Admissions 2016
Professional Admissions Test Syllabus
PROFESSIONAL PROGRAMMES

Candidates can refer to the various syllabi, depending on the course they have applied for, as indicated in their application forms.

There will be negative marking for all multiple choice questions.

B.Ed. (BACHELOR OF EDUCATION)

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

QUESTION PAPER FORMAT:

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 – 30 marks - 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.

M.Ed. (MASTER OF EDUCATION)

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

QUESTION PAPER FORMAT: There will be two papers which are compulsory viz., Paper-I – General English (One hour) – 50 marks.

Paper-II – Related to B.Ed curriculum consisting of objective questions of 100 marks for 1½ hours duration. Total duration of the test is 2 hours.

School Administration, Planning & Management (20 marks)
Educational Evaluation & Elementary Statistics (20 marks)

M.B.A.

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

QUESTION PAPER FORMAT: 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:

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.

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.

Management Aptitude: The purpose of this test is to assess the candidate’s aptitude for Management profession and his ability to comprehend facts, and analyze 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: Standard books used for CAT/MAT/GMAT Entrance Examinations.

ADMISSIONS TEST AND RESPONSE SHEET

Each candidate will have to answer the following Tests:

| Sub-test I | English | 60 questions | 1 hour |
| Sub-test II | Quantitative Analysis & Logical Reasoning | 30 questions | 45 min. |
| Sub-test III | Aptitude Test | 30 questions | 30 min. |
| Written English | A short write upon a specific theme | 15 min. |

The university uses an Optical Mark Recognition (OMR) system for evaluation. A sample OMR response sheet is exhibited on the reverse of this sheet to ensure that the candidate is familiar with it.

IMPORTANT: The candidate needs to carry two HB pencils along with an eraser and sharpener for the admission test. The candidate is also required to carry a pen (preferably blue ink).

The points to be noted with regard to use of the OMR response
You are required to write your (i) Applicant Id and (ii) Question Paper Code no. and SHADE THE NUMERALS appropriately in the space provided on the RESPONSE SHEET. You are also required to write the (iii) Room number and (iv) Test Date in the space provided separately.

The correct answer, chosen from the Question Paper, should be SHADED ON THE RESPONSE SHEET viz., A, B, C, D or E. The method of shading the correct response is given in the enclosed sample copy.

Use of electronic calculator is strictly not permitted.

M.Tech. in COMPUTER SCIENCE

Each candidate will have to answer the following Tests:

<table>
<thead>
<tr>
<th>Part</th>
<th>80 Objective type items</th>
<th>80 Marks (80 min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part B</td>
<td>9 Short Answer type Questions</td>
<td>40 Marks (40 min.)</td>
</tr>
<tr>
<td>Total Marks: 120</td>
<td>Total Duration: 120 min.</td>
<td></td>
</tr>
</tbody>
</table>

You will be given TWO sets of question papers, titled, PART-A & PART-B as per schedule.

Write your Applicant ID No, Room No, Date, Subject Title, and Subject Code on both the booklets only in the space provided for it.

PART-A will be given first. It contains 80 objective type items of one mark each. You must enter your answers in the Response Sheet provided. Please note multiple shading will be considered as wrong answer.

PART-B contains 9 short answer questions for a total of 40 marks. Part-B is to be answered within the space provided for in the question paper itself.

The university uses an Optical Mark Recognition (OMR) system for evaluation. A sample OMR response sheet is exhibited on the reverse of this sheet to ensure that the candidate is familiar with it.

IMPORTANT: The candidate needs to carry two HB pencils along with an eraser and sharpener for the admission test. The candidate is also required to carry a pen (preferably blue ink).

The points to be noted with regard to use of the OMR response sheet are elucidated below:

(a) You are required to write your (i) Applicant Id and (ii) Question Paper Code no. and SHADE THE NUMERALS appropriately in the space provided on the RESPONSE SHEET. You are also required to write the (iii) Room number and (iv) Test Date in the space provided separately.

(b) The correct answer, chosen from the Question Paper, should be SHADED ON THE RESPONSE SHEET viz., A, B, C, D or E. The method of shading the correct response is given in the enclosed sample copy.

NOTE: Calculators, mobile phones, digital devices will not permitted in the examination hall.

QUESTION PAPER FORMAT

General English Aptitude Test: 20 marks- ½ hour- essay type questions- to test English language and communication skills
Written Test: 120 Marks- 2 hours- Computer Science (67%) and Mathematics (33%) - two parts:
Part A- 80 marks- 60 multiple choice questions of Computer Science- 20 multiple choice questions of Mathematics
Part B- 8 x 5 = 40 marks- 4 short answer type questions of Computer Science- 4 short answer type questions of Mathematics
Practical Programming Skills Test (subject to qualification in written test)- 80 Marks- 2 ½ hours- to test the proficiency in designing, coding and debugging abilities in C language- the coding language will be in Linux platform
Technical Viva-Voce (subject to qualification in first two components): 30 Marks- to test the comprehension of basics and analytical abilities

Final Interview: An Interview will be conducted for candidates who qualify in the Practical and Viva- voce for final selection.

The syllabi for the above written tests are as follows:

COMPUTER SCIENCE

The subjects to be covered under this area are: Data Structures & Algorithms, Computer Organization and Architecture, Data Communication and Networks, Database Systems, Operating system and System programming, and C, C++, & Java programming concepts.


Data Communication and Networks: packet/circuit switching, loss, delay, throughput in a network, protocol layers, OSI & TCP/IP, HTTP/FTP, Electronic mail, DNS, Client server vs P2P architecture, Transport-layer Multiplexing and demultiplexing, sliding window protocols, TCP & UDP protocols, Principles of reliable data transfer, congestion control, Virtual circuit and datagram networks, IPv4, IPv6, Routing algorithms, Multiple access protocols, Error correction-detection, Wireless and Mobile Networks, GSM,CDMA, 802.11 standard, handling mobility in cellular networks, basics of physical layer


Operating Systems and System Programming: The concept of a process, operations on processes, process states, concurrent processes, process control block, process context, Job and processor scheduling, scheduling algorithms, Problems of concurrent processes, critical sections, mutual exclusion, synchronization, deadlock, Memory organization and management, storage allocation, Virtual memory concepts, paging and segmentation, File organization: blocking and buffering, file descriptor, directory structure, Basics of assemblers, Macro preprocessors and compilers.


Calculus of One and Several Variables: Limit, continuity, differentiation and integration of functions of one and more variables. Directional derivative and gradient of a function.

MATHEMATICS

The subjects to be covered are: ODE, Discrete Mathematics, Linear Algebra, Probability and Statistics and Basic Calculus

Linear Algebra: vector spaces, subspaces, basis, linear transformation, matrix of linear transformations, system of linear equations and their solutions using Gaussian elimination method, Eigen values and Eigen vectors, diagonalization of a linear transformation.

Discrete Mathematics: Set theory, Mathematical logic, Relations and functions, Trees and Graphs.

Probability and Statistics: random variables, discrete and continuous distributions including Bernoulli, binomial, uniform, Poisson, exponential, hyper-geometric distributions, expectation, moments, central limit theorem, law of large numbers, random sample, sample mean, sample variance, mean, median and mode.
MATHMATICS

Linear algebra by Larry smith, 3rd edition, Springer Verlag.

M.Tech. in OPTOELECTRONICS AND COMMUNICATIONS

Question Paper Format:
General English Aptitude Test- 20 marks- ½ hour - essay type question to test English language written communication skills
Written Test- 100 Marks- 3 hours- short answer and problem solving type questions
Technical Viva-Voce
Final Interview

Written Test: Duration of the test will be 3 hours and it will contain multiple choice, short answer and problem solving type questions.

Common for B.E. / B.Tech. / M.Sc. in Physics

General English Aptitude Test: This will consist of an essay type question to test English language written communication skills. The test will be for half an hour with allocation of 20 marks.

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's 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.


For B. E. / B.Tech Applicants only

Networks: Network graphs; matrices of graphs; Solution methods, Nodal and mesh analysis, Network theorems, Thévenin'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, 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. LTISystems: 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 LTISystems. 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, Pointing 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.

For M.Sc. in 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; Ampère's and Biot-Savart's laws; Faraday's law; Maxwell's equations; boundary conditions; electromagnetic waves; radiation from moving charges.

Quantum Mechanics: Schrödinger 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-ray 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.
The end of education is character
SRI SATHYA SAI BABA