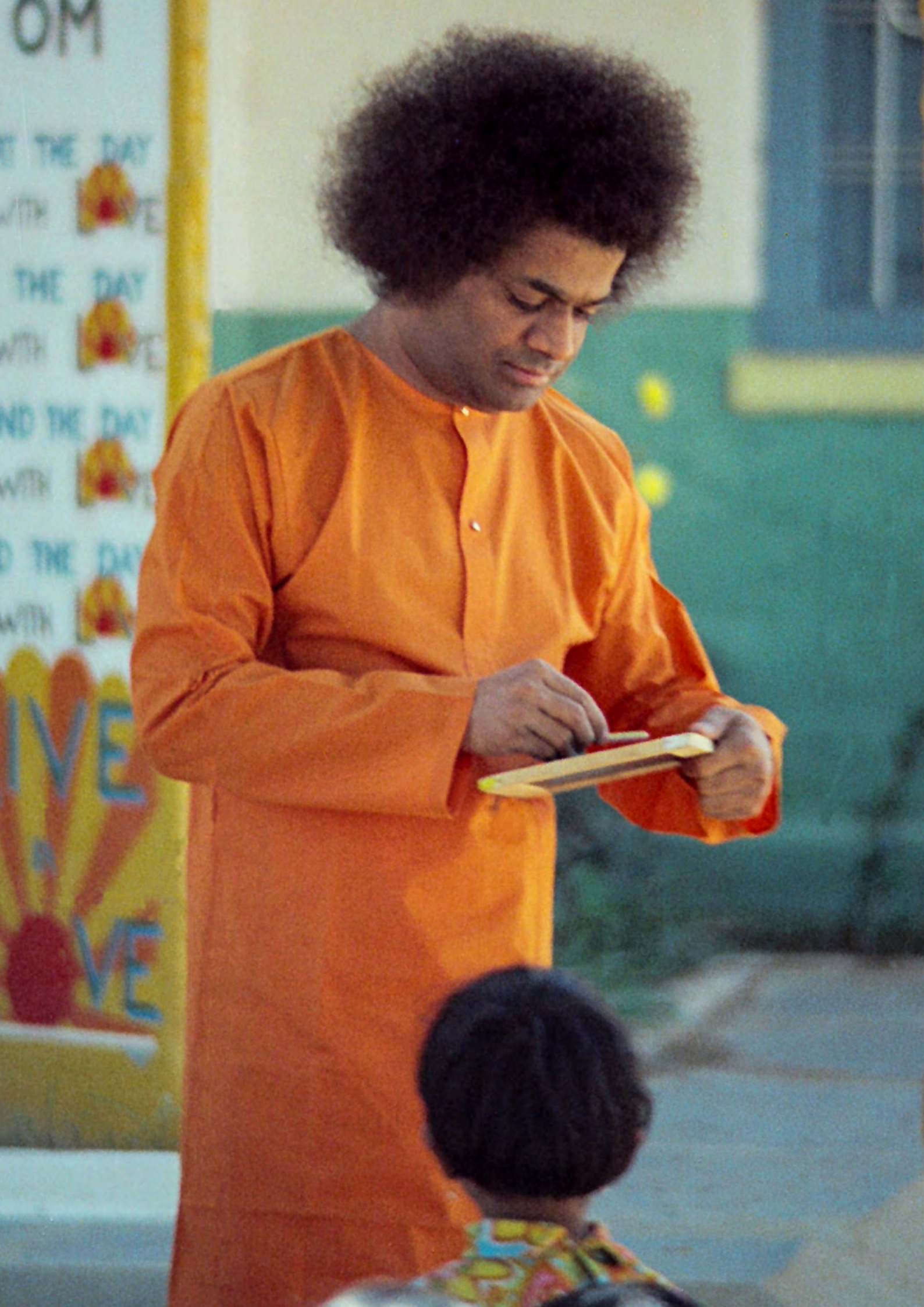
professional

SRI SATHYA SAI INSTITUTE OF HIGHER LEARNING
PRASANTHI NILAYAM
सत्यं वद धर्मं चर

Professional Programmes

Admissions Prospectus

2024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The Underlying Philosophy

The Sai educational institutions have been established not merely to enable students to earn a living but to make them acquire good traits, lead ideal lives, and give them ethical, moral and spiritual strength. I have established them with a view to inculcate love and teach good qualities to students. They will learn here humility, discipline and faith.

I have established these institutions to impart spiritual education as a main component and worldly education as a secondary one. Education should enable one to cultivate good qualities, character and devotion. The teaching of the university curricula is only the means employed for the end, namely, spiritual uplift, self-discovery and social service through love and detachment.

This will be a Gurukula – a place where teachers and taught will grow together in love and wisdom - and like the ancient system of education, it will develop in its students a broad outlook and promote virtues and morals, which serve to foster noble ideals in society.

This Institute will be a temple of learning where youth are shaped into self-reliant, contented and enterprising heroes of action and self-sacrifice, for the purpose of serving humanity.

SRI SATHYA SAI BABA
Revered Founder Chancellor, SSSIHL

Contents

Introduction

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From the admissions office

Welcome to Sri Sathya Sai Institute of Higher Learning (SSSIHL).

This prospectus is for students interested in applying for professional study at SSSIHL.

The first few pages will give you an introduction to the Institute and why SSSIHL is so unique. It will give you information on the application process, programme descriptions and detailed information on each professional programme available for 2024 admissions.

Detailed information about the Institute and the admissions process can also be found on our website, **sssihl.edu.in/admissions**

Good Luck and Sai Ram!

Admissions Office
Office of the Registrar, SSSIHL

Sri Sathya Sai Values-based Integral Education

Sri Sathya Sai Institute of Higher Learning (Deemed to be University), Prasanthi Nilayam, Andhra Pradesh, India, is a visible manifestation of Bhagawan Sri Sathya Sai Baba's vision of education for human transformation.

Bhagawan Baba designed Sri Sathya Sai Values-based Integral Education to ensure deep inner transformation of students during their time at SSSIHL. This concept is unique at the university level of education.

The Institute hosts students from across the country at its four campuses located in Andhra Pradesh and Karnataka, India, and provides quality education free of cost for all programmes of study.

For Women:

- Anantapur Campus at Anantapur, Andhra Pradesh

For Men:

- Prasanthi Nilayam Campus at Puttaparthi, Andhra Pradesh
- Brindavan Campus at Kadugudi, Bangalore, Karnataka
- Muddenahalli Campus at Muddenahalli, Karnataka

Programmes offered include:

- Undergraduate: B.A., B.S. (Hons.), B.Com. (Hons.), B.S. & B.S. (Hons.), B.B.A., B.P.A.
- Postgraduate: M.A., M.Sc.
- Professional: B.Ed., M.B.A., M.Tech.
- Research: Ph.D.

A Modern Gurukula

Sri Sathya Sai Institute of Higher Learning (SSSIHL) was founded to inculcate ethical and moral values in students, along with secular education. This transformation (of students, teachers, and staff) has been the guiding principle right from its inception when it integrated ethics and values as the undercurrent of every subject taught at the Institute. Combined with academic and research excellence, the Institute provides its students with a holistic framework of interpersonal development. Its residential character trains the student's mind, body, and spirit in an environment similar to the ancient Indian 'gurukula' system of education in the most modern context.

Teachers and students live and grow together in an atmosphere of mutual trust and unity. This helps students develop a wholesome and balanced personality, where academic competence is intertwined with value systems.

Distinctive Features

Admissions

- Free, high-quality education for all students
- Merit-based open admissions policy for all, irrespective of income, religion or region

Residential Character

- A residential character where all students, doctoral research scholars and select teaching faculty reside together in the hostel, which enables the translation of lessons learned into practical skills through experiential learning
- Spiritual ambience in an environment of discipline and love
- Cultivation of the spirit of self-reliance, brotherhood and sacrifice through mentoring and personal example

Infrastructure

- Campuses set in spacious and peaceful surroundings
- Well-equipped, modern science laboratories and a cutting-edge Research Instruments Facility
- Automated Library using an Integrated Library Management System (ILMS) with a digitisation facility accessed through the online Public Access Catalogue (OPAC) within the campus premises
- Libraries across campuses with over 1,90,000 volumes
- Connected to the National Knowledge Network (NKN)
- Computer and Multimedia learning centres with ultra-high-speed internet connectivity
- International Centre for Sports at the Prasanthi Nilayam Campus and multiple sports facilities at other campuses

Academics & Research

- 4-year undergraduate curriculum aligned to NEP 2020, extending to Postgraduate studies
- Student-teacher ratio 8:1
- Research collaborations with premier Indian and International Institutions and Industry
- Interdisciplinary / multidisciplinary research for societal benefit
- Awareness Programmes and Moral Classes reinforcing human values

Integral Education

- Life lessons learned through the message of the Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba
- Integrating human values with secular knowledge
- Inculcating the spirit of self-reliance and service to society
- Synthesis of science and spirituality for societal benefit
- The concept of integral education that SSSIHL imparts is pursued by all teachers, staff, and students

The Process

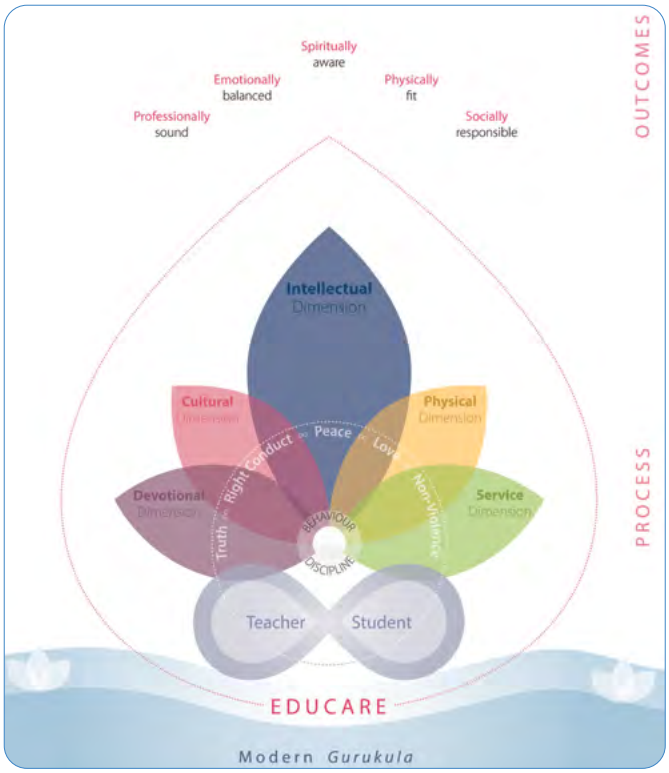
Sri Sathya Sai Values-based Integral Education is a modern, rational, scientific education system rooted in Indian ethos. It takes the best of both ancient and contemporary learning techniques.

As depicted in the diagram, the base is the concept of a modern Gurukula that sustains all relationships and activities at SSSIHL. It is responsible for creating and sustaining the congenial environment necessary for the teacher-student interaction to grow and develop.

Adherence to discipline and appropriate behaviour are the two important aspects that encompass all interactions. The five human values of Truth, Right Conduct, Peace, Love and Non-violence form the undercurrent of the integral education's dimensions.

These dimensions are Intellectual, Physical, Cultural, Devotional and Service. The key activities for each dimension form the basis of most of a student's time at SSSIHL.

Bhagawan Baba purposefully designed the system of Integral Education so that students spend their time on academics (intellectual capacities) and developing other qualities. See the Integral Education Activities for further details.



Sri Sathya Sai Values-based Integral Education

The Daily Routine

This is a crucial component of this process. Each student's day starts at 5:00 a.m., with a couple of hours spent in prayer, exercise and other vocational pursuits (such as practice sessions for music, band, traditional Indian music, etc.).

Classes commence at 8:45 a.m. After college ends at around 4:00 p.m., students move to the Sports Field / Mandir / Prayer Hall for participation in sports and games / congregational chanting (Veda), devotional singing (bhajans), and other spiritual activities. These also include talks by eminent speakers on a variety of spiritual topics. Post dinner, students continue to concentrate on their studies.

The Outcome

The outcomes of the system of Values-based Integral Education at SSSIHL are threefold. It prepares all graduates to be:

- Professionally sound
- Emotionally balanced
- Physically fit
- Socially responsible and
- Spiritually aware

It helps develop a strong character and positive qualities in students and nurtures virtues like adaptability, tolerance and sacrifice, shaping them into noble and responsible citizens.

LEARN MORE

Visit the About Us section of our website to learn more about the uniqueness of SSSIHL.

This includes information on our Revered Founder Chancellor, what makes SSSIHL a modern Gurukula, our vision and philosophy, campuses, facilities and more.

I have established these institutions to impart spiritual education as a main component and worldly education as a secondary one. Education should enable one to cultivate good qualities, character and devotion. The teaching of the university curricula is only the means employed for the end, namely, spiritual uplift, self-discovery and social service through love and detachment.

Sri Sathya Sai Baba
Revered Founder Chancellor, SSSIHL

Integral Education Activities

Students spend their time at SSSIHL on all five dimensions of the Sri Sathya Sai Values-based Integral education: Intellectual, Devotional, Cultural, Physical, and Service. These are highlighted below.

Devotional Dimension

- Bhajans (Sankirtan)
- Vedic chants and stotrams
- Meditation & Silent sitting
- Suprabhatam (prayer at dawn)
- Assembly (college prayer)
- Brahmarpanam (food prayer)
- Kshama Prarthana (night prayer)

The activities of the devotional dimension enable a student to connect to his/her Divine inner Self. This inner connection opens the heart and brings forth the feeling of love, compassion and empathy for fellow human beings.

Cultural Dimension

- Celebration of festivals: Guru Poornima, Ganesh Chaturthi Ugadi, Republic Day, Independence Day, Eid-al-Fitr, Christmas Sri Krishna Janmashtami, Sri Ramanavami, Buddha Jayanti, etc.
- Brass Band
- Nadaswaram & Panchavadyam ensemble
- Annual Sports & Cultural Meet
- Performing Arts: Music programmes, Drama & Dance
- Fine Arts: Rangoli, Cardmaking, Photography, Altar making
- Public Speaking
- Debates and Elocution

The cultural dimension is designed to give students wide opportunities to find an avenue for their individual artistic expression.

The Institute makes every effort to provide the best possible material and human resources so that students excel at their chosen activities.

Festivals of major world religions are celebrated, reinforcing the unity among all faiths. Every student is involved in one way or another in the celebration of these festivals.

Physical Dimension

- Sports
- Games
- Jogging
- Exercises and Yogasanas
- Annual Sports & Cultural Meet

Sports and games are a part of the daily routine of all students. From yoga classes to fitness training, team sports to individual sports, students are encouraged to overcome their limitations and excel in these activities. SSSIHL has excellent sports facilities.

Service Dimension

- Self-reliance departments:

  Electricals, Plumbing (water supply), Audiovisual, General store, Dispensary, Dietary services, Hostel mess, Arts & Crafts, costumes & props, etc.
- Community living
- Social work
- Voluntary work
- Grama Seva (Village Service)
- Prasadam distribution

The service philosophy at SSSIHL is based on the concept that divinity pervades all of humanity; hence, when you serve others, you are serving the Divine. Students learn to serve without expecting anything in return, other than the deep inner satisfaction of serving others.

The compulsory residential system, where students live in dormitory-styled accommodation with other students from totally different backgrounds (for a minimum of two years and up to five years or more), provides an excellent foundation for the service dimension.

Intellectual Dimension

Apart from academics and research, the activities in this dimension include:

Awareness Courses

These mandatory courses are designed to cultivate a broad view of the human condition in students. The course content (e.g. the Unity of Religions and Faiths, Study of the Indian Epics, etc.) helps trigger self-reflection and enquiry and sensitises students to the concerns of society, and gets them to think about practical solutions to these problems.

Moral Class (Thursday)

At each campus, Thursday mornings begin with an hour of inspiring and ennobling talks by speakers focusing on their personal spiritual experiences, messages from sacred scriptures and other elevated and socially relevant themes. It also highlights students' talents in music, dramatics, elocution, debates, quizzes, etc.

Some of the topics typically include: Why are Values Important?, Where There Is E-go, He Go-es, Indian Army, Origins of Life, The Divine Architect, Madhuram Sai Brindavanam, Just another Sai Alumnus 3 km away, Life Lessons of a Data Scientist, Life Lessons as a Manager, Life is a Challenge Meet it, Lessons from the Aadhar Story, Sai Student, Moral values from the Ramayana, Divine Directions, Role and Importance of Guru, Debate on Government Should Regulate Social Media, Panel Discussion on 'Corruption Free India for a Developed Nation', Yoga & Holistic Human Health, Significance of Ugadi and several sessions on Experiences, and teachings of our Revered Founder Chancellor.

Prayer Talks

Every morning before classes commence at the college, all students and teachers gather for the morning assembly. Prayers, Veda chanting, Bhajans and a few minutes of silent sitting are sometimes followed by a talk by students, faculty members or invited guests on topics related to morals and values.

Some of the topics typically include: God is Just a Call Away, How to Become a Beautiful Page in Swami's Scrap Book, Proximity With God is the Greatest Wealth of All, Trial and Errors with Swami: Realisation in His Presence, His Delays are Not His Denials, Positivity in Life, Trust in God's Timings and Have Faith in His Decisions, Power of Thoughts, Tough Love, Self-Love – A Path to your Inner Self, The Rat Race: Choice of Freedom, Certainty in Uncertainty.

SSSIHL in numbers 2022/23

28%

Admissions Acceptance Rates

73%

PhD

*20 pursuing

Teachers with PhDs

8:1

Student Teacher Ratio

2:1

Student Computer Ratio

41%

National Exams (Combined)

number of final year SSSIHL postgraduate students that qualified

GATE, CSIR, JRF, NET, LS, JEST, CTET, UPSC IAI, ACET, CB3, CM2, CP3, CP2, CS1, DS1 and MAS

SSSIHL Students represent

23

out of 28 states of India

Student Diversity

₹ 2.53 lakh

Expenditure per Student / per year

90%

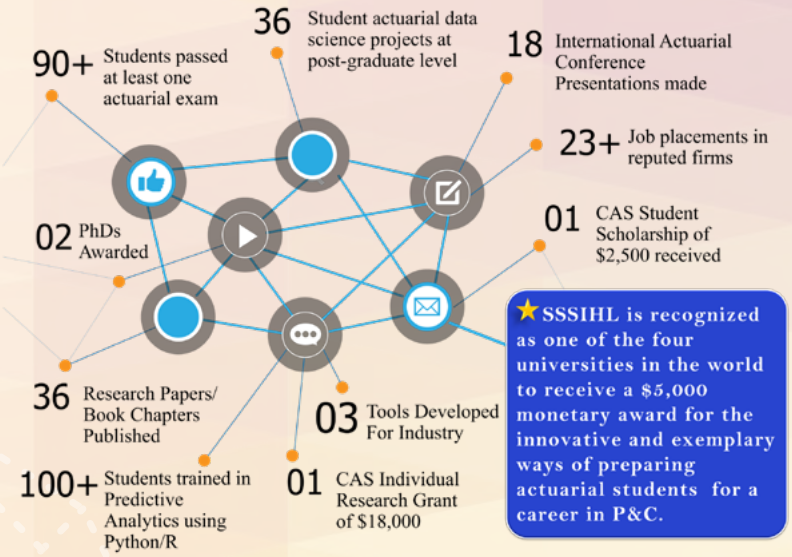
Undergraduate Programmes

95%

Postgraduate & Professional Programmes

Examinations Pass Rates


INDIAN
CULTURE
&
SPIRITUALITY


36 Student actuarial data science projects at post-graduate level
90+ Students passed at least one actuarial exam
18 International Actuarial Conference Presentations made
23+ Job placements in reputed firms
01 CAS Student Scholarship of $2,500 received
02 PhDs Awarded
SSSIHL is recognized as one of the four universities in the world to receive a $5,000 monetary award for the innovative and exemplary ways of preparing actuarial students for a career in P&C.
36 Research Papers/ Book Chapters Published
03 Tools Developed For Industry
100+ Students trained in Predictive Analytics using Python/R
01 CAS Individual Research Grant of $18,000


Ascend™ 400

Sai Student Life

Student Life @ SSSIHL

Campuses

SSSIHL campuses are all located in areas surrounded by mountains, greenery and nature, which helps create an ambience for integral education that the Institute curricula imparts Visit our **Campuses** page to learn more. You can also see the **Facilities** students have access to.




Hostel life

The philosophy of hostel life is based on the approach of community living: each one lives for the other and all live together for a common higher cause.

Students from different states of India, and varied economic and cultural backgrounds live in dormitory-styled accommodation with 10-14 students staying together in a room. the aesthetically pleasing hostel buildings also create a noble ambience for students to live in.

As a result, the hostel is a miniature model of the world outside with people of different habits, temperaments, lifestyles, language and outlook staying together and working. This develops the qualities of understanding, adjustment, sharing and caring amongst the students. It nurtures virtues like adaptability, tolerance and sacrifice; developing students into noble and responsible citizens.

The ambience is suffused with both discipline and loving care. All doctoral research scholars reside with the students in the hostel. The relationship between the students and teachers is very cordial and warm, and the teachers pay personal attention to the problems of each and every student. The teachers are chosen with extreme care to play an important role in this process. Many of them are alumni of the Institute, dedicated and well versed in integral education. They serve as facilitators and are available at all times for mentoring the students on personal and academic matters.

Personal cleanliness, punctuality and regularity, general behaviour, personal etiquette and room cleanliness are the major components of the discipline that is followed at SSSIHL hostels.

Self reliance

A major portion of the functioning of the hostel is taken care of by the students and resident staff members. The guiding principles of the hostel are a simple life coupled with self reliance. Students do their work with least dependence on external agencies. To inculcate the dignity of labour and respect for work, most functions and departments of the hostel are run by students under the able guidance of resident faculty.

The self reliance departments include:

- Electrical
- Plumbing (water supply)
- Audiovisual
- General store
- Dispensary
- Dietary services
- Hostel Mess
- Arts & Crafts
- Costumes & props

These self reliance activities enable students to become self-confident and independent. They also contribute to developing leadership and entrepreneurial skills. To maintain continuity and effective succession planning, senior students train the junior students in all aspects of respective self reliance departments before graduating.


Professional Programmes

Application Process

SSSIHL is unique

As detailed in the **Introduction** pages above, SSSIHL is unique in several ways.

Firstly, aligned with the vision of Bhagawan Sri Sathya Sai Baba, **education at SSSIHL is provided FREE to all students for all programmes of study**.

This commitment aims to eliminate financial barriers and promote access to quality education for all deserving candidates, fostering an inclusive learning environment.

SSSIHL **does not** levy any of the following fees:

- **Tuition** fees
- **Admissions** fees
- **Infrastructure & Development** fees
- **Library** fees
- **Examination** fees
- **Basic amenities** fees
- **Sports** fees
- **Medical** fees*

**students have access to free medical treatment at Sri Sathya Sai General and Sri Sathya Sai Super Speciality Hospitals located at Prasanthi Nilayam and Whitefield, Bangalore.*

Hostel fees: Boarding and lodging charges will be communicated to selected candidates.

Secondly, owing to the unique system of education, we have the following notice that applies to all applicants (at all levels of study):

NOTICE TO ALL APPLICANTS

Given the unique modern Gurukula system of Values-based Integral Education at SSSIHL, it is mandatory that all students **study and reside at gender-specific campuses** during their entire period of study.

Programmes for Admissions

As a first step, carefully review in detail the descriptions of the programmes you are interested in. These can be found from page 19 onwards in this prospectus.

Each programme includes an **overview**, **eligibility requirements** (for that particular programme) and a comprehensive **list of courses** in each year (per semester of study).

Eligibility

The requirements for admissions vary from programme to programme. See the individual Programme pages for detailed information.

Candidates who do not meet all the admissions criteria listed for the programme they apply to will not be eligible for admissions.

Sri Sathya Sai Institute of Higher Learning (Deemed to be University) has a merit-based **Admissions Policy** open for all.

NOTE: Relaxation of admissions norms for special categories is applicable **as per the Govt. of India** guidelines.

Application Guide

NOTE: Applications for admissions to all programmes at SSSIHL are **ONLINE ONLY**.

After you have decided on what programme to apply for, head over to the **Application Guide**. This page will give you step-by-step guidance on how to successfully apply for a programme at SSSIHL.

Once you submit your online application, you will not be able to change it.

Therefore, it is **very important** you go through the **Application Guide** and read the important information it provides on various aspects of the application such as Registration for Online applications, what documents to upload, and what happens at each stage of your application process.

Dates & Deadlines

Next, to make sure you don't miss out on a chance to apply to SSSIHL, kindly visit the **Dates & Deadlines** page of the Admissions section of the website.

Documents Checklist

Before you fill in your application form, in order to save time, make sure you keep these key documents ready in a digital format before you register and apply online.

All documents uploads must be clear, legible and attested (where required). Failure to meet these requirements may result in your application being rejected.

The documents you must upload are: :

1. **One passport-sized photograph**
   Latest photograph of the applicant in the prescribed format mentioned in the application form

2. **Statement of Marks**
   Self-attested (by the applicant) photocopies of the Statement of Marks for X Std. issued by your Higher Secondary School Board

   Self-attested (by the applicant) photocopies of the Statement of Marks for XII Std. issued by your Higher Secondary School Board

   Self-attested (by the applicant) photocopies of the Statement of Marks (along with the final degree certificate) of all semesters/ years issued by the authority (University/College/Institution) which conducted the Qualifying Examinations leading to your Final degree

   Note: If you have just finished your final exams or are about to take them, please upload final mark sheets for all the years preceding the final year. If your institution follows a semester system, please upload exam mark sheets for all semesters preceding the final semester.

3. **Application fee payment receipt**
   A copy of the application fee payment receipt.

4. **Photo identification proof**
   A clear copy of any Government approved Photo ID, such as your Aadhaar card.

5. **For special categories as per Govt. of India**
   A self-attested copy of the relevant certificate issued by the statutory authorities (state / central)

Apply Online

Once you are ready with the above, visit the **Apply Online** page.

Registration
The first step is to register online with a valid email address (email ID). This is done on the **Apply Online** page. Kindly refer to **Step 1** of the **Application Guide** for full details.

Filling and submission of your Application Form
You can then begin filling in the admissions application form online. Kindly refer to **Step 5** of the **Application Guide** for full details.

Note: All your information is transmitted through a secure server and is kept fully confidential. Your application information and accompanying credentials are reviewed only by authorized representatives of the Institute.

Admissions Technical Viva Voce, Group Dicussions & Interviews

Next, you must wait to hear from the Institute in regards to the outcome of your application. Applicants who meet the eligibility criteria for the programme they applied for will then proceed to the next step of their application

The list of candidates selected for the round of interviews will be published on the **Admissions Lists** page of the website.

Note: All notifications to applicants from SSSIHL during the entire admissions application process will be sent to your registered **email address**.

B.Ed. Programme: There is no admissions test. Applications will be shortlisted based on merit. The shortlisted candidates will be asked to attend an online interview.

M.B.A. Programme: Eligible applicants will be asked to take an online admissions test. Shortlisted candidates will then be invited for an offline Group discussion and an interview.

Applicants with valid score in CAT, CMAT or XAT are exempted from the admissions test and will be invited directly for the offline Group Discussion round, followed by an interview.

M.Tech. Programmes: Eligible applicants will be asked to take an online admissions test. Shortlisted candidates will then be invited for an offline Technical Viva Voce, followed by an interview.

Applicants with a valid GATE/CSIR/JEST score in relevant fields are exempted from the admissions test and will be invited directly for the Technical Viva Voce round, followed by an interview.

Admissions Test Syllabus
Candidates applying for the M.B.A., M.Tech. in Computer Science or the M.Tech. in Optoelectronics & Communications, can view or download the **Admissions Test Syllabus**.

If you do not meet the eligibility criteria for the programme you applied for, you will be notified accordingly via email.

Results: Provisional List of Selected Candidates

Once you have attended the interview, the Institute will publish the list of selected candidates on the **Admissions Lists** page.

This page will be regularly updated as and when the Admissions team scrutinizes and processes applications at each stage of the admissions process.

Join SSSIHL!

Congratulations! You have got an opportunity to study at Sri Sathya Sai Institute of Higher Learning.

List of Documents to be submitted upon admission to SSSIHL

All newly admitted candidates must submit the following to the Director of the Campus on the opening day of the academic year:

- Original Marks Certificate of X and XII Standard.
- Original / Provisional Degree Certificate (or marksheets of all previous semesters / years of your current degree, if the results are not yet published)
- Transfer certificate
- Conduct certificate
- Health Record
- Caste certificate (if applicable)

1 July 2024
Academic year 2024/25 commences

How do I contact the admissions Office if I need further help?

If you still need further assistance please contact us either by email or telephone.

By Email:
For admissions related queries, please email us on **admissions@sssihl.edu.in**.

We will answer all email enquiries within two working days of receipt of your email.

By Telephone:
To contact the admissions office for Admissions related queries, please telephone:

+91 9441 911 391 or
+91 83310 34774 or
+91 8555 287239 (landline)

The above numbers are for admissions related queries for the Institute (SSSIHL) only.

Lines are open between 9:30 a.m. and 4:30 p.m., Monday to Saturday.

Outside of these hours, please email us on either one of the above addresses, depending on the nature of your query.

You are wished the very best.
Sai Ram!

Student Support

For information related to admission of international students, admissions policies, code of conduct, anti-ragging and grievance redressal mechanisms, etc., please visit the **Student Support** page of our website.

Professional Programmes

Programmes for Admissions

There are separate programmes available for **Women** and **Men** applicants, as the Institute hosts separate campuses for women and men students.

Given below are the **Professional** Programmes open for admissions in 2024.

Professional Programmes (2 years)

For **Women** candidates

B.Ed.
M.B.A.

For **Men** candidates

M.B.A.
M.Tech. in **Computer Science**
M.Tech. in **Optoelectronics & Communications**

Programme descriptions

Common Courses for all Programmes

360 DEGREES LEARNING

The unique aspect of all degree programmes at SSSIHL is that the curriculum encompasses a wide variety of types of courses: Discipline Specific and Interdisciplinary Elective Courses, Ability Enhancement courses, Multidisciplinary courses, Major Discipline Specific Core courses, Interdisciplinary Minor courses, Skill Enhancement courses, Values-based courses and Research work & projects.

These are incorporated in the programme descriptions given in this prospectus.

In addition, students spend many hours of their courses on non-classroom study: seminars, conferences, tutorials, practical and laboratory work, internships, field trips and engaging with their communities.

PUBLIC SPEAKING

Students are also encouraged to come forward and speak in front of the SSSIHL community on topics ranging from science to metaphysics, thus giving them an appropriate platform to develop their public speaking skills and to refine their thought process.

THURSDAY MORAL CLASSES

At each campus, Thursday mornings begin with an hour of inspiring and ennobling talks by speakers focusing on their personal spiritual experiences, messages from sacred scriptures and other elevated and socially relevant themes. It is also used to highlight students' talents in music, dramatics, elocution, debates, quizzes, etc.

PRAYER TALKS

Every morning before classes commence at the college, all students and teachers gather for the morning assembly. Prayers/ veda chanting/bhajans and a few minutes of silent sitting are sometimes followed by a talk by students, faculty members or invited guests on topics related to morals and values.

AWARENESS COURSE

Each semester, students they have a series of Awareness Courses. These mandatory, credited courses are common to all programmes of study and are designed to cultivate a broad view of the human condition in students.

The course content helps trigger self-reflection and enquiry and sensitises students to the concerns of society, and gets them to think about practical solutions to these problems.

B.Ed. Programme

YEAR 1

Semester 1
Education for Life – Individual Transformation

Semester 2
God, Society and Man

YEAR 2

Semester 3
Guidelines for Life

Semester 4
My Life is My Message

M.B.A. Programme

YEAR 1

Semester 1
Indian Ethos and Values – Part 1

Semester 2
Indian Ethos and Values – Part 2

YEAR 2

Semester 3
Values in Management – Part 1

Semester 4
Values in Management – Part 2

M.Tech. Programmes

YEAR 1

Semester 1
Fundamentals of Indian Culture

Semester 2
Sources of Values

YEAR 2

Semester 3
Work Culture, Ethics and Value

Semester 4
SSSIHL's Core Values and Philosophy

PROGRAMME DESCRIPTIONS

The following pages will highlight the information for each individual professional programme of study at SSSIHL for 2024 entry.

This includes: the length of the programme, whether it is applicable for women candidates or men or both, the eligibility criteria and a programme overview, and a full list of courses of study for each year (and semester).

Note: SSSIHL may revise or update any aspects of a programme based on the changing requirements of the employability, industry, entrepreneurship, skill development and research.

B.Ed.

For Women | 2024 entry

Programme Overview

The Bachelor of Education (B.Ed.) programme is designed to prepare individuals for a career in education, specifically for roles as teachers, educators, or instructors at various levels of the education system. It prepares teachers for Upper Primary or Middle Level (Class VI- VIII), Secondary Level (Class IX-X) and Senior Secondary Level (Class XI-XII).

Since the programme is two years, it allows the time for student-teachers to become reflective practitioners. The course structure offers comprehensive coverage of themes and rigorous field engagement with the child, school and community. It also includes special courses for enhancing the professional capacities of the student-teachers.

The unique aspect of this programme is that it stresses the importance of imparting values-based education to students, resulting in their wholesome and balanced development.

The programme is recognized by National Council for Teacher Education (NCTE).

Eligibility

- 10+2 years of schooling from a recognized board and 3 years of university (total 15 years)
- Either passed or appeared for Final exams at Bachelor's degree level before the date of Admissions Test. If not appeared for Bachelor's degree final exams, aggregate marks in all the preceding Years/Semesters put together will be considered.
- Candidates with at least 50% marks either a Bachelor's degree and/or in a Master's degree in Science / Social / Humanities / Bachelor's in Engineering or Technology with 55% marks or any other qualification equivalent thereto, are eligible to apply
- Age: Preferably below 28 years as of 30th June in the year of admission

Courses Taught

YEAR 1

Semester 1

- Basics of Education
- Childhood and Growing Up
- Information and Communication Technology in Education
- Pedagogy of Teaching – Group I*
- Pedagogy of Teaching – Group II**
- School Attachment Program- 1 (SAP -1)
- Education in Human Values
- Awareness Course I: Education for Life – Individual Transformation

**Any one: English or Physical Science or Telugu or Hindi*

***Any one: Mathematics or Biological Science or Social Science*

Semester 2

- Contemporary India and Education
- Learning and Teaching
- Assessment for Learning
- Pedagogy of Teaching – Group I*
- Pedagogy of Teaching – Group II**
- School Attachment Program II (SAP-II)
- Reading and Reflecting on Text
- Awareness Course II: God, Society and Man

**Any one: English or Physical Science or Telugu or Hindi*

***Any one: Mathematics or Biological Science or Social Science*

YEAR 2

Semester 3

- School Administration and Action Research
- Language Across Curriculum
- Elective – I
- Internship Phase – I
- Awareness Course III: Guidelines for Life

Semester 4

- Knowledge and Curriculum
- Creating an Inclusive School
- Gender, School, and Society
- Drama and Art in Education
- Understanding the self
- Elective – II
- Internship Phase – II
- Awareness Course IV: My Life is My Message

Electives

- Yoga Education
- Peace Education
- Disaster Management
- Guidance and Counseling
- Environmental Education
- Health and Physical Education

M.B.A.

For Women & Men | 2024 entry

Programme Overview

The SSSIHL M.B.A. Programme is a professional course delivered in a gurukul ambience giving prospective managers the best of both worlds – employable skills enriched with values and prosocial attitudes. It has been structured in a balanced manner providing equal importance to the development of managerial skills and capabilities and the inculcation of healthy attitudes and values, thus enabling the student to grow into a proficient manager and a responsible member of society. It has four components:

Foundation Courses – that have a special focus on universal human values and cover subjects such as Self-Development, Values-based Management, Values-Centered Leadership and Rural Management.

Core and Functional Courses – which cover concepts and techniques connected with functional management in Marketing, Operations, Finance and Human Resources.

Integrative Courses – they cover subjects that span across the different functions and disciplines such as Management Information Systems, Total Quality Management, and Management Strategies, etc.

Electives – students can choose from a wide range of streams such as Marketing, Finance, Operations, Systems, Human Resource Management, Organisational Behaviour, Systems, Data Science and General Management.
The programme stresses on experiential learning which will enable students to apply classroom learning to real-world challenges. From Massive Open Online Courses (MOOCs) to Industrial Visits, frequent interaction with industry stalwarts to internships, the progamme helps develop leadership skills through transformational experiences.

Courses include the use of varied pedagogy ranging from seminars, conferences, presentations, case-studies, games and simulations to activity-based learning, coupled with ICT enabled classrooms, make learning engaging and holistic.

All of this will translate to SSSIHL M.B.A. graduates having the opportunity to apply their skills and experience in order to affect positive social and economic changes in local communities in India and abroad.

Eligibility

- 10+2 years of schooling from a recognized board and 3 years of university (total 15 years)
- Either passed or appeared for Final exams at Bachelor's degree level before the date of Admissions Test. If not appeared for Bachelor's degree final exams, aggregate marks in all the preceding Years/Semesters put together will be considered.
- Applicants with valid score in CAT, CMAT or XAT are exempted from the admissions test and will be invited directly for the offline Group Discussion round, followed by an interview (Cut-off score for CAT, XAT and CMAT is 70%)
- Age: Preferably below 28 years as of 30th June in the year of admission

Courses Taught

YEAR 1

Semester 1

- Economics for Managers
- Values Based Management
- Marketing Management
- Self-Development
- Financial Accounting for Managers
- Financial Management
- Computer Applications: Financial Management
- Statistics for Business Management
- Business and Managerial Communication – 1
- Analytical and Presentations Skills
- Awareness Course I: Indian Ethos and Values – Part 1

Semester 2

- Entrepreneurship & Innovation
- Human Resource Management
- Fundamentals of Research Methods
- Business Law
- Rural Management
- Management Accounting
- Service Operations Management
- Management Science
- Awareness Course II: Indian Ethos and Values – Part 2

YEAR 2

Semester 3

- Strategic Management
- Management of Quality
- Management of Quality- Applications
- Business and Managerial Communication – 2
- Elective I
- Elective II
- Elective III
- Computer Applications- Business Analytics
- Awareness Course III: Values in Management – Part 1

Semester 4

- Values-Centered Leadership
- Fundamentals of Project Management
- Business Sustainability
- Digital Business Management
- Elective IV
- Elective V
- Elective VI
- Computer Applications - Enterprise Applications
- Group Dynamics
- Awareness Course IV: Values in Management – Part 2

M.Tech. in Computer Science

For Men | 2024 entry

Programme Overview

A masters programme for students with a background in science and engineering alike that teaches students the theoretical foundations of Computer Science as well as practical knowledge regarding computer systems.

This is achieved primarily through core theoretical courses. In order to impart working knowledge and programming for solving problems, the program is designed to have a software lab associated with each of the courses.

A well-structured list of electives from various areas like Computer Vision, Machine Learning, Data Analytics, High Performance Computing, Software Systems, etc. enable students to specialize in frontier areas of computer science.

The M.Tech. programme at SSSIHL provides students with the flexibility to customize their expertise through diverse specializations, including Intelligent Systems and Knowledge Engineering, Advanced Computer Networks, Human-Computer Interaction, Theoretical Computer Science, Computer Systems, Multi-Core and Parallel Computing, Software Engineering, and Mathematical Methods in Computer Science.

General Electives

Throughout the course, in all four semesters, students can select their preferred focus, tailoring their academic journey to align with specific interests and career goals. They can pick and choose from any four electives from a broad range of streams (see the list of Courses).

A comprehensive viva voce and project work in the second year prepares graduating students with the necessary knowledge and skills for the next stage of their careers upon graduation.

As a result, the specific programme outcomes include the application of knowledge in mathematics, computer science, and programming, the ability to identify and solve engineering problems in specialized areas, contribution to research and innovation, formulation of evaluation criteria for well-informed conclusions, understanding the global impact of engineering solutions for sustainable development, and professional functioning with ethical responsibility in both individual and multidisciplinary team contexts.

Graduates will have the necessary tools to succeed in diverse fields, fostering problem-solving skills through interactions with industry experts and emphasizing recognition for analytical, research, design, and implementation skills.

Eligibility

- Either passed or appeared for final exams of one of the following:
- M.Sc. in Mathematics / M.Sc. in Physics / M.Sc. in Computer Science / M.C.A., or
- B.E. in Computer Science / B.Tech. in Computer Science
- Candidates with a Bachelor's degree (B.E. / B.Tech.) in Computer Science, Computer Science and Engineering, Electronics & Communications Engineering (with a background in Computer Science*) and Information Technology (with Mathematics background) are eligible to apply
- Familiarity with the following is mandatory for admissions:

  Mathematics: Calculus of one and several variables, Sequence and Series, Linear Algebra and Matrix Theory, Differential equations and Laplace Transforms, Mathematical logic.

  Computer Science: Data Structures and Simple Algorithms, Computer Organization and Architecture, Data communications and Networks, Database Systems, Languages Translators
- Candidates with valid a GATE/CSIR/JEST score in relevant fields can appear directly for the second round of the admission process – Technical Viva Voce Round
- Age: preferably below 28 years on 30th June in the year of admission

**implies an adequate, formal training and qualification from a recognized institution or relevant Computer / IT industry / academic experience for a minimum period of 5 years*

Courses Taught

YEAR 1

Semester 1
- Design and Analysis of Algorithms
- Practical: Design and Analysis of Algorithms
- Advanced Computer Architecture
- Practical: Advanced Computer Architecture
- Practical: Parallel Processing, Parallel Processing
- Elective – I
- Seminar – I
- Seminar – II
- Semester End Viva Voce
- Awareness Course I: Fundamentals of Indian Culture

Semester 2
- Theory of Computation
- Distributed Systems
- Practical: Distributed Systems
- Topics in Database Management Systems
- Practical: Topics in Database Management Systems
- Elective – II
- Elective – III
- Mini Project
- Awareness Course II: Sources of Values

YEAR 2

Semester 3
- Elective – IV
- Project Work Review
- Awareness Course III: Work Culture, Ethics and Values

Semester 4
- Project Work
- Problem Solving Lab
- Comprehensive Viva Voce
- Awareness Course IV: SSSIHL's Core Values and Philosophy

Electives

Stream 1: **Intelligent Systems and Knowledge Engineering**
- Artificial Intelligence
- Natural Language Processing
- Machine Learning
- Mining of Big Data Sets
- Deep Learning
- Fundamentals of Blockchain Technologies and Applications

Stream 2: **Advanced Computer Networks**
- Wireless and Mobile Networks

Stream 3: **Human Computer Interaction**
- Digital Image Processing
- Medical Image Processing
- Computer Vision

Stream 4: **Theoretical Computer Science**
- Advanced Algorithms
- Cryptography
- Design of Quantum Algorithms

Stream 5: **Computer Systems**
- Advanced Programming in the Unix Environment

Stream 6: **Multi-Core and Parallel Computing**
- High-Performance Computing with Accelerators
- Cloud Computing

Stream 7: **Software Engineering**
- Object Oriented System Design

Stream 8: **Mathematical Methods in Computer Science**
- Mathematical Methods in Image Processing
- Numerical Methods in Image Processing
- Mathematical Methods for Data Mining

M.Tech. in Optoelectronics & Communications

For Men | 2024 entry

Programme Overview

What are the technologies that harness the power of light? How does a WhatsApp video sent from thousands of kilometers away reach you in a fraction of a second? Can your data travel at the speed of light? Can you send light into a 'conductor' like you send an electric current? If yes, then what are the electronic devices that generate, detect and control it?

The answer is Optoelectronics and Communications. Just like electronics did in the 20th century, this set of revolutionary technologies is impacting human progress in the 21st century like none other.

This interdisciplinary programme aims to generate trained professionals in the broad areas of Optoelectronics and Communications with an emphasis on Optical Communications, Optical Networking, Signal Processing, Very Large Scale Integration (VLSI) technologies, Computer Programming and Automation.

Students will gain the ability to design, construct and use optoelectronic devices for sensor applications and get hands-on experience with optical fibers and fiber-based components. They will get proficient in building and analyzing computer networks and Optical Networking technologies.

One half of the courses are core papers and the other half are electives, enabling students to pursue their academic interests. The core courses provide a strong foundation in science and engineering which are supplemented by laboratory courses, enabling the students to take up project work in the second year. This training makes them highly compatible and ubiquitous in leading industries and R&D organizations across the world.

Electives

Throughout the course, in all four semesters, students can customize their programme based on their aptitude and interest. They can pick and choose from any five electives from a broad range of streams (see the list of Courses).

The industry relevant project work taken up by the students in the second year is in collaboration with mentors from leading Networking, Communications and Semiconductor industries. It provides students with an ultimate training to apply the technologies learnt, serving as a heads-up to meet the industry requirements.

The programme will prepare students to enter industries related to telecommunications, fiber optics, photonics, and optoelectronic devices and contribute in the development of critical technologies that are used in areas such as medicine, defence, manufacturing, communication networks, and renewable energy.

On a broader scale, they will also have the ability to understand the impact of engineering solutions in a contemporary, global, economic, environmental, and societal context for sustainable development.

Eligibility

- The candidate must have either passed or appeared for final exams of one of the following:
  M.Sc. in Physics **or** B.E. / B.Tech. in Electronics and Communications engineering (ECE) / Electrical & Electronics Engineering (EEE) / Electronics and Instrumentation Engineering (EIE)
- Candidates with valid a GATE/CSIR/JEST score in relevant fields can appear directly for the second round of the admissions process – Technical Viva Voce Round
- Age: preferably below 28 years on 30th June in the year of admission

Courses Taught

YEAR 1

Semester 1

- Optoelectronics and Optoelectronic Sensors
- Digital Communication Systems
- Broadband Communication Networks
- Elective – I
- Optoelectronics Lab
- Fiber Optic Components Lab
- Algorithm Development Lab
- Awareness Course I: Fundamentals of Indian Culture

Semester 2

- Optical Communication Systems
- Optical Networks
- Elective – II
- Elective – III
- Entrepreneurship and Innovation
- Network Lab
- Automation Lab
- Mini Project
- Awareness Course II: Sources of Values

YEAR 2

Semester 3

- Elective – IV
- Elective – V
- Network Security Lab
- Project Work
- Awareness Course III: Work Culture, Ethics and Values

Semester 4

- Project Work
- Awareness Course IV: SSSIHL's Core Values and Philosophy

Electives

Stream I: **Optoelectronics**

- Principles of Photonics
- Optical Instrumentation
- Integrated Optics
- Biomedical Optics
- Biophotonics

Stream II: **Networking and Communications**

- IoT and Sensor Networks
- Network Security
- Wireless Communication Networks
- AI & ML in Cyber Security

Stream III: **Very Large Scale Integration (VLSI) Technology**

- Principles of VLSI
- VLSI Design & Test
- FPGA Based Design
- Embedded Systems and RTOS
- ASIC Design
- Digital Logic Design

Stream IV: **Robotic Technologies**

- Embedded Signal Processing
- Adaptive Signal Processing
- Image Processing and Computer Vision
- Robotic Instrumentation and Sensors
- Robot Programming
- Fundamentals of AI for Robotics

Open Electives

- Introduction to Virtualization Technologies
- Software Engineering
- Microfluidics: Devices and Applications
- Biomedical Signal Processing
- Data Structures and Algorithms
- Computer Organization and Architecture
- Basics of Managing a Business

ADMISSIONS TEST SYLLABUS

› There will be negative marking for all multiple choice questions.
› **Model Test Papers** are **accessible below** and also on the Institute's website - on the **Admissions Downloads** page

M.B.A.

Download the model test paper

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

English:
60 Questions (1 Hour)
› 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:
30 Questions (45 mins)
› 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:
30 Questions (30 mins)
› 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.

Written English:
(15 mins)
› A short essay on a specific theme

REFERENCE BOOKS
Standard books used for CAT/MAT/GMAT Entrance Examinations.

M.TECH. IN COMPUTER SCIENCE

Download the model test paper

QUESTION PAPER FORMAT
For the written test, the question paper is divided into two parts:

Written Test: 120 Marks- 2 hours- Computer Science (67%) and Mathematics (33%)- two parts:

Part A: 80 Objective type items - 80 Marks (80 min.). This consists of 60 multiple choice questions of Computer Science- 20 multiple choice questions of Mathematics

Part B: Short Answer type Questions - 40 Marks (40 min.). This consists of 8 x 5 =40 marks- 4 short answer type questions of Computer Science- 4 short answer type questions of Mathematics.

In addition, there is a **General English Aptitude Test**: 20 marks- ½ hour- essay type questions- to test English language and communication skills

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.

TOPICS

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 Structures and Algorithms:
› Asymptotic Relations, Sorting Algorithms, Searching Algorithms, Basic Data Structures like Linked List, Doubly Linked List, Circular Linked List and Binary Tree. Abstract Data Types like Stacks, Queues and Graphs.

Computer Organization and Architecture:
› Computer Arithmetic, Instruction Set Architecture Characteristics, Instruction Cycle, CISC, RISC, Super Scalars Architectures, Instruction Formats, Addressing Modes, Pipelining and Instruction Level Parallelism, Speed-up of a Processor, Control Hazards, Basics of Cache, Cache Coherence, Basics of I/O, Interrupts.

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.

Database Systems:
› Database languages, View of Data, Relational Model, SQL: set operations, Aggregate functions, Nested Sub queries, Joined relations; ER Model: Constraints, Weak Entity sets, Generalization, Specialization, Reduction to Relational Schemas; Normalization: Different Normal Forms, Functional Dependency, Multi-valued Dependency; Transaction: Transaction concept, ACID properties, Serializability, Recoverability, Testing for serializability.

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.

Object Oriented Programming Concepts:
› Principles of Object Oriented Programming, Classes, objects, constructors and destructors, Operator overloading, Type conversions, Type of constructors, Function over loading, Inheritance, Polymorphism, File stream – File operators.

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.

REFERENCE BOOKS

COMPUTER SCIENCE
› Data structures and algorithms in C by Mark Allen Weiss
› Computer Organization and design by David A. Patterson and John L. Hennessy , Elsevier Pub.
› Computer Networking: A Top-Down Approach, 4/E James F. Kurose, Keith W. Ross, Pearson Pub.
› Data Base System Concepts by Silberchatz, Korth and Studarshan, Tata McGraw Hill Pub.
› Systems programming by Lelend Beck, 3rd edition, Pearson India.
› C++ How to Program, 4/e by Paul Deitel

MATHEMATICS
› Calculus by Stanley I. Gossman, Academic Press Pub.
› Linear algebra by Larry smith, 3rd edition, Springer Verlag.
› Discrete Mathematical Structures by Kolman, Busby and Ross, 4th Ed., Pearson Pub.
› Advanced Engineering Mathematics by Kreyszig, 8th ed., Wiley Eastern, 1999.
› Differential Equations by Shapley L. Ross John Wiley and Sons Pub.

M.TECH. IN OPTOELECTRONICS & COMMUNICATIONS

Download the **model test paper**

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 , multiple choice and problem solving type questions

Technical Viva voce

Final Interview

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.
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.

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, 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; Ampere's and BiotSavart'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.

SRI SATHYA SAI INSTITUTE OF HIGHER LEARNING

PRASANTHI NILAYAM

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