



ADMISSIONS PROSPECTUS 2018

UNDERGRADUATE POSTGRADUATE PROFESSIONAL



THE UNDERLYING PHILOSOPHY

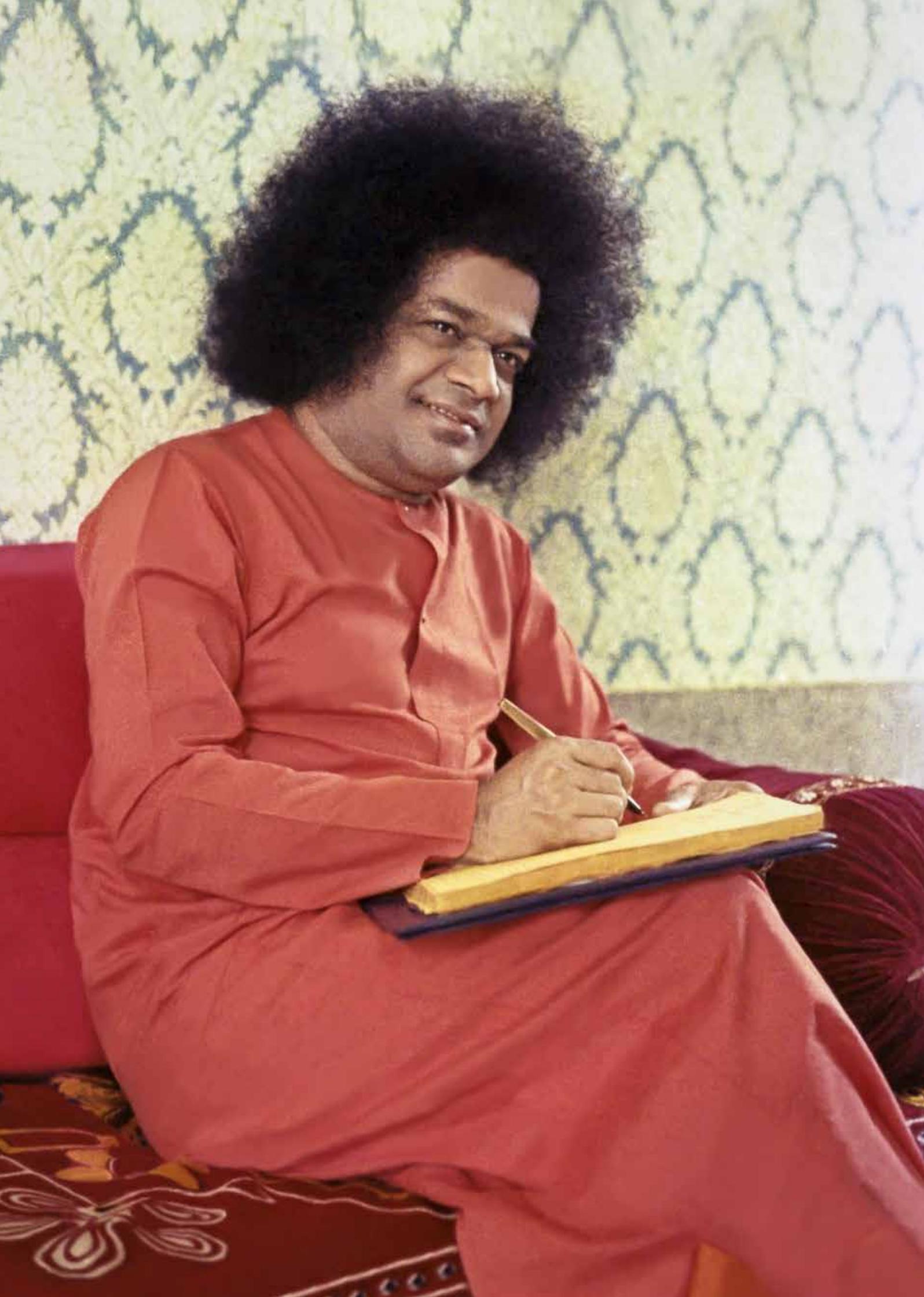
The Sai educational institutions have been established not merely to enable students to earn a living but to make them acquire good traits, lead ideal lives, and give them ethical, moral and spiritual strength. I have established them with a view to inculcate love and teach good qualities to students.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



“EDUCATION MUST TEACH A PERSON WHAT LIFE IS, AND WHAT ITS GOALS ARE. IT MUST PURIFY THE HEART AND CLARIFY THE VISION. IT MUST PREVENT POLLUTION OF THE HAND, HEART AND HEAD BY HABITS INJURIOUS TO THE INDIVIDUAL, SOCIETY AND THE NATION. IT MUST PROMOTE VIRTUES AND RAISE THE MORAL AND SPIRITUAL STANDARDS OF THE EDUCATED.”

BHAGAWAN SRI SATHYA SAI BABA,
Revered Founder Chancellor

FROM THE ADMISSIONS OFFICE

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

This prospectus is for students interested in applying for undergraduate, postgraduate and professional study at SSSIHL.

The first few pages will give you an introduction to the university and why SSSIHL is so unique. It will give you information on the application process, frequently asked questions, the Admissions Test & Interview Schedule and the programmes available for admissions.

The rest of the prospectus is divided into three major colour-coded sections:

Undergraduate Programmes

Postgraduate Programmes

Professional Programmes

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

Good Luck and Sai Ram!

Admissions Office
Office of the Registrar, SSSIHL

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INTRODUCTION TO SSSIHL

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

The university hosts over 1300 undergraduate, postgraduate and professional programme students across four campuses:

For women students:

- Anantapur Campus at Anantapur, Andhra Pradesh

For men students:

- Prasanthi Nilayam Campus, at Puttaparthi, Andhra Pradesh
- Brindavan Campus, at Whitefield, Bangalore, Karnataka
- Muddenahalli Campus at Muddenahalli, near Chickaballapur, Karnataka

The university has a merit-based open admissions policy for all, irrespective of income, religion or region.

SSSIHL provides free education to students in all programmes of study. This includes waiver of all fees- tuition, examinations, laboratory, library, sports and medical.

Programmes offered include undergraduate, postgraduate, professional and research.

A MODERN GURUKULA

Sri Sathya Sai Institute of Higher Learning was founded to inculcate ethical and moral values in students. These ethics and morals form the undercurrent of every subject taught at the university. Here, the development of a student's character is just as important as imparting knowledge.

This holistic development of students can only be possible in an environment that encourages the development of the student's mind, body and spirit.

To facilitate this, the university has a compulsory residential policy for all students. The environment is similar to the ancient Indian *gurukula* system of education, in a modern context. Teachers and students live and grow together in an atmosphere of mutual trust and unity.

Most students typically spend between two to five years pursuing an education at SSSIHL. As a result, what differentiates them from graduates of other universities is the transformation of their hearts, not just the training of their minds.

RESIDENTIAL CHARACTER

The compulsory residential system is an essential ingredient for the university's Values-based Integral Education to achieve its objective of transformation. This is where the concept of the modern *gurukula* really comes to the fore. In fact, Bhagawan Baba Himself designed the entire system and its activities, right down to the daily routine of students!

Residential Teachers

Residential teachers voluntarily stay with students at the hostel. They choose this responsibility in addition to their academic and administrative workload. Like students, they also share rooms with typically two teachers in a room.

They perform three fundamental tasks:

- Ensure the all-round welfare of students
- Discharge specific duties for the upkeep of the hostel daily routine and general discipline
- Facilitate the smooth functioning of the hostel Self Reliance departments

THE MODEL OF INTEGRAL EDUCATION AT SSSIHL NECESSITATES A FAVOURABLE STUDENT-TEACHER RATIO AND A HOST OF RESIDENTIAL TEACHERS WHO ARE WILLING TO MAKE SACRIFICES BY LIVING WITH THE STUDENTS FULL-TIME IN THE HOSTEL. THIS FOSTERS THE IDEAL ENVIRONMENT FOR THE KIND OF STUDENT-TEACHER INTERACTION THAT ALLOWS STUDENTS TO MAKE THE BEST OF THE SYSTEM HERE.

STUDENTS SPEND 60% OF THEIR TIME ON ACADEMICS AND 40% ON OTHER AREAS OF INTEGRAL EDUCATION. THIS MOULDS THEM IN A WHOLESOME MANNER, IN LINE WITH THE VISION OF ITS REVERED FOUNDER CHANCELLOR, BHAGAWAN SRI SATHYA SAI BABA. THE TRANSFORMATION OF STUDENTS IS EVIDENT THROUGH BOTH THEIR ACADEMIC RESULTS AND THEIR ALL-ROUND GROWTH IN OTHER ASPECTS, SUCH AS THEIR PERSONALITIES AND CHARACTER.

VALUES-BASED INTEGRAL EDUCATION

In the words of Bhagawan Sri Sathya Sai Baba, Revered Founder Chancellor, SSSIHL:

Spiritual education is not a distinct and separate discipline; it is part and parcel of all types and levels of education. In fact, it is the very foundation on which a lasting edifice can be built. Secular and spiritual educations are like the two halves in the seeds of pulses; the germ that sprouts is in between; it is fed by both.

Bhagawan Baba has designed the system of Sri Sathya Sai Values-based Integral Education in such a manner that between the time an 18-year old student joins the university and when she or he graduates (at the age of 21 or 23) there is a deep *inner* transformation that takes place. This concept is very unique at the university level.

The Process

The diagram on the right forms the basis of the system of Values-based Integral Education at SSSIHL.

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.

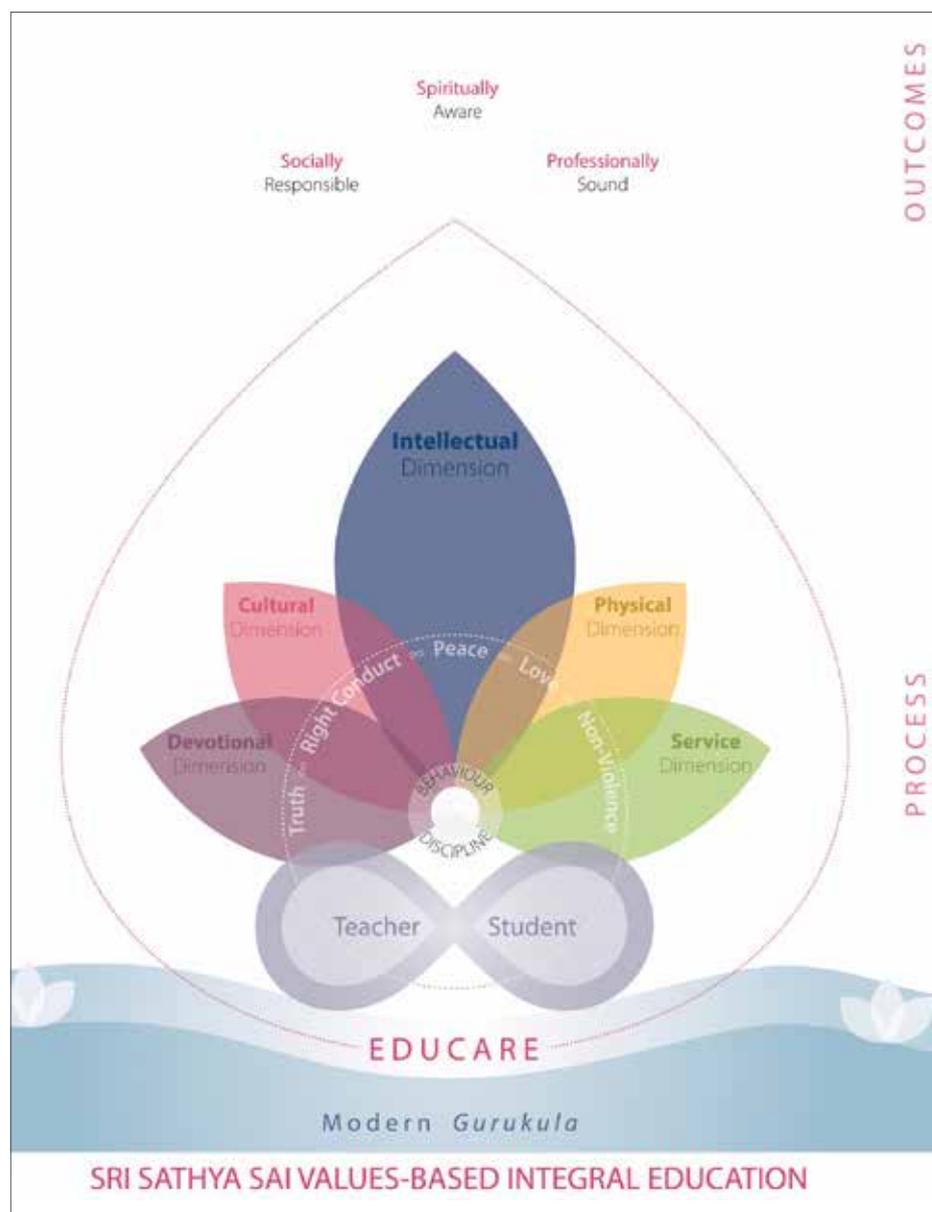
The five human values of Truth, Right Conduct, Peace, Love and Non-violence form the undercurrent of all the dimensions of integral education.

These dimensions are: Intellectual, Physical, Cultural, Devotional and Service. The key activities for each of these dimensions form the basis of most of the time that students spend at SSSIHL.

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

- o Spiritually aware
- o Socially responsible and
- o Professionally sound

For further information, visit sssihl.edu.in



WHY SSSIHL?

All statistics: 2016/17

2.6 : 1

Student Computer Ratio



₹ 10.45 CR.

Expenditure on Equipment & Infrastructure



₹ 1.94 CR.

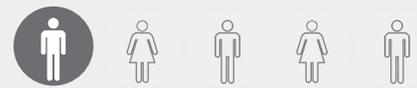
Research & Teaching Grants



- › Favourable student-teacher ratio (9:1)
- › Excellent academic and research facilities
- › World-class facilities and resources offered despite a rural set-up
- › Campuses set amidst peaceful surroundings
- › Spiritual ambience in an environment of discipline and love
- › Inculcates in students the spirit of self-reliance and service to society
- › Alumni who are highly accomplished - professionally and personally.
- › Free education for all students

508

Total Admissions



1/5

applicants is admitted



69

Doctoral Research Scholars



130

Visiting Faculty & Guest Lecturers



9:1

Student Teacher Ratio



1 in 4

Teachers are Residential



Undergraduate Acceptance Rates

373 / 2225
accepted eligible applicants



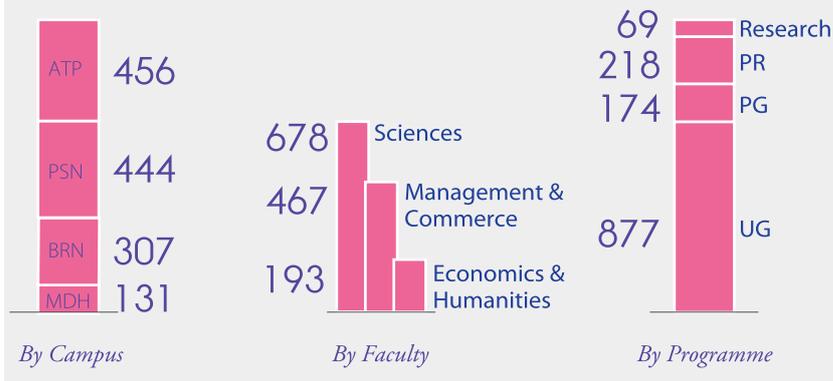
Postgraduate & Professional Acceptance Rates

135 / 731
accepted eligible applicants

1338



Student Profile



155

Teacher Designations

20 Professor
34 Associate Professor
88 Asst. Professor
13 Others

66%



*21 pursuing



2:1

academic administrative

Staff Profile

STUDENT LIFE @ SSSIHL

HOSTEL LIFE

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

Students hailing from different states of India, diverse cultures and varied economic and financial backgrounds live in dormitory-styled accommodation with 10-14 students staying together in a room. The pan-Indian character of the university comes alive in the hostel. The hostel buildings are also aesthetically pleasing, thus creating 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 in the hostel is suffused with both discipline and loving care. All doctoral research scholars and one of every four teaching faculty 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- these 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:

- > Electricals
- > 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.

DAILY ROUTINE

All students stay in the hostel located in the campus. The daily routine at the Hostel is designed to keep students engaged in constructive and productive activities—academic and extracurricular—throughout the day.

The day typically 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 instrumental music and the likes). Classes commence at 9:00 a.m.

After college ends at around 4:00 p.m., students move to the *Mandir*/Prayer hall for participation in 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 usually spend time on their studies.

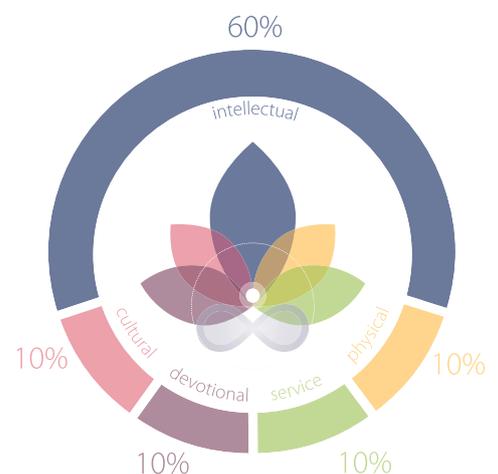
TIME ON DIMENSIONS

There are extended periods during each semester when a significant amount of time is devoted to a particular dimension of Sri Sathya Sai Integral Education.

Examples include:

- > Festivals (Cultural & Devotional)
- > Cultural presentations (Cultural & Devotional)
- > Summer Course in Indian Culture & Spirituality (Intellectual, Cultural & Devotional)
- > Annual Sports & Cultural Meet (Physical & Cultural)
- > Prasanthi Vidwan Mahasabha (Intellectual, Cultural, Devotional)
- > Hostel Self Reliance Departments (Service)
- > Community Service (Service)

The diagram below depicts the broad distribution of time students spend on different dimensions of Sri Sathya Sai Values-based Integral Education during the year.





APPLICATION PROCESS

APPLICATION FORM

There are two ways to fill in an application form:

1. **ONLINE** – visit: sssihl.edu.in
2. **PAPER** – Get a paper application form:
 - By Hand** – pick up a paper application form
 - By Post** – get a paper application form posted to you

ONLINE APPLICATION

The **fastest, simplest and most secure way to apply** to SSSIHL is to visit the home page of the university's website, sssihl.edu.in, click on the link for online application, and you will be guided step-by-step on how to fill in the form.

Note: It is mandatory that you have an **email ID**. If you do not have one yet, we suggest you create an online account with a popular service provider such as Google, Yahoo, Hotmail, etc. They are all free of charge.

Once completed, you will be able to view the filled-in application form in PDF format and save it on your computer.

Important: If you apply for more than one programme (does not apply to Undergraduate programmes), you must fill in a **separate** form for each programme.

The online application portal page on sssihl.edu.in will have further, specific instructions for all online applicants.

PAPER APPLICATION (BY HAND)

If you choose to pick up the application form yourself (or have a friend pick it up on your behalf), kindly visit the Admissions Office located in the

Administrative Building at SSSIHL, Prasanthi Nilayam.
The cost of the form is ₹100 and the amount can be paid in cash at the time of your visit.

PAPER APPLICATION (BY POST)

If you prefer to get the application form by post, please write to:

The Admissions Office
Administrative Building
Sri Sathya Sai Institute of Higher Learning
Prasanthi Nilayam – 515 134
Dist. Anantapur
Andhra Pradesh

Note: If you apply for more than one programme (does not apply to Undergraduate programmes), you need to send **separate** written requests along with the below-mentioned DD/ IPO.

You must send the following along with the written request for each application:

1. **Indian Postal Order (IPO) or Demand Draft (DD) for Rs.100/-.** The Bank draft should be drawn in favour of Sri Sathya Sai Institute of Higher Learning, payable at SBI, Prasanthi Nilayam/Puttaparthi.
2. Your name and complete postal address along with programmes for which application form is required should be clearly stated in **BLOCK letters on the reverse of the IPO/DD** and also in the requisition letter.
3. **Indication of which programme you would like to apply to.** Incorrect forms will be rejected.
4. **Complete postal address and phone number for correspondence** - Please indicate your complete address

and telephone number, clearly mentioned in your written request, so that we can post you the form and Admissions Prospectus.

APPLICATION DEADLINE

28 February 2018.

Final date for sale of Paper forms and Online applications. Applications will not be available after this date.

SUBMISSION DEADLINE

10 March 2018.

Final date before which completed applications must reach the university.

DOCUMENTS CHECKLIST

Once you have filled in the paper application form in full – complete with signatures, photograph, etc. you will have to make sure that you collect all the **supporting documents that are requested** with the form before posting the application to SSSIHL.

Online applicants will be able to view their form in full in PDF format after they go through the online application portal and will be able to print the same.

THE COMPLETE LIST OF SUPPORTING MATERIALS TO INCLUDE IS:

1. **One additional passport-sized photograph**
This is in addition to the one you have attested and stuck on the application form. On the reverse side of the photograph, please clearly write the following:
Your name and applicant ID (online applications) or application number (paper applications)
2. **Statement of Marks**
For Undergraduate Programme applicants:
Self-attested photocopies of the Statement of Marks for X Std.

issued by your Higher Secondary School Board
Self-attested photocopies of the Statement of Marks issued by your school / college / university.

3. **Co-curricular Achievements**

This is optional. If you have certificates that highlight your involvement in co-curricular (non-academic) activities, please include copies of these with your application for consideration.

SUBMIT APPLICATION FORM WITH REQUIRED DOCUMENTS

Once you are satisfied that you have completed all the necessary requirements for the application form and the supporting materials, you will now be in a position to post your application to the Admissions office of the university.

Please follow these **four steps** to ensure your application will be processed and not rejected:

1. **Staple** the filled application form with all supporting materials. Then, seal them in an **A4-sized envelope**. This is important so you do not fold the form and certificates attached.

Note: ONLINE APPLICANTS ONLY

- If you have chosen to pay online, kindly print and attach a copy of the electronic receipt. Otherwise, kindly send an **Indian Postal Order (IPO) or Demand Draft (DD) for ₹100/-** per application. The Bank draft should be drawn in favour of Sri Sathya Sai Institute of Higher Learning, payable at SBI, Prasanthi Nilayam/Puttaparthi.

IMPORTANT

All Online applicants must send the printed copies of their completed application forms along with their marksheets and payment to the Admissions Office by post or in person.

2. Write the **Applicant ID** (online applications) or **Application Number** (paper applications) and the course for which you have applied on the envelope that you are posting.
3. Post the completed application so that it **reaches the university BEFORE the submission deadline: 10 March 2018**.

On average, allow one week for applications posted within South India and two weeks for the rest of India. **Late Applications** reaching after this date **will be rejected**.
4. It is **compulsory** that all **applications** are posted either by **Registered Post or via a courier service** to the address provided below. Should you opt for a courier service, it is advisable that you check with them if they have an office or delivery service at Puttaparthi, Andhra Pradesh. Two examples include: DTDC or Professional Couriers, both of whom have offices at Puttaparthi.

The postal address to use is:

The Admissions Office
Administrative Building
Sri Sathya Sai Institute of Higher Learning
Prasanthi Nilayam – 515 134
Dist. Anantapur
Andhra Pradesh

Tip: Application forms can also be submitted in person at the admissions office at the Administrative Building of SSSIHL, Puttaparthi.

AWAIT CONFIRMATION ON ELIGIBILITY FOR WRITTEN TEST

Once the Admissions Office receives your application, it will be duly processed to make sure that you meet all the preliminary eligibility criteria and that all the supporting materials (including your application form) are accurate.

List of applicants whose forms have been accepted will be put on the website **sssihl.edu.in** on a weekly basis.

If you meet all these criteria, the university will write to you on the **mailing address** that you indicated in your application form. You will receive an **Admissions Entrance Test card (Hall ticket)**. This will allow you to sit for the Admissions Entrance Test.

If you do not meet the criteria, you will also hear in writing from the university, stating that your application has been rejected.

The list of candidates called for the admissions tests will be published on the university's website by

31st March 2018.

Important: Those candidates who have been called for admissions test but have not received the hall ticket, can collect the same, one day prior to their scheduled admissions test from the test centre.

FAQS

WHAT DO I DO ON THE MORNING OF THE ADMISSIONS TEST?

All admissions tests will be held at the Prasanthi Nilayam Campus of the university. The building is located 200 meters from the Ganesh Gate of the ashram. (Take a right once you exit the ashram and walk past the bus stand, the police station and the shops. The college building will be on your left). It is a five minutes walk.

You are required to report to the premises 45 minutes prior to your scheduled test time. For example, if your test begins at 9 a.m., reach the college building at 8:15 a.m.

When you reach the main entrance of the building, various instructions and announcements pertaining to the tests, interviews etc. will be displayed on the notice board at the entrance of the college building.

Do I need to bring anything with me to the Entrance Test?

All candidates need to bring:

1. **Two HB pencils**
2. **An eraser and sharpener for the admissions test.**
3. **A pen (preferably blue ink).**

Electronic Calculators are strictly NOT allowed.

QUESTION PAPER PATTERN

1. **For B.A./B.Sc./B.Sc. (Hons.)/B.Com. (Hons.):** Each candidate is required to answer a paper in General English and three subject papers in the combination chosen. The General English Question paper contains 40 Multiple choice questions and one Essay Question. The 3 Subject Papers (viz., M/P/C, B/Z/C, A/C/E etc.,) consist of 40 Multiple Choice questions each. **Exam duration is around three hours.**

2. **For B.B.A.:** Each candidate is required to answer tests to ascertain Verbal Skills, Numerical Skills and Reasoning Skills.

Each Test contains 40 Multiple choice questions, total number of Questions being 120. In addition, there will a short essay test.

Exam duration is around two hours and forty minutes.

3. For B.C.A. & Integrated M.C.A.:

Verbal skills - 40 questions

Short Essay Test

Mathematical Skills - 60 questions

Logical Reasoning and Quantitative

Aptitude - 60 questions.

MULTIPLE-CHOICE BASED EVALUATION

The admissions tests are largely objective multiple-choice questions that are evaluated by an Optical Mark Recognition (OMR) system. The OMR system is foolproof and 100% accuracy is guaranteed during evaluation.

Negative marks are awarded for every incorrect answer. This is usually 25% of the total marks allocated for that particular question.

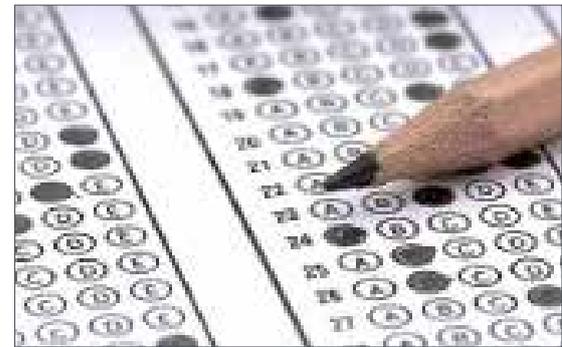
THE RESPONSE SHEET

The Response Sheet (see sample below) is a paper OMR sheet that contains checkbox bubbles which can

be recognized by OMR software for automatically capturing your responses to multiple choice responses. This is how you will be evaluated.

Candidates are required to accurately write the following details on the Response Sheet:

- › Applicant ID
- › Question Paper Code No.
- › Room Number
- › Test Date



Important: Shade the boxes of the answer you choose (E.g. A, B, C, D or E) to each question fully with your HB pencil. See the sample ABOVE.

SRI SATHYA SAI INSTITUTE OF HIGHER LEARNING (Deemed to be University) RESPONSE SHEET																							
Important Instructions: <ul style="list-style-type: none"> • Write your Applicant ID as in Admission Test Entrance Card and also shade the numerals appropriately. • Write the Question Paper Code and also shade the numerals appropriately. • Write your room number, today's date and put your signature in the box provided. • Shade the correct response A, B, C, D or E. Incorrect responses attract Negative marks. 										Shading Instructions: WRONG METHOD CORRECT METHOD 													
Applicant ID: 				Question Paper Code: 				Date: _____ Room Number: _____															
Candidate's signature: _____										Invigilator's signature: _____													
1	A	B	C	D	E	41	A	B	C	D	E	81	A	B	C	D	E	121	A	B	C	D	E
2	A	B	C	D	E	42	A	B	C	D	E	82	A	B	C	D	E	122	A	B	C	D	E
3	A	B	C	D	E	43	A	B	C	D	E	83	A	B	C	D	E	123	A	B	C	D	E
4	A	B	C	D	E	44	A	B	C	D	E	84	A	B	C	D	E	124	A	B	C	D	E
5	A	B	C	D	E	45	A	B	C	D	E	85	A	B	C	D	E	125	A	B	C	D	E
6	A	B	C	D	E	46	A	B	C	D	E	86	A	B	C	D	E	126	A	B	C	D	E
7	A	B	C	D	E	47	A	B	C	D	E	87	A	B	C	D	E	127	A	B	C	D	E
8	A	B	C	D	E	48	A	B	C	D	E	88	A	B	C	D	E	128	A	B	C	D	E
9	A	B	C	D	E	49	A	B	C	D	E	89	A	B	C	D	E	129	A	B	C	D	E
10	A	B	C	D	E	50	A	B	C	D	E	90	A	B	C	D	E	130	A	B	C	D	E

WHAT ABOUT THE INTERVIEW?

Only candidates who pass the written test will be invited for an interview. Candidates are shortlisted for an interview on the basis of their performance in General English and the total aggregate of other tests, both of which have a minimum cut-off point.

The interview process evaluates the suitability of the candidates keeping in view the unique requirements of the fully residential, values-based system of education at SSSIHL.

The interview is usually conducted on the very next day following the written test.

Admission Test results are published on the same day of the test (late evening/night) or early morning of the following day.

They will be posted on notice boards at the following two places:

1. **In the Ashram (outside the Ladies side of the South Indian Canteen)**
2. **Prasanthi Nilayam Campus**

The above notice will also contain details regarding the date and the time of Interviews.

If you are selected for the interview stage, you will be required to spend more time at Prasanthi Nilayam.

HOW DO I REACH PRASANTHI NILAYAM?

Prasanthi Nilayam is the name of the ashram established by Bhagawan Sri Sathya Sai Baba. It is also the name of the main campus of Sri Sathya Sai Institute of Higher Learning. It is located in Puttaparthi, in the district of Anantapur, Andhra Pradesh.

By train:

Prasanthi Nilayam has a railway station by the name Sri Sathya Sai Prasanthi Nilayam (station code: SSPN). The campus and ashram are located at

about 10 km from the railway station. Several trains come directly to Sri Sathya Sai Prasanthi Nilayam. Auto rickshaws will charge around Rs. 80 for a one-way fare to the main entrance of the ashram.

Alternatively, you can reach Puttaparthi by taking a train to the Dharmavaram Junction (station code: DMM).

Dharmavaram is about 40 km from Puttaparthi and is on the Guntakal-Bangalore section of the South-Central Railway.

Those alighting at Dharmavaram Railway Station may board direct buses from the railway station to Prasanthi Nilayam. If direct buses are not available from the station, you can take an auto rickshaw to the Dharmavaram Bus Stand, from where buses to Puttaparthi are available for a nominal charge. Private taxis and vans may also be available in the vicinity of the Dharmavaram Bus Stand.

A computerized Railway Reservation facility is available at the Puttaparthi bus stand for those who wish to book return tickets.

By bus:

Puttaparthi may be reached directly by bus from Chennai, Bangalore, Hyderabad, and major towns of Andhra Pradesh. Buses alight at the Puttaparthi Bus Stand which is conveniently located directly opposite to the entrance gate of the ashram.

By car:

Puttaparthi is located off National Highway (NH) 7, which connects Bangalore to Hyderabad. Look out for signs to Puttaparthi or visit Google Maps for point-to-point directions.

By flight:

The nearest airport to Puttaparthi is Bangalore International airport. Once you exit the terminal building, you can negotiate a taxi to take you to Puttaparthi.

On average, expect to pay ₹2000 to ₹2300 for a one-way taxi fare. It takes two hours to reach Puttaparthi from Bangalore airport.

WHEN SHOULD I ARRIVE?

We strongly recommend that you arrive in Prasanthi Nilayam the day prior to the Written Test.

To ensure that you get accommodation in the ashram, we strongly suggest that you arrange your travel plans so that you arrive at the ashram accommodation office before 8 p.m. (latest) on the day of your arrival.

HOW CAN I GET ACCOMMODATION?

The entrance of the ashram (Ganesh Gate) is located opposite the bus stand. Following a brief security check (of your luggage), you may proceed directly to the accommodation office. For any help or directions, just ask a sevadal (women or men volunteers with yellow or blue scarves) to assist you.

Accommodation

All candidates (and their accompanying parents/wards) visiting Prasanthi Nilayam for entrance tests will be provided accommodation at nominal prices inside the ashram. However, it is mandatory that you have your Admission Test Entrance card at hand and produce it to the Accommodation Officer on arrival.

The accommodation office is located inside the ashram next to North 9 block and is open from 6:15 a.m. to 8 p.m. everyday. You cannot get accommodation in the ashram outside of these hours.

Entry to the Ashram – via car (Gopuram Gate) or by foot (Ganesh Gate) is between 4 a.m. and 9:30 p.m., everyday.

ADMISSIONS TEST & INTERVIEW SCHEDULE

SSSIHL Admissions Tests and interviews for 2018 entry will be held from **17 April to 1 May 2018** at **Prasanthi Nilayam**, (in Andhra Pradesh). You must arrive **at least the day before** your test. Refer to the Admissions Test schedule below for exact dates and times.

Notes:

- › Written Tests in General English are **COMMON TO ALL APPLICANTS**.
- › Interviews will be held **ONLY FOR THOSE CANDIDATES WHO CLEAR THE WRITTEN TESTS**. The list of successful candidates will be published on the campus and ashram notice boards (latest) on the morning following the day of the written test.
- › The final list of candidates provisionally selected for entry into SSSIHL will be published on the university's website (sssihl.edu.in) on **Wed, 2 May 2018**.

FOR WOMEN CANDIDATES

UNDERGRADUATE PROGRAMMES

B.A.	Tue 17 April
B.Com. (Hons.)	9 AM to 12:15 PM — Written Tests
B.Sc. in Food & Nutritional Sciences	
B.Sc. (Hons.) in Mathematics / Physics / Chemistry	Wed 18 April, Thu 19 April & Fri 20 April
B.Sc. (Hons.) in Biosciences / Chemistry	Interviews

PROFESSIONAL PROGRAMMES

M.B.A.	Wed 18 April
	9 AM to 11:15 AM — Written Tests
	Thu 19 April
	2 PM onwards — Short Essay Test & Group Discussions
	Fri 20 April
	Interviews
B.Ed.	Wed 18 April
	2 PM to 5 PM — Written Tests
	Thu 19 April
	Interviews

POSTGRADUATE PROGRAMMES

M.A. in English Language & Literature	Thu 19 April
	9 AM to 10:30 AM — Written Test (General English)
M.Sc. in Biosciences	10.45 AM to 12.45 PM — Written Tests (Subjects)
M.Sc. in Food & Nutritional Sciences	Fri 20 April
	Interviews

FOR MEN CANDIDATES

UNDERGRADUATE PROGRAMMES

<p>B.A. B.Com. (Hons.) B.B.A. B.Sc. (Hons.) in Mathematics / Physics / Chemistry B.Sc. (Hons.) in Mathematics / Computer Science / Statistics B.Sc. (Hons.) in Mathematics / Economics / Statistics B.Sc. (Hons.) in Biosciences / Chemistry B.C.A. Integrated M.C.A.</p>	<p>Sat 21 April 9 AM to 12:15 PM — Written Tests</p> <p>Sun 22 April, Mon 23 April & Tue 24 April Interviews</p>
<p>Diploma in Music Bachelor of Performing Arts (Music)</p>	<p>Sat 21 April 9 AM onwards — Tests</p> <p>Sun 22 April 9 AM onwards — Interviews</p>

PROFESSIONAL PROGRAMMES

<p>M.B.A.</p>	<p>Thu 26 April 9 AM to 11:15 AM — Written Tests</p> <p>Fri 27 April 9:00 AM onwards — Short Essay Test & Group Discussions</p> <p>Sat 28 April, Sun 29 April & Mon 30 April Interviews</p>
<p>M.Tech. in Computer Science M.Tech. in Optoelectronics and Communications</p>	<p>Sun 29 April 9 AM to 12 noon — Written Tests</p> <p>Mon 30 April 9 AM onwards — Oral/Practical Tests (Computer Science) Subject Vivas (Opto. & Communications)</p> <p>Tue 1 May Interviews</p>

POSTGRADUATE PROGRAMMES

<p>M.A. in Economics M.Sc. in Mathematics M.Sc. in Physics M.Sc. in Chemistry M.Sc. in Biosciences</p>	<p>Thu 26 April 9 AM to 10:30 AM — Written Test (General English) 10:45 AM to 12:45 PM — Written Test (Subjects)</p> <p>Fri 27 April Interviews</p>
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RESULTS

ADMISSIONS RESULTS / FINAL DECISION

After all the admissions tests and interviews are completed in April, The final list of candidates provisionally selected for entry into SSSIHL will be published on the university's website (sssihl.edu.in) by **2 May 2018**.

Additionally, the provisional list of selected candidates for entry to SSSIHL will also be put up on notice boards at the Ashram (outside the Ladies side of the South Indian Canteen) and at the Prasanthi Nilayam Campus.

In addition, a selection letter will be sent to all selected candidates. Along with the letter, related information will also be included.

JOIN THE UNIVERSITY!

Congratulations! If you made it to this stage, you have got a place to study at Sri Sathya Sai Institute of Higher Learning. We look forward to welcoming you at one of our campuses.

The Academic Year 2018/19 commences on 1 June 2018.

HOW DO I CONTACT THE ADMISSIONS OFFICE IF I NEED FURTHER HELP?

The Admissions pages of the website (<http://sssihl.edu.in/sssuniversity/Admissions.aspx>) are designed to make sure that candidates have all the information that they require to successfully apply to SSSIHL.

You may refer to the Application Guide to get all the information you need for getting and filling an application form completely, supporting documentation and materials, and related information about test dates, schedules and how to find out about the progress of your application. We even have a dedicated Related Downloads page on the university's website (sssihl.edu.in) to further assist you.

The Application Guide will give you the answers to most, if not all, queries that you may have for admissions.

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

By Email:

- › For admissions related queries, please email: admissions@sssihl.edu.in
- › For online applications related queries, please email: onlineadmissions@sssihl.edu.in

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

By Telephone:

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

+91 9441 911 391
+91 8555 287239

The above numbers are for admissions related queries **only between 9 a.m. and 5 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!

DATES & DEADLINES

Application Deadline
Wed, 28 February 2018

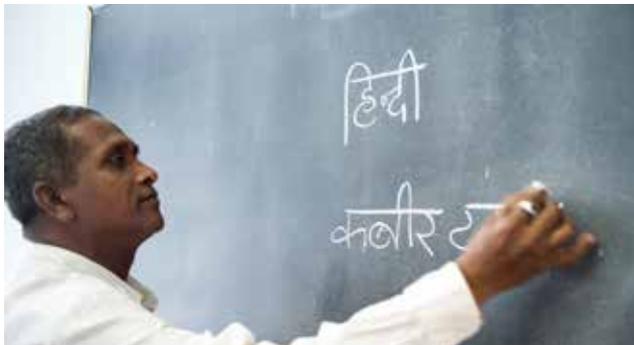
Submission Deadline
Sat, 10 March 2018
(see pages 12-13 for further details)

Admissions Tests & Interviews
17 April to 1 May 2018

Admissions Test Results
Wed, 2 May 2018

Reporting date for selected candidates
Thu, 31 May 2018

Academic Year 2018/19 begins
Fri, 1 June 2018



PROGRAMMES FOR ADMISSIONS

There are separate programmes available for **WOMEN** and **MEN** applicants, as the university hosts separate campuses for women and men students. The university also offers **Ph.D.** programmes. Kindly visit www.ssihl.edu.in for further information on how to apply for Ph.D. programmes.

Given below are the **PROGRAMMES OPEN FOR ADMISSIONS IN 2018.**

- › Successful graduates of selected B.Sc. / B.Sc. (Hons.) programmes can choose to study a postgraduate programme at SSSIHL in certain subjects (subject to meeting the eligibility criteria). These subjects are clearly marked in asterisk (*).

FOR WOMEN CANDIDATES

UNDERGRADUATE PROGRAMMES (3 YEARS)

B.A.

- › In the first two years, a student can choose to study any three subjects amongst: Economics, Political Science, Philosophy, History & Indian Culture and Optional English
- › In the third year, students study one major subject (along with the other two basic subjects)

B.Com. (Hons.)

B.Sc. in Food and Nutritional Sciences*

B.Sc. (Hons.) in Mathematics / Physics / Chemistry

- › In the first two years of study, all three subjects (Mathematics, Physics and Chemistry) are taught
- › In the third year, the subject of specialization will determine the final degree awarded:
 - B.Sc. (Hons.) in Mathematics **or**
 - B.Sc. (Hons.) in Physics **or**
 - B.Sc. (Hons.) in Chemistry

B.Sc. (Hons.) in Biosciences* / Chemistry

- › In the first two years of study, both subjects (Biosciences and Chemistry) are taught.
- › In the third year, the subject of specialization will determine the final degree awarded:
 - B.Sc. (Hons.) in Biosciences **or**
 - B.Sc. (Hons.) in Chemistry

POSTGRADUATE PROGRAMMES (2 YEARS)

M.A. in English Language and Literature

M.Sc. in Biosciences

M.Sc. in Food and Nutritional Sciences

- › With an option to specialize in either Applied Nutrition or Food Technology

PROFESSIONAL PROGRAMMES (2 YEARS)

B.Ed.

M.B.A.

UNDERGRADUATE PROGRAMMES (3 YEARS)

B.A.

- › In the first two years, a student can choose to study any three subjects amongst: Economics, Optional English, Political Science and History & Indian Culture
- › In the third year, students study one major subject (Economics) along with the other two basic subjects

Note: At the end of the second year of study, students will have the option to pursue the Honours Programme in Economics (subject to meeting the eligibility criteria) in the final year and will be awarded a **B.A. (Hons.) in Economics**.

B.B.A.

B.Com. (Hons.)

B.C.A. or Integrated M.C.A.

- › Choose between either of the two following degree options:
B.C.A. - **Three year programme**, or
Integrated M.C.A. - **Five year integrated programme**

B.Sc. (Hons.) in Mathematics* / Physics* / Chemistry*

- › In the first two years of study, all three subjects (Mathematics, Physics and Chemistry) are taught
- › In the third year, the subject of specialization will determine the final degree awarded:
B.Sc. (Hons.) in Mathematics **or** B.Sc. (Hons.) in Physics **or** B.Sc. (Hons.) in Chemistry

B.Sc. (Hons.) in Biosciences* / Chemistry*

- › In the first two years of study, both subjects (Biosciences and Chemistry) are taught.
- › In the third year, the subject of specialization will determine the final degree awarded:
B.Sc. (Hons.) in Biosciences, **or** B.Sc. (Hons.) in Chemistry

B.Sc. (Hons.) in Mathematics* / Economics* / Statistics

- › In the first two years of study, all three subjects (Mathematics, Economics and Statistics) are taught
- › In the third year, the subject of specialization (Mathematics or Economics only) will determine the final degree awarded:
B.Sc. (Hons.) in Mathematics, **or** B.Sc. (Hons.) in Economics

B.Sc. (Hons.) in Mathematics* / Computer Science / Statistics

- › In the first two years of study, all three subjects (Mathematics, Computer Science and Statistics) are taught
- › In the third year, the subject of specialization (Mathematics only) will determine the final degree awarded: B.Sc. (Hons.) in Mathematics

Bachelor of Performing Arts (Music)

Diploma in Music (2 years)

POSTGRADUATE PROGRAMMES (2 YEARS)

M.A. in Economics

- › With an option to specialize in Financial Economics

M.Sc. in Mathematics

- › With an option to specialize in either Actuarial Science or Computer Science

M.Sc. in Physics

- › With an option to specialize in either Photonics, Nuclear Physics or Materials Science

M.Sc. in Chemistry

M.Sc. in Biosciences

PROFESSIONAL PROGRAMMES (2 YEARS)

M.B.A.

M.Tech. in Computer Science

M.Tech. in Optoelectronics & Communications

PROGRAMME DESCRIPTIONS & ELIGIBILITY

The following pages will highlight the information for each individual undergraduate, postgraduate and professional programme of study at SSSIHL for 2018 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 description, which includes the courses of study for each year (and semesters).

The minimum requirements for admissions vary from programme to programme. Candidates who do not meet all the admissions criteria listed for the programme they want to apply to will not be eligible for admissions and their applications will not be processed by the Admissions Office and a letter of rejection will be sent out to them.

Candidates belonging to Scheduled Castes/Scheduled Tribes are entitled to a relaxation of 5% marks for ALL programmes.

NOTICE TO ALL APPLICANTS

Given the unique Gurukula system of Values-based Integral Education at the university, where students need to be compulsorily resident at gender-specific hostels and campuses during the entire period of study, only single (bachelor / maiden) students will be admitted.

Engaged or married candidates need not apply.



COMMON COURSES TO ALL PROGRAMMES

THE FOLLOWING COURSES ARE COMMON TO ALL

UNDERGRADUATE PROGRAMMES:

LANGUAGES

For the first four semesters of all Programmes, each student must study English as a first language and one of Sanskrit, Hindi, Telugu or Additional English* as a second language.

*Additional English can be opted in exceptional cases, where the student does not have an adequate background in Hindi or Telugu or Sanskrit.

AWARENESS COURSE

A series of courses entitled 'Awareness' are taught for all six semesters of study.

YEAR 1

Semester 1

Education for Transformation (Based on Bhagawan Baba's Life and Teachings)

Semester 2

Unity of Religions

YEAR 2

Semester 3

Eternal Values for the changing world

Semester 4

Study of Classics: Bhagavat Vahini- Bhagavatam as narrated by Bhagawan Sri Sathya Sai Baba

YEAR 3

Semester 5

Study of Classics: Ramakatha Rasavahini- Ramayana as narrated by Bhagawan Sri Sathya Sai Baba

Semester 6

Life and its Quest

ENVIRONMENT COURSE

A course in Environmental Studies and Human Values is also taught for the first two semesters.

THE FOLLOWING COURSES ARE COMMON TO ALL

POSTGRADUATE PROGRAMMES:

AWARENESS COURSE

A series of courses entitled 'Awareness' are taught for all six semesters of study.

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- Bhagawan Sri Sathya Sai Baba

THE FOLLOWING COURSES ARE COMMON TO ALL

PROFESSIONAL PROGRAMMES:

A course entitled 'Awareness' is taught for all four semesters of study for all Professional Programmes with the exception of the B.Ed. and M.Ed. programmes, where it is incorporated in the course structure.

AWARENESS COURSE

The following topics are covered in this Awareness course over the four semesters:

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- Bhagawan Sri Sathya Sai Baba

B.A.

Duration: 3 Years | For Women & Men Candidates

› In the first two years, a student can choose to study **any three subjects amongst:**

Women Students: Economics, Political Science, Philosophy, History & Indian Culture and Optional English

Men Students: Economics, Political Science and History & Indian Culture

› In the third year, students study one major subject (along with the other two basic subjects)

B.A. (Hons) in Economics (Men Students only): Men Students who meet the eligibility criteria at the end of the first two years of study will have the option to pursue the Honours Programme in Economics. They must study two additional courses of Economics in place of the basic subjects of the three-subject combination in Year 3 (Semesters 5 and 6).

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling from a recognized board (CBSE or equivalent)
- ✓ Either passed or appeared for Final exams at XII level before Admissions Test
- ✓ XII Standard: 55% or more (English) and 60% or more (Aggregate including English)
- ✓ (If not appeared for XII Standard exams, X and XI Standard marks will be considered)
- ✓ Age: preferably below 19 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Economics: Economic Analysis- I

Political Science: Elements of Political Science

Philosophy: Introduction to Indian Philosophy

History & Indian Culture: Ancient India- I

Optional English: Prose

Optional Telugu: Poetry, Prosody and Grammar

Semester 2

Economics: Economic Analysis- II

Political Science: Elements of Government

Philosophy: Introduction to Western Philosophy

History & Indian Culture: Medieval India

Optional English: Poetry

Optional Telugu: Novel

YEAR 2

Semester 3

Economics: Mathematics for Economics

Political Science: Modern Governments- I

Philosophy: Twentieth Century Philosophers- Indian and Western

History & Indian Culture: Modern India - (1760 - 1950 A.D.)

Optional English: Drama

Optional Telugu: Poetry and Grammar

Semester 4

Economics: Statistics for Economics

Political Science: Modern Governments- II

Philosophy: Western Logic (Formal and Symbolic)

History & Indian Culture: Ancient Societies of Egypt, Mesopotamia and China

Optional English: Novel

Optional Telugu: Folk Literature and Alankaras

YEAR 3

Semester 5

Economics: Indian Economy: Structure and Development, Intermediate Micro Economic Theory and a practical course of Introduction to Computer Application-I

Political Science: Principles of Public Administration and a major course to be chosen from Indian Political Thought and Western Political Thought

Philosophy: The Philosophy of Upanishads and major course entitled Ethics- Normative and Applied.

History & Indian Culture: Ancient Greek and Roman Civilizations; Tourism and Travel Management and a major chosen from a set of four electives

Optional English: Study of Literary Forms- Short Story and one-act play and a major course entitled History of English Language

Optional Telugu: History of Literature-I and the major course of Sanskrit- Poetry, Grammar and Translation

Semester 6

Economics: Public Finance and Fiscal Policy, Intermediate Macroeconomic Theory and a practical course entitled Introduction to Computer Application-II

Political Science: Public Personnel Administration and a major course entitled International Politics

Philosophy: General Psychology and a major course entitled Study of Classics- Eastern and Western

History & Indian Culture: Modern World (1750-1945); Principles and Methods of Archeology and a major chosen from a set of four electives.

Optional English: History of English Literature and a major course entitled Literary Criticism

Optional Telugu: Telugu Journalism and a major course of Sanskrit- Poetry, Grammar and Translation

Economics (Hons.) - Semester 5: Indian Economy: Structure and Development, Intermediate Micro Economic Theory, a practical course of Introduction to Computer Application-I, Indian Financial System and International Economics

Economics (Hons.) - Semester 6: Public Finance and Fiscal Policy, Intermediate Macroeconomic Theory and a practical course entitled Introduction to Computer Application-II, Development Economics and Basic Econometrics

B.Com. (Hons.)

Duration: 3 Years | For Women & Men Candidates

The B.Com. (Hons.) Programme will impart basic knowledge and skills in all the important subjects in the field of commerce. It will equip students thoroughly in the field of accounting, finance and taxation. The programme will help students prepare for advanced studies in finance and management and also professional courses in accounting, costing, financial analysis, insurance and corporate secretary-ship. Significant amount of time will also be spent on fostering ethical and moral attitudes to help students become better professionals in the financial services sector and in conducting business and serving industry after graduation.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling from a recognized board (CBSE or equivalent)
- ✓ Either passed or appeared for Final exams at XII level before Admissions Test
- ✓ XII Standard: 55% or more (English) and 60% or more (Aggregate including English)
- ✓ (If not appeared for XII Standard exams, X and XI Standard marks will be considered)
- ✓ Age: preferably below 19 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Business Communication, Financial Accounting-I, Business Economics; Introduction to Quantitative Techniques and Introduction to Computers

Semester 2

Principles of Management, Financial Accounting-II, Business Environment, Quantitative Techniques-I and Practical course on word processing and presentation software

YEAR 2

Semester 3

Company Law, Corporate Accounting, International Business, Quantitative Techniques-II and a Practical course on Accounting Package

Semester 4

Business Statistics, Accounting for Financial Services, Elements of Costing and Practical course on spreadsheet applications - foundations, and a commercial workshop

YEAR 3

Semester 5

Elements of Income Tax, Banking Theory and Practice, Financial Management, two (of four electives) courses, a practical course in Spreadsheet Applications and a commercial workshop

ELECTIVES

Foreign Trade Procedures, Fundamentals of Insurance, Methods of Costing, Advanced Accountancy and Essentials of E-commerce

Semester 6

Principles of Marketing, Commercial Law, Auditing, two courses from a list of four electives, a practical course in Presentation and Database applications (Optional), a comprehensive Viva voce and a commercial workshop

ELECTIVES

Management of International Business, Regulation and Management of Insurance, Management Accounting, Investment Analysis and Retail Management.

Bachelor of Business Administration (B.B.A.)

Duration: 3 Years | For Men Candidates only

A comprehensive introduction to Business Administration at the Undergraduate level, the B.B.A. programme will equip the student with a thorough understanding of the theory and practice of Business Management via twenty core courses, taught over three years. What makes this programme unique from others is the focus on Values-based Management, Rural Development and Corporate Initiatives, Sales Management, National Perspectives and Entrepreneurial Development and Schemes – all of which are seamlessly integrated with the undercurrent of ethics and values.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling from a recognized board (CBSE or equivalent)
- ✓ Either passed or appeared for Final exams at XII level before Admissions Test
- ✓ XII Standard: 55% or more (English) and 60% or more (Aggregate including English)
(If not appeared for XII Standard exams, X and XI Standard marks will be considered)
- ✓ Age: preferably below 19 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Values Oriented Management, Financial Accounting for Management, Business Communications and a practical course in Computer Theory and MS Office-Word

Semester 2

Organizational Behaviour, Analytical Techniques for Management, Business Economics and a practical course in Computers (Accounting Package, MS Office)

YEAR 2

Semester 3

Human Resources Management, Financial Management, Company Law and Corporate Accounting, Office Management and Information Systems and a practical course in Computers (Office Management and Information Systems)

Semester 4

Selected Commercial Laws, Costing for Management, Principles of Marketing and a practical course in MS Office-Access

YEAR 3

Semester 5

Taxation, Rural Development and Corporate Initiatives, Banking-Theory and Practice, Management of Operations, two elective courses from the streams of Marketing, Finance and Human Resources Management without necessarily confining to any single group, a practical course in e-Commerce and a Viva voce

Semester 6

National Perspectives, Management Accounting, Sales Management, Entrepreneurial Development and Schemes, two elective courses from the streams of Marketing, Finance and Human Resources Management without necessarily confining to any single group and a practical course in ERP and CRM

ELECTIVES

Marketing Group

Consumer Behaviour & Marketing Research
Rural Marketing
Promotion & Customer Relationship Management
Retail Marketing

Finance Group

Accounting for Financial Services
Financial Markets & Institutions
Financial Services
Investment Analysis and Portfolio Management
Fundamentals of Insurance
Regulation and Management of Insurance

Human Resources Management Group

Human Resources Development
Labor Welfare & Social Security
Industrial Relations & Labor Law
Employee Training and Development

Information Technology

E-Commerce
IT Basics
Business Analytics

Bachelor of Computer Applications (B.C.A.)

Duration: **3 Years** | For **Men** Candidates only

The program provides training in fundamental courses in Computer Science including Computer Architecture, Algorithms, Operating Systems, Computer Network, Database Systems, Internet Programming, Linux environment. It also provides the foundational mathematical training through courses like Calculus, Linear Algebra and Discrete Mathematics. Students can choose two elective subjects from a list chosen subjects. The application part entails eight software lab courses in C, C++, Java, Unix, Systems Software, Web Programming, SQL and Python scripting, etc. A compulsory software project in the final semester gives students an opportunity of developing their own application software. Courses on Business Communications and Financial Accounting & Management provide additional relevant skills to students.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling from a recognized board (CBSE or equivalent)
- ✓ Either passed or appeared for Final exams at XII level before Admissions Test
- ✓ XII Standard: 55% or more (English) and 60% or more (Aggregate including English)
(If not appeared for XII Standard exams, X and XI Standard marks will be considered)
- ✓ ***In XI / XII Standard, Mathematics (inc. Algebra, Geometry, Calculus and basic Statistics) must be studied***
- ✓ Age: preferably below 19 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Linear Programming, Fundamentals of Computer Systems, Introduction to Computer Science, Software Lab in C (Part-1), Foundation Course-I: Insights into Ramayana

Semester 2

Foundations in Algebra and Geometry, Digital Circuits and Logic Design, Data Structures and Algorithm Analysis in C Software Lab in C (Part-2), Foundation Course-II: Insights into Bhagavatam

YEAR 2

Semester 3

Foundations in Differential and Integral Calculus, Network Essentials, Object Oriented Analysis and Design in C++, Software Lab in C++, Seminar-I, Foundation Course – III: The eternal message of the Bhagavad Gita

Semester 4

Probability and Statistics, Operating System Fundamentals of Financial Accounting, Software Lab in Java, Seminar-II, Foundation Course-IV: The Essentials of Indian Cultural Heritage

YEAR 3

Semester 5

Discrete Mathematics, Internet and Web Technology, Database Management System Business Communications, Elective – I Software Lab in Web Programming Software Lab in SQL and Python Scripting

Semester 6

E-Commerce, System Software, Elective – II Software Lab in Linux Environment, Software Lab in Advanced Java, Software Lab (Mini Project), Comprehensive Viva-voce

Integrated Master of Computer Applications (M.C.A.)

Duration: 5 Years | For Men Candidates only

The programme covers a wide spectrum of courses in Computer Science and Applications including Computer Architecture, Algorithms, Operating Systems, Computer Network, Database Systems, Internet Programming, Linux environment and .NET. A host of advanced courses provide a solid grounding in the area of Computer Science and Applications.

Courses in Mathematical Logic, Operations Research along with Calculus, Linear Algebra, Discrete Mathematics, Probability and Statistics solidify students' mathematical foundation. Students have a choice of eight electives in the program. In order to supplement theoretical learning, related lab courses are conducted each semester. This enhances the application of the core principles of the course. Lastly, courses from mathematics and business will promote logical thinking and expose students to the nuances of the current world business environment. In the final year a compulsory software project completes the rigorous training in Computer Application for solving problem in various domains of science and technology. This would make students ready for a professional career as well as Higher studies.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling from a recognized board (CBSE or equivalent)
- ✓ Either passed or appeared for Final exams at XII level before Admissions Test
- ✓ XII Standard: 55% or more (English) and 60% or more (Aggregate including English)
(If not appeared for XII Standard exams, X and XI Standard marks will be considered)
- ✓ **In XI / XII Standard, Mathematics (inc. Algebra, Geometry, Calculus and basic Statistics) must be studied**
- ✓ Age: preferably below 19 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Linear Programming, Fundamentals of Computer Systems, Introduction to Computer Science, Software Lab in C (Part-1), Foundation Course-I: Insights into Ramayana

Semester 2

Foundations in Algebra and Geometry, Digital Circuits and Logic Design, Data Structures and Algorithm Analysis in C Software Lab in C (Part-2), Foundation Course-II: Insights into Bhagavatam

YEAR 2

Semester 3

Foundations in Differential and Integral Calculus, Network Essentials, Object Oriented Analysis and Design in C++, Software Lab in C++, Seminar-I, Foundation Course – III: The eternal message of the Bhagavad Gita

Semester 4

Probability and Statistics, Operating System Fundamentals of Financial Accounting, Software Lab in Java, Seminar-II, Foundation Course-IV: The Essentials of Indian Cultural Heritage

YEAR 3

Semester 5

Discrete Mathematics, Internet and Web Technology, Database Management System Business Communications, Elective – I Software Lab in Web Programming Software Lab in SQL and Python Scripting

Semester 6

E-Commerce, System Software, Elective – II Software Lab in Linux Environment, Software Lab in Advanced Java, Software Lab (Mini Project), Comprehensive Viva-voce

YEAR 4

Semester 7

Mathematical Logic for Computer Science, Artificial Intelligence, Computer Organization and Design, Linux System Programming, Software Engineering, Software Lab in ARM Processor, Software Lab in Linux System Programming

Semester 8

Operations Research, Foundations of Design and Analysis of Algorithms, Data Warehousing, Mobile Computing, Software Architecture, Software Lab in C#.NET, Software Lab in Network programming, Year End Viva voce

YEAR 5

Semester 9

Elective I, Elective II, Computer Graphics, Software Lab in Computer Graphics, Software Project Interim Review, Comprehensive Viva voce

Semester 10

Elective III, Elective IV, Cloud Computing, Software Lab in Parallel Programming, Software Project

ELECTIVES

GROUP I

Graph Theory, Multimedia Systems, Front End Design Tools, Management Information Systems (MIS), Micro Processor

GROUP II

Distributed Systems, Retrieval, Embedded Computing, Enterprise Resource Planning, Soft Computing, Compiler Design, Formal Languages, Healthcare Informatics, EMR Design & Architecture, Artificial Intelligence

NOTE: The choice of Electives and streams of specialization offered will be decided by the Head of Department. Students can choose any paper as an Elective only from Group I in the 5th & 6th semesters and only from Group II in the 9th & 10th semesters.

B.Sc. in Food and Nutritional Sciences

Duration: **3 Years** | For **Women** Candidates only

The nutritionist plays an increasingly important role as health has become a mainstream and topical issue in society. The programme is a scientific study of health and chemical aspects of food. It provides a strong academic training in nutrition and the related disciplines of food science, physiology, biochemistry and microbiology. Students will get a thorough understanding of the role of diet and nutrition in health and the prevention of major diseases.

The programme content is wide and varied, ranging from the key scientific properties of food to the development of new and innovative food products. It provides an exciting opportunity for students to develop an in-depth scientific understanding of food, as well as important critical thinking and innovation skills needed by the food industry.

The programme is designed to provide an understanding of both the biological and social science perspectives. Students receive basic theoretical and practical training in three major areas—Public Health Nutrition, Dietetics & Food Science and Quality Control—which can be their chosen career specializations for further postgraduate or doctoral research study.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling from a recognized board (CBSE or equivalent)
- ✓ Either passed or appeared for Final exams at XII level before Admissions Test
- ✓ XII Standard: 55% or more (English) and 60% or more (Aggregate including English)
(If not appeared for XII Standard exams, X and XI Standard marks will be considered)
- ✓ Only candidates with subject combinations in XII Standard of Mathematics/Physics/Chemistry or Botany/Zoology/Chemistry are eligible to apply.
- ✓ Age: preferably below 19 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Principles of Culinary Science and Art, Applied Chemistry, Fundamentals of Nutrition, Practical: Principles of Culinary Science and Art, Practical: Applied Chemistry, Practical: Fundamentals of Nutrition

Semester 2

Human Physiology, Microbiology, Introductory Food Science, Practical: Human Physiology, Practical: Microbiology Practical: Introductory Food Science

YEAR 2

Semester 3

Biochemistry, Basic Food Chemistry, Food Preservation Techniques, Practical: Biochemistry, Practical: Basic Food Chemistry Practical: Food Preservation Techniques

Semester 4

Human Nutrition and Metabolism, Bakery and Confectionery, Food Processing Technologies Computer Basics and Applications, Practical: Human Nutrition and Metabolism, Practical: Bakery and Confectionery, Practical: Food Processing Technologies

YEAR 3

Semester 5

Functional Foods and Nutraceuticals, Institutional Food Management, Ergonomic Science, Women and Pediatric Nutrition, Sports Nutrition, Practical: Institutional Food Management, Practical: Women, Pediatric and Sports Nutrition

Semester 6

Food Quality Assurance and Evaluation, Food Product Development, Dietetics, Community Nutrition, Nutrition in Emergency and Disasters, Practical: Food Quality Assurance and Evaluation, Food Product Development, Practical: Dietetics Practical: Community Nutrition

B.Sc. (Hons.) in Mathematics / Physics / Chemistry

Duration: 3 Years | For Women & Men Candidates

- › In the first two years of study, all three subjects (Mathematics, Physics and Chemistry) are taught.
- › In the third year, the subject (**students will take courses in only that subject**) of specialization will determine the final degree awarded: B.Sc. (Hons.) in Mathematics, B.Sc. (Hons.) in Physics, or B.Sc. (Hons.) in Chemistry.

Honours in **Mathematics** (Year 3): Students strengthen their basics of Mathematics as they pursue advanced courses such as Abstract Algebra, Linear Algebra, sophistications of Complex analysis, Topology, Numerical Methods etc. and software laboratory courses such as Introduction to C Programming and Data Structure and File handling using C during the last two semesters. Those who wish to pursue Computer Science may choose elective courses from a list of well structured elective courses. Moreover, students with eligible CGPA at the Honours level with credible performance will get admitted to the M.Sc. in Mathematics programme. Besides getting very good training in Mathematics, this programme provides opportunities to Mathematics graduates for specialization in Computer Science or Actuarial Science.

Honours in **Physics** (Year 3): The programme has been designed to provide a strong foundation in fundamental physics concepts that form the very basis of advanced scientific inventions. The curriculum presents a blend of science and technology, with the physics courses complimented by adequately equipped laboratory experiments and supplemented by lessons in advanced electronics and microprocessors. The program aims at inspiring students to further pursue science at the Masters level and beyond.

Honours in **Chemistry** (Year 3): The emphasis is on teaching the fundamental principles of Chemistry that cover topics under each of the major branches of Chemistry such as Inorganic, Organic and Physical, and giving training in appropriate experimental methods. Electives (including interdepartmental) are being introduced for Chemistry Honours students that enable the incorporation of emerging fields into the syllabus as and when the need arises. The graduating student will be exposed to almost every aspect of the subject - Theoretical, Applied, Instrumental, Computational and Experimental.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling from a recognized board (CBSE or equivalent)
- ✓ Either passed or appeared for Final exams at XII level before Admissions Test
- ✓ XII Standard: 55% or more (English) and 60% or more (Aggregate including English)
(If not appeared for XII Standard exams, X and XI Standard marks will be considered)
- ✓ Age: preferably below 19 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Mathematics: Multivariable Calculus, Foundations of Mathematics

Physics: Electronics I: Analog and Digital and Practical Course in Electronics I

Chemistry: Principles of Structure and Bonding, Lab Course in General Chemistry

Semester 2

Mathematics: Probability (MPC group) Linear Programming (MES, MCSS group), Methods of Ordinary Differential Equations

Physics: Optics and Practical course in Optics

Chemistry: Chemical Thermodynamics, Laboratory Course on Titrmetry and Thermodynamics

YEAR 2

Semester 3

Mathematics: Introduction to Real Analysis, Introduction to Linear Algebra

Physics: Classical Mechanics and Practical course in Classical Mechanics

Chemistry: Chemical Kinetics and Equilibria, Lab Course on Chemical Kinetics and Equilibria

Semester 4

Mathematics: Real Analysis, Algebraic Structure

Physics: Electromagnetism and Practical course in Electromagnetism

Chemistry: Chemistry of Organic Functional Groups, Lab Course on Methods and Synthesis in Organic Chemistry

YEAR 3

Semester 5

Mathematics: Complex Analysis, Topics in Linear Algebra, Topology, and two electives chosen from the streams of Mathematics, and Computer Science and Software Lab I (Introduction to C Programming)

or

Physics: Two courses of Mathematical Physics (Mathematical Physics-I and Mathematical Physics-II), Quantum Mechanics, Electronics comprising Operational Amplifiers, Computational Techniques in Physics and three practical courses out of which one will be general, one in Operational Amplifiers and one in software

or

Chemistry: Chemistry of Elements, Topics in Physical Chemistry, Dynamic Aspects of Organic Chemistry, Chemistry of Biological Molecules, Quantum Chemistry, Environmental and Green Chemistry, Lab Course in Physical and Inorganic Chemistry, Lab Course in Organic Chemistry and Biochemistry, Project / Lab Course in Computer Applications – I

Semester 6

Mathematics: Algebraic Structures-II, Numerical Analysis, Methods of Differential Equations; Two electives chosen from the streams of Mathematics, and Computer Science; and Software Lab II (Data Structure and File Handling using C)

or

Physics: Solid State Physics, Nuclear Physics, Thermal Physics and Statistical Physics, Elements of Atomic and Molecular Spectroscopy and Lasers, Microprocessors; practical course in Microprocessors and software Lab and a Project work

or

Chemistry: Spectroscopy, Analytical Chemistry, Synthetic Organic Chemistry, Topics in Inorganic Chemistry, Theoretical Aspects of Spectroscopy, Materials of Industrial Importance, Lab Course in Inorganic and Analytical Chemistry, Lab Course in Synthetic Organic Chemistry and Spectral Methods, Project / Lab Course in Computer Applications – II

ELECTIVES

Mathematics group:

Geometry, Combinatorics, Elementary Number theory, Graph theory, Continuum Mechanics, Operations Research, Linear Programming, Introduction to coding theory and Discrete Mathematics

Computer Science group:

Introduction to Computer Science, Fundamentals of Computer Systems, Data Structures and Algorithms, Mathematical Logic for Computer Science, and Design of Algorithms.



B.Sc. (Hons.) in Biosciences / Chemistry

Duration: 3 Years | For Women & Men Candidates

- › In the first two years of study, both subjects (Biosciences and Chemistry) are taught
- › In the third year, the subject (**students will take courses in only that subject**) of specialization will determine the final degree awarded: B.Sc. (Hons.) in Biosciences or B.Sc. (Hons.) in Chemistry

Honours in **Biosciences** (Year 3): Much emphasis is laid on getting students abreast with the newly emerging areas of Biological Sciences. Practical courses—including hands-on training in laboratory techniques—enhance students' understanding of the basic and applied theoretical concepts. These include morphological and anatomical aspects gained earlier along with Structure; functional relationships that exist among organisms and applications developed in the field of Biological Sciences for improving the quality of Man's life.

Honours in **Chemistry** (Year 3): The emphasis is on teaching the fundamental principles of Chemistry that cover topics under each of the major branches of Chemistry such as Inorganic, Organic and Physical, and giving training in appropriate experimental methods. Electives (including interdepartmental) are being introduced for Chemistry Honours students that enable the incorporation of emerging fields into the syllabus as and when the need arises. The graduating student will be exposed to almost every aspect of the subject - Theoretical, Applied, Instrumental, Computational and Experimental.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling from a recognized board (CBSE or equivalent)
- ✓ Either passed or appeared for Final exams at XII level before Admissions Test
- ✓ XII Standard: 55% or more (English) and 60% or more (Aggregate including English)
(If not appeared for XII Standard exams, X and XI Standard marks will be considered)
- ✓ Age: preferably below 19 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Biosciences: Algae and Fungi, Invertebrata

Chemistry: Principles of Structure and Bonding, Lab Course in General Chemistry

Semester 2

Biosciences: Bryophytes and Pteridophytes, Chordata

Chemistry: Chemical Thermodynamics, Laboratory Course on Titrimetry and Thermodynamics

YEAR 2

Semester 3

Biosciences: Taxonomy and Economic Importance of Angiosperms, Embryology of Animals

Chemistry: Chemical Kinetics and Equilibria, Lab Course on Chemical Kinetics and Equilibria

Semester 4

Biosciences: Biostatistics and Information Technology, Bacteriology and Virology

Chemistry: Chemistry of Organic Functional Groups, Lab Course on Methods and Synthesis in Organic Chemistry

YEAR 3

Semester 5

Biosciences: Plant Physiology, Animal Physiology, Cell Biology, Anatomy and Embryology of seed Plants and one course to be chosen from Microbial Physiology and Genetics and an Inter-Departmental Elective- Chemistry of Biological Molecules

or

Chemistry: Chemistry of Elements, Topics in Physical Chemistry, Dynamic Aspects of Organic Chemistry, Chemistry of Biological Molecules, Quantum Chemistry, Environmental and Green Chemistry, Lab Course in Physical and Inorganic Chemistry, Lab Course in Organic Chemistry and

Biochemistry, Project / Lab Course in Computer Applications – I

Semester 6

Biosciences: Genetics and Evolution, Environmental Biology, Introductory Molecular Biology, Biological Chemistry, Biotechnology

or

Chemistry: Spectroscopy, Analytical Chemistry, Synthetic Organic Chemistry, Topics in Inorganic Chemistry, Theoretical Aspects of Spectroscopy, Materials of Industrial Importance, Lab Course in Inorganic and Analytical Chemistry, Lab Course in Synthetic Organic Chemistry and Spectral Methods, Project / Lab Course in Computer Applications – II

B.Sc. (Hons.) in Mathematics / Economics / Statistics

Duration: 3 Years | For Men Candidates only

- › In the first two years of study, all three subjects (Mathematics, Economics and Statistics) are taught
- › In the third year, the subject (**students will take courses in only that subject**) of specialization (Mathematics or Economics only) will determine the final degree awarded: B.Sc. (Hons.) in Mathematics, or B.Sc. (Hons.) in Economics

Honours in **Mathematics** (Year 3): Students strengthen their basics of Mathematics as they pursue advanced courses such as Abstract Algebra, Linear Algebra, sophistications of Complex analysis, Topology, Numerical Methods etc. and software laboratory courses such as Introduction to C Programming and Data Structure and File handling using C during the last two semesters. Those who wish to pursue Computer Science may choose elective courses from a list of well structured elective courses. Moreover, students with eligible CGPA at the Honours level with creditable performance will get admitted to the M.Sc. in Mathematics programme. Besides getting very good training in Mathematics, this programme provides opportunities to Mathematics graduates for specialization in Computer Science or Actuarial Science.

Honours in **Economics** (Year 3): The Economics programme provides rigorous training in micro and macro economic theory, quantitative analysis and some areas of applied economics such as finance, international economics, public finance and development economics. On the whole, there is considerable emphasis on quantitative orientation in all courses. Part of the training includes computer applications using data relating to the Indian economy. Graduating students can further pursue an MBA or a Masters degree in economics.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling from a recognized board (CBSE or equivalent)
- ✓ Either passed or appeared for Final exams at XII level before Admissions Test
- ✓ XII Standard: 55% or more (English) and 60% or more (Aggregate including English)
(If not appeared for XII Standard exams, X and XI Standard marks will be considered)
- ✓ Age: preferably below 19 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Mathematics: Multivariable Calculus, Foundations of Mathematics

Economics: Economic Analysis - I,

Statistics: Introductory Statistics

Semester 2

Mathematics: Probability (MPC group)
Linear Programming (MES, MCSS group),
Methods of Ordinary Differential Equations

Economics: Economic Analysis - II

Statistics: Probability Theory and Distributions

YEAR 2

Semester 3

Mathematics: Introduction to Real Analysis, Introduction to Linear Algebra

Economics: Introduction to Mathematical Economics

Statistics: Statistical Inference

Semester 4

Mathematics: Real Analysis, Algebraic Structure

Economics: Money and Banking

Statistics: Applied Statistics

YEAR 3

Semester 5

Mathematics: Complex Analysis, Topics in Linear Algebra, Topology, and two electives chosen from the streams of Mathematics, and Computer Science and Software Lab I (Introduction to C Programming)

or

Economics: Indian Economy: Structure and Development, Intermediate Micro Economic Theory, Indian Financial System, International Economics and a practical course of Introduction to Computer Application-I

Semester 6

Mathematics: Algebraic Structures-II, Numerical Analysis, Methods of Differential Equations; Two electives chosen from the streams of Mathematics, and Computer Science; and Software Lab II (Data Structure and File Handling using C)

or

Economics: Public Finance and Fiscal Policy, Intermediate Macroeconomic Theory, Development Economics, Basic Econometrics and a practical course entitled Introduction to Computer Application-II

B.Sc. (Hons.) in Mathematics/Computer Science/Statistics

Duration: **3 Years** | For **Men** Candidates only

- › In the first two years of study, all three subjects (Mathematics, Computer Science and Statistics) are taught
- › In the third year, only Mathematics course will be taught, leading to the final degree awarded: B.Sc. (Hons.) in Mathematics.

The programme is built on the four paradigms to study science: Theory, Experiment, Data Analysis and Simulation. In the first two formative years, the focus is given on Computer Science training in the current, modern context. This includes: The use of a computer more as a tool for problem solving, Data Structures with Python, Database or Information system (including associated lab work), Data Visualization, Artificial Intelligence (AI) and Web Technology and Design.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling from a recognized board (CBSE or equivalent)
- ✓ Either passed or appeared for Final exams at XII level before Admissions Test
- ✓ XII Standard: 55% or more (English) and 60% or more (Aggregate including English)
(If not appeared for XII Standard exams, X and XI Standard marks will be considered)
- ✓ Age: preferably below 19 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Mathematics: Multivariable Calculus, Foundations of Mathematics

Computer Science: Introduction to Information System, Information Systems Lab

Statistics: Introductory Statistics

Semester 2

Mathematics: Probability (MPC group) Linear Programming (MES, MCSS group), Methods of Ordinary Differential Equations

Computer Science: Problem Solving using Computers, Python Lab

Statistics: Probability Theory and Distributions

YEAR 2

Semester 3

Mathematics: Introduction to Real Analysis, Introduction to Linear Algebra

Computer Science: Introduction to Data Visualization, Data Visualization Lab

Statistics: Statistical Inference

Semester 4

Mathematics: Real Analysis, Algebraic Structure

Computer Science: Introduction to Artificial Intelligence, Web Technology & Design Lab

Statistics: Applied Statistics

YEAR 3

Semester 5

Mathematics: Complex Analysis, Topics in Linear Algebra, Topology, and two electives chosen from the streams of Mathematics, and Computer Science and Software Lab I (Introduction to C Programming)

Semester 6

Mathematics: Algebraic Structures-II, Numerical Analysis, Methods of Differential Equations; Two electives chosen from the streams of Mathematics, and Computer Science; and Software Lab II (Data Structure and File Handling using C)

Bachelor of Performing Arts (Music)

Duration: **4 Years** | For **Men** Candidates only

The Department of Music at Prasanthi Nilayam Campus for MEN offers full time residential programmes in music in Carnatic (South Indian) system as well as Hindustani (North Indian) system in Vocal and Instrumental streams. The department offers four major disciplines.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling (with music as one the subject) from a recognized board (CBSE or equivalent) OR
- ✓ 10+2 years of schooling with Diploma in Music from a recognized board (CBSE or equivalent) OR
- ✓ 10+2 years of schooling from a recognized board (CBSE or equivalent) with minimum two years of training from a reputed Guru **
- ✓ Either passed or appeared for Final exams at XII level before Admissions Test
- ✓ XII Standard: 50% or more (English) and 55% or more (Aggregate including English) Candidates belonging to Scheduled Castes / Scheduled Tribes are entitled to a relaxation of 5% marks.
- ✓ If not appeared for XII Standard exams, X and XI Standard marks will be considered) In such cases: 50% or more (English) and 55% or more (Aggregate including English) Candidates belonging to Scheduled Castes / Scheduled Tribes are entitled to a relaxation of 5% marks. The candidate should have taken their final year qualifying examination before the date of admission test.
- ✓ Age: preferably below 19 years as of 31st May in the year of admission

** Candidates who have not studied Music as one of the subjects in X/XII qualifying examination must have studied Music for not less than two years in a recognized Institution OR got training in Music for not less than two years from a well-known teacher/guru. Such candidates shall be required to submit a certificate issued by the teacher/institution.

MAJOR & ELECTIVE SUBJECTS

The department offers four major disciplines. **Students can opt one major and one elective.** In the first two years both major and elective subjects are taught and in the third year only the chosen major subject is taught. Candidates will have to choose one major and one related elective subject from the above. The elective subjects offered will be based on the aptitude of the candidates.

Major

Vocal (Carnatic) Major
 Vocal (Hindustani) Major
 Instrumental Mridangam Major
 Instrumental Tabla Major

Elective

Vocal (Hindustani) OR Instrumental Mridangam OR Instrumental Veena
 Instrumental Sitar OR Instrumental Tabla OR Vocal Carnatic
 Vocal (Hindustani) OR Instrumental Tabla OR Instrumental Veena OR Vocal Carnatic
 Vocal (Hindustani) OR Instrumental Sitar OR Instrumental Mridangam

Facilities: The Department of Music has facilities not just for imparting education in Music but is also equipped with computerized audio recording facility, a well-equipped library with a good number of books relating to Music as well as Sai spiritual literature. A huge digital music collection of great maestros with a latest multipurpose music system are available in the library for the benefit of the students. Musical instruments required for the purpose of classroom teaching and for practice sessions are provided.

Visiting Artistes: Artistes from various corners visit Prasanthi Nilayam as pilgrims. They are invited to visit the Sri Sathya Sai Institute of Higher Learning, from time to time and give lecture demonstrations. Great maestros like Sri Umayalpuram Sivaraman (Mridangam Vidwan), Sri Komanduri Sheshadri (Violin Vidwan), Sri Hariharan (Ghazal Singer), Sri Naiveli Santana Gopalan (Carnatic Vocal Vidwan), Suresh Wadkar (North Indian Classical Singer), Smt Anuradha Krishnamurthy (Carnatic Vocal Vidwan), Padmashri Palanivel (Thavil Vidwan) and Prof. Yella Venkateswara Rao (Mridangam Vidwan) are some of the artists whose expertise richly benefits students, particularly during interactive sessions.

Diploma in Music

Duration: **2 Years** | For **Men** Candidates only

A two-year Diploma Course in Music is offered for MEN students at Prasanthi Nilayam Campus under the department of Music. This Diploma Course is offered in two streams viz., Carnatic and Hindustani systems in following disciplines Vocal, Veena, Mridangam, Sitar, Mridangam and Tabla.

ELIGIBILITY REQUIREMENTS

- ✓ Passed X Std. of study from a recognized board (CBSE or equivalent)
- ✓ Foundation Course (or equivalent) in Music from a recognized College / Institution
- ✓ Age: Above 16 years and below 20 years as of 31st May in the year of admission

Note: Candidates who are especially talented, with a family background in Professional Music and other Fine Arts will also be considered. In such cases, the candidate must produce documentary evidence.

COURSES TAUGHT

Carnatic System

YEAR 1

Main Stream DC (Vocal): Theory, General English, Vocal Practical
 Main Stream DC (Veena): Theory, General English, Veena Practical
 Main Stream DC (Mrudangam): Tala Theory, General English, Mrudangam Practical
 Ancillary Stream DC (Vocal): Ancillary Vocal Practical
 Ancillary Stream DC (Veena): Ancillary Veena Practical
 Ancillary Stream DC (Mrudangam): Ancillary Mrudangam Practical

YEAR 2

Main Stream DC (Vocal): Theory, General English, Vocal Practical
 Main Stream DC (Veena): Theory, General English, Veena Practical
 Main Stream DC (Mrudangam): Tala Theory, General English, Mrudangam Practical
 Ancillary Stream DC (Vocal): Ancillary Vocal Practical
 Ancillary Stream DC (Veena): Ancillary Veena Practical
 Ancillary Stream DC (Mrudangam): Ancillary Mrudangam Practical

Hindustani System

YEAR 1

Main Stream DH (Vocal): Theory, General English, Vocal Practical
 Main Stream DH (Sitar): Theory, General English, Sitar Practical
 Main Stream DH (Tabla): Tala Theory, General English, Tabla Practical
 Ancillary Stream DH (Vocal): Ancillary Vocal Practical
 Ancillary Stream DH (Sitar): Ancillary Sitar Practical
 Ancillary Stream DH (Tabla): Ancillary Tabla Mrudangam

YEAR 2

Main Stream DH (Vocal): Theory, General English, Vocal Practical
 Main Stream DH (Sitar): Theory, General English, Sitar Practical
 Main Stream DH (Tabla): Tala Theory, General English, Tabla Practical
 Ancillary Stream DH (Vocal): Ancillary Vocal Practical
 Ancillary Stream DH (Sitar): Ancillary Sitar Practical
 Ancillary Stream DH (Tabla): Ancillary Tabla Mrudangam

Applications for this programme are NOT available online. Paper applications are available from the Admissions Office, SSSIHL, Prasanthi Nilayam. Applications can be picked up in person or by emailing us at admissions@sssihl.edu.in

UNDERGRADUATE TEST SYLLABUS

The admission test syllabus is based on XI/XII Std. of CBSE. The question paper will be of Multiple Choice type.

- › There will be negative marking for all multiple choice questions.
- › The General English / Verbal skills Test is compulsory for all undergraduate programmes
- › **Model Test Papers** are available on the university's website - sssihl.edu.in

GENERAL ENGLISH

- › Comprehension of Unseen Passage: Prose and Poetry.
- › **Vocabulary:** Antonyms, Synonyms, One-word Substitutes, Pairs of Words Often Confused
- › **Grammar:** Tenses, Prepositions, Phrasal Verbs, Voice(s), 'too – enough,' 'since' and 'for'
- › **Structure:** Reported Speech, Spellings, Punctuation, Correction of Sentences
- › **Composition:** Re-ordering or re-arranging of sentences to form a coherent whole, guided composition, paragraph writing, letter writing.

MATHEMATICS

- › **Algebra and Trigonometry:** Sets, Relations and functions; Complex Numbers; Matrices and Determinants; Quadratic Equations; Permutations and Combinations; Mathematical Induction and its applications; Binomial theorem and its applications; Sequences and Series; Trigonometry.
- › **Calculus:** Differential Calculus; Integral Calculus; Differential Equations.
- › **Two Dimensional Geometry.**
- › **Statistics:** Measures of Central tendency and Dispersion; Probability.

PHYSICS

- › **Measurements:** Fundamental and derived units – length, mass and time measurements; Accuracy and precision of measuring instruments, errors in measurement – significant figures; Dimensions - dimensions of physical quantities – dimensional analysis;
- › **Scalar and vector quantities:** Addition and subtraction of vectors, unit vector, resolution of vectors, rectangular components, multiplication of vectors - scalar, vector products.
- › **Mechanics and Kinematics:** Motion in a straight line, position time graph, speed and velocity, uniform and non-uniform motion, uniformly accelerated motion; Motion in two dimensions; projectile motion; Force and inertia, Newton's laws and their applications; unit of force – impulse; law of conservation of linear momentum and its applications; Equilibrium of concurrent forces – triangle law, parallelogram law; Uniform circular motion, angular velocity, angular acceleration; relation between linear and angular velocities. Centripetal force; Work done by a constant force and a variable force; unit of work. Potential and kinetic energy, work – energy theorem; Collisions – Elastic and in-elastic collisions in one dimension; Moment of inertia and its physical significance – radius of gyration; angular momentum. Torque – conservation of angular momentum.
- › **Gravitation:** The universal law of gravitation; acceleration due to gravity and its variation with the altitude, latitude, depth and rotation of the Earth.
- › **Solids:** Elastic behaviour, stress – strain relationship, Hooke's law; three types of moduli of elasticity;
- › **Periodic motion:** Period, frequency, displacement as a function of time. Simple harmonic motion – amplitude, frequency, phase – uniform circular motion as SHM. Oscillations of a spring; Energy in SHM. kinetic and potential energies;
- › **Wave motion:** longitudinal and transverse waves – relation between frequency, wavelength and velocity of a wave, Superposition principle, Interference – intensity and sound level; beats, standing waves – standing waves in strings and pipes – sonometer – resonance air column – fundamental mode and harmonics. Doppler effect;
- › **Thermodynamics and Kinetic theory:** Laws of thermodynamics; heat conduction, convection, radiation; kinetic theory of gases;
- › **Optics:** Reflection of light – reflection at plane and curved surfaces; total internal reflection; determination of velocity of light – Michelson's method; refraction – spherical lenses – thin lens formula, lens makers formula – magnification – power

of a lens – combination of thin lenses in contact; refraction of light through a prism – dispersion – spectrometer – determination of μ – rainbow; optical instruments – microscope, telescope, resolving power;

- › **Electrostatics and Current Electricity:** Electric charges, conductors, insulators, charging by induction, properties of electric charge, coulomb's law, forces between multiple charges, electric field, electric field lines, electric flux, electric dipole, dipole in uniform external field, electrostatic potential, potential due to point charge, electrostatics of conductors, capacitors, capacitance, parallel plate capacitor, energy stored in capacitors, combination of capacitors.
- › **Electric current, Electric current in conductors:** ohm's law - electrical energy and power, combination of resistance, Kirchoff's law, wheat stone bridge network, metre bridge, potentiometer
- › **Moving Charges, Magnetism and Electromagnetic induction:** Earth's magnetic field and magnetic elements. Bar magnet - magnetic field lines. Magnetic field due to magnetic dipole along the axis and perpendicular to the axis; torque on a magnetic dipole in a uniform magnetic field; magnetic properties of materials–Intensity of magnetisation, magnetic susceptibility, magnetic induction and permeability Dia, Para and Ferromagnetic substances with examples; magnetic force and motion in a magnetic field, Biot-savart Law, Ampere's circuital law, solenoid, torque on current loop, magnetic flux, Faraday's law, Lenz's law, motional EMF, AC generator;
- › **Atomic and Nuclear Physics:** Alpha particle scattering and Rutherford's nuclear model, atomic spectra, Bohr model of hydrogen atom, hydrogen atom spectra, composition of nucleus, size of the nucleus, nuclear binding energy, nuclear force, radioactivity, Nuclear Fission and Fusion;
- › **Electronics: Semiconductors:** intrinsic and extrinsic, p-n junction, diodes, special purpose diodes, transistors, digital electronics -logic gates.

CHEMISTRY

- › **General and Physical Chemistry:** Some basic concepts of chemistry-structure of atom-acids and bases-pH-buffers-buffer action-buffer capacity-hydrolysis of salts-solubility product-states of matter (gases and liquids)-solutions-thermodynamics-1st and 2nd law-electrochemistry-Nernst equation, electrochemical cell, cell representation and cell potential-chemical equilibrium- redox reactions-solid state-chemical kinetics-1st order rate expression, 2nd order rate expression, half life period and Arrhenius equation and surface chemistry- chemical adsorption and physical expression.
- › **Inorganic Chemistry:** Periodic table-chemical bonding and molecular structure – hydrogen-general characteristics of s-block elements-p-block elements and d-block elements-coordination chemistry-EAN rule, nomenclature and valence bond theory- organometallics-importance of coordination compounds in qualitative inorganic analysis principles and processes of isolation of elements-nuclear chemistry-different types of decay.
- › **Organic and Applied Chemistry:** Purification and Characterization of Organic Compounds; Some basic principles-Hydrocarbons-haloalkanes and haloarenes-organic compounds containing oxygen (alcohols, phenols, carbonyl compounds, carboxylic acids), Organic Compounds containing Nitrogen (aliphatic and aromatic amines – primary, secondary and tertiary amines) – diazonium salts-synthetic and natural polymers-biomolecules - chemistry in action-environmental chemistry.

COMPUTER SCIENCE

- › Introduction to computers
- › Hardware & software concepts
- › Parts of computer
- › Operating systems
- › Language Processors
- › Number conversion (binary, octal, decimal, hexadecimal)
- › Logical reasoning

BOTANY

- › **Plant Kingdom:** Five kingdom classification major groups and their salient features. Bacteria, Fungi, Bryophytes, Pteridophytes, Gymnosperm.
- › **Morphology:** Structural organization of stem, leaf and root and their modifications (Stem-climber,

Rhizome, tuber, bulb, corm); leaf - foliage, scale and bract; root - tap and adventitious roots in dicot and monocot plants.

- › **Anatomy:** Tissues - Parenchyma, collenchymas, sclerenchyma, xylem, phloem. Anatomy of root, stem and leaf of monocot and dicot plants.
- › **Embryology:** Structure and function of flower, Inflorescence, (Cymose, Racemose and special types) Androecium (Anther structure, microsporangium, microsporogenesis and male gametophyte), Entomophilies, Hydrophily, Zoophily, Fertilization, Fruits (Simple, aggregate and multiple fruits).
- › **Physiology:** Basic account on water absorption, Ascent of sap, Transpiration (Exchange of gases, stomatal mechanism), Respiration (Glycolysis, Krebs cycle, electron transport system), Photosynthesis (Light and dark reaction - Calvin cycle), factors affecting photosynthesis - light, temperature and Carbon dioxide, Growth (Plant hormones and growth regulation) and movements (Turgor and growth movements), Mineral nutrition (essential and non-essential elements) in plants.
- › **Applied Botany:** Plant concept of Plant breeding - mutation, hybridization, polyploidy. Use of fertilizers and pesticides (advantages and hazards).
- › **Cell Biology:** Introduction on Cell theory, Prokaryotic, Eukaryotic cell, Cell wall, cell membrane and cell organelles, Plastids, mitochondria, endoplasmic reticulum, golgi bodies, ribosome, lysosome, nucleus and chromosomes, Mitosis, Meiosis.
- › **Ecology:** Concept of Organism and population, Ecological adaptation, Ecosystem: Components, types, energy flow, nutrient cycling.

ZOOLOGY

- › **Diversity of living organisms:** Classification of animals, salient features of non-chordata upto phyla level, chordata to class level.
- › **Anatomy, histology and physiology (Earthworm, cockroach, Frog and Human):** Integumentary system, digestive system, respiratory, circulatory, excretory, Muscular, nervous, endocrine and reproductive systems. Connective tissue, epithelial tissue, small intestine, Histology of stomach, bone, blood, lymph, liver, pancreas, lung, spleen, kidney, skin, testis and ovary.

ACCOUNTANCY

(Including Quantitative Aptitude)

- › Basic Accounting theory
- › Recording of transactions: Subsidiary books - Journal - Ledger
- › Trial balance, rectification of errors
- › Financial statements, trading and profit and loss account (with adjustments) and balance sheet
- › Final accounts for non-trading concerns
- › Bills of exchange
- › Partnership accounting: Admission, retirement, death and dissolution
- › Company accounts: Issue of shares, forfeiture, re-issue, issue and redemption of debentures, final accounts - classification of assets and liabilities of presenting balance sheet
- › Depreciation Accounting: Straight line and Diminishing value methods; Provision for Depreciation
- › Single entry: Statement of affairs and determination of profit.
- › Quantitative Aptitude:
- › Basic arithmetical operations - Basic properties of numbers - HCF & LCM - Fractions - Decimals - Percentages - Ratio & proportions - Power & groups - Simple Interest & Compound Interest - Mensuration - Problem solving in Algebra - Elementary Geometry - Statistical tables & averages.

COMMERCE

- › Business Organization and Principles of Management:
- › Economic activities and business
- › Formation of business units
- › Corporate Organization – Types
- › Stock exchange
- › Transport and storage/warehousing
- › Banking and financial institutions
- › Evolution and growth of management
- › Organization of modern business office
- › Nature and purpose of business
- › Structural aspects of business
- › Business and sources of finance
- › Trade: Internal and external
- › Elements of insurance/types
- › Nature and significance of management
- › Planning, organizing, staffing, directing and controlling

ECONOMICS

- › **Basic concepts:** What is an economic problem? - Meaning of economy - Goods and Services - Economic systems (Capitalism, Socialism and Mixed Economy)- Economic Methods

(deductive and inductive)- Micro and Macroeconomics.

- › **Consumption:** Meaning of wants - Utility - Laws of demand - Elasticity of demand- Indifference Curve Analysis-Consumer equilibrium.
- › **Production:** Supply- Law of variable proportions - Cost and Revenue concepts- Economies of scale (large scale and small scale production)- Returns to Scale.
- › **Value and Exchange:** Determination of price - Market price and normal price- Market structure-features - nature of demand curves- Perfect competition, Imperfect competition and Monopoly.
- › **Distribution:** Factor Pricing-derived demand- The concepts of Rent, Wages, Interest and Profit.
- › **Macro economics:** Aggregate demand - Aggregate supply- Effective demand- Equilibrium level of income - Propensity to consume- Propensity to save and invest - MEC - MEI- Multiplier- Accelerator (only concepts).
- › **Indian Economic Problems:** Nature of Indian Economy- Basic structure - Poverty and unemployment in India - Problem of Population - Regional disparities - India's national Income- Inequality- Indian Planning - The effect of Economic Reforms.

STATISTICS

- › **Statistical data:** Definition and scope of the Statistics - collection and organisation of data, frequency distributions - diagrams and graphical representation of data.
- › Measures of Location: Arithmetic mean - Median, Quartiles, Deciles and Percentiles - Mode - Weighted arithmetic mean, Geometric mean and Harmonic mean - Simple problems.
- › Measures of Dispersion: Range - Quartile deviation - Mean deviation - Variance and Standard - Coefficient of variation - simple problems.
- › Correlation: Concept of bivariate distributions - Scatter diagram, Karl Pearson's co-efficient of correlation - Spearman's rank correlation (without ties) - Simple Problems.
- › Data interpretation: Interpretation of quantitative variables from tables and from diagrams.
- › Index Numbers: Meaning- types- Wholesale Price Index- Consumer Price Index- Inflation and Index Numbers- Uses of Index Numbers.

CIVICS

- › **Civics** - Meaning and scope; Aims and value of its study; its relationship with History, Political Science, Economics and Ethics.
- › **Individual and his relationship with family and society, Society** - meaning and advantages of social life; Role of various Associations, eg., Religious, Political, Economic and Cultural.
- › **Citizenship** - meaning and importance: Single and dual citizenship - advantages and disadvantages; Rights and Duties of Citizens; Hindrances to good citizenship.
- › **Nation** - meaning and importance: Nationality, meaning and elements, India as a Nation.
- › **State and its essential elements;** Population; Territory; Government and Sovereignty. Definition of the term sovereignty - nature, characteristics and coercive nature of the State.
- › **Individual and the Modern State** (Basic concepts):
 - › (a) **Law** - meaning, characteristics, sources - law and morality, (b) **Liberty** - meaning and kinds; Law and Liberty, (c) **Equality** - meaning and kinds; Relation between liberty and equality, (d) **Fraternity** - meaning - need for co-operation and co-existence of individuals for common good.
 - › **Liberty** - meaning and kinds; Law and Liberty
 - › **Forms of Government;** Unitary and Federal, Parliamentary and Presidential - characteristics - merits and demerits. (Provide stress on the functions of the Legislature, Executive and Judiciary)
 - › **Spheres of State activity,** Individualism, socialism, communism, capitalism and dictatorship.
 - › **Democracy:** meaning - kinds - features - merits and demerits of direct and indirect democracy, conditions necessary the success of democracy; role of parties and public opinion in democracy.
 - › **Constitution of India:** Brief study of the features as given below:
 - › (a) Preamble, (b) Fundamental rights, (c) Directive principles of State Policy, (d) Federal System, (e) Parliamentary features.
 - › **Govt. of India:**
 - › (a) Parliament, (b) Cabinet, (c) All India Services, (d) State Legislatures and Cabinet, (e) Centre-State relations - Administrative, Legislative and Financial.
 - › Structure and working of Local Governments (Brief Study)
 - › (a) Corporations and Municipalities, (b) Panchayat Raj, (c) Zilla Parishads and Mandala Parishads, (d) The role of District Collectors.

- › **Adult Franchise:** Meaning and working. Advantages and disadvantages; Development of Weaker Sections.
- › **National Integration and its need:** (a) Communalism, (b) Casteism, (c) Linguism, (d) Regionalism.
- › United Nations - Its aims and principal organs. Its role in promoting international peace and understanding.

POLITICAL SCIENCE

- › **Political Science** - meaning, nature and scope
- › **Citizen** - State and Society; Citizenship - Rights and duties of citizens (a brief study of the fundamental rights and fundamental duties of Indian citizens).
- › **State and Government:** Nature and definition of State; Elements of state; State and Society; State and Associations.
- › **Nation and Nationality:** Meaning of the terms Nation and Nationality, Elements of Nationality; Nationalism - meaning, importance, merits and demerits.
- › **Sovereignty** - meaning, characteristics and kinds of sovereignty, legal, political and popular sovereignty.
- › **Law, Liberty and equality:** Meaning of the terms Law and Liberty, Law and morality. Liberty and Law, Sources of Law, Kinds of Law; Definition of the term Liberty, Kinds of liberty; Equality - Definition of the term, kinds - liberty and equality.
- › **Forms of Government:** Unitary and Federal - meaning, merits and demerits, Parliamentary and Presidential - explanation - merits and demerits of both systems.
- › **Spheres of State activity:** Individualism, Socialism, Communism, Capitalism and Dictatorship, Gandhism and Sarvodaya.
- › **Constitution:** Classification - Written and Unwritten; Rigid and Flexible - meaning - merits and demerits.
- › **Indian Constitution:** Salient Features - Indian National Movement: Main events 1857, 1919, 1935, 1942 and 1945.
- › **Legislature:** Organization, powers and functions of the legislature; A brief study of the organization, functions and working of Indian Parliament.
- › **Executive in India:** President - election, powers and functions; Vice-President, Prime Minister and the Council of Ministers; Governor - appointment - powers and functions, Chief Minister and the Council of Ministers.
- › **Judiciary:** Role and importance, Independence of Judiciary, Supreme Court and the High Courts in India.
- › **Civil Services:** Nature - importance and

functions of Civil Services; Bureaucracy, U.P.S.C., Organization and functions.

- › **Electorate:** Types of franchise, Merits and Demerits, Direct Democratic Devices.
- › **Party system:** Political parties, their role and functions, Role of opposition in democracy.
- › **Public Opinion:** Meaning - Agencies of public opinion, role and importance of Public Opinion.
- › **Local Self Government:** Panchayat Raj, Municipal Govt., planning - importance - socio economic development - rural and urban development; development of scheduled castes and tribes.
- › **Factors conditioning Indian Democracy:** Inequality - social and economic; Regional imbalance, communalism and casteism, Regionalism and Linguism.
- › **Internationalism:** Meaning and importance - United Nations - Aims - Objectives, Organs and functions.

HISTORY

ANCIENT INDIA

- › **Introduction:** Pre-history – The Stone Age: Paleolithic and Neolithic cultures
- › **The Harappan Culture:** Origin, extent and date, Important cities: Harappa; Mohenjodaro; Kalibangan; Lothal and Dholavira; Trade, commerce, seals and script; Religion
- › **The Vedic Period:** Rigveda, its date and geographical knowledge; Socio, Economic, Religious and Political conditions; Later Vedas, their date and geographical knowledge; Epics: Ramayana and Mahabharata, their contents.
- › **Jainism and Buddhism:** Jainism - Mahavira and his teachings; Buddhism - Buddha and his teachings.
- › **The Mauryan Age:** Chandragupta Maurya and his achievements; Ashoka and his achievements; Asoka and Buddhism; Mauryan administration; Fall of the Mauryas.
- › **Satavahanas:** Early history; Gautamiputra Satakarni; Later Satavahanas and their decline.
- › **Kushans:** Kanishka and his achievements; Decline of Kushans.
- › **Age of the Guptas:** Samudragupta; Chandragupta II; Science and technology; Art, architecture and painting; Golden age of the Guptas.
- › **Chalukyas of Badami:** Early history; Pulakesi II.
- › **Rashtrakutas:** Early history; Dhruva; Amoghavarsha Nrupatunga.
- › **Pallavas:** Mahendrarman I; Narasimharman I; Contribution to literature, art and architecture.
- › **Cholas:** Rajaraja Chola I; Rajendra Chola I; Chola art and architecture.

MEDIEVAL INDIA

- › **Harshavardhana and his times:** Carrier and achievements of Harshavardhana; Religion with special reference to Buddhism.
- › **Arabs in India:** Arab conquest of Sindh; Mohammed of Ghazni, and nature of his invasions; Mohammed of Ghor, his conflicts with Prithviraj Chauhan.
- › **The Vijayanagar Empire:** Origin and founders of Vijayanagara kingdom; Sri Krishnadevaraya, and his patronage to art, literature, religion and philosophy; the battle of Tallikota.
- › **Sher Shah:** Early life and his rise to power; Wars with Mughals; Administrative reforms.
- › **Mughals:** Akbar's accession and political achievements; His religious policy and Din – e – Illahi; Aurangzeb and fall of the Mughal Empire; Mughal contribution to Art, Architecture and Literature.
- › **Rise of the Marathas:** Shivaji's political achievements; Shivaji's administration;
- › **Peshwas:** Balaji Viswanath; Baji Rao; Balaji Baji Rao.

MODERN INDIA

- › **Advent of Europeans in India:** Portuguese in India; Dutch and their decline; English and the formation of the East India Company; French settlements in India.
- › **The Revolt of 1857:** Causes and nature of revolt; Course of the revolt and results; Causes for the failure.
- › **Rise of the British power in India:** Battles of Plassey and Buxar; Three Carnatic wars and the success of the English.
- › **Nationalism Movement in India:** Genesis of Indian National Congress; Moderates and Extremesists; Surat Split; Rise of Extremism; Home Rule Movement; Revolutionary and Terrorist movement; Jallianwalabagh Tragedy of 1919; Non Cooperation Movement; Civil Disobedience Movement; Quit India Movement; Indian Independence.

B.B.A.

Numerical skills and Reasoning skills

- › Basic arithmetical operations
- › Basic properties of numbers
- › HCF & LCM
- › Fractions
- › Decimals
- › Percentages
- › Ratio & proportions
- › Power & groups
- › Simple Interest & Compound Interest
- › Mensuration - Problem solving in Algebra
- › Elementary Geometry
- › Statistical tables & averages and logical reasoning.

B.C.A. & INTEGRATED M.C.A.

MATHEMATICS

Part A: Algebra, Vectors, Linear Programming

- › Real Numbers, Complex Numbers
- › Polynomials, Linear Equations in one and two variables, Quadratic Equations in one variable, Permutations and Combinations, Binomial Theorem, Arithmetic Progression, Geometric Progression, Standard Progressions and Series
- › Types of Vectors, Vector addition, Scalar multiplication, Scalar and Vector products of 2, 3 and 4 vectors
- › Linear Inequalities, Linear Programming – Graphical Method

Part B: Mensuration, Geometry, Analytical Geometry

- › Areas, Surface Areas and Volumes of standard plane and solid regions
- › Euclid's Axioms and Postulates, Lines, Angles, Triangles, Congruent Triangles, Quadrilaterals, Area, Circles, Similar Triangles
- › Cartesian coordinate system for a plane, Distance formula, Section formula, Area of Triangle, Equations of a straight line, Equations of a plane, Conic Sections
- › Cartesian coordinate system for space, Direction Cosines, Direction Ratios, Lines and Planes in Space

Part C: Trigonometry, Calculus and Differential Equations

- › Trigonometric Ratios, Identities, Trigonometric Functions of sum and difference of Angles, Trigonometric Equations
- › Sets, Relations, Functions, Simple problems on Limits, Continuity, Derivatives of First and Higher Order, Rules of Differentiation, Bernoulli Rule, Partial Derivatives of First order
- › Indefinite Integral, Definite Integral, Rules of Integration, Applications of Integrals
- › Ordinary Differential Equations, General and Particular Solutions, First Order Differential Equations – Classification and Solution, Second Order Homogeneous Differential Equations

Part D: Statistics and Probability

- › Introduction to Statistics, Data Collection & presentation, Mean, Median, & Mode, Cumulative Frequency Distribution, Measures of Dispersion, Range, Mean Deviation, Standard Deviation,
- › Sets and Relations, Empirical Probability, Theoretical Approach Random Experiments, Events, Axiomatic Approach to Probability, Conditional Probability, Independent Events, Bayes's Theorem, Random Variable & its distribution, Bernoulli's trials, Binomial Distribution.

QUANTITATIVE APTITUDE

- › This test is with a view to test the candidate's ability in comprehending and analyzing quantitative data)
 - Basic arithmetical operations - Basic properties of numbers - HCF & LCM
 - Fractions - Decimals - Percentages - Ratio & proportions - Power & groups
 - Simple Interest & Compound Interest - Mensuration - Problem solving in Algebra
 - Elementary Geometry - Statistical tables & averages.

LOGICAL REASONING

- › This test is with a view to ascertain the candidate's ability to apply logic, rationale and constraint based deduction skills. This will be tested with questions which involve pictorial representations and hypothetical situations of real life scenarios which call for application of logic and reason to find feasible solutions.

BACHELOR OF PERFORMING ARTS (MUSIC)

- › Candidates will be selected for admission on the basis of their performance in the Admissions Test in:

General English (ref page 37) and Aptitude test in Music in the major/ elective subjects chosen for study

DIPLOMA IN MUSIC

- › Candidates will be selected for admission on the basis of their performance in the Admissions Test in:

General English (ref page 37) and Aptitude test in Music in the major/ elective subjects chosen for study

M.A. in English Language and Literature

Duration: 2 Years | For Women Candidates only

The M.A. in English Language and Literature is designed to inspire students to appreciate first-hand, the varieties and shades of language and style and various kinds and trends of imaginative writing in Modern English Literature (1500 to the present day). Over the course of the programme, students will learn how to train their critical taste and judgment in such a way that they are able to respond sympathetically and imaginatively to diverse literary trends and movements. Concurrently, their ability to arrive at an impersonal and dispassionate evaluation of a given work of art and/or a given writer will be honed. They will gain the skills necessary to be aware of problems, limitations and strengths implicit in the appreciation of English language and literature, and learn how to write effectively and cogently while expressing themselves either in critical or in creative writing.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling and 3 years of university (total 15 years) as recognized by SSSIHL
- ✓ Either passed or appeared for Final exams at Bachelor's degree level before the date of Admissions Test
- ✓ Bachelor's degree: 50% or more (English) and 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more (10-point scale) and 5 or more (10-point scale) in English.
(If not appeared for Bachelor's degree final exams, aggregate marks in all the preceding Years/Semesters put together marks will be considered)
- ✓ Age: preferably below 23 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

English Literature: Chaucer and 1550-1660, Shakespeare,
English Literature: 1660-1789, English Literature: 1789-1830

Semester 2

English Literature: 1830 – 1900, English Literature: 20th Century, Indian Writing in English, Commonwealth Literature

YEAR 2

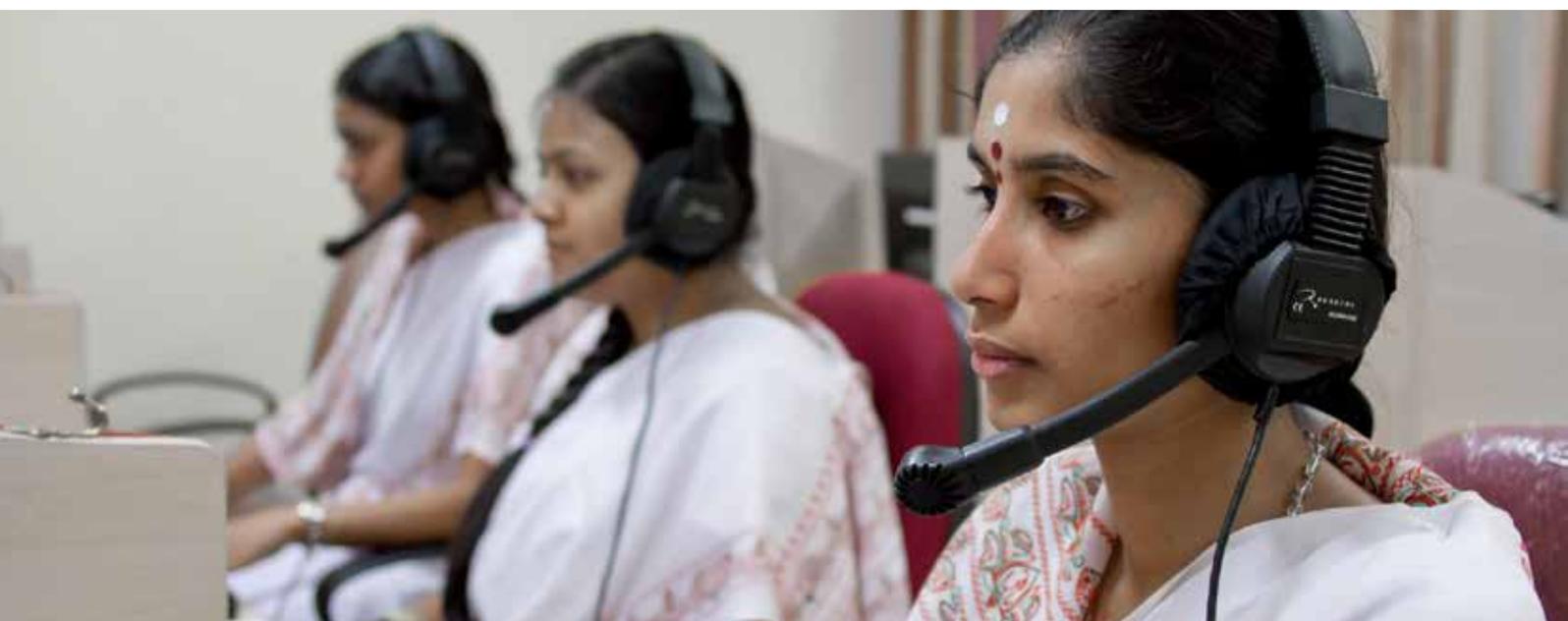
Semester 3

American Literature, Literary Criticism, Structure of Modern English – I (Elements

of Linguistics and Phonetics), Structure of Modern English – II (Grammar)

Semester 4

English for the Media, two courses (chosen from two sets of electives) and a Dissertation / Open Course in World Drama



M.A. in Economics

Duration: **2 Years** | For **Men** Candidates only

The programme is designed to equip students with potential to serve in positions of responsibility with the government, the corporate sector, universities and research institutions. The set of courses offered fall into core courses and electives. The core courses are intended to provide well-balanced training in economic theory, contemporary economic problems and quantitative methodology so as to build the essential tools for economic analysis of problems arising in a variety of contexts. The elective courses from the economics stream deal with application of economic theory and econometrics to address practical issues in a range of fields like demography, labour, industry, agriculture, development, education and health economics. The elective courses from financial economics deal with the allocation and deployment of economic resources, both spatially and across time, in an uncertain environment. In both streams, the electives enable the students to acquire more advanced training in branches of their choice.

› Students have an option to **specialize in Financial Economics**.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling and 3 years of university (total 15 years) as recognized by SSSIHL
- ✓ Either passed or appeared for Final exams at Bachelor's degree level before the date of Admissions Test
- ✓ Bachelor's degree: 50% or more (English) and 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more (10-point scale) and 5 or more (10-point scale) in English.
(If not appeared for Bachelor's degree final exams, aggregate marks in all the preceding Years/Semesters put together marks will be considered)
- ✓ Age: preferably below 23 years as of 31st May in the year of admission

COURSES TAUGHT

› Students have an option to specialize in Financial Economics

YEAR 1

Semester 1

Microeconomic Theory, Macroeconomic Theory, Quantitative Methods for Economics, Public Economics, Financial Markets and Institutions and a practical course on Computer Applications In Economic Analysis-I

Semester 2

Agricultural Economics, Ethics, Economics and Society, Econometrics, two elective courses chosen from a list of electives of Economics and Financial Economics and a practical course entitled Computer Applications in Economic Analysis- II

YEAR 2

Semester 3

Monetary Theory and Policy, Time Series Modelling, Industrial Economics, two courses chosen from a list of electives taken from the streams of Economics and Financial Economics, a practical course entitled Computer Applications in Economic Analysis- III and a Dissertation review

Semester 4

Indian Economy: Contemporary Issues and Policies, Energy and Resource Economics, two courses chosen from a list of electives taken from the streams of Economics and Financial Economics, a practical course entitled Computer Applications in Economic Analysis- IV and a Dissertation

M.Sc. in Mathematics

Duration: **2 Years** | For **Men** Candidates only

The M.Sc. in Mathematics Programme provides a broad-based knowledge of mathematics to students through core courses that cover the areas of Analysis, Algebra, Geometry, Differential Equations, Probability & Statistics, Operations Research, etc. The syllabus also provides one software laboratory course in each of the four semesters, which will enable hands-on experience with various programming languages, software packages and in working in different platforms. In order to develop a deep understanding and skill in chosen areas, the programme provides different streams of electives.

- › Besides core Mathematics subjects, students may specialize in **Computer Science** or **Actuarial Science** by choosing appropriate electives from the given list of courses.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling and 3 years of university (total 15 years) as recognized by SSSIHL
- ✓ Either passed or appeared for Final exams at Bachelor's degree level before Admissions Test
- ✓ Bachelor's degree: 50% or more (English) and 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more (10-point scale) and 5 or more (10-point scale) in English.
(If not appeared for Bachelor's degree final exams, aggregate marks in all the preceding Years/Semesters put together marks will be considered)
- ✓ Only candidates with a B.Sc. in Mathematics or other B.Sc. programmes (M/P/C or M/E/S or M/P/CS) with a major/specialization in Mathematics are eligible to apply
- ✓ Familiarity with the following is mandatory for admissions:
 - Mathematics:** Calculus, Differential Equations, Probability Theory, Real Analysis, Group Theory, Ring Theory, Linear Algebra, Complex Analysis, Discrete Mathematics, and Numerical Analysis
 - Computer Science:** C Language Programming
- ✓ Age: preferably below 23 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Advanced Real Analysis, Advanced Linear Algebra, Commutative Algebra, Number Theory/Stream Core-I, Software Lab I

Semester 2

Functional Analysis, Probability & Statistics, Measure Theory/ Stream Core-II, Theory of Ordinary Differential Equations / Stream Core-III, Software Lab II, Seminar

YEAR 2

Semester 3

Differential Geometry, Optimization Techniques, Theory of Partial Differential Equations/Stream Core-IV, Elective I, Guided Reading

Semester 4

Mathematical Modeling, Elective II, Elective III, Elective IV, Dissertation, Comprehensive Viva voce

LAB COURSES

- › C++ Programming
- › Advanced C++ Programming
- › Programming in Python
- › Numerical Methods and Simulation Lab
- › Introduction to SageMath Programming
- › Symbolic Computing in SageMath
- › Introduction to MATLAB Programming
- › Advanced MATLAB Programming
- › Introduction to OCTAVE Programming
- › Advanced OCTAVE Programming
- › Data Analysis and Visualization using Python
- › Mathematical Methods in Data Mining using Python
- › SQL Programming
- › Core Java Programming
- › Operating Systems Lab
- › Actuarial Mathematics using R
- › Actuarial Mathematics using SAS

ELECTIVES

STREAM-I: Algebra, Geometry & Number Theory

Algebraic Topology, Algebraic Geometry, Symplectic Geometry, Foundations on Algebraic Number Theory, Analytic Number Theory, Riemannian Manifolds, Differentiable Manifolds

STREAM-II: Analysis and Applications

Sobolev Spaces and Sobolev Functions, Distribution Theory, Advanced Complex Analysis, Functional Analytic Methods for Partial Differential Equations, Spectral Theory of Linear Operators, Harmonic Analysis

STREAM-III: Differential Equations and Dynamical Systems

Dynamical Systems, Time scale, Integral Equations, Control Theory, Numerical Solutions of Partial Differential Equations

STREAM-IV: Applied Mathematics:

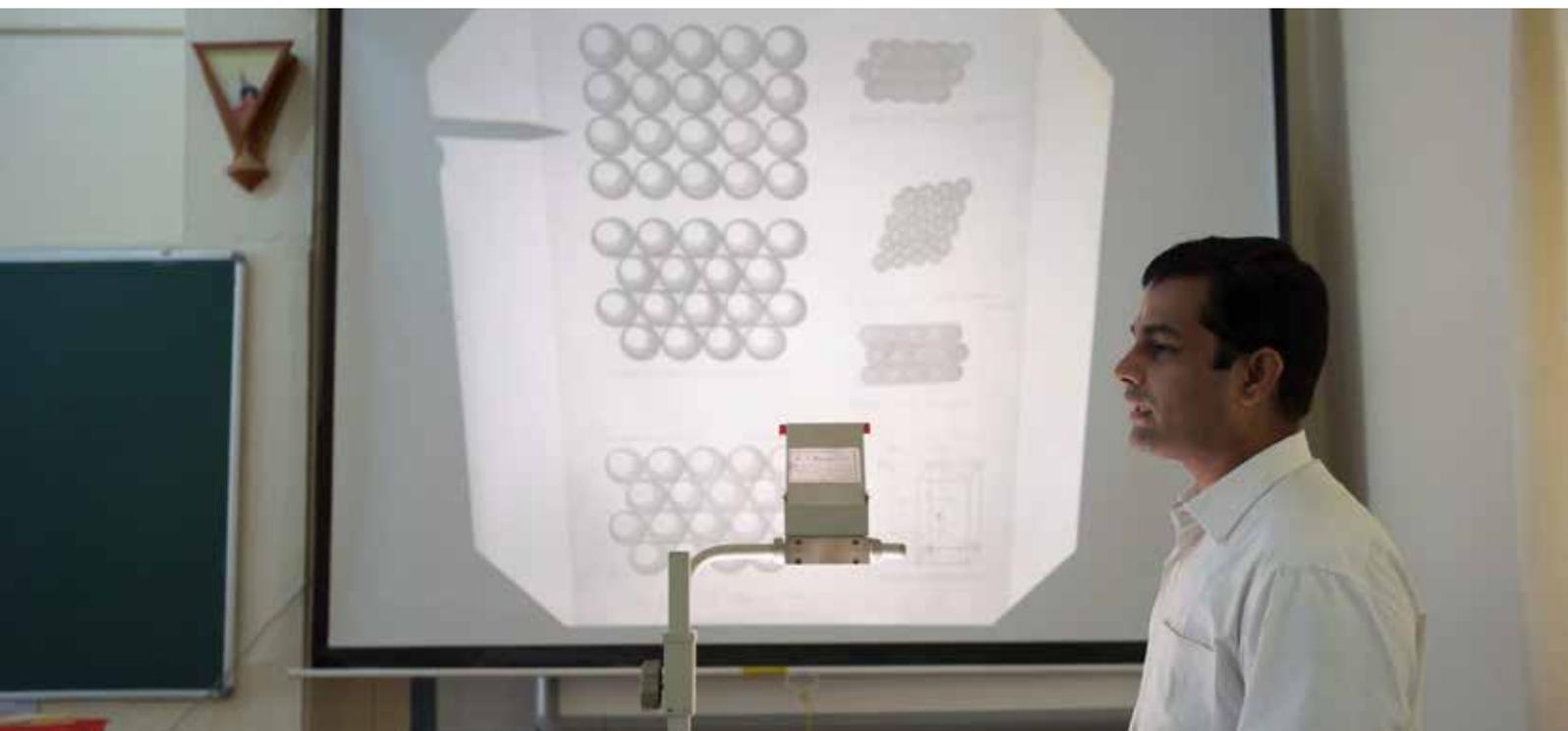
Calculus of Variations, Finite Element Methods, Wavelet Analysis, Mathematical Ecology, Mathematical Methods in Image Processing, Numerical Methods in Image Processing, Integral Transforms, Techniques in Applied Mathematics, Statistics, Convex Optimization, Game Theory

STREAM-V: Computer Science

Artificial Intelligence, Computer, Formal Languages and Automata, Recognition, Networks, Mathematical Methods for Data Mining, Design of Algorithm, Operating System

STREAM-VI: Actuarial Science

General Insurance, Life and Health Contingencies, Economics, Actuarial Risk Management 1 – Foundation, Actuarial Risk Management 2 – Advanced, Enterprise Risk Management



M.Sc. in Physics

Duration: **2 Years** | For **Men** Candidates only

The Masters Programme in Physics is designed to equip the students with strong fundamentals of physics. Specialization in Photonics, Nuclear Physics or Materials Science is offered in the second year of study. Students get adequate exposure to theory and experimental methodology of Modern Physics along with requisite computational techniques. A project work is designed to cater to the research potential of the students wherein they are exposed to gain experience in handling sophisticated equipment and are exposed to advanced concepts in Physics.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling and 3 years of university (total 15 years) as recognized by SSSIHL
- ✓ Either passed or appeared for Final exams at Bachelor's degree level before Admissions Test
- ✓ Bachelor's degree: 50% or more (English) and 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more (10-point scale) and 5 or more (10-point scale) in English.
(If not appeared for Bachelor's degree final exams, aggregate marks in all the preceding Years/Semesters put together marks will be considered)
- ✓ Candidates with a **B.Sc. (Hons.)**: Physics as a main subject along with Mathematics and either Chemistry, Statistics, Electronics or Computer Science as additional subjects are eligible to apply
- ✓ Candidates with a **B.Sc. without Honours**: 3-subject combination with Physics, Mathematics and either Chemistry, Statistics, Electronics or Computer Science are eligible to apply
- ✓ Age: preferably below 23 years as of 31st May in the year of admission

COURSES TAUGHT

- › Students have an option to specialize in either Photonics, Nuclear Physics or Nanoscience

YEAR 1

Semester 1

Classical Mechanics, Mathematical Physics, Classical Electrodynamics, Quantum Mechanics-I, Solid State Physics I, Laboratory course in General Physics and Software and a Comprehensive Viva voce

Semester 2

Nuclear and Particle Physics, Solid State Physics II, Applied Optics, Laboratory course in General Physics and Software and a Comprehensive Viva voce

YEAR 2

Semester 3

Molecular Spectroscopy, Quantum Mechanics-II, one course to be chosen from the streams of Photonics, Semiconductor Device Physics, Statistical Physics, Nuclear Physics and Electronics, one course from a set of twelve electives, a Specialization Laboratory, a Project Work Review and a Comprehensive Viva voce

Semester 4

Advanced Computational Techniques in Physics, one course to be chosen from the streams of Photonics, Nuclear Physics and Electronics, one course from a set of twelve electives, a Specialization Laboratory, Project Work and a Comprehensive Viva voce

ELECTIVES

Materials Science
Microelectronics
Ultrafast Optics
Nanostructured Materials – Synthesis, Characterization and Properties
Introduction to Biomedical Optics & Biophotonics
Introduction to Microfluidics: Devices and Applications
Applications of Nanotechnology

M.Sc. in Chemistry

Duration: **2 Years** | For **Men** Candidates only

The Masters Programme in Chemistry covers all aspects of the different branches of chemistry and lays emphasis on detailed understanding of the fundamental principles and on training in appropriate computational and experimental methods. This rigorous training in all the major branches of chemistry - theoretical, applied, instrumental, computational and experimental – sets the stage for electives in interdisciplinary areas as well as for an introduction to advanced emerging fields of research in the final semester.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling and 3 years of university (total 15 years) as recognized by SSSIHL
- ✓ Either passed or appeared for Final exams at Bachelor's degree level before Admissions Test
- ✓ Bachelor's degree: 50% or more (English) and 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more (10-point scale) and 5 or more (10-point scale) in English.
(If not appeared for Bachelor's degree final exams, aggregate marks in all the preceding Years/Semesters put together marks will be considered)
- ✓ Only candidates with a B.Sc. or B.Sc. (Hons) in Chemistry are eligible to apply
- ✓ Age: preferably below 23 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Quantum Chemistry and Group Theory (Theory only), Mathematics for Chemistry (Theory only), Analytical Chemistry (Theory and Practicals), Coordination Chemistry (Theory and Practicals), Advanced aspects of Organic structure and Stereochemistry (Theory only), Organic Qualitative Analysis (Practicals only)

Semester 2

Structural Inorganic and Bio- Inorganic Chemistry, Chemical Kinetics and Surface Chemistry, Thermodynamics and Electrochemistry, Physical and Mechanistic aspects of Organic Chemistry and practical courses in Inorganic Chemistry, Chemical Kinetics and Electrochemistry and Organic Synthesis and Spectral Analysis

YEAR 2

Semester 3

Organometallic Chemistry, Polymer Chemistry and Special Topics from Physical Chemistry, one elective course to be chosen from Chemistry and one inter-departmental elective, a practical course in Computational and Statistical tools for Chemistry and Project Work (Review)

Semester 4

Solid State Chemistry and Nano Materials, Special Topics from Bio-organic Chemistry, Medicinal Chemistry, two inter-departmental electives, a practical course in Computational and Statistical tools for Chemistry and Project Work

M.Sc. in Biosciences

Duration: **2 Years** | For **Women and Men** Candidates

The curriculum of M.Sc. in Biosciences is designed to provide an in-depth understanding of the major sub-disciplines of life sciences such as Molecular biology, Microbiology, Biochemistry, Developmental biology, Immunology and Genetics. Strengthening the foundations in these aspects sets the stage for elective courses offered in advanced topics in the domains of Biotechnology and Systems Biology. Laboratories with state-of-the-art equipment provide students with hands-on training in Animal and Plant Cell Culture, Microbiology, Molecular biology, Biochemistry and Bioinformatics. A dissertation project spanning the final two semesters of the programme equips students with essential laboratory techniques and trains them to design and conduct in vitro and in silico studies in topics aligned to the thrust areas of the Department of Biosciences. Weekly colloquia and lab meetings require students to make presentations on their progress to the faculty members and research scholars of the department thereby honing their communication skills and building confidence.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling and 3 years of university (total 15 years) as recognized by SSSIHL
- ✓ Either passed or appeared for Final exams at Bachelor's degree level before Admissions Test
- ✓ Bachelor's degree: 50% or more (English) and 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more (10-point scale) and 5 or more (10-point scale) in English.
(If not appeared for Bachelor's degree final exams, aggregate marks in all the preceding Years/Semesters put together marks will be considered)
- ✓ Only candidates with a B.Sc. or B.Sc.(Hons) in Biosciences, Botany or Zoology are eligible to apply
- ✓ Age: preferably below 23 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Molecular Cell Biology, Molecular Biology, Plant Systematics and Conservation, Instrumentation and two practical courses

Semester 2

Biostatistics and Bioinformatics, Molecular Developmental Biology, Genetic Engineering, Biochemistry of Macro molecules and two practical courses

YEAR 2

Semester 3

Intermediary metabolism, Cytogenetics and Plant Breeding, two electives from the streams of Biotechnology / Mycology & Plant Pathology, two practical courses and Project Work (Review)

Semester 4

Immunology/ Biocatalysis for Industry and Development, Environmental Biotechnology/ Biomolecular Structure and Function, two electives from the streams of Biotechnology / Mycology & Plant Pathology, two practical courses and Project Work in lieu of the two practical courses

M.Sc. in Food and Nutritional Sciences

Duration: **2 Years** | For **Women** Candidates only

The M.Sc. in Food and Nutritional Sciences programme covers the major disciplines of Food Sciences and Nutritional Sciences that will professionally equip students to practice in industry with high levels of skill in these areas. The comprehensive curriculum includes fundamental courses in Food and Nutrition, Biochemistry, Research Methodology and Food Microbiology. Advanced and specialized courses in Food Sciences cover aspects of Food Product Development, Food Quality and Safety, Food Chemistry and Entrepreneurship. Specific courses in Nutritional Sciences focus on Dietetics, emerging area of Functional Foods, Molecular Nutrition, Ayurvedic Nutrition, Nutritional Counseling and Public Health Nutrition. These courses along with project work in two areas of specialization (Applied Nutrition and Food Technology) are designed to help the students to pursue research and career in various Health Care Institutions, Food Industries and NGOs with particular emphasis on community service.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling and 3 years of university (total 15 years) as recognized by SSSIHL
- ✓ Either passed or appeared for Final exams at Bachelor's degree level before Admissions Test
- ✓ Bachelor's degree: 50% or more (English) and 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more (10-point scale) / 3.5 or more (5-point scale) with 50% or more in English (If not appeared for Bachelor's degree final exams, aggregate marks in all the preceding Years/Semesters put together marks will be considered)
- ✓ Only candidates with a B.Sc. in Home Science or Biosciences, or Mathematics / Physics / Chemistry are eligible to apply
- ✓ Age: preferably below 23 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Concepts in Food Science, Nutrition and Technology, Bio-macro molecules and intermediary metabolism, Research methodology and applied statistics, Food microbiology and safety, Practical I: Food microbiology and safety, Practical II: Food analysis, Practical III: Computer applications in research

Semester 2

Analytical techniques, Chemistry of food components, Nutrition through life cycle, Food product development and evaluation, Practical IV: Chemistry of food components, Practical V: Nutrition through life cycle & Food product development and evaluation

YEAR 2

Semester 3

Food quality control & assurance, Advanced human nutrition, Postharvest technology of fruits and vegetables, Therapeutic nutrition and Dietetics, Advances in food processing and packaging technologies, Elective I, Practical VI: Advanced human nutrition, Practical VI: Postharvest technology of fruits and vegetables, Practical VII: Dietetics and clinical nutrition, Practical VII: Advances in Food processing and packaging technologies, Practical VIII: Experimental methods, Project work

Semester 4

Indian traditional foods and Ayurvedic nutrition, Dairy technology, Public nutrition and Epidemiology, Food grain and oilseed technology, Elective II, Practical IX: Public nutrition and epidemiology, Practical X: Special research techniques, Project work, Comprehensive viva voce

POSTGRADUATE TEST SYLLABUS

- › There will be negative marking for all multiple choice questions.
- › **Model Test Papers** are available on the university's website - sssihl.edu.in

GENERAL ENGLISH

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

M.A. IN ENGLISH LANGUAGE & LITERATURE

QUESTION PAPER FORMAT

- › Five short answer type: Comprehension of unseen passage, prose, poetry (100 words).
- › Long Answer (essay) type: Testing the knowledge and understanding of literary background (400 words).
- › Set on major literary forms (150 words).
- › 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

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

M.A. IN ECONOMICS

QUESTION PAPER FORMAT

The question paper is of two hours in duration / 75 marks. It is divided into three sections:

Section A: Objective type questions
Section B: Short answer questions
Section C: One essay type question

TOPICS

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.

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.

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. IN MATHEMATICS

QUESTION PAPER FORMAT

The question paper is of two hours in duration / 75 marks. It is divided into three sections:

Section A: 40 multiple choice questions (40 marks)

Section B: Problem-solving type questions - 5 marks each - internal choice (25 marks)

Section C: Short C-Programming Test (10 marks)

Viva voce: Those who pass the English and Written Tests will undergo a technical Viva voce (25 marks)

TOPICS

MATHEMATICS

- › Calculus, Differential Equations,

Probability Theory, Real Analysis, Group Theory, Ring Theory, Linear Algebra, Complex Analysis, Discrete Mathematics, and Numerical Analysis. The detailed syllabus is as follows:

Calculus: Higher Order Partial Derivatives, Differentiability, Gradient, the Chain Rule, Directional Derivative, Total Differential and Approximation, Constrained Extrema and Lagrange Multipliers, Double and Triple Integration.

Differential Equations

- › Classification of Ordinary and Partial Differential Equations, Types of Solutions, Existence and Uniqueness of Solution for an Initial Value Problem, Bernoulli Equation, Exact Differential Equations and Integrating Factors, Cauchy-Euler Equation, Method of Variation Of Parameters, Method of Undetermined Coefficients, Wronskian, Method of Separation of Variables for solving Boundary Value Problems

Probability Theory

- › Conditional Probability-Bayes's Formula, Independent Events, Discrete and Continuous Random variables, Expected Value, Variance, Covariance, Variance of sums and Correlations, Moment generating functions.

Real Analysis

- › Logic, Sets and Relations, Functions, Cardinality, Natural Number and Induction, Ordered Field, Completeness Axiom, Topology of the Reals and Compactness, Convergence, Sequences and Series, Convergence Tests, ϵ - δ definition, Limit theorems, Continuous Function and Uniform continuity, Intermediate Value Theorem, Mean Value Theorem, L'Hospital's rule, Point-wise and Uniform Convergence, Taylor's Theorem, Riemann Integration, Radius and Interval of Convergence for Power Series.

Group Theory

- › Groups, Subgroups, Cyclic Groups, Normal and Quotient Subgroups, Permutation Groups, Homomorphism, Automorphism, Cayle's and Sylow's Theorem.

Ring Theory

- › Rings, Integral Domain, Division Rings, Ideals, Quotient Rings, Euclidean Rings, Polynomial Rings, Field of Quotients, Polynomials over Rational Fields.

Linear Algebra:

- › Vector Spaces, Linear Independence and Dependence, Bases and Dimension, Linear Transformations, Systems of Linear Equations, Eigenvalue and Eigenvector Theory.

Complex Analysis

- › Algebra of Complex Numbers, Analyticity - Harmonic Functions, Elementary Functions, Cauchy Integral Formula, Convergence of Sequence and Series, Taylor Series - Laurent Series, Types of Isolated Singularities, Residue Theorems.

Discrete Mathematics

- › Logic, Counting, Graphs and Trees.

Numerical Analysis

- › Bisection Method, Newton Method, Secant Method, Polynomial Interpolation, Simpson Rule, Trapezoidal Rule, LU Factorization, Residual Correction Method, Method of Least Squares, Power Method, Taylor's Method, Euler's Method, Runge-Kutta Method.

COMPUTER SCIENCE**C Language Programming**

- › A minimal exposure to programming is expected from the students. Nevertheless, those qualified for the M.Sc. (Mathematics) programme and desirous of opting for computer science specialization will be tested in fundamentals of Computer Science and Programming once they are enrolled for the course.

M.SC. IN PHYSICS**WEIGHTAGE**

- › Written Test: 70%
- › Technical Interview: 30% (subject to passing the written test)

QUESTION PAPER FORMAT

The question paper is of two hours in duration / 75 marks.

Section A: Mathematics, Electronics, Chemistry & Computer Science (25 marks)
Section B: Physics (50 marks)

SECTION A**Mathematics**

- › Calculus of single and multiple variables, partial derivatives, Matrices and determinants, Algebra of complex numbers; Taylor expansion, Fourier series; Vector algebra, Vector Calculus, Multiple integrals, Divergence theorem, Green's theorem, Stokes' theorem. First order equations and linear second order differential equations with constant coefficients.

Integral Calculus

- › Integration as the inverse process of differentiation, definite integrals and their properties, Fundamental theorem of integral calculus. Double and triple integrals, change of order of integration. Calculating surface areas and volumes using double integrals and applications. Calculating volumes using triple integrals and applications. Vector Calculus: Scalar and vector fields, gradient, divergence, curl and Laplacian. Scalar line integrals and vector line integrals, scalar surface integrals and vector surface integrals, Green's, Stokes and Gauss theorems and their applications.

Linear Algebra

- › Vector spaces, Linear dependence of vectors, basis, dimension, linear transformations, matrix representation with respect to an ordered basis, Range space and null space, rank-nullity theorem; Rank and inverse of a matrix, determinant, solutions of systems of linear equations, consistency conditions. Eigenvalues and eigenvectors. Cayley-Hamilton theorem. Symmetric, skewsymmetric, hermitian, skew-hermitian, orthogonal and unitary matrices.

Probability

- › Basic concepts of probability theory. Binomial, Poisson & Normal distributions.

Numerical Analysis

- › Solution of non-linear equations using iterative methods. Interpolation Lagrange's formula and Newton's formula for equidistant points). Numerical differentiation and integration Trapezoidal and Simpson's rules.

Electronics

- › Boolean algebra: Binary number systems; conversion from one system to another system; binary addition and subtraction. Logic Gates AND, OR, NOT, NAND, NOR exclusive OR; Truth tables; combination of gates; de Morgan's theorem; Zener diode and its applications, BJT:

characteristics in CB, CE, CC modes. Single stage amplifier, two stage R-C coupled amplifiers. Simple Oscillators: OP AMP and applications: Inverting and non-inverting amplifier. 8085 or 8086 Microprocessor architecture and knowledge of assembly language programming.

Chemistry

- › Periodic Table: Periodic classification of elements and periodicity in properties; general methods of isolation and purification of elements. Chemical Bonding and Shapes of Compounds: Types of bonding-Ionic and covalent bonding, M.O. and V.B. approaches for diatomic molecules, VSEPR theory and shape of molecules, hybridisation; Chemical Thermodynamics: Reversible and irreversible processes; First law and its application to ideal and nonideal gases; Thermochemistry; Second law; Entropy and free energy, Criteria for spontaneity. Chemical and Phase Equilibria: Law of mass action; K_p , K_c , K_x and K_n ; Effect of temperature on K ; Ionic equilibria in solutions; pH and buffer solutions; Chemical Kinetics- Reactions of various order; Basis of Organic Reactions Mechanism: Elementary treatment of S_N1 , S_N2 , $E1$ and $E2$ reactions; Acids and Bases: Arrhenius, Lowry -Bronsted concepts of acids and bases - Strengths of acids and bases.

Computer Science

- › Basic knowledge of computer systems, software and programming; Number systems. Basic electronic gates. Algorithmic approach to solve problems. Fundamentals of C language.

SECTION B (PHYSICS)**Mechanics and General Properties of Matter**

- › Newton's laws of motion and applications, Velocity and acceleration in Cartesian, polar and cylindrical coordinate systems, uniformly rotating frame, centrifugal and Coriolis forces, Motion under a central force, Kepler's laws, Gravitational Law and field, Conservative and non-conservative forces. System of particles, Centre of mass, equation of motion of the CM, conservation of linear and angular momentum, conservation of energy, variable mass systems. Elastic and inelastic collisions. Rigid body motion, fixed axis rotations, rotation and translation, moments of Inertia and products of Inertia, parallel and perpendicular axes theorem. Principal

moments and axes. Kinematics of moving fluids, equation of continuity, Euler's equation, Bernoulli's theorem.

Oscillations, Waves and Optics

- › Differential equation for simple harmonic oscillator and its general solution. Superposition of two or more simple harmonic oscillators. Damped and forced oscillators, resonance. Wave equation, traveling and standing waves in one dimension. Energy density and energy transmission in waves. Group velocity and phase velocity. Sound waves in media. Doppler Effect. Fermat's Principle. General theory of image formation. Thick lens, thin lens and lens combinations. Interference of light, optical path retardation. Fraunhofer diffraction. Rayleigh criterion and resolving power. Diffraction gratings. Polarization: linear, circular and elliptic polarization. Double refraction and optical rotation.

Electricity and Magnetism

- › Coulomb's law, Gauss's law. Electric field and potential. Electrostatic boundary conditions, Solution of Laplace's equation for simple cases. Conductors, capacitors, dielectrics, dielectric polarization, volume and surface charges, electrostatic energy. Biot-Savart law, Ampere's law, Faraday's law of electromagnetic induction, Self and mutual inductance. Alternating currents. Simple DC and AC circuits with R, L and C components. Displacement current, Maxwell's equations and plane electromagnetic waves, Poynting's vector, Lorentz Force and motion of charged particles in electric and magnetic fields.

Kinetic theory, Thermodynamics

- › Elements of Kinetic theory of gases. Velocity distribution and Equipartition of energy. Specific heat of Mono-, di- and tri-atomic gases. Ideal gas, van-der-Waals gas and equation of state. Mean free path. Laws of thermodynamics. Zeroth law and concept of thermal equilibrium. First law and its consequences. Isothermal and adiabatic processes. Reversible, irreversible and quasi-static processes. Second law and entropy. Carnot cycle. Maxwell's thermodynamic relations and simple applications. Thermodynamic potentials and their applications. Phase transitions and Clausius-Clapeyron equation. Ideas of ensembles, Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein distributions.

Modern Physics

- › Inertial frames and Galilean invariance. Postulates of special relativity. Lorentz

transformations. Length contraction, time dilation. Relativistic velocity addition theorem, mass energy equivalence. Blackbody radiation, photoelectric effect, Compton effect, Bohr's atomic model, X-rays. Wave-particle duality, Uncertainty principle, the superposition principle, calculation of expectation values, Schrödinger equation and its solution for one, two and three dimensional boxes. Solution of Schrödinger equation for the one dimensional harmonic oscillator. Reflection and transmission at a step potential, Pauli exclusion principle. Structure of atomic nucleus, mass and binding energy. Radioactivity and its applications. Laws of radioactive decay. Nuclear reactions, Nuclear model- liquid drop model.

Solid State Physics and Devices

- › Crystal structure, Bravais lattices and basis. Miller indices. X-ray diffraction and Bragg's law; Intrinsic and extrinsic semiconductors, variation of resistivity with temperature. Fermi level. p-n junction diode, I-V characteristics.

Atomic and Molecular Spectroscopy

- › Atomic Spectra: Spin and orbital angular momenta and related quantum numbers, Elements of Molecular Spectroscopy: quantization of energy; representation of spectra; elements of practical spectroscopy.

Lasers

- › Quantum theory of radiation; Einstein A and B coefficients, Essential elements of a laser; laser operation; characteristics of laser light.

M.S.C. IN CHEMISTRY

QUESTION PAPER FORMAT

The question paper is of two hours in duration / 75 marks.

Section A: Objective type – 25 questions (25 marks)

Section B: Short answer type. 6 out of 8 questions- Global choice (6x5=30 marks)

Section C: Essay type – long answer type- One out of two questions (20 marks)

GENERAL CHEMISTRY

- › Electronic structure of atoms: Atomic spectra - H-spectrum.
- › Wave Mechanics: De Broglie matter waves- Heisenberg uncertainty principle, Schrödinger's wave equation. Hydrogen atom- Theories of chemical bonding: Valence bond theory -various types of hybridization and shapes of simple

inorganic and organic molecules/ ions- sp^2 , sp^3d , sp^3d^2 , d^2sp^3 and sp^3d^3 ; VSEPR theory – applications to NH_3 , H_3O^+ , SF_4 , ClF_3 , ICl_2^- , H_2O , $SnCl_2$, XeF_2 , XeF_4 , IF_5 ; MO theory- homonuclear and heteronuclear diatomic molecules;- dipole moment- electronegativity- Fajan's rules – Resonance - Delocalized bonding - 1, 3 butadiene and benzene; Electronic displacements: inductive, resonance and hyper conjugative effects. Bonding in metals; Intermolecular forces: Molecular crystals, hydrogen bond; vander Waals forces, Debye, Keesom & London forces.

ANALYTICAL CHEMISTRY

- › Solvents: Non aqueous solvents
- › Solubility of substances: activity, activity coefficients, ionic strength of electrolytes, electrolytic dissociation - acids & bases.
- › Aqueous equilibria: Weak electrolytes -
- › Oswald's law, common ion effect - Neutralization reactions - Sparingly soluble salts - solubility product. Complex ions. Salt hydrolysis & Buffers.
- › Quantitative analysis: Titrimetry - Basic principle, types of reactions - Theoretical principles involved in titrimetric analysis using neutralization and redox reactions - Potentiometric titration curves; Theory of pH indicators; Theory of redox indicators.

INORGANIC CHEMISTRY

- › Group I: General characteristics - Alkali metals in liquid ammonia- alkali metal complexes, crown ethers and cryptands;
- › Group II A: General characteristics - Diagonal relationships - complexes of Be & Ca;
- › Noble gases: Uses, general characteristics - Fluorides of Xenon- Clathrates;
- › Group III A: General properties - Oxidation states and types of bonds- oxygen compounds of boron - Diborane and Boron - Nitrogen compounds;
- › Group IV A: Physical properties, inert pair effect, multiple bonding, graphite compounds Carbides. Classification of silicates: Silicones - preparation and application - hydrides of silicon Carbon allotropes;
- › Group V A: Electronic structure and oxidation states - Oxoacids of nitrogen - Oxoacids of phosphorous;
- › Group VI A: Electronic structure and oxidation states - oxoacids of sulphur;
- › Group VII A: Electronic structure, oxidation states and general characteristics - Oxoacids of halogens - Interhalogen compounds, Polyhalogen compounds - pseudo halogens and pseudo halides.
- › Chemistry of transition elements: General characteristics - periodic trends; Magnetic properties; Metallic nature- oxidation states, catalytic properties, complexes.

- › Coordination chemistry: Werner's theory - Nomenclature of coordination compounds - Isomerism – EAN (effective atomic number) rule - Crystal field theory - Applications of crystal field theory.
- › Periodicity: Basic trends - First and second row anomalies.
- › Nuclear chemistry: Composition of the nucleus - radioactive decay modes - law of radioactivity, natural and artificial disintegration series - Nuclear reactions, Applications of radioisotopes as tracers; Counting statistics - Counting techniques.

ORGANIC CHEMISTRY

- › Aliphatic hydrocarbons: Nomenclature; chain and conformational isomerism; General methods of preparations, reactions of alkanes/alkenes/alkynes; Geometric isomerism in alkenes - sequence rules.
- › Cycloalkanes: Nomenclature - General methods of preparation - Geometrical Isomerism - conformational analysis.
- › Aromatic Hydrocarbons: Chemical criteria for aromaticity - Aromatic sextet – Substitution reactions of Aromatic compounds - Substituent effects - Reactions of Polycyclic benzenoid aromatic hydrocarbons: Naphthalene, Anthracene & Phenanthrene:
- › Stereochemistry: Absolute configuration – assignment of R&S - Optical activity - concept of dissymmetry (chirality) - optical isomers of tartaric acid.
- › Halogen derivatives: Methods of preparation and reactions of alkyl and aryl halides. SN2, SN1 reactions, rearrangements - E1 & E2 reactions.
- › Organometallic compounds: Organomagnesium compounds - Grignard reagents.
- › Alcohols: Nomenclature, physical properties - preparation, and reactions.
- › Phenols: Acidity and structure - Synthesis and Reactions.
- › Ethers: Nomenclature, synthesis and reactions.
- › Carbonyl compounds: Nomenclature - preparation of aldehydes and ketones. General mechanism of nucleophilic addition reactions.
- › Carboxylic acids and their derivatives: General methods of preparation - Mechanism of ester hydrolysis (acid catalyzed and base catalyzed AAC2, BAC2) - Reactions of Carboxylic acids. Dicarboxylic acids: Hydroxy acids (lactic acid and salicylic acid).
- › Reactive methylene compounds: Diethylmalonate and ethylacetoacetate.
- › Organic compounds of nitrogen, Amines: Effect of structure on basicity, preparation and reactions of amines - synthetic applications of azo compounds.

PHYSICAL CHEMISTRY

- › Chemical kinetics: The rate of reactions - rate laws - rate constants - reaction order - Methods of determining reaction orders and rate laws - Radioactive decay - Half life.
- › Complex reactions: Parallel, consecutive and reversible reactions.
- › Theory of chemical kinetics: Arrhenius equation - Collision theory, Transition state theory. Surface Chemistry: Adsorption, physisorption & chemisorptions - adsorption isotherms. Catalysis - heterogeneous catalysis.
- › Chemical thermodynamics: Thermodynamics of closed systems - 1st law of thermodynamics. Heat and enthalpy: Relation between ΔH and ΔU - Kirchoff's law - Joule-Thomson effect. Work of adiabatic expansion: adiabatic - reversible expansion of a perfect gas - Applications of 1st law concepts: Joule-Thomson expansion - characteristics. 2nd law of thermodynamics: Carnot cycle - Clausius inequality - Spontaneous, nonspontaneous changes - Combined equations of I & II laws of thermodynamics - Maxwell relations - Helmholtz and Gibbs energy - Phase transition processes. 3rd law of thermodynamics: Nernst theorem - Internal pressure - Gibbs - Helmholtz Equation.
- › Electrochemistry- Electrochemical cells: Galvanic and electrolytic cells. Electrode types. Chemical cells: Liquid junction potential-Nernst equation - Application of standard reduction potentials - electrochemical series - potentiometric titrations - Fuel cells.
- › Ionics: Electric properties of ionic solutions, Equivalent conductance - molar conductivity. Strong electrolytes - Kohlrausch's law - applications.
- › Weak electrolytes: Ostwald's dilution law- hydrodynamics, conductivity of H⁺ and OH⁻ ions. Phase rule and phase diagram: Basic concepts - Derivation of Gibbs phase rule - phase diagram of one component system - H₂O and sulphur.

BIOCHEMISTRY

- › Carbohydrates: Introduction, classification, nomenclature, monosaccharides-structure and reactions, disaccharides, oligosaccharides, polysaccharides; Aminoacids and Proteins.

SPECTROSCOPY

- › UV-Vis spectroscopy: Theory- instrumentation – Woodward-Fieser rules for calculation of λ_{max} of dienes, Fieser-Kuhn rules for determining λ_{max} and ϵ_{max} of polyenes;

- › Infrared spectroscopy: Theory- instrumentation - Sampling techniques; Analysis of IR spectral data- identification of functional groups.

INDUSTRIAL CHEMISTRY:

- › Surface coatings: Paints and varnishes - Pigments: classification and applications.
- › Petroleum Refining: Occurrence - composition - processing - applications; Fuels from petroleum - raw materials (chemicals) from petroleum for industrial applications.
- › Polymers: Importance of polymers - basic concepts - Types of polymers - Structure and properties. Polymer processing, classification based on methods of preparation.
- › Dyes: Definition - classification based on method of application, color and structure - Classification based on chemical constitution - Methods of application.
- › Fertilizers: Classification - organic fertilizers, inorganic/commercial fertilizers.

M.SC. IN BIOSCIENCES

QUESTION PAPER FORMAT

The question paper is of two hours in duration / 75 marks.

Section A: Objective type – 25 questions (25 marks)

Section B: Short answer type. 6 out of 8 questions- Global choice (6x5=30 marks)

Section C: Essay type – long answer type- One out of two questions (20 marks)

BOTANY

- › **Cryptogams and Phanerogams:** Important features (habit, morphology and reproduction); General classification of Virus, Bacteria, Algae and Fungi; Common Viral, fungal and Bacterial diseases in Plants, Animals and Man; Economic importance of Bacteria, Algae and Fungi and their applications; Evolutionary trends among Bryophytes, Pteridophytes and Gymnosperms; Binomial nomenclature and modern trend in taxonomy; Economic importance of Brassicaceae, Melliaceae, Leguminaceae, Solanaceae and Poaceae.
- › **Plant Anatomy:** Types of meristematic and other tissue systems in Plants; Anatomy of root, stem and leaf in Dicots; Micro and Macro Sporogenesis; Endosperm: Formation and Types; Polyembryony: Embryogenesis in Monocots and Dicots: Types and examples.

Plant Physiology:

- › Osmosis - Principle, Mechanism and factors affecting osmosis; Active Transport - Principle and mechanism; Physiology of Photosynthesis - Introduction, PSI & PSII systems, Mechanism of Photosynthesis - Light and Dark reaction; Respiration - Kinds of respiration, aerobic and anaerobic respiration, mechanism of aerobic respiration: Glycolysis, Krebs cycle; Transpiration: Kinds of transpiration, guttation and exudation; Translocation: Mechanism of ascent of sap, path of translocation, structure of xylem and phloem; Flowering Photoperiodism, classification of plants according to flowering, vernalization; Growth: growth regulators/hormones; Dormancy: Kinds, factors causing dormancy, mechanism; Mineral nutrition in plants: essential and non-essential elements, major and minor elements and their role.

ZOOLOGY

- › **Non-Chordates & Chordates:** Classification of Non-Chordates, Prochordates and non-Chordates; 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.

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 foeta membranes; Mendel's laws of inheritance, Multiple alleles, linkage - Sutton's and Morgan's views, kinds of linkage; Crossing over -- somatic and germinal crossing over, mechanism of meiotic crossing over; Sex determination

-- Sex chromosome mechanisms, types of sex chromosomal mechanism of sex determination; Mutation -- kinds of mutation, classification of mutation based on various types; Operon concept -- basic concept and types; Eugenics - basics, pedigree analysis, positive and negative eugenics; Genetic code -- basics of cryptoanalysis, methods of cryptoanalysis of genetic code; Principles of plant and animal breeding; Evidences of evolution -- Darwin's and Lamarkian Theories; Darwin's and Lamarkian theories of evolution origin and evolution of man, isolation and speculation.

ENVIRONMENTAL BIOLOGY

- › Biotic and Abiotic factors of environment; Biogeochemical cycles -- types, general process, climax concept; examples of succession; trends of succession; Ecological Succession -- types, general process, climax, concept, examples of succession, trends of succession; Ecosystem, Population ecology; Arboreal, Volant, Deepsea, Xerophytic, Hydrophilic and epiphytic adaptations; Environmental pollutions -- origin, types, kinds and sources, remedial measures;

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.

BIOCHEMISTRY & BIOTECHNOLOGY

- › Classification of enzymes, coenzymes and vitamins, structure and function 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.

M.SC. IN FOOD & NUTRITIONAL SCIENCES**QUESTION PAPER FORMAT**

The two-part question paper is of two hours in duration / 75 marks.

Part I (30 min): Subject based test for all the streams Objective type (25x1=25 Marks) Twenty-five out of thirty questions with global choice

Part II (90 min): Subject based test for all the streams Descriptive type (10x5 = 50 Marks). Ten out of fifteen questions with global choice.

The question paper will contain questions on the following topics carrying equal marks. There will be balanced distribution of questions from each of the topics listed below to enable the students from various streams get an opportunity to score in the test.

Food Science and Nutrition

- › 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).
- › Energy requirement: Basal metabolism, Energy requirement for different age groups.
- › Study of Nutrients: (a) Carbohydrates, proteins and fats -- chemistry and nutritional aspects such as digestion, absorption, metabolism, functions, sources, deficiency and requirements (b) Vitamins and minerals - functions, sources, requirements, and deficiencies (c) Water balance.

Dietetics and Public Health Nutrition

- › Principles involved in adoption of normal diet for formulating therapeutic diet - use of food exchange groups.
- › Diet during pregnancy, lactation, infancy, school age, adolescent, adulthood and old age.
- › Nutritional deficiency diseases.
- › Dietary management in diseases (metabolic disorders, febrile conditions, surgical & other stress conditions) - causes, symptoms, physiological changes and diet.
- › National and international agencies and intervention programmes in the betterment of nutritional status.
- › Methods of assessing the nutritional status.

Microbiology, Food safety and Quality control

- › Historical development and scope of microbiology; General characteristics, morphology, growth and reproduction of bacteria, fungi and algae. Pure culture techniques; Stains and staining techniques.
- › Causes of food spoilage; Principles of food safety and preservation; Methods of food preservation.
- › Food contamination and adulteration: Types and detection methods of adulterants.
- › Food safety evaluation and quality control assurance systems.

- › Food laws and standards; Subjective and objective methods of evaluating food acceptability.

Biochemistry and Physiology

- › Chemistry and metabolism of carbohydrates, lipids, proteins and nucleic acids.
- › Enzymes, coenzymes and cofactors; Hormones.
- › Structure and functions of the following - Cell, Skeletal system, Blood and Circulatory system, Gastro-intestinal system, Excretory system, Respiratory system, Endocrine system, Reproductive system, Immune system and Sense organs.

Chemistry and Physics

- › Chemistry: The gas laws, properties of gases, electrolytes, thermo-chemistry, chemical equilibrium, chemical kinetics, concept of pH and buffer, molecular orbital theory, chemical bonds and the forces involved therein; periodic table; Aliphatic and aromatic hydrocarbons. Organic substitution reactions, electrophilic and nucleophilic reactions; Isomerism; structural and optical isomers. Solubility and concentration (molar, normal and molal) of solutions.
- › Food Chemistry: Water activity in foods; Carbohydrates: Mono, di-saccharides (reducing and non-reducing sugars) and polysaccharides (starch, cellulose, pectins) - sources and properties; Proteins: Primary, secondary and tertiary structure

of proteins- Protein denaturation, peptide bonds, amino acids; Fats and oils: Properties and modification of fats; Colloids and emulsions; Plant acids and pigments.

- › Physics: Elements of mechanics, colligative properties, Laws of Thermodynamics: Mode of heat transfer; Electrostatics, magnetism and electrostatics; Outlines in optics and sound; Electro-magnetic radiation; Radioactivity and elements in quantum physics; Physico – chemical properties: Vapour pressure, boiling point, freezing point, viscosity, interfacial and surface tension and specific gravity.

Chemistry and Physics

- › Chemistry: The gas laws, properties of gases, electrolytes, thermo-chemistry, chemical equilibrium, chemical kinetics, concept of pH and buffer, molecular orbital theory, chemical bonds and the forces involved therein; periodic table; Aliphatic and aromatic hydrocarbons. Organic substitution reactions, electrophilic and nucleophilic reactions; Isomerism; structural and optical isomers. Solubility and concentration (molar, normal and molal) of solutions.
- › Food Chemistry: Water activity in foods; Carbohydrates: Mono, di-saccharides (reducing and non-reducing sugars) and polysaccharides (starch, cellulose, pectins) - sources and properties; Proteins: Primary, secondary and tertiary structure of proteins- Protein denaturation,

peptide bonds, amino acids; Fats and oils: Properties and modification of fats; Colloids and emulsions; Plant acids and pigments.

- › Physics: Elements of mechanics, colligative properties, Laws of Thermodynamics: Mode of heat transfer; Electrostatics, magnetism and electrostatics; Outlines in optics and sound; Electro-magnetic radiation; Radioactivity and elements in quantum physics; Physico – chemical properties: Vapour pressure, boiling point, freezing point, viscosity, interfacial and surface tension and specific gravity.



Bachelor of Education (B.Ed.)

Duration: 2 Years | For Women Candidates only

The B.Ed. programme 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 a comprehensive coverage of themes and rigorous field engagement with the child, school and community. It also includes special courses for enhancing professional capacities of the student-teachers. The unique aspect of this programme is that it stresses on the importance of imparting values-based education to students, resulting in their wholesome and balanced development.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling and 3 years of university (total 15 years) as recognized by SSSIHL
- ✓ Either passed or appeared for Final exams at Bachelor's degree level before the date of Admissions Test
- ✓ Bachelor's degree (BA/BA (Hons.)/B.Sc./B.Sc. (Hons.)/B.Com. (Hons.)/BBA/BE/B.Tech.): 50% or more (English) and 60% or more (Aggregate incl. English); or 5 or more in English and CGPA aggregate of 6 or more (10-point scale).
(If not appeared for Bachelor's degree final exams, aggregate marks in all the preceding Years/Semesters put together marks will be considered)
- ✓ Age: preferably below 28 years as of 31st May in the year of admission

Note: All applicants of the B.Ed. programme must refer to page 61 and **choose one of the four pedagogy subjects** for the entrance test and indicate the same on the application form.

COURSES TAUGHT

YEAR 1

Semester 1

Childhood and Growing Up, Basics in Education, Technology of Teaching and Learning, Pedagogy of Teaching – Group I: (Any one of the following), (A) Pedagogy of English, (B) Pedagogy of Physical Science, Pedagogy of Teaching – Group II: (Any one of the following): (A) Pedagogy of Mathematics, (B) Pedagogy of Biological Science, (C) Pedagogy of Social Science, Critical Understanding of ICT, Psychological Testing, Internship Phase- I (3 weeks)

Semester 2

Learning and Teaching, Contemporary India and Education, Assessment for Learning, Pedagogy of Teaching – Group I: (Any one of the following), (A) Pedagogy of English, (B) Pedagogy of Physical Science, Pedagogy of Teaching – Group II: (Any one of the following): (A) Pedagogy of Mathematics, (B) Pedagogy of Biological Science, (C) Pedagogy of Social Science, Language Across Curriculum, Internship Phase- II (8 weeks)

YEAR 2

Semester 3

School Organization, Supervision and Administration, Knowledge and Curriculum, Reading and Reflecting on Text, Internship Phase-III (4 weeks)

Semester 4

Education In Human Values: Peace Education, Creating an Inclusive School, Yoga Education, Gender, School and Society, Optional Course (Any one of: Guidance and Counseling, Environmental Education, Health and Physical Education), Community Work Drama and Art in Education, Internship Phase-IV (5 weeks)
Final Practice Teaching: Practical in Two Pedagogies

M.B.A.

Duration: **2 Years** | For **Women and Men** Candidates

The Management Programme 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. The Foundation Courses have special focus on universal human values and cover subjects such as: Self-Development, Values-based Management, Values-Centered Leadership, National Perspectives and Rural Development. The Core and Functional Courses cover concepts and techniques connected with functional management in Marketing, Operations, Finance, and Human Resources. The Integrative Courses cover subjects that span across the different functions and disciplines such as: Management Information Systems, Total Quality Management, and Management Strategies among others. Electives are offered in streams such as Marketing, Finance, Operations, Systems, Human Resources and International Business.

ELIGIBILITY REQUIREMENTS

- ✓ 10+2 years of schooling and 3 years of university (total 15 years) as recognized by SSSIHL
- ✓ Either passed OR appeared for Final exams at Bachelor's degree level OR Master's degree level before Admissions Test
- ✓ Bachelor's degree: 50% or more (English) and 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more (10-point scale) / 3.5 or more (5-point scale) with 50% or more in English
(If not appeared for Bachelor's degree final exams, aggregate marks in all the preceding Years/Semesters put together marks will be considered)
- ✓ Master's degree: 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more and 5 or more in English (10-point scale) with 50% or more in English at the Bachelor's level
- ✓ Age: preferably below 28 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Self-Development, Values Based Management, Financial and Cost Accounting, Financial Management, Quantitative Methods, Marketing Management, Production and Operations Management and a practical course in Computer Applications

Semester 2

Communication Skills, Human Resources Management, Research Methods for Managers, Economics for Managerial Decision making, Management Accounting, Management Science, Banking, a practical course in Computer Applications and Internal Viva voce

YEAR 2

Semester 3

Total Quality Management, Business Laws, Management Information and Control Systems, three electives to be chosen from the streams of General Management, Finance, Human Resources Management, International Business, Marketing, Production and Systems, a practical course in Computer Applications and Project Work (Review)

Semester 4

Values-Centered Leadership, Strategic Management, Group Dynamics for Teams, National Perspectives and Rural Development, three electives chosen from the streams of General Management, Finance, Human Resources Management, International Business, Marketing, Production and Systems, a practical course in Computer Applications, Project Work, Integrated Games and Comprehensive Viva voce

M.Tech. in Computer Science

Duration: **2 Years** | For **Men** Candidates only

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 the 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. 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.

ELIGIBILITY REQUIREMENTS

- ✓ The candidate must have either passed or appeared for final exams of one of the following:
 - a) M.Sc. in Mathematics or M.Sc. in Physics or M.Sc. in Computer Science or M.C.A., or
 - b) 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 Computer Science background*) and Information Technology (with Mathematics background) are eligible to apply.
- ✓ Bachelor's degree: 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more (10-point scale) (If not appeared B.E./B.Tech./M.Sc. final exams, aggregate marks in all the preceding Years/Semesters put together marks will be considered)
- ✓ Master's degree: 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more (10-point scale) with 50% or more in English at the Bachelor's level
- ✓ Familiarity with the following is mandatory for admissions:
 - Mathematics:** Calculus of one and several variable, 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, Data base Systems, Languages Translators
- ✓ Age: preferably below 28 years as of 31st May 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, Advanced Computer Architecture, Parallel Processing, one elective to be chosen from the eight streams, two courses in Seminars, and a Semester End Viva voce

Semester 2

Theory of Computation, Distributed Systems, two electives to be chosen from eight streams, two Seminars and a Semester End Viva voce

YEAR 2

Semester 3

One elective to be chosen from the eight streams, and a Project Work Review

Semester 4

Project work, Viva voce and Comprehensive Viva voce

ELECTIVES

STREAM I: INTELLIGENT SYSTEMS AND KNOWLEDGE ENGINEERING

Artificial Intelligence, Genetic Algorithms, Natural Language Processing, Neural Networks, Data Mining and Data Warehousing, Pattern Recognition, Machine Learning, and Mining of Big Data Sets

STREAM II: ADVANCED COMPUTER NETWORKS

Telecom Networking, Network Security, Wireless and Mobile Networks, and Advanced Computer Networks

STREAM III: HUMAN COMPUTER INTERACTION

Digital Image Processing, Medical Image Processing, Computer vision, Advanced Topics in Image Processing, and Video Processing

STREAM IV: THEORETICAL COMPUTER SCIENCE

Advanced Algorithms, and Cryptography

STREAM V: COMPUTER SYSTEMS

Compiler Design, Embedded Computing, Advanced Programming in Unix Environment, Programming for performance, and Operating Systems

STREAM VI: MULTI-CORE AND PARALLEL COMPUTING

Parallel Numerical Linear Algebra, Multi core Computing, High Performance Embedded Computing, High Performance Computing with Accelerators, Cloud Computing, and Multi Processor Programming

STREAM VII: SOFTWARE ENGINEERING

Object Oriented System Design, and Web Technology

STREAM VIII: MATHEMATICAL METHODS IN COMPUTER SCIENCE

Mathematical Methods in Image Processing, Numerical Methods in Image Processing, and Mathematical Methods for Data Mining



M.Tech. in Optoelectronics & Communications

Duration: 2 Years | For Men Candidates only

Optoelectronics has been deemed as the 21st century revolutionary technology that will create as enormous an impact as electronics did in the 20th century. This interdisciplinary M.Tech programme aims to generate trained professionals in the broad areas of optoelectronics and communications with an emphasis on networking technologies. One half of the courses are core ones and the other half are electives, that enable students to pursue areas that have their academic interest. The core courses give a strong background of science and engineering. These are supplemented with laboratory courses, enabling the students to take up project work in the second year. Graduates with training in optoelectronics and related communication technologies will be useful in industries and R&D organizations involved in the areas of Optoelectronics, telecommunication & networks.

ELIGIBILITY REQUIREMENTS

- ✓ The candidate must have either passed or appeared for final exams of one of the following:
 - a) M.Sc. Physics, or
 - b) B.E. / B.Tech. with background in Optics and Electromagnetic Theory
- ✓ Master's degree: 60% or more (Aggregate incl. English) or CGPA aggregate of 6 or more (10-point scale)
- ✓ Candidates with a Bachelor's degree in B.E. or B.Tech. (with background in Optics and Electromagnetic Theory) or a Master's Degree in Physics are eligible to apply
- ✓ Age: preferably below 28 years as of 31st May in the year of admission

COURSES TAUGHT

YEAR 1

Semester 1

Optoelectronics, Digital Communication Systems, Fiber Optic Components, two elective courses from the streams of Optoelectronics, Open Electives, a Laboratory course in Optoelectronics and Software and a Viva voce

Semester 2

Opto-Electronic sensors, Digital Communication Systems, Optical Networks, two elective courses from the streams of Optoelectronics, Network Lab, and Open Electives, a Laboratory course in Network and Software Lab and Viva voce

YEAR 2

Semester 3

Two elective courses, Unix Network Programming lab, and a Comprehensive Viva voce and Project Interim Review

Semester 4

Project work and Viva voce

ELECTIVES

Stream-I: Optoelectronics

Principles of Photonics
Fourier Optics and Optical Engineering
Optical Computing
Optical Instrumentation
Integrated Optics
Optical System Design
Biomedical Optics and Bio-Photonics

Stream II: Networking and Communications

Computer Networks
Adhoc – Wireless Networks
Networks Security
Broadband Communications
Signal Processing

Stream III: Very Large Scale Integration (VLSI) Technology

Principles of VLSI
VLSI Design & Test
FPGA based Ddesign
Embedded Systems
ASIC Design

OPEN ELECTIVES

Digital Image Processing
Introduction to Computer and Operating Systems
Geospatial Information Systems
Introduction to Virtualization Technologies
Software Engineering
Reliability, Availability and Serviceability of Systems
Microfluidics: Devices and Applications

PROFESSIONAL TEST SYLLABUS

- › There will be negative marking for all multiple choice questions.
- › **Model Test Papers** are available on the university's website - sssihl.edu.in

B.ED.

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

QUESTION PAPER FORMAT:

PART A

General English: 50 Marks / 50 Mins

- › Reading Comprehension.
- › Correction of Sentences, Articles, Prepositions, Tenses, Spelling.
- › Vocabulary, Synonyms, Antonyms.
- › Transformation of Sentences - Simple, Compound and Complex. Voices, Direct Speech and Indirect Speech.

Situational Analysis: 25 Marks / 25 Mins

The purpose of this sub test is to assess the candidate's ability to analyze a given situation with all its implications and, her capacity to respond to different problems and values issues raised.

PART B

Subject Test: 100 Marks / 100 Mins

Candidates to take a test in either **one** of the following subjects:

- › Mathematics
- › Physical Sciences
- › Biological Sciences
- › Social Studies

Part B: MATHEMATICS

- › Sets-relations-binary operations-semi groups-groups-subgroups-normal subgroups-homomorphism-Functions permutations permutation groups-cyclic groups-quotient group- automorphism.
- › Rings-Integral domains-fields-characteristic-homomorphism-Ideals-Prime Ideals-maximal ideals-Rings of permutations-polynomials-polynomial rings.
- › Vector spaces-linearly independent vectors-Basis-dimension-linear transformation--Null space--Range--Rank of a linear transformation.
- › Elementary matrix operations-Elementary matrices--Determinants-properties-rank of matrix-inverse of a matrix- Eigen vectors- Eigen values-systems of linear equations.

- › Three dimensional geometry--Coordinates--distance formula-direction cosines-plane- angle between two planes--perpendicular distance from a point-Equation of a line-skewlines--shortest distance-The sphere tangent plane power of a point-polar plane and pole-radical plane-coaxial system of spheres-The circle-radius-centre.
- › Real numbers-properties-functions-range-sequences-series-limits-continuity; Differentiability-differentiation-mean value theorems--L'Hospital rules--Integration definite integrals- Reimann integral.
- › Differential equations--first order and first degree-different forms--Exact differential equations-change of variables-equation of first order but not of first degree-higher order linear differential equations-system of linear differential equations.
- › Elements of Number theory--Divisibility-primes- congruences-solutions of congruences- congruences of degree 1; The Euler function ϕ --Quadratic equations-quadratic expressions-change of sign--roots maximum-minimum values.

PART B: PHYSICAL SCIENCES

PHYSICS (50 Marks)

- › Vector Analysis: Scalar and Vector fields, Gradient of a scalar field. Divergence and curl of a vector field
- › Mechanics of particles: Laws of motion, Motion of variable mass system. Conservation of energy and momentum
- › Central forces: Central forces - definition and examples, Conservative nature of central forces. Equation of motion under a central force, Gravitational field, motion under inverse square law, derivation of Kepler's laws
- › Kinetic theory of gases: Deduction of Max Well's law of distribution of molecular speeds - Transport phenomena - Viscosity, thermal conduction and diffusion of gases.
- › Diode theory: Intrinsic and extrinsic semiconductors; pn junction diode; approximations of a diode; biasing and its effects; V-I characteristics, specifications of a diode Rectifiers: Half wave rectifier, full wave rectifier, bridge rectifier, power supply LC and RC filters and regulators; Types of diodes and their applications: power, signal, Zener, Schotkky, LED, 7-segment displays and photodiodes Clippers; negative and positive clampers; voltage multipliers Zener diode as a constant voltage source & as a regulator Use of LED as a display, high frequency application of Schotkky, photodiode
- › Polarization and double refraction: Polarized light - Brewsters law -Malus Law - phenomenon of double refraction is calcite - Refraction of plane wave incident on a negative crystal like calcite - Nichol prism. Analysis of polarized light by quarter wave plate - Babinet compensator.
- › Newton's Laws, Equations of motion and their Solutions for a Single Particle: Newton's laws of motion and frame of reference, relative velocity; Applications of Newton's laws to the motion of a single particle - Concepts of kinetic energy and potential energy, conservative force and Work-Energy theorem; Equations of Motion and their solutions for motion under - constant force
- › Oscillations: Simple harmonic oscillator-simple pendulum, physical pendulum, spring mass system; damped harmonic oscillator; forced oscillations; coupled oscillations
- › Waves: Vibrating Strings; equation of motion in a string- solution; Normal modes of vibration
- › Electrostatics-I: The electric field: Coulombs law; continuous charge distribution ,Divergence and curl of electrostatic fields: field lines, flux and Gauss law ,Divergence of E; Application of Gauss's law:spherical, cylindrical and plane symmetries; curl of E, Work and energy in Electrostatics: work done to move a charge; energy of a point charge distribution; energy of a continuous charge distribution Conductors: basic properties; induced charges; surface charge and force on a conductor; Capacitors
- › Nuclear Physics: Radioactivity: The radioactive decay law; half-life and mean life; Statistical nature of radioactivity; statistical errors in nuclear physics, Radioactive growth and decay; transient and secular equilibrium, Natural radioactivity and radioactive series Artificial radioactivity; Determination of age of the Earth, Carbon dating; Units for

measuring radiation; Nuclear Reactions: Introduction; nomenclature; Types of nuclear reactions, Balance of mass and energy in nuclear reactions

- › Constituents of a nucleus; Discovery of neutron, Nuclear radius; distribution of nuclear charge; Measurement of nuclear radius, Nuclear mass and abundance of nuclides; Mass spectrometer, Nuclear binding energy; Nuclear angular momentum and parity; statistics, Nuclear Magnetic moment; Nuclear electric quadrupole moment; Nuclear excited states; failure of proton-electron hypothesis
- › Electromagnetic induction: Faraday's law- Lenz's law-expression for induced emf –electromotive force-time varying magnetic fields - Betatron - Ballistic galvanometer-theory-damping correction-self and mutual inductance, coefficient of coupling, calculation self-inductance of along solenoid-toroid-energy stored in magnet in field principles of transformer.
- › Varying and alternating currents: CR circuits, LR circuits, growth and decay of currents, LCR circuit, critical damping-alternating current, relation between current and voltage in pure RC and L-vector diagrams LCR circuit power factor, series and parallel resonant circuit-Q-factor.
- › Maxwell's equations and electromagnetic wave: A review of basic laws of electricity and magnetism- displacement current -Maxwell's equations in differential form Maxwell's wave equation. Plane electromagnetic waves transverse nature of electromagnetic waves Poynting theorem, production of electromagnetic waves (Hertz experiment)

CHEMISTRY (50 Marks)

- › Atomic Structure and Elementary Quantum Mechanics
- › Black Body radiation, Plack's Radiation law, Photoelectric effect, heat capacity of solids, Compton effect. De Broglie's hypothesis, Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, Schrodinger's wave equation and its importance, physical interpretation of the wave function.
- › Chemical Bonding: Ionic solids - lattice and salivation energy, solubility of ionic solids rule, power and polarisability of ions, covalent nature of ionic bond covalent bond –Stereochemistry of inorganic molecules - common hybridization and shapes of molecules

Molecular orbital theory - Shapes and sign convention of atomic orbital, modes of overlapping, concepts of sigma and pi bonds, criteria for forming molecular orbital from atomic orbital, LCAO - concept, types of molecular orbital - bonding, antibonding and non-bobding, electron density distribution diagram for H₂ +, MOED of homonuclear - H₂, He₂+, B₂, C₂, N₂, O₂, F₂ and their ions (unhybridised diagrams only) and heteronuclear diatomic molecules CO, CN-, NO,NO- and HF. Bond order and magnetic properties.

- › Periodic properties
- › Review of trends in atomic and ionic radii - covalent radii - single, double and triple bond covalent radii, van der Waal radii, radii of cations, anions isoelectronic ions, ionization energy, Electropositivity, basic nature, reducing behavior, electron affinity and electro negativity - Methods of determination and evaluation - Pauling's and Mulliken's approach, application in predicting and explaining chemical behavior - nature of bond, bond length and bond angles, diagonal relationship.
- › Chemistry of elements of Second and Third Transition series- comparative treatment with their 3d analogues with respect to oxidation state, magnetic behavior, spectral properties.Study of Ti, Cr and Cu triads-Titanium triad - electronic configuration, reactivity of +III and +IV states -oxides, halides. Chromium triad - reactivity of +III and +VI states. Copper triad - reactivity of +I, +II, and +III states.
- › Metals: Theories of bonding in metals - Free electron theory - thermal and electrical; conductivity of metals, drawbacks. Valence bond theory - explanation of metallic properties and its limitations. Band theory - explanation of metallic properties, conductors, semiconductors and insulators. General methods involved in extraction of metals - minerals and ores, ore concentration –electromagnetic separation, gravity separation - wilfley table, hydraulic classifier, leaching, froth flotation, Calcination and roasting. Acid and alkali digestion. Reduction of oxides, carbonates, halides, sulphides, sulphates - smelting, flux, auro reduction, alumino - thermic reduction, hydrometallurgy, electrolytic reduction.
- › Gaseous state: Deviation of real gases from ideal behavior, Vanderwaal's equation of state. Critical Phenomena:

PV - isotherms of real gases, continuity of state, Andrew's isotherms of carbon dioxide. The vander waals equation and the critical state, Derivation of relationship between critical constants and Vander waal's constants. Experimental determination critical constants.

- › Liquid state: Intermolecular forces, structure of liquids (qualitative description). Structural different between solids, liquids and gases. Liquid crystals, the mesomorphic state: classification of liquid crystals into Semectic and Nematic, differences between liquid crystal and solid/liquid. Application of liquid crystals as LCD devices,lubricants and in digestion/assimilation of food.
- › Solutions: Liquid - liquid mixtures - ideal liquid mixtures, Raoult's and Henry's law. Fractional distillation. Partially miscible liquids - phenol-water, trimethyl amine-water, nicotine-water systems, Lower and upper consolute temperature. Effect of impurity on consolute temperature. Immiscible liquids and steam distillation.
- › Chemical Kinetics: Rate of a reaction, factors influencing the rate of a reaction - concentration, temperature, pressure, solvent, light and catalyst. Concentration dependence of rates, mathematical characteristics of simple chemical reactions - Zero order, first order, second order, pseudo first order, half-life and mean life. Determination of order of a reaction - differential method, method of integration, half-life method and isolation method. Radioactive decay as first order phenomenon. Arrhenius equation, and concept of activation energy. Theories of chemical kinetics: effect of temperature on rate of a reaction Simple collision theory based on hard sphere model.
- › Thermodynamics: Definition of thermodynamic terms: System, surroundings, types of systems, and intensive and extensive properties. State and path functions and their differentials.
- › Thermodynamic process. Concept of heat and work.
- › First law of Thermodynamics: Statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law - Joule. Thomson coefficient and inversion temperature.
- › Thermodynamic scale of temperature. Concept of entropy, entropy as a state function, entropy as a function of V & T, entropy as a function of P & T, entropy change in physical processes. Gibbs and Helmholtz functions: Gibbs function (G)

- › Acids and Bases: Arrhenius, Lowry-Bronsted concepts of acids and bases-Strengths of acids and bases-Dissociation of poly-protic acids, Lewis theory of acids and bases: HSAB(Hard and soft acid and base) Concept-Pearson's classification as hard and soft acids and bases, acid-base strength and hardness and softness.
 - › Carbohydrates: Introduction: Classification and nomenclature-classification into mono, oligo and polysacchrides into pentoses, hexoses etc. into aldoses and ketoses. Monosaccharides: All discussion to be confined to (+) glucose as an example of aldo hexoses and (-) fructose as example of ketohexoses. Chemical properties and structural elucidation: Number of optically active, isomers possible for the structure, configuration of glucose based on D-glyceraldehydes as primary standard (No proof for configuration is required). Evidence for cyclic structure of glucose (some negative aldehyde tests and mutarotation).
 - › Amino acids and proteins: Introduction: Definition of Amino Acids, classification of Amino acids into alpha, beta and gamma amino acids. Natural and essential amino acids - definition and examples, classification of alpha amino acids into acidic, basic and neutral amino acids with examples Zwitter ion structure-salt like character, solubility, melting points, amphoteric character, definition of isoelectric point. Chemical properties: General reactions - Reactions due to amino and carboxyl groups- Lactams from gamma and delta amino acids by heating peptide bond (amide linkage). Structure and nomenclature of peptides and proteins, peptide synthesis.
- Part B: BIOLOGICAL SCIENCES**
- BOTANY (50 Marks)**
- › Evolution of Life and Diversity of Microbes. Origin and evolution of Life -an outline. Viruses: Structure, replication and transmission; plant diseases caused by viruses and their control. Bacteria: Structure, nutrition, reproduction and economic importance, an outline of Plant diseases of important crop plants caused by bacteria and their control. Brief account of Archaeobacteria, Chlamydia, Actinomycetes and Mycoplasma, cyanobacteria
 - › Algae and Fungi: General account, thallus organisation, structure, reproduction, classification and economic importance - Oedogonium, Ectocarpus and Polysiphonia. Fungi: Structure, reproduction and life history of Cercospora, Penicillium, Puccinia, Alternaria, General account of plant diseases caused by Fungi and their control. Lichens: Structure and reproduction; ecological and economic importance.
 - › Bryophyta and Pteridophyta
Bryophytes: General characters, classification and alternation of generations. Structure, reproduction, life history and systematic position of Marchantia, Anthoceros and Funaria, Polytrichum. Evolution of Sporophyte in Bryophytes. Pteridophytes: General characters, classification, alternation of generations and evolution of sporophyte. Structure, reproduction, life history and systematic position of Rhynia, Lycopodium, Equisetum Evolution of stele, heterospory and seed habit in Pteridophytes.
 - › Gymnosperms and paleobotany
General characters, structure, reproduction and classification. Morphology of vegetative and reproductive parts, systemic position, life history of Pinus and Gnetum. Distribution and economic importance; endangered Gymnosperms. Palaeobotany: Introduction, Fossils and fossilization; Geological time scale; Importance of fossils. Bennettiales: General account
 - › Anatomy:
Meristems, Leaf, Stem and root. Anamalous secondary growth-General account. Stem-Boerhavia, Bignonia, Dracaena; Wood structure: General account. Study of local timbers-Teak, Rosewood, Red sanders, Nallamaddi Yegisa, and Neem
 - › Embryology:
History and importance of Embryology, Anther structure, Microsporogenesis and development of male gametophyte. Ovule structure and types; Megasporogenesis; types and development of female gametophyte. Pollination-Types; Pollen-pistil interaction. Fertilization. Endosperm-Development and types. Embryo-development and types; Polyembryony and Apomixis- an outline. Palynology: Principles and applications. Taxonomy:
Plant systematics, Systematics vs Taxonomy, Types of classification: Artificial, Natural and Phylogenetic. Systems of classification: Bentham & Hooker, Engler & Prantle. Current concepts in Angiosperm Taxonomy: Cytotaxonomy, Chemotaxonomy and Numerical Taxonomy. Nomenclature and Taxonomic resources, Herbarium
 - › Medicinal Botany:
Ethnomedicine, Outlines of Ayurveda, Sidda, Unani and Homeopathic systems of traditional medicine. Plants in primary health care, Traditional medicine vs Modern medicine. Pharmacognosy, Plant crude drugs
 - › Cell Biology:
Plant cell envelopes, Nucleus, Chromosome and its types, Karyotype. Cell division: Cell cycle and its regulation;
 - › Genetics:
Mendelism, Genetic interactions, Linkage and crossing over. Mutations: Chromosomal aberrations, Gene Expressions, Extra nuclear genome: Mitochondrial and plastid DNA, plasmids.
 - › Ecology:
Concept and components of Ecosystem. Energy flow, food chains, food webs, ecological pyramids, Plants and environment: Ecological factors-Climatic (light and temperature), edaphic. Ecological adaptations of plants, Population ecology, Community ecology, Production ecology
 - › Biodiversity and Conservation:
Biodiversity: Concepts, Convention on Biodiversity - Earth Summit. Types of biodiversity. Levels, threats and value of Biodiversity. Hot spots of India, Agro-biodiversity, Principles of conservation, Role of organisations in the conservation of Biodiversity.
 - › Plant Physiology:
Water Relations, Mineral Nutrition, Enzymes, Photosynthesis, Translocation of organic substances
Physiology: Respiration, Nitrogen Metabolism, Lipid Metabolism, growth and Development, Stress Physiology
 - › Tissue Culture and Biotechnology:
Tissue culture, Callus culture, cell and protoplast culture, Somatic hybrids and cybrids. Applications of tissue culture. Biotechnology: Introduction, history and scope. rDNA technology: Vectors and gene cloning and transgenic plants.
 - › Seed Technology and Horticulture:
Seed: Seed dormancy; causes and methods of breaking dormancy, Seed storage, Seed production technology,

seed testing and certification, Horticulture techniques, Floriculture, Micro irrigation systems, Vegetative Propagation of plants, Layering and bud grafting, Role of plant growth regulators in horticulture.

ZOOLOGY (50 Marks)

- › Biology of Invertebrates and cell biology: General characters and classification of Major Invertebrate phyla with examples up to orders, Ultra structure of Animal Cell: Cell Division, Mitosis and Meiosis. Structure and function of the following cell organelles: (i) Plasma Membrane: Membrane, Transport of small molecules, Cell Junctions, Cell adhesion, (ii) Cytoskeleton, (iii) Golgi Complex, (iv) Lysosomes, (v) Role of mitochondria in cellular energy, transactions, (vi) Chromosomes-Structure and type, Salivary gland chromosomes.
- › Animal Physiology, Behaviour and Ecology: Nutrition: Types, vitamins and minerals. Digestion, Respiration, Circulation, Excretion, Nervous transmission, Muscle contraction in mammals. Endocrine glands, Hormonal control of reproduction in mammals. Concept of Homeostasis. Animal Behaviour, Animal Ecology, Animal associations, Environments and adaptive features of animals Environmental pollution, Wild life, wild life sanctuaries and national parks of India.
- › Biology of Chordates, Genetics, Evolution and Zoogeography: Protochordata, Cyclostomata, Parental care in Amphibia, Dentition in Mammals, Developmental Biology Genetics: Gene interaction with 3 examples, Sex determination, Sex linked inheritance, Blood group inheritance, Fine structure of gene, Operon/ concept, Cloning, Lethal genes, Chromosomal Aberration and human diseases. Evolution and Zoogeography, Modern synthetic theory of Evolution, Mutations, Genetic basis of Evolution, Genetic Drift (Hardy Weinberg's Law), Isolation and speciation, Characteristics of the following Zoogeographic regions and their fauna

Part B: SOCIAL STUDIES

POLITICAL SCIENCE

POLITICAL SCIENCE CONCEPTS, THEORIES AND INSTITUTIONS

- › Introduction, definition of Political Science
- › State–nation and Civil Society
- › Sovereignty: Monism and Pluralism
- › Theories of Origin of the State: Social Contract and Evolutionary (Historical)
- › Concepts: Law, Liberty and Equality–Their Relationship theories and kinds of Rights
- › Forms of Government
- › Theory of Separation of Powers
- › Organs of Government

GOVERNMENT AND POLITICS

- › Salient Features of Indian Constitution
- › Evolution of Indian Constitution– nationalist Movement and Philosophical Foundations
- › Indian Federation–Centre-State relations
- › President–election, Powers and Functions–Prime Minister and Council of Ministers
- › Parliament–Composition, Powers and Functions
- › Judiciary–Supreme Court, Composition, Powers, Functions and Judicial review– Judicial Activism.
- › Party System: national and regional parties, Coalitional Politics.
- › Election Commission–Electoral reforms and voting behavior
- › State Government–
- › Governor, Chief Minister and Council of Ministers–powers and Functions

POLITICAL THOUGHT

- › Ancient Indian Political Thought: Sources of Ancient Indian Political Thought, Manu: Varnadharma and Dandaneeti, Kautilya: State and Society, Gouthama Buddha: Dharma and Sangha
- › Modern Indian Political Thought: Gandhi: Ahimsa and Satyagraha, Nehru : democratic Socialism, Ambedkar: Annihilation of Caste, M.N.Roy: Radical Humanism
- › Western Political Thought: Plato, Aristotle, Machiavelli, Thomas Hobbes, John Locke, J.J.Rousseau, Jermy
- › Bentham, J.S.Mill, Hegel, Marx

ECONOMICS

- › Micro- Macro, Static-Dynamic, Normative and Positive Economics.
- › Cardinal and Ordinal approaches, and law of diminishing marginal utility.
- › Law of variable proportions, and returns to scale.
- › Different concepts of costs and their Inter-reaction.
- › Concepts of National Income.
- › Meaning of Economic Development and

Measure of Economic Development–GNP, PQLI, and HDL

- › Sources of Public revenue.
- › Canons and Effects of Public Expenditure.
- › Functions and classification of Money.
- › Budgets and Money supply–concept of Inflation.
- › Functions of commercial banks and functions of Reserve Bank of India.
- › Methods of Credit control.
- › Importance of Agriculture in the Indian Economy,
- › Population growth in India–causes– problems of over population.
- › Regional disparities– causes of inequalities in Income and Wealth.
- › Meaning of a mixed Economy, characteristic features.
- › The concept of poverty–causes of poverty in India.
- › Types of unemployment–Disguised, Seasonal, Frictional, And Structural.
- › Objectives of Planning in India–Important achievements and failures of planning India.

GEOGRAPHY

- › Unit-I: Principles of Physical Geography:
- › Unit-II: Submarine relief - Distribution of temperature and salinity - Movements of Ocean water: Waves, Tides and Currents - Currents of the Pacific, the Atlantic and the Indian Ocean - Ocean deposits.
- › Unit-III: Regional Geography of India: Locational aspects, Major Physiographic regions, climate, drainage, soil types and natural vegetation–pattern and growth trends of population, urbanization –Agriculture: Rice, Wheat, Cotton, Jute, Sugarcane, Tea and Coffee - irrigation and power development in India–Minerals: Iron, coal and petroleum–Composition and pattern of trade.
- › Unit-IV: Regional Geography of Asia: Scope and content of Regional Geography–location, Relief, Drainage, Climate, Natural Vegetation, Agriculture. Types mineral wealth (iron, tin, coal and oil); Industrial development, industries (shipbuilding, petrochemicals, automobiles); Population distribution; Broad outlines of the following as regions: South East Asia: Thailand, Malaysia, Indonesia - South West Asia: Iran, Iraq, Afghanistan.

HISTORY

- › Unit–I: Indus valley civilization – Vedic culture --Rise of new religious Movements–Jainism and Buddhism in 6th Century B.C Impact on society and culture.

- › Unit-II: A brief survey of political conditions in ancient India –Magadha - Alexander’s Invasion and Mouryas – Ashoka’s Dharma. Its nature and propagation–Mouran Administration – Economy – Art and Architecture.
- › Unit-III: Post -Mouryan period in North India– A brief political survey of Kushans, Guptas, Puswabuthi and Rajputs Polity and Administration – Social condition – Caste system – position of Women – Economy – Indian Feudalism –Art – Architecture – Education, Literature, Philosophy, Science and Technology.
- › Unit –IV: A brief political survey of South India – Sangham Age – Satavahanas – Pallavas - Cholas – Calukyias and Rastrakutas - Kakatiya and Vijayanagara – Polity and Administration, Society Economy – Art and – Architecture.
- › Unit –V: Social reform and Literary Movements
- › Unit –VI: Invasions of Arabs, Ghaznavids and Ghoris and Delhi Sultanate
- › Unit –VII: Impact of Islam on Indian Society and Culture - Bhakthi and Sufi Movements Emergence of Composite culture.
- › Unit –VIII: Survey of Sources- Establishment of Mughal Empire– Sur Interrugnam
- › Unit- IX: Advent of European powers – Portuguese, Dutch, English and French Expansion and consolidation of British Empire
- › Unit –X: Anti - Colonial Upsurge – Peasant and Tribal revolts – 1857 revolt – Causes – results and nature.
- › Unit –XI: Factors for social change
- › Unit –XII: Indian National Movement –
- › Unit –XIII: Emergence of Communal trends – partition of India – Integration of Princely States into Indian Union.
- › Unit –XIV: Characteristic features of Renaissance
- › Unit –XV: Emergence of nation States in Europe – Nature of Feudalism in Europe and Asia Unit- Age of revolutions – Glorious revolution (1688) – American Revolution (1776) – French Revolution (1789)
- › Unit –XVI: World between 1914–1945- Rivalry among colonial powers Imperialist. Hegemony

M.B.A.

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

The entrance procedure consists of:

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

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.

QUESTION PAPER FORMAT

For the written test, the question paper is divided into 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

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

Data Base 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

The entrance procedure consists of:

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 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:

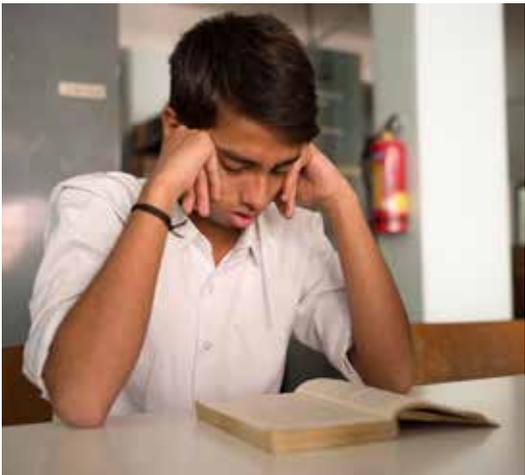
- › Elements of X-crystallography; structure determination; bonding, elastic properties, defects, lattice vibrations and thermal properties, free electron theory; band theory of solids; metals, semiconductors and insulators; transport properties; optical, dielectric and magnetic properties of solids;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



THE END OF EDUCATION IS CHARACTER
Sri Sathya Sai Baba



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