph writing (150-200). 6. Spelling.

M.A. (English Language and Literature):

1. Five short answer type: Comprehension of unseen passage, prose, poetry (Answer not to exceed 100 words). 2. Long Answer (essay) type: Testing the knowledge and understanding of literary background (Answer not to exceed 400 words). 3. Set on major literary forms (150 words). 4. Multiple choice type: a) Vocabulary testing b) Common literary terms c) Rewriting a passage: to correct grammatical mistakes - in verbs, spelling or of a similarly type.

Prescribed texts:

1. A short history of English Literature by Evans. 2. A background to the study of English Literature - for Indian students by B.Prasad, Macmillan.

M.A. (Telugu Language and Literature):

The Admission Test syllabus will be provided on request.

NOTE: The Question Paper pattern of the Admission Test is of Short Answer and Long Answer/Problem Solving Questions.

M.A.(Economics):

The test is designed to ensure that selected candidates are able to cope with the requirements of the M.A. programme at the Institute. The way this programme is designed, students should be able to handle issues within an analytical frame, argue logically and articulate their views clearly. They are also expected to undertake processing of data to derive meaningful conclusions and to make empirical judgments consistent with social realities and ethical values.

The question paper of two hours duration and carrying 100 marks, is divided into three sections. Section A consists objective type questions. Section B has short answer questions, and, Section C has one essay type question. Level and coverage of questions is comparable to those of a good undergraduate programme in economics. Topics covered are as follows:

1. Economic Theory:

Consumer behaviour: preference ordering, utility, budget sets and demand functions; Theory of the firm; Costs, supply and factor demand; Market structure: pricing and production under perfect and imperfect competition, General equilibrium and welfare; Taxation; Elements of national income accounting; Level of economic activity under classical assumptions; Keynesian theory of effective demand and employment; Monetary and fiscal policies; International trade.

2. Quantitative Methods:

Functions of one variable; Linear and quadratic equations; Derivatives and rules of differentiation; Measures of central tendency and dispersion; Correlation and regression with two variables; Index numbers; Elements of probability theory; Random variables and common distributions.

3. Indian Economy and Development:

Basic issues and indicators of economic development; Economic growth; Aspects of development policy: Population growth and employment; Strategies and theories of development; Human values and economic development; Structure of the Indian economy; Human resource development; Persistence of poverty and inequality; New economic policy regime; Indian ethos and policies for all round development; Aspects of the International Economy.

M.Sc.(Food Science and Nutrition)/M.Sc.(Food Technology):

For Bachelor of Home Science students:

Food Science, Nutrition and Dietetics: Food as a source of nutrients, composition, properties, characteristics, and nutritive value of different foods (cereal grains, millets, pulses, nuts and oil seeds, fruits and vegetables, milk and milk products, meat, egg, poultry, fish, spices and condiments. Chemistry and biochemical roles of fat soluble vitamins, water soluble vitamins, inorganic elements. 1. Energy requirement: Basal metabolism, total energy requirements. 2. Study of Nutrients: (a) Carbohydrates, proteins, fats - chemistry, biochemistry and nutritional aspects such as digestion, absorption, metabolism, functions, sources and requirements. (b) Vitamins and minerals - functions, sources, requirements, and deficiencies. 3. Water balance. 4. Methods of assessing the nutritional status. 5. Principles involved in adoption of normal diet for formulating therapeutic diet - use of food exchange groups. 6. Diets during pregnancy, lactation, infancy, school age, adolescent, adulthood and old age. 7. Nutritional deficiency diseases. 8. Diet in diseases (metabolic disorders, febrile conditions, surgical & other stress conditions) - causes, symptoms, physiological changes and dietary management. 9. National and International agencies and programmes in the betterment of Nutritional status.

Human Development: 1. Principles of child development. 2. Prenatal development and care - postnatal care - neonate – 1st four weeks of life. 3. Infancy - 1 to 2 years: physical, motor, emotional and social development care during infancy; 4. Pre-school years (2 to 6 years); Physical growth and sequence, of motor skills, social behaviour, importance of children's motor activities, intellectual development, oral development; 5. Significance of preschool education; 6. Preschool education: Essentials, Programmes, values of play - parent education; 7. Child from 6 through 12 years: Aspects given under 4th topic; 8. Adolescence: Physical changes, needs, interests, problems and adjustments, social and personality development; 9. Adulthood: Vocational, Marital and Social adjustments; 10. Old Age: Areas of adjustments; Inter generational conflict.

Home Management: 1. Principles of Home Management of resources; 2. Interior decoration and furnishing: Art elements, principles of design, colour, functions and types of lighting, selection, use and care of household equipments.

Textile and Clothing: 1. Textile fibres, classification: Cellulose fibres, protein fibres and synthetic fibres, properties and uses of fibres; 2. Classification of traditional textiles - woven, dyed, embroidered and tie and dye; 3. Khadi and handloom: Evolution, national and economic significance; 4. Selection of fabrics: Clothing needs of the family, buying for different age groups, self-help garments, selection of fabrics for household linens; 5. Application of principles of clothing construction, drafting of basic blocks, adaptations and modifications.

Extension Education: 1. Extension Education: Meaning, principles and objectives; 2. Integration and extension of Home Science Research to rural and slum areas; 3. Communication in extension education; 4. Extension teaching methods; 5. Audio-visual aids in communication: Planning, preparation and use of the aids; 6. Programme planning and evaluation.

For B.Sc.(Biosciences) students:

I. Botany: Cryptogams and Phanerogams: General classification of Virus and Bacteria Common Viral and Bacterial diseases in Plants, Animals and Man. Classification, Reproduction and Economic importance of Algae and Fungi Common fungal diseases. Evolutionary trends among Bryophytes, Pteridophytes and Gymnosperms and their economic importance systems of classification, Binomial nomenclature and modern trend in taxonomy. Economic importance of Brassicaceae, Meliaceae, Leguminosae, Solanaceae and Poaceae.

Plant Anatomy: Types of meristematic and other tissue systems in Plants Anatomy of root, stem and leaf in Dicots and monocots. Micro and Macro Sporogenesis, Endosperm, Polyembryony and embryogenesis in Dicots and Monocots. Plant Physiology: Osmosis, Active Transport, Physiology of Photosynthesis Respiration, Transpiration and translocation, flowering, growth dormancy and Mineral nutrition in plants.

II. Zoology: Non-Chordates & Chordates: Classification of Non-Chordates, Prochordates and Chordates Nutrition, Locomotion and reproduction in Protozoa Protozoan and Helminthes Parasites of Man, Comparative anatomy of Chordates, flight adaptations and migration in Birds. Poisonous and Non-Poisonous snakes of India. Dentition in Mammals, Apiculture, Sericulture, Pearl, Prawn and Fish culture techniques. Animal Histology & Physiology: Epithelial, Connective, Muscular and Nervous tissues. Physiology of Digestion, Osmoregulation, Respiration, Circulation, Excretion and Reproduction in mammals. Muscle contraction Impulse conduction. Blood composition, Blood groups, Endocrine glands and Hormonal action, Thermoregulation in Animals.

III. Cell Biology, Genetics & Evolution: Structure of cell, Cell organelles, Types of Chromosomes Mitosis and Meiosis, Gametogenesis, mechanism of fertilization, cleavage patterns, Gastrulation, Placentation and Menstruation in Mammals, Extra foetal membranes.

Mendel's laws of inheritance, Multiple alleles, linkage and crossing over, sex determination. Sex-linked inheritance Mutations, Operon concept, genetic code Eugenics, Principles of Plant and Animal Breeding; Evidences of evolution Darwin's and Lamarckian Theories of Evolution, Darwin's and Lamarckian Theories of Evolution origin and evolution of Man, Isolation and Speculation.

IV. Environmental Biology: Abiotic and Biotic factors of environment, Biogeochemical cycles, Ecological Succession, Ecosystem, Population ecology, Arboreal, Volcanic, Deepsea, Xerophytic, Hydrophilic and epiphytic adaptations, Environmental pollutions, wild Life-conservation.

V. Microbiology: Classification and characteristics of microorganisms Physiology and Cultivation of microbes. Microbes in water, soil, air food and sewage. Air, Water, Soil, food and Vector borne diseases prophylactic measures Antigen, Antibody reactions and Principles of immunization.

VI. Biochemistry & Biotechnology: Classification of enzymes, coenzymes and vitamins, structure functions and classification of carbohydrates, proteins and lipids and their energy metabolism. Plant and Animal tissue culture techniques, Micro-Propagation, Monoclonal Antibodies, Protoplast culture, DNA sequencing, Recombinant DNA, Applied aspects of Biotechnology in Agriculture, Animal Husbandry, Medicine, disease, diagnosis and Therapy.

Food Science, Nutrition and Dietetics:

Food as a source of nutrients, composition, properties, characteristics, and nutritive value of different foods (cereal grains, millets, pulses, nuts and oil seeds, fruits and vegetables, milk and milk products, meat, egg, poultry, fish, spices and condiments. Chemistry and biochemical roles of fat soluble vitamins, water soluble vitamins, inorganic elements. 1. Energy requirement: Basal metabolism, total energy requirements. 2. Study of Nutrients: (a) Carbohydrates, proteins, fats - chemistry, biochemistry and nutritional aspects such as digestion, absorption, metabolism, functions, sources and requirements. (b) Vitamins and minerals - functions, sources, requirements, and deficiencies. 3. Water balance. 4. Methods of assessing the nutritional status. 5. Principles involved in adoption of normal diet for formulating therapeutic diet - use of food exchange groups. 6. Diets during pregnancy, lactation, infancy, school age, adolescent, adulthood and old age. 7. Nutritional deficiency diseases. 8. Diet in diseases (metabolic disorders, febrile conditions, surgical & other stress conditions) - causes, symptoms, physiological changes and dietary management. 9. National and International agencies and programmes in the betterment of Nutritional status.

For B.Sc.(MPC) students:

Organic Chemistry: Electronic displacement – inductive, resonance & hyper conjugative effects. Hydrocarbons – aliphatic hydrocarbons – nomenclature; alkanes – conformational isomerism; cycloalkanes – conformational analysis (chair and boat form); disubstituted cyclohexanes; aromatic hydrocarbons – general characteristics and chemical criteria for aromaticity. Stereochemistry – absolute configuration – R&S nomenclature, optical activity – chirality, enantiomers, epimers, diastereomers and meso compounds, racemisation and optical resolution substitution reaction – mechanism of SN1 and SN2, stereochemistry, elimination reactions – mechanism of E1 and E2 reactions. Alcohols – physical properties, hydrogen bonding, reactivity of different classes of alcohols. Carbonyl compounds – Nomenclature and general characteristics, reactive methylene compounds – synthetic application of dimethylmalonate and ethyl acetoacetate, keto-enol-tauto-merism. Amines – effects of structure on basicity, reactions of amines-alkylation, acylation, carbylamine reactions, differentiation of 1^o, 2^o and 3^o amines. Diazotisation of aromatic amines. Bioorganic chemistry – Nomenclature and classification of carbohydrates, aminoacids, lipids and nucleic acid – classification and kinetics of enzymes.

Analytical Chemistry: Solvents – types, acids and bases, buffers – components, mechanism of action, types. Titrimetry – Basic principles, characteristics of primary and secondary standards, indicators-types (neutralization and redox). Theory of gravimetric analysis.

Physical Chemistry: Chemical kinetics – rates of reaction, complex reactions – reversible, parallel and consecutive, factors affecting reaction rates. Surface chemistry – types of adsorption (physisorption, chemisorption), catalysis – types and examples. Thermodynamics – laws, thermochemistry. Solutions – Raoult's law, Henry's law, colligative properties, Nernst equation, relation between cell potential and free energy. Electrolytes – types and conductance. Colloids –

classification, methods of preparation, purification and properties.

Medicinal Chemistry: Introduction and classification of drugs based on site of action (CNS drugs, CVS drugs), site, mode and mechanism of action. Chemotherapy – definition and characteristics (Sulpha drugs and Antibiotic).

Food Science, Nutrition and Dietetics:

Food as a source of nutrients, composition, properties, characteristics, and nutritive value of different foods (cereal grains, millets, pulses, nuts and oil seeds, fruits and vegetables, milk and milk products, meat, egg, poultry, fish, spices and condiments. Chemistry and biochemical roles of fat soluble vitamins, water soluble vitamins, inorganic elements. 1. Energy requirement: Basal metabolism, total energy requirements. 2. Study of Nutrients: (a) Carbohydrates, proteins, fats - chemistry, biochemistry and nutritional aspects such as digestion, absorption, metabolism, functions, sources and requirements. (b) Vitamins and minerals - functions, sources, requirements, and deficiencies. 3. Water balance. 4. Methods of assessing the nutritional status. 5. Principles involved in adoption of normal diet for formulating therapeutic diet - use of food exchange groups. 6. Diets during pregnancy, lactation, infancy, school age, adolescent, adulthood and old age. 7. Nutritional deficiency diseases. 8. Diet in diseases (metabolic disorders, febrile conditions, surgical & other stress conditions) - causes, symptoms, physiological changes and dietary management. 9. National and International agencies and programmes in the betterment of Nutritional status.

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B.Ed.:

Admission to B.Ed. programme of the Institute will be based on the performance in admission test and interview.

General English and Aptitude Test

□ **Test 1: This will consist of two sub-tests of 80 minutes duration and for 65 marks.**

- **Sub-test: 1(a): General English - 30marks - 40 minutes:** This sub-test is designed to test the candidate's knowledge and her command over English language and language skills.
- **Sub-test 1(b): Situation Analysis - 35 marks - 40 minutes:** The purpose of this sub-test is to assess the candidate's ability to analyse a given situation in all its implications and, her capacity to respond to different problems and value issues raised.

□ **Test 2: This test will consist of two papers on the core subjects studied in the qualifying degree.**

- **The test will be of 100 minutes duration and for 100 marks (50+50):** This test is designed to assess and evaluate candidate's knowledge in two specific subjects in teaching methodology. For this purpose, candidates have to choose any two papers from the following which they have studied in the qualifying degree:

Students with Postgraduate qualification:

Mathematics and Physics; Mathematics and Chemistry; Physics and Chemistry; Biology and Chemistry; English and Social Studies; English and History; English and Civics; English and Geography.

Students with Undergraduate qualification:

Mathematics and Physical Sciences; Biological Sciences and English; Social Studies and English.

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