Indian Institute of Space science and Technology

(Declared as Deemed to be University under Section 3 of the UGC Act, 1956)

Valiamala, Thiruvananthapuram - 695 547, Kerala

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Vision & Mission

Vision

To be a world class educational and research institution contributing significantly to the Space endeavours.

Mission

- **Create a unique learning environment enriched by the challenges of the Space Programme.**
- **Nurture the spirit of innovation and creativity.**
- **Establish Centres of Excellence in niche areas.**
- **Provide ethical and value based education.**
- **Promote activities to address societal needs.**
- **Network with national and international institutions of repute.**

Key Functionaries

Chancellor

Dr. B. N. Suresh

President, IIST Governing Body
Chairman, IIST Governing Council
Secretary, DoS/ Chairman, ISRO

Shri. S. Somanath

Director, IIST
Chairman,
Board of
Management

Dr. S. Unnikrishnan Nair

Registrar

Dr. Y. V. N. Krishna Murthy

Deans

Dr. A. Chandrasekar
(Academic and Continuing Education)

Dr. Raju K. George
(Research & Development and Intellectual Property Rights)

Dr. Kuruvilla Joseph
(Student Activities, Student Welfare and Outreach

1. ABOUT THE INSTITUTE

Indian Institute of Space Science and Technology (IIST) established in 2007, and situated at Thiruvananthapuram, Kerala, is a Deemed to be University under Section 3 of the UGC Act, 1956. IIST, functions as an autonomous institution under the Department of Space (DoS), Government of India. IIST was conceived with a vision to nurture exceptional manpower for the Indian Space Research Organization (ISRO), one of the world's leading scientific organizations engaged in space research and space applications. The institute is the first of its kind in the country to offer high-quality education at the undergraduate, graduate, doctoral and post-doctoral levels on areas with special focus towards space sciences, space technology and space applications. Equipped with excellent infrastructure and about 100 highly qualified faculty members, IIST has, within a decade of its inception, risen to great heights. It was ranked among the top 43 Engineering institutes of the country according to 2023 NIRF rankings of MHRD with a high score of more than 75% in Teaching, Learning and Resources; a score much better than many premier institutes in the country. The institute currently offers three undergraduate and fifteen postgraduate programmes that are listed below.

Postgraduate Programmes

- M.Tech. in Thermal and Propulsion
- M.Tech. in Aerodynamics and Flight Mechanics
- M.Tech. in Structures and Design
- M.Tech. in RF and Microwave Engineering
- M.Tech. in Digital Signal Processing
- M.Tech. in Control System
- M.Tech. in VLSI and Microsystems
- M.Tech. in Power Electronics
- M.Tech. in Materials Science and Technology
- M.Tech. in Earth System Science
- M.Tech. in Geoinformatics
- Master of Science in Astronomy and Astrophysics
- M.Tech. Machine Learning and Computing
- M.Tech. in Optical Engineering
- M.Tech. in Quantum Technology

Undergraduate Programmes

- B. Tech in Aerospace Engineering
- B. Tech in Electronics and Communication Engineering (Avionics)
- Dual Degree (B.Tech in Engineering Physics + Master of Science/ M.Tech in one of the following):
    - Master of Science in Astronomy and Astrophysics
    - Master of Science in Solid State Physics
    - M. Tech in Earth System Science
    - M. Tech in Optical Engineering

In addition, IIST has a vibrant research environment with close to 300 PhD scholars engaged in frontline research areas. The academic programmes have been formulated to strengthen the fundamentals, provide hands-on experience through practical work, enhance the understanding and expand the boundaries of knowledge in various areas of interest. IIST focuses on inculcating the culture of innovation in students.

The curriculum labs are meticulously designed and the best experimental set-ups and equipment are provided. IIST has three Centres of Excellence in the areas of (i) Advanced Propulsion and Laser Diagnostics, (ii) Virtual Reality and (iii) Nano science and Technology, where students get to involve themselves in various advanced and sophisticated experiments. The many state of-the-art research laboratories offer a unique learning environment for the students to delve into cutting-edge research. With IIST stepping into the next decade, the decadal plans promise ample opportunities to the young, bright students to get actively involved in space related projects like ExoWorlds - An ISRO Exoplanet Mission, Space Robotics, Space Sensors, etc.

IIST AT A GLANCE - 2022		
Strength of Departments		
Department	**Faculty members**	**Scientific/Technical Staff**
Aerospace Engineering	23	19
Avionics	23	12
Chemistry	8	6
Earth and Space Sciences	13	4
Humanities	5	3
Mathematics	11	3
Physics	13	13

Postgraduate Enrollment (2010 - 2022)	
Department	**Total no. of students enrolled**
Aerospace Engineering	262
Avionics	342
Chemistry	81
Earth and Space Sciences	170
Mathematics	89
Physics	93
Total	1037

Undergraduate Enrollment (2007 - 2022)	
Course	**Total no. of students enrolled**
B.Tech. in Aerospace Engineering	946

B.Tech. in Electronics & Communication Engineering (Avionics)	988
B.Tech.* in Engineering Physics (Dual Degree)	415
Total	2349

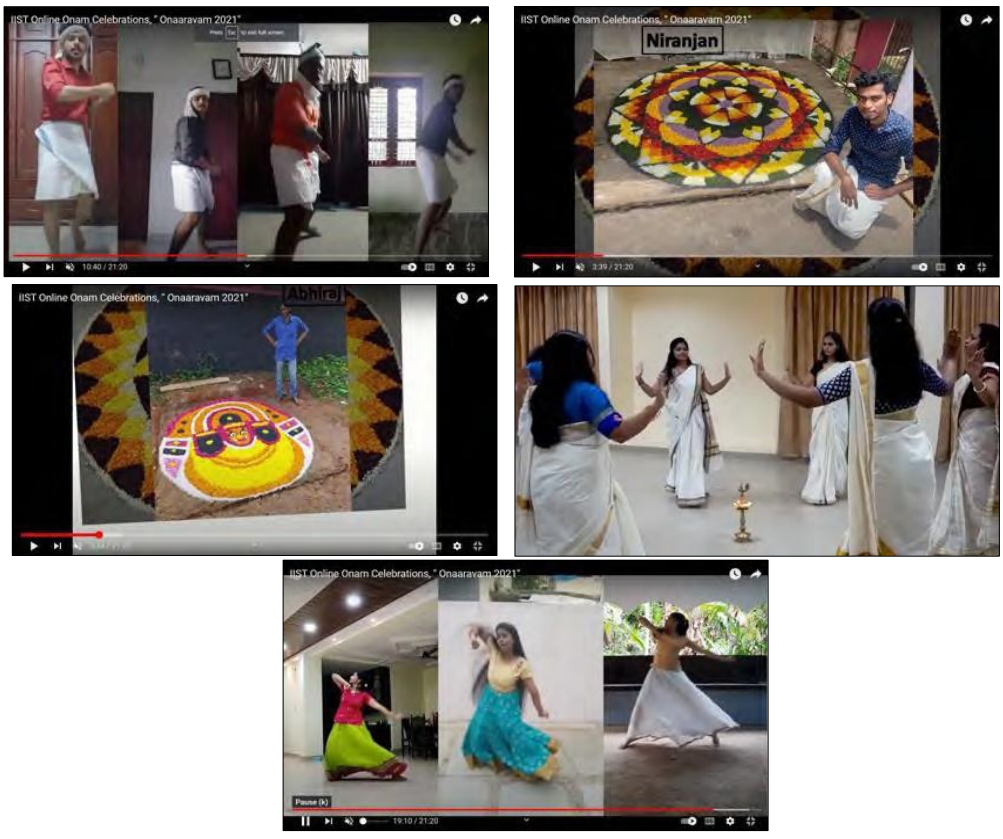
*Including earlier B.Tech. (Physical Sciences)

PhD Enrolment (2010 – 2023) – 533 Nos

Degrees Awarded (2011-2022)			
Postgraduate	**Undergraduate**	**Dual Degree**	**PhD**
687	1491	86	137

Campus life at IIST

IIST promises a vibrant campus life for the young and energetic students amidst the serene greenery close to the foothills of the Sahyadri ranges.



There are well-equipped hostels, student canteens, cafeteria, bank and ATM, playgrounds, gyms, etc. Very good medical and counseling facilities are also available on campus. Clubs like the Astronomy Club, Robotics Club, and Mathematics Club are very active in the campus. Conscientia, IIST's Astronomy & Technical Fest is organized every year by the students to trigger innovative ideas. For their holistic growth, IIST encourages students in extra-curricular pursuits like sports and cultural activities. IIST's Annual Cultural Fest, Dhanak is now one of the most popular student festivals in south India, where a large number of students converge on to showcase their talent. Festivals and events are celebrated with enthusiasm by the student community with active participation from the entire IIST fraternity.

Figure: Campus life at IIST

Awards

Mohd Abdullah Khan, M.Tech., Thermal and Propulsion 2020 batch, First position in Thesis-2021, ISHMT Trivandrum Chapter mentored by **Dr. Prathap C. & Dr. Manu K.V.**

Usurupati Samiyalu , M.Tech., Best Thesis award by IEEE Microwave Theory and Techniques Society (MTT-S) Kerala Chapter 2021, mentored by **Dr. Immanuel Raja and Dr. Chinmoy Saha.**

Student team(Pragya Yadav & Srikara Reddy (M.Tech. 2020 Power Electronics), Harshith V Reddy, G Sai Pavan & Mokshith SR (M.Tech. 2021 Power Electronics), Vidya V (PhD), and VLN Mallikarjun (B.Tech. 2021 ECE), won the Texas Instruments India Chairman Award for Technical Innovation (1st Prize) in the

India Inno vation Challenge and Design Competition (IICDC) organized by DST, AICTE, Texas Instruments, IIM Bangalore and mygov.in **(mentored by Dr. R. Sudharshan Kaarthik, HST).**

Students Activities & Events

Many festivals are celebrated by IIST students such as Holi, Onam, Dussehra, Diwali.

Tenth Convocation -

The 10th convocation ceremony of IIST was held at 10:00 a.m. on 17th December 2022. This year a total of 271 academic degrees in various disciplines were awarded (B. Tech - 112, Dual Degree - 20, M. Tech - 104 and Ph. D - 35). Chief Guest, Shri. G. Madhavan Nair, Former Secretary, DOS/Chairman, ISRO was the Chief Guest. Dr. S. Unnikrishnan Nair, Director, IIST welcomed all the dignitaries, faculties, and students. Dr. S. Unnikrishnan Nair, Director, IIST, Shri. S. Somanath, President, Governing Council, IIST, Secretary DOS and Chairman, ISRO. Dr. B.N. Suresh, Hon. Chancellor, IIST and the Chief Guest congratulated all the degree recipients and advised them to develop smart solutions for all the challenges existing in the space field.

Mr. Aditya Deevi (B Tech in Electronics and Communication Engineering (Avionics) and Mr. Kiran L. (Master of Science in Astronomy and Astrophysics) were the toppers in U.G and P.G respectively, and they were awarded with prestigious Gold medals. Shri. Subhrahmanya V was the topper in B Tech in Aerospace Engineering, and he was presented with a Cash Award and an Excellence Certificate. Shri. Abhishek A, M Tech in Optical Engineering under Dual Degree

Programme was adjudged the Best All-Rounder in academics, co-curricular and extra-curricular activities, and he received a Cash Award and an Excellence Certificate.

Startup Activities: STIIC

Space Technology Innovation and Incubation Centre (STIIC), hosted by Indian Institute of Space Science and Technology (IIST) Thiruvananthapuram is an umbrella for advancement of entrepreneurship and innovations at IIST. STIIC manages a business incubator which envisages to provide systematized scientific guidance and infrastructure support to young entrepreneurs within its campus. With its current infrastructure spread over 5,000 sq.ft, STIIC can accommodate an average of 12 startups at a time. Through STIIC, IIST yearns to achieve the mission to foster the spirit of innovation and act as a pedestal to assist knowledge driven enterprises to establish and prosper in their chosen domains. The activities of STIIC are formulated, streamlined, guided, supported, and monitored by STIIC Establishment and Operational task team and the IPR and Incubation Cell Monitoring Committee, constituted by Director, IIST.

Currently we have incubated five startup companies in STIIC and several prospective applications are under review. The incubated companies include

1. **Vashishtha Research Pvt. Ltd.:** with focus on Inspection and Measurement Instruments and working towards

- Robotics and Machine Development
- Electronics and Embedded software
- Engineering software and 3D viewers

2. SPACETIME 4D printing solutions LLP:

- Developing 3D printers for 3D printing materials research
- Direct printing from raw materials - customized printers

3. **Bhuh Pramaan Pvt. Ltd.:** Developing innovative solutions in satellite image & Geo-spatial data processing

4. **Inter Cosmos Space Exploration Technologies Pvt. Ltd** Develop a proof-of-concept on their product on satellite propulsion.

5. **SPECRULE Scientific Pvt Ltd.:** In house development of laser based optical sensor systems for aerospace and combustion research

2. POSTGRADUATE PROGRAMMES: AN OVERVIEW

Department of Aerospace Engineering(AE)

1. M.Tech.in Aerodynamics and Flight Mechanics

The M.Tech programmes is intended to impart knowledge in low- and high speed aerodynamics, space and atmospheric flight mechanics, and the control and design of aerospace vehicles such as aircraft, spacecraft, and launch vehicles. The curriculum includes various topics accessible to students with mechanical and aerospace engineering backgrounds. Elective courses provide students with the opportunity to build on the foundations developed in their chosen disciplines.

The academic programmes is supported by well-equipped Aerodynamics and Flight mechanics labs. These labs help provide exposure to use of low speed wind tunnels and instrumentation, design and operation of rotary and fixed wing MAVs, flight controllers and simulators. In addition, state of the art facilities are also available to students for carrying out research as a part of their 1 year Thesis work. Some of the notable research facilities include

- Fully instrumented high pressure shock tube for performing unsteady gas dynamics and high speed flow studies
- Laser absorption spectroscopy lab for development of quantitative laser based sensors for high enthalpy flow applications
- Centralised HPC facility with access to commercial and open source CFD software. The following laboratory facilities are available to this programme

• A laboratory for aerodynamics featuring two low-speed wind tunnels and a fully instrumented shock tube. These facilities include advanced instrumentation, such as a hot wire anemometer, an unsteady three-component force balance, electronic pressure scanners, a high-speed Schlieren, and high-speed data acquisition systems.

• The flight mechanics laboratory is equipped with a small selection of fixed and rotary wing unmanned aerial vehicles (UAVs) that are routinely used for instructional and research purposes. Additionally, the facility is equipped with flight controllers and simulators to develop and test manned and unmanned vehicle flights.

• The centralized high-performance computing facility provides access to various commercial and open-source computational fluid dynamics (CFD) software packages Throughout the M. Tech thesis work, students can utilize these facilities to work on basic or applied research problems, gaining exposure to cutting-edge aerodynamics and flight mechanics.

The faculty in this programme has expertise in a variety of fields of research, including the following:

- Low and High Speed Flows, Experimental aerodynamics, Computational Fluid Dynamics, Flow instability and transition, Aeroacoustics, Unsteady Aerodynamics, Hypersonic Aerothermodynamics, Quantitative laser diagnostics
- Aerodynamic Shape Optimization, Optimization of launch vehicle trajectory, Optimization of aerospace systems on a multidisciplinary level, Machine learning for space applications

- Unmanned aerial vehicle design and flight testing; intelligent guidance and control of unmanned aerial vehicles; and development and manufacture of next-generation unmanned aerial vehicles.

Students are taught to use their core knowledge to analyze and research advanced concepts. The project phase introduces the student to addressing contemporary aerodynamics and flight mechanics design and research problems from a fundamental perspective.

Several of our alumni are also placed in various and wide range of government and private industries such as ISRO, GE, Tata Advanced systems, Siemens Digital Factory, Skyroot Aerospace, L&T Technology Services, Mazagon Docks Shipbuilders and a few startup companies. Many of our graduated students have joined doctoral studies at renowned top institutes in India and abroad.

2. M.Tech in Structures and Design

This programme mainly focuses on concepts of design and analysis of advanced structures. The programme covers the fundamentals of static and dynamic

Figure: Micro Raman Spectrometer

analysis and design of various structures. The curriculum covers topics such as Elasticity, Structural Dynamics, Finite element methods, Composite mechanics and a wide variety of electives in the areas of Acoustics, Stochastic Mechanics, Structural Health Monitoring and Wave Propagation, Fracture Mechanics, Robotics, and Advanced Computational Techniques.

Students get an opportunity to carry out their lab experiments at various state of the art facilities in house and in the research centers of ISRO. The in-house lab facilities available in the house include Modal testing, Experimental composite micromechanics using micro- Raman spectrometer, Structural health monitoring facility using laser Doppler velocimetry, Advanced robotics, and wheeled Rovers for NDT. Students have access to Computational mechanics software such as ABAQUS, ANSYS, NASTRAN, FEAST, ADAMS, and various modelling software. An interdisciplinary approach with flexibility in choosing courses enables students to tackle real-life engineering challenges. Students are exposed to the structural design challenges faced by the Aerospace and allied industries and related research. The dissertation enables students to tackle research and industrial problems with a fundamental outlook.

Out of the graduated students of M.Tech in Structures and Design, about 53% have been placed in different reputed firms such as UTC Aerospace, Indian Space Research organization, Indian Railways, Entuple Technologies, TCS (Engineering and Industrial Services), to name a few.

About 22% of the graduates from Structures and Design are undergoing higher studies in reputed Universities within the country and abroad including IISC Bangalore, India, Indian Institute of Technology, Kanpur, India, Indian Institute of Technology, Hyderabad, India, Pennsylvania State University, USA, University of Groningen, Netherlands, Politecnico di Torino, Italy.

3. M.Tech in Thermal and Propulsion

The Master's degree programme in Thermal and Propulsion provides an opportunity for B.Tech. or equivalent degree holders in Aerospace/ Aeronautical/Mechanical/Chemical Engineering to specialize in the field of thermal-fluid sciences and propulsion engineering. This postgraduate programme consists of advanced compulsory courses, electives, a laboratory practice course, a credit seminar, and a year long project in the second phase. The curriculum and syllabus are framed to lay the foundations for a fundamental understanding of the basic topics related to the field of specialization and to extend the learning in the niche areas offered as electives. Through the final year project, the programme aims to develop analytical and experimental skills in thermal sciences and propulsion engineering. The

individual project will provide ample opportunity for the student to develop insight and exposure in frontier research and developments based on the current technological need of industry and research establishment. The faculty regularly floats project topics in the field of fluid mechanics, compressible flows, heat transfer, combustion, propulsion technology, computational fluid dynamics, and two-phase flows.

The faculty resources and infrastructure available in the department helps to inculcate independent research activities and practical system designs with innovation. The research activities are supported by a Centre of Excellence in Advanced Propulsion and Laser Diagnostics along with other research facilities in combustion and flame diagnostics, heat transfer, two-phase flows, high-speed flows, etc. The students also have access to a computational facility where computational research involving modeling and simulation is promoted using commercial, open-source resources, and indigenously developed computer codes. Figure l(a) shows a typical CFD simulation output obtained by solving the governing equations in fluid dynamics and heat transfer using advanced numerical techniques. The 2D flowfield measured experimentally in a swirling flowfield using laser diagnostic technique 2D Particle Image Velocimetry (2D PIV) is shown in Figure (b) below.

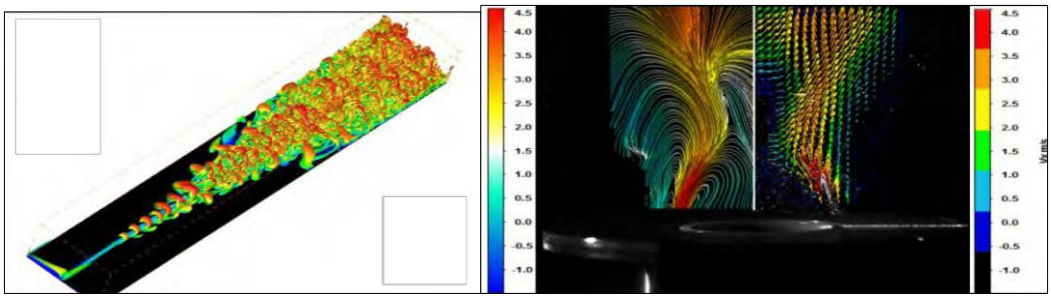


Figure: (a) Direct numerical simulation of laminar- turbulent.flow transition; (b) Streamlines (left) and 2D mean axial velocity (right) distribution under isothermal conditions in a swirl stabilized burner measured using 2D Particle Image Velocimetry (2D-PIV)

Out of the graduated students of M.Tech in Thermal and Propulsion, about 23% of them are undergoing higher studies in reputed Universities within the country and abroad including IISC Bangalore, and IITs. About 57% have been placed in different reputed firms such as CSIR National laboratories, Indian Space Research organization, Air India Engineering Services LTD, Skyroot Aerospace Pvt. Ltd. to name a few.

Department of Avionics (AV)

1. M.Tech in Control Systems

M.Tech in control Systems is a unique- two year interdisciplinary master's programme designed to provide due weightage for both R&D as well as Industrial sectors. This well-structured and focused M.Tech programme gives a comprehensive exposure to students in a wide area of control systems theory and practice. Senior scientists of **ISRO** who had been involved in the development of control systems for **ISRO** launch vehicles and satellites are also serving as adjunct/ guest faculties in the control group.

Courses in this programme range from fundamental topics like classical control design techniques to advanced topics like nonlinear control theory, optimal control design, etc. These courses are backed with design projects in embedded systems and control. Further, students are exposed to the application of control theory in the field of launch vehicles, spacecraft, and robotics as part of their elective courses. As part of their final year project, students get an opportunity to work with cutting edge technologies in the field of robotics, spacecraft attitude control, biomedical engineering, UAVs, etc.

The M. Tech students have ample opportunities to do internships and projects related to the advanced research projects undertaken by the faculties of the control group. The list of a few such projects is given below:

- Control system development for the half humanoid Vyommitra to be launched by **ISRO** to function oa board the Gaganyaan, a crewed orbital spacecraft.
- Configuration design and Control system development for a human mimetic general purpose humanoid, an advanced **R&D** project initiated by **ISRO** as a part of Vision-2030.
- Attitude determination and Control Systems setup using Quadcopters
- Attitude determination and Control Systems for small satellites (Ahan) developed at SSPACE IIST and to be launched by ISROs launch vehicle.
- Three axis reaction wheel development for attitude control of cubesats.
- Attitude control system using cold gas thrusters for small satellites to be launched by **ISRO**
- Health care assessment in space arena using deep learning based monitoring, diagnosis and prognostics for human health care in space.

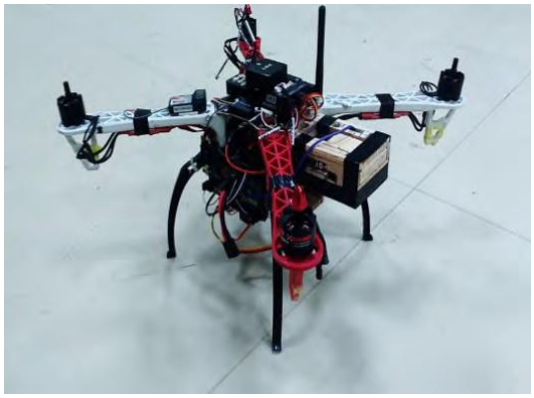


Figure: Quadcopters developed at IIST by M.Tech. Control systems students

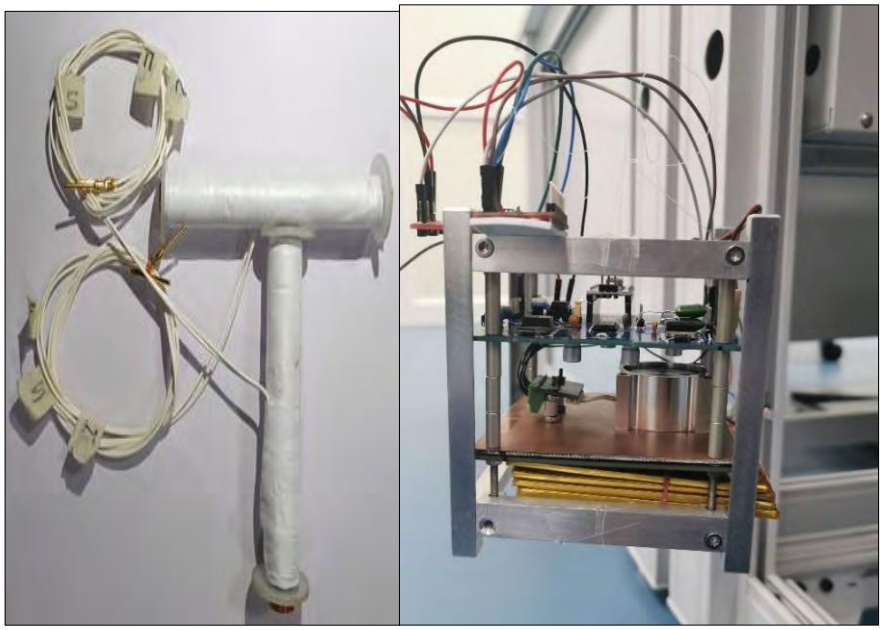


Figure:Magnetotorquesr and Single axis Momentum wheel based ADCS system developed at IIST by M.Tech. Control Systems students.

Our alumni are currently placed in reputed companies/organization such as:

- Mercedes Benz Research and Development India Pvt.Ltd.
- Agnikul Cosmos
- Skylark Drones
- Continental Automotive Components (India) Pvt. Ltd.
- GE Transportation
- Axiom Research Lab Private Labs
- Delta Electronics
- HCL Technologies
- Team Indus Aerospace

After graduation, many of our students are pursuing higher studies m universities and institutes such as:

- Indian Institute of Science, Bangalore
- Indian Institute of Technology Bombay
- Indian Institute of Technology Madras
- Indian Institute of Technology Delhi

2. M.Tech in Digital Signal Processing

The M.Tech in Digital Signal Processing (DSP) programme is a two year course offered to students who are passionate about the field of signal processing and allied fields such as communication systems, image processing, machine learning for signal processing, and computer vision. Students in this

course are instructed by experienced faculty in fundamental subjects such as probability and random processes, estimation and detection, linear algebra, advanced signal analysis, pattern recognition, and machine learning. These fundamental subjects enable students to proceed seamlessly to advanced courses in signal processing, communication systems, deep learning, computer vision and Internet of Things which are offered in the programme. The DSP programme also offers elective courses in cutting edge subjects such as Reinforcement Learning and Control and Internet of Things. The M.Tech in DSP programme also offers the students hands -on experience in various subjects through laboratories in digital signal processing, communication systems, machine learning, artificial intelligence, computer networks and systems, and computer vision. Our labs are well equipped with software-defined radios, MIMO evaluation kits, spectrum analyzers, RF signal generators, digital signal processing boards, sensor network motes, and network development kits, to name a few.

A few representative pictures of the labs are given below.

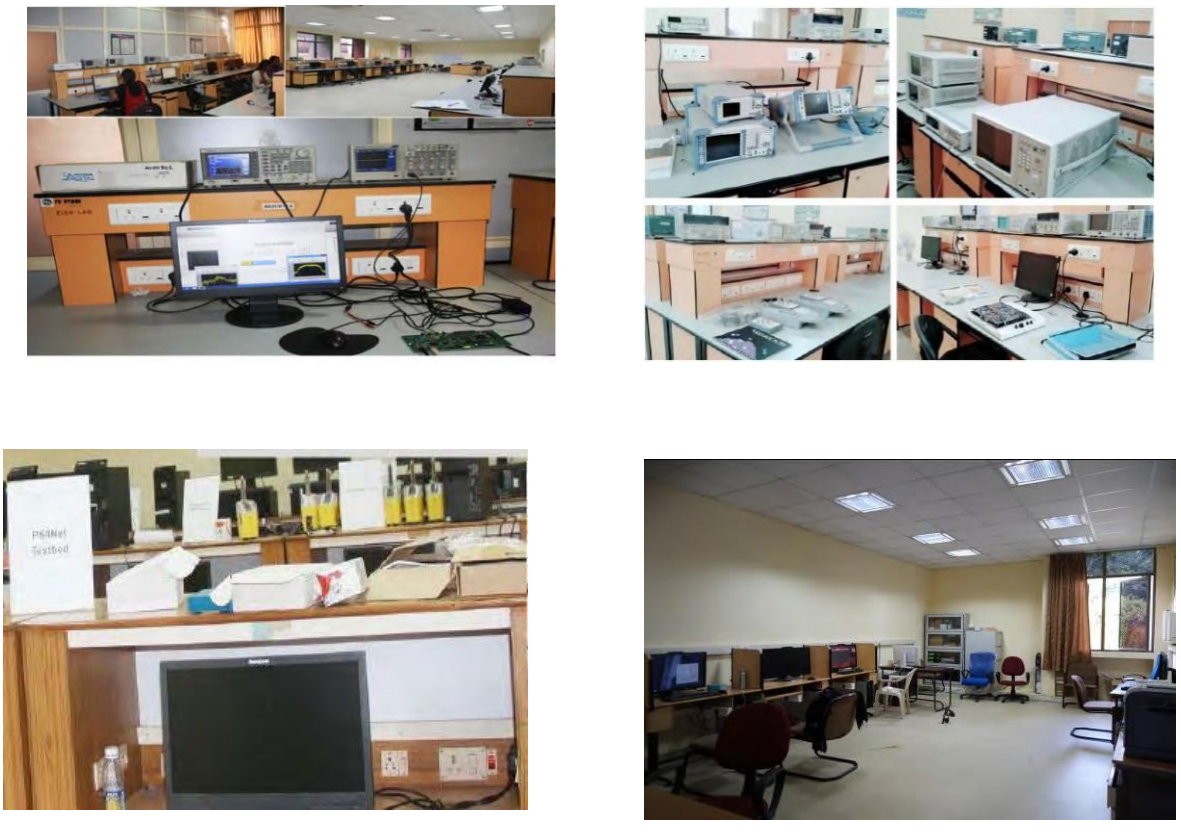


Figure: (clockwise from top left), Digital Signal Processing Laboratory , Communication Systems Laboratory, Virtual Reality Laboratory, Systems and Networks Lab

The rigorous study enables the M.Tech in DSP students to participate competitively in current research activities, development projects, and pursue higher studies. The work done by our M.Tech students have been reported in 6 journal publications and 14 conference publications. The students work on various research projects in association with several centers of ISRO such as URSC, IISU, NRSC, and VSSC. They also get opportunities to work in collaborative projects with other institutes such as IITs. Students from M.Tech in **DSP** have received the prestigious INAE best project award, and two best paper awards for their work.

The two-year programme also offers ample opportunities for developing industry-specific skills through an innovative design project, summer internship, and final year project. To date, 25% of our students have been **ISRO** employees who have joined the DSP programme for further training or have been placed in ISRO after their graduation. Of the rest of the students, 58% have been placed or have had internship opportunities in PSUs, industries, and research organizations such as:

- NPOL (DRDO)
- IES (Railways)
- Analog Devices
- Mathworks
- Team Indus
- Mercedes Benz
- Tata Consultancy Services (Research and Development)
- Subex
- Flytxt Mobile Ltd.
- KPIT

After graduation, 24% of students (non **ISRO** employees) have or are pursuing higher studies in universities and institutes such as:

- Indian Institute of Science, Bangalore
- Indian Institute of Technology, Bhubaneswar
- Indian Institute of Technology, Madras
- Indian Institute of Technology, Kharagpur
- Georgia Institute of Technology, Atlanta

3. M.Tech in RF and Microwave Engineering

The M.Tech. in RF and Microwave Engineering programme under the department of Avionics is a unique Two-year course designed with a specific focus of the state of the art industry requirements, Government R & D Laboratories, and higher education. The course curriculum under the programme is designed in a well-balanced manner to equip the students with fundamental courses along with advanced ones in the niche area of Advanced Electromagnetics, Antenna technology, Microwave and MM-wave circuits and THz Technology. There are ample opportunities for the students to pursue advanced research through integrated components of the curriculum like, course-based mini-projects, Engineering Design, Seminar Presentation on the latest trends as well as extensive projects work running for two full semesters. Thanks to the availability of the well- equipped antenna fabrication facilities and high frequency measuring instruments in the laboratory, students get ample exposure to various practical experiments, hands on experience and associated system aspects through various research projects of Department of Science and Technology, (Government of India), ISRO centres along with IIST projects.

Figure: Glimpses of the selective major equipment and devices/antennas/system realized by the M.Tech. in RF and Microwave students at IIST

Due to strong association and collaboration with various centre and laboratories of Indian Space Research Organization (ISRO), students get opportunities to work in various live projects catering to the space antennas, mm-wave and THz antennas, Internet of Things test beds, and circuits, etc. in various ISRO centres and industries. Above Figure shows the glimpses of some of the research equipment/facilities along with a few selected prototypes developed by the M.Tech RF and Microwave Engineering students under the supervision of the faculty members of the group. More than 65% of the alumni of M.Tech. in RF and Microwave have been placed and currently working in different reputed organizations like (selective):

- Ansys , Bangalore, India
- Mercedes-Benz, Bangalore, India
- COMSOL Multiphysics, Bangalore, India
- Astra Microwaves, Hyderabad, India
- Asarva Chips and Technologies Pvt. Ltd., Bangalore, India
- Teamindus, Bangalore, India
- Honeywell, India and Canada
- NEST Technology, Trivandrum, India
- BPL Medical Technologies, Bangalore, India
- Space Application Centre, ISRO, Ahmedabad, India
- UR Rao Satellite Centre,ISRO, Bangalore, India
- SatishDhawan Space Centre (SDSC), ISRO, Sriharikota, Andhra Pradesh
- Raman Research Institute, Bangalore, India
- NIT Surathkal, India
- Shivaji University, Kolhapur, Maharashtra

Till date 27% of the graduates from the RF and Microwave Engineering Students have opted for higher education at premier Institutes across India and abroad. A selective list is as follows:

- Indian Institute of Space science and Technology, Trivandrum, India
- University of Waterloo, Ontario, Canada
- Curtin University, Perth, Australia
- IISC Bangalore, India
- Indian Institute of Technology Madras, India
- Indian Institute of Technology, Hyderabad, India

Graduates of M.Tech. in RF and Microwave Engineering students have

- received several best paper awards in prestigious International conferences
- received International Travel support awards from **DST,** Government of India
- published various high quality articles in reputed journals like IEEE Transaction on Antennas and Propagation, Microwave and Optical Technology Letters. IEEE Access, IET Microwave Antennas and Propagation etc.

4. M.Tech.in Power Electronics

M. Tech in Power Electronics (PE) offers courses that cover the latest trends in Power Converters, Electric Drives, Grid Connected Systems, Internet of Things, Electronic Systems Design, Emerging and Advanced Topics in Power Electronics, and Control Systems with hands-on laboratory experience.

The PG Power Electronics Lab is equipped with several converter modules including rectifiers, inverters, Multi-phase and multi-level converters, high-end digital signal oscilloscopes, LCR meters, thermal cameras, power quality analyzers, programmable power supplies, and electronic loads, which are available for research and extensive experimentation to PG students. Control platforms such as Digital Signal Controllers, programmable System on Chip, and FPGAs are available. Electric machines including induction machines (3-phase, 5-phase, 6-phase), synchronous machines - (3 phase, 6-phase), DC machines are available. In addition to these, special electrical machines such as BLDC motors, multi-phase motors are also available.

PG students are encouraged to design and build converter prototypes and controller platforms, design electrical machines, explore research problems in emerging areas such as solid state transformers, electric-vehicle technology, multi-level converters, and multi-phase drives. B. Tech and M. Tech students who work in power electronics labs regularly publish in high quality journals and present their work in international conferences. In the past two years, there have been more than two journals and ten international conference publications where the lead work was done by an M. Tech student. Furthermore, the projects are nominated for the prestigious Indian National Academy of Engineering Innovative Students Project Award- as of now, two projects have qualified for the final presentation. A few achievements of students have been listed below.

Student Awards:

1. GS Athira (M.Tech 2018) Shortlisted for final presentation for INAE Innovative Student Project Award.
2. Ranjith S (M.Tech 2019) Shortlisted for final presentation for INAE Innovative Student Project Award.
3. Pragya Yadav (M. Tech 2020) Semi-finalist in India Innovation Design Challenge Competition 2020 (IICDC 2020).

Recent Journal papers by M. Tech Students:

[1] Athira Suresh, Archana C M, R. Sudharshan Kaarthik and Rajeevan P P, "An Induction Generator Scheme with Se£ies Compensation for Frequency Insensitive Loads," in IEEE Transactions on Industrial Electronics, doi: 10.1109/TIE.2020.3013520.

[2] Ranjith S, Vidya V and R. Sudharshan Kaarthik, "An Integrated EV Battery Charger with Retrofit Capability," in IEEE Transactions on Transportation Electrification, doi: 10.1109/TTE.2020.2980147

[3] S. K. Dash and R. Sudharshan Kaarthik, "Independent Speed Control of Two Parallel Connected Split-Phase IM with a Common DC Link and Inverter," in IEEE Transactions on Power Electronics, vol. 34, no. 10, pp. 99S7 9965, Oct. 2019.

M.Tech in PE started in 2016 and has graduated three batches of students so far in 2018, 2019 and 2020 respectively. The placement/higher education scenario for these two years at a glance is listed here.

Of the 4 students graduated in 2018:

- 3 students got placement offers from four companies namely Delta Electronics, Schnieder Electric India, Centum Electronics and also ROHM Semiconductors in the final year of their PG programme. One student went on to pursue PhD at IIT Kharagpur.

Of the 5 students graduated in 2019

- 4 students got placement offers from Delta Electronics in the final year of their PG programme. One student is pursuing her PhD at Indian Institute of Science, Bangalore.

Of the five students graduated in 2020

- Three students got placement offers from Delta Electronics, Bangalore, and Kone Elevator India, Chennai, **one** student joined as a research fellow at IIT Dharwad, and one is pursuing **PhD** at IIT Roorkee.

Two of our research labs are shown below:

Figure: PEDS Lab

5. M.Tech in VLSI and Microsystems

M.Tech in VLSI and Microsystems is a 2-year Full-Time post-graduate programme offering specialization in Very Large Scale Integration (VLSI) design and Microelectronics systems.

The course covers the basics and advanced topics of Semiconductor devices and technology, analog, digital and mixed-mode VLSI design, RF Integrated Circuit Design, microelectronic devices and materials, Micro Electro Mechanical Systems (MEMS) and its applications and Optoelectronics system design. Mastering the above courses entails the students to acquire significant theoretical, practical experience and knowledge with the techniques and state of the art development tools of Integrated circuits and Micro electro Mechanical System to cater to the need for integrated microsystem and VLSI industries.

The VLSI Design Lab and Microelectronics Lab are well equipped with the latest IC design tools and MEMS design tools which could mould the student to take up the design of IC/MEMS for fabrication. The students will get hands-on experience in fabrication in the fabrication Lab, developing sensors and characterization in the sensor lab which is one of the unique features of this course. The students are exposed to advanced IC design projects. Each of the VLSI (analog, digital, mixed-signal, RFIC) courses has their own course project which aid in the in-depth understanding of the course material and provide a hands-on design experience.

The uniqueness of this course depends on the student's interest. They will get the opportunity to work specifically on VLSI designs on developing analog/digital/mixed-signal design or integrated microsystem which includes sensors, actuators and its sophisticated electronic system for control and communication which will enable them to get expertise in the respective area. Faculty members associated with this M-Tech programme have active collaborative R&D projects with ISRO centres for development of MEMS and VLSI based ASICs. The programme also has a close collaboration with SCL Chandigarh (ISRO) for realizing the devices.

VLSI Microsystem Laboratories

These laboratories were established m 2013 to support the post graduate programme VLSI and Microsystems and research activities in the areas of VLSI, Micro/Nano electronics, MEMS/NEMS devices, and technologies. These laboratories would support the R&D activities in these areas at ISRO. The development of the R & D ecosystem in the area of NEMS and Nano electronics at IIST for academia, ISRO, and other research organizations is also in progress.

VLSI Design Lab

The VLSI Design Lab is equipped with high end computing facility, FPGA design kits (zynq, Virtex 7) with latest IDE software and state of art IC design simulation tools for Digital/ Analog and Mixed VLSI IC Design from Cadence, Synopsys, Mentor Graphics.

MEMS & Microelectronics Design Lab

The lab is equipped with modelling, design and simulation tools for MEMS devices, Micro/Nano electronics devices and systems. (High-end workstations, Coventorware and MEMS+ from Coventor, Silvaco ATLAS, and ATHENA TCAD, Sentaures TCAD 3D Process and Device TCAD from Synopsis, COMSOL Multi physics etc.)

Figure: VLSI and Microelectronics Design Lab

MEMS & Nano FAB (Micro/Nanofabrication Laboratory)

MEMS/Micro/nanofabrication facility is planned to be established m a cleanroom spanning 140 square meters. The facility is planned for 4" silicon wafer substrates with upgradability for 6" wafers. Phase- I of MEMS &Nano FAB has been established with the following major facilities.

a) Class 1000 Modular wall cleanroom
b) Double Side Mask Aligner (Photolithography)
c) Spin processor and Hot Plates
d) DC/RF/ Pulse DC Sputtering System
e) Parylene CVD
f) WaterPlant

Figure: MEMS and NanoFAB Facility

Micro/Nanosystems Characterization lab

Micro/Nano systems characterization lab has characterization equipment for electrical and mechanical characterization of micro/Nano-scale devices and VLSI.

Figure: Micro/Nanosystems Characterization lab

Gas Sensor and Biosensor Lab:

The lab has a facility to characterize the gas sensor for four gases together. Now, the lab is upgraded to handle eleven gases including explosive and toxic volatile compounds. It also has a facility to develop electrochemical sensors for various applications.

Placement Details

Students get an opportunity to do their final year projects as internships in various VLSI industries. In addition, students get placed in core VLSI companies on and off campus. Some students pursue their doctoral work in the top institutions in India and abroad. Companies like Intel, Global Foundries, Texas Instruments, Analog Devices, Ignitarium, etc., have recruited our students in the past through internships/placements.

Achievements Patents

M-Tech students in VLSI and Microsystems are provided opportunities to contribute to various R&D projects and some of their works have resulted in patent applications related to sensors/devices too.

1. "Reliable room temperature Gas Sensor with negligible baseline drift suitable at different air flow conditions" Palash Kumar Basu L. Karthikeyan, Akshaya. M. V, [Indian Patent 2017: 201741027050.

Papers Published

The scholars along with the faculty members have published papers in various reputed journals and proceedings such as IEEE Sensor, Journal of Micromechanics and Micro engineering, Microsystem Technologies (Springer), International Workshop on Physics of Semiconductor Devices, IEEE VLSI Design Conference etc.,

Best thesis/paper Award

The thesis work of the M.Tech (VLSI and Microsystem) graduates are accepted for INAE-M.Tech Best Thesis award and best paper award in International Conferences.

Department of Chemistry(CH)

1. M.Tech in Materials Science and Technology

'Steeped in fundamentals yet space-age' is the guiding principle of the M.Tech. programme in Materials Science and Technology primarily offered by the Department of Chemistry. The core faculty strength of the department spread over diverse areas of Chemistry, Chemical Engineering, and Materials Science

along with shared expertise from the Aerospace department suffice to implement this 71 credits programme which attracts students from diverse backgrounds including Polymer Science and Technology/ Chemical Engineering/ Rubber Technology/ Metallurgical Engineering/Materials Science/Materials Science and Metallurgical Engineering/ Mechanical Engineering/ Production Engineering/ Production and Industrial Engineering/ Plastic Technology/ Chemistry/Physics/Materials Science/Nanoscience and Technology. A comprehensive curriculum grounded in fundamental sciences assists students to appreciate the macro-micro-nano-angstrom level manifestations in materials and their role in dictating the material properties and their diverse utility including those for space applications. Substantial components of laboratory sessions revealing the nexus of research and practice, a broad set of electives to explore and expand their research interests, and innumerable project opportunities to tackle real-world problems await the aspirants of the programme.

Figure: Glimpses of Materials processing, Materials characterization and wet labs utilized by Master's students in the Department of Chemistry

The students enrolled in the programme get opportunities to work in the advanced laboratories established in the department including Polymer and Materials Processing Lab, Materials Characterization Lab and Nanoscience Lab housing some of the advanced instrumentation facilities along with exposure to some of the unique facilities in ISRO centres. Most of the students succeed in having publications/patents out of their final year project and emerge highly competent for pursuing higher studies or work in reputed firms demanding high levels of professionalism and practical knowledge. Among our alumni over the past 5 years 25% of the candidates were ISRO sponsored, 44% are currently pursuing PhD in reputed international and national institutes (like IISc Bangalore, 11TB, IITM) and 22% are placed in PSUs or other firms.

Department of Earth and Space Sciences (ESS)

1. Master of Science in Astronomy & Astrophysics

Astrophysics deals with understanding the physical universe through the fundamental laws of physics. The universe provides a natural laboratory to study phenomena in extreme conditions such as the near vacuum of interstellar space to nuclear densities inside neutron stars. Astrophysics uses knowledge from several domains of physics. Consequently, the pursuit of a career in astrophysics requires a foundation in basic physics.

Along with gaining an in depth understanding of how the universe works, the Master of Science programme in Astronomy & Astrophysics prepares students for the next step in higher education and research in this field. The first year of the programme includes coursework covering areas such as astronomical techniques, computational astrophysics, exoplanets and planetary sciences, stellar astrophysics, high- energy astrophysics, galactic and extragalactic astronomy, and cosmology. Students gain exposure to the analysis of multi wavelength archival data, along with collecting and analyzing data from the institute's observatory facility. The second year of the programme is devoted to original research leading to a thesis. The Astronomy & Astrophysics group has seven faculty members working on unsolved problems in star formation, galaxy evolution, interstellar and intergalactic medium, accretion around compact objects, and relativistic stellar explosions.

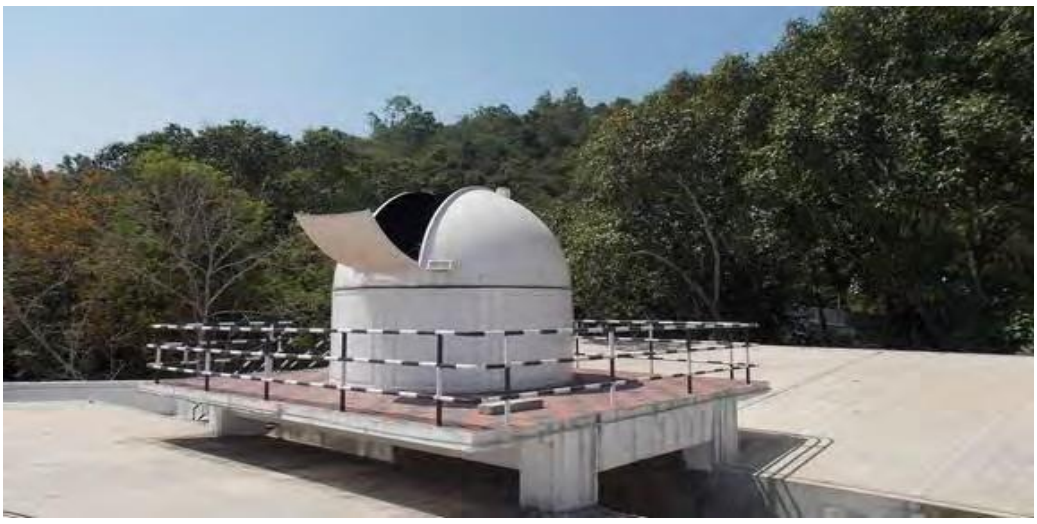


Figure: The observatory at IIST hosts an 8-inch and a 14-inch telescope. Students collect and analyze data from the telescope as part of their observational lab.

In the past, the programme has attracted undergraduate and post graduate students from diverse backgrounds in engineering and physical sciences. Most of the graduates from the Master of Science programme (100% over the last three years) have gone on to pursue a doctoral programme in Astronomy & Astrophysics in universities across the world or have taken up research project positions at various institutions. Universities where students have been placed (over the duration of the programme) include University of Liege (Belgium), University Cote d'Azur (France), Universitat Potsdam (Germany), University of Groningen (Netherlands), University of Texas, Dallas (USA), University of Strasbourg (France), University of Western Australia (Australia), Universidad de Chile, IIST, Tata Institute of Fundamental Research, IIT Hyderabad and Indian Institute of Astrophysics (Bangalore).

2. M.Tech in Geoinformatics

Since July 2013, Indian Institute of Space Science and Technology has been offering M.Tech in Geoinformatics with the objective of contributing to the development of skilled manpower in Geoinformatics with potential for taking up methodological and computational aspects of Geoinformatics. The type of courses and delivery mechanism of this programme is structured in such a way as to equip the students with necessary skills in theoretical, practical and software implementations of different aspects of Geoinformatics and make themselves suitable for taking up careers in research and corporate entities. The programme spans through various fundamental courses like remote sensing, image processing, geographic information system, spatial data analytics, photogrammetry, and microwave remote sensing initially followed by advanced courses as core and elective subjects.

Rationale in curriculum design

1. To keep pace with the changing tools, technology and industrial environments for enhanced job prospects of students,
2. To continue offering the firm background in various areas of remote sensing, GIS and related IT environments and reflect the contemporary developments such as hyperspectral and LiDAR remote sensing, and close-range photogrammetry.
3. Blending the geospatial data handling and analysis with- machine learning-based approaches
4. To ensure student-led problem solving initiatives, the course has credited unconventional credited outreach programme to interact with government and non-government sector and identify local/regional social problems which can be addressed with geoinformatics

5. Improving masters level academic project works with staggered credits oriented towards research, manuscript writing and publication

Figure: Geoinformatics Department

Geoinformatics students passed out have mostly joined industries across the country through Campus placement and individually. Geospatial industries where our alumni work include Aarav Unmanned Systems Pvt. Ltd, Tech Mahindra, GeoknoPvt Ltd Satsure, Seacon Pvt Ltd, BhuhPramaan Pvt Ltd, Quantela Pvt. Ltd etc. About 40% of the students are pursuing research in IITs, IISC and other international universities including the University of Nice Sophia Antipolis France, Trinity College Dublin, University of Michigan – Ann Arbor in the field of image processing, remote sensing, and spatial analytics. Few have joined the Government Departments also.

3. M. Tech. in Earth System Science

The Earth System Science deals with the understanding of the complex physical processes of Earth's atmosphere, oceans, and its geological features. This stream specifically focuses on the dynamics and thermodynamics of atmosphere and the oceans and the interactions between the atmosphere-oceans and land surface that lead to the evolution of Earth's weather and climate. The study of atmospheric and oceanic sciences includes all aspects of the atmosphere and physical oceanography, their mutual interaction, and their interaction with space and the rest of the earth system. Although the most important goal is to understand the atmosphere and ocean for the purpose of predicting the weather, atmospheric and oceanic sciences encompass and deal with the following broad interest as well: motions at large, medium, and small scales; clouds and

precipitation; solar and terrestrial radiation; air chemistry and quality; and past, present, and future climates. Furthermore, satellites play a very pivotal role in obtaining atmospheric observations as well as sea surface observations together with atmospheric circulation patterns at both global and local scales.

The objective of the Master's programme in Earth System Science is to prepare the students to appreciate and master all aspects of the atmosphere, oceans and land processes and their role in determining the weather and climate of Planet Earth. In the first semester, M.Tech students are provided a thorough introduction to the basic concepts and tools in the core courses, which cover the physics and dynamics of the atmosphere and ocean, in addition to a course on Earth Resources and Tectonics. An array of elective courses are offered in the second semester, in the areas of Numerical Weather Prediction, Air Sea Interactions, Aerosol-Cloud-Climate Interactions, Boundary layer meteorology, Planetary Geosciences, Satellite Meteorology and Oceanography, and Atmospheric and Oceanic Instrumentation and Measurement Techniques. The students will conduct original research in the second year of the programme. The Earth System Science group has five faculty members who have expertise in various aspects of Earth Science such as atmospheric modeling, aerosol and its interactions to climate, Ocean modeling, Climate modeling and analysis, Climate change, Solid Earth, and Planetary Geosciences.

During the last three years, the placement is close to 100%. The passed out students in the MTech Earth System Science programme are pursuing higher studies toward the Doctoral programme. Universities where students have been placed include University of Hohenheim (Germany), University of Maryland (USA), LATMOS (Paris, France), University of Washington (USA), Embry Riddle Aeronautical University (USA), University of Alberta (Canada), Lund University (Sweden), Maastricht University (Netherlands), IISc (Bangalore), IITM (Pune) etc. A few of them got placed in industries and government sectors such as Climate Connect and Airport Authority of India.

Department of Mathematics (MA)

I. Master of Technology in Machine Learning & Computing

The Master of Technology (M.Tech.) in Machine Learning & Computing offered by the Department of Mathematics, IIST is a two year programme which started in 2010. It is one of the first Master programmes the institute has started and has now become one of the most sought-after courses. The admission is based on the GATE score and is highly competitive. A few seats are reserved for scientists from **ISRO.**

It is a four semester programme tailored in tune with the mathematical and computational aspects of the cutting-edge technologies in the area of Machine Learning. The curriculum comprises of the topics related to Artificial Intelligence, Machine Learning, and Computer programming by giving equal emphasis on their theoretical and practical aspects. Such treatment helps to produce highly competent Data scientists who could contribute positively to the growing field of Machine Learning.

The core courses include Optimization Techniques, Data Mining, Numerical Linear Algebra, Foundations of Machine Learning, Advanced Machine Learning and Statistical Models and Analysis. The elective courses in the programme give the candidate an exposure to the latest technologies and state of the-art techniques in Data Modeling. The list of elective courses includes Discrete Mathematics & Graph Theory, Introduction to Internet of-Things, Introduction to Parallel programming, Image & Video Processing, Advanced Kernel Methods, Advanced Optimization, Computer Vision, Graphical and Deep Learning Models, Reinforcement Learning, Theory of Algorithms, Topological Data Analysis, and Cloud Computing.

The second year of the programme is dedicated solely to the Project and Seminar. As part of the project thesis, the candidate is expected to work on a challenging problem that leads to novel contributions in the field of Machine Learning.

Lab facilities

The Machine Learning lab provides computer systems of customized configurations to meet the demanding computational requirements of the courses offered.

Figure: Machine Learning Lab

The lab is equipped with a high end workstation of 2 x Intel Xeon 3.2GHz CPU, Tesla K80 and GTX 1080 GPUs and 256 GB RAM, two workstations with Intel Xeon 2.4 GHz CPU, Quadro K4200 GPU and 80 GB RAM, a workstation with Intel Xeon 2.4 GHz CPU, GTX 1080-Ti GPU and 80 GB RAM, 10 desktops with Intel i5 3.2 GHz CPU and 4 GB RAM and a brain computer interface with 16 channel EEG recording unit.

Alumni details

The prospects of the course are found to be very promising on the basis of the current status of our Alumni. The majority of the alumni are working with reputed industries and some of them are in the field of academics.

Our students are in great demand in industries and are offered positions that ensure career growth and the best salary package available in the market. The industries in which they are working include Robert Bosch, Michelin, Hitachi, FireEye, Flytxt, Quantela, Happiest Minds, UST Global, Innovation Incubator Labs, Accenture, and TCS. Our students have also been enrolled for PhD in reputed national as well as international universities such as ETS Canada, Caen Normandie University - France, and Indian Institute of Technology Madras.

Department of Physics (PH)

1. M.Tech in Optical Engineering

Optical engineering programme is offered to prepare students for the application of fundamental optics in modem technology and research environments. Rapid advancements in the field optics, lasers and optoelectronics are making optical engineering an essential tool in majority day today applications. Moreover, the recent advent of quantum information technology is largely driven by a combination of fundamental optics and optical technology.

The master's programme is offered in a truly interdisciplinary manner and it accommodates students from physics, mechanical engineering, electrical and electronics engineering, and equivalent areas equally well. The courses are designed with the right balance of science and engineering with full emphasis on optics. Advanced concepts like Fourier optics, holography, image processing, guided waves etc. are complemented by practical courses like laser and optoelectronics, optomechanical design, adaptive optics, etc. The course is supported by one of the most advanced optics training laboratories in the country. Emerging areas of quantum technology are also covered in the programme since the requisite expertise covering both experimental and

theoretical aspects is available in the department. Experts from ISRO regularly visit the department to impart knowledge in specific areas unique to ISRO. The students get to visit and work in some of the ISRO centres as part of their projects.

Figure: A view of the Applied and Adaptive Optics Lab

As a matter of convention, most students passing out from the programme continue to pursue higher education in the field of optics and optical engineering. This is fuelled by the standards met both by the students as well as faculty involved in this programme. Many of our M. Tech. in optical engineering students publish papers in reputed international journals such as Physical Review A, Optics Letters, JOSA A, Applied Optics, etc, as part of their final year project, and this has enabled them to gain international visibility. Since the inception of the programme in the year 2012, with the first batch passing out in 2014, several of the passing out students have gone to pursue higher studies. In fact, two of our M.Tech in Optical engineering students had won the prestigious Marie Curie fellowship towards pursuing their doctorates in Europe. Seven others have gone abroad to pursue Ph.D. which are fully funded. Three of them have gone on to pursue Ph.D. in the country, both at UST and IITs. Four of them have got absorbed in to public sector undertakings through open competition. The remaining have been readily placed in the industry due their unique training and experience.

Figure: Prof Chris Dainty interacting with a student in the Optics Lab,and Prof Takeda with some of our M.Tech. in Optical engineering students.

Professors of international repute working in the field of optics, visit the department every year to deliver talks and interact with IIST students, and collaborate with our faculty. In particular, our M. Tech. in Optical Engineering students get the opportunity to interact with them on a very informal basis, to gam exposure.

2. M.Tech. in Quantum Technology

The MTech programme in Quantum Technology at IIST joins the global effort in preparing young engineering and science graduates, towards industry and research, to meet the specific goals targeted by ISRO and other national scientific establishments. The outlined coursework at IIST provides a strong foundation with the required basics and gives a broad overview of cutting-edge Quantum Technologies. The first semester lays the essential foundations where the students are trained in the basics of quantum mechanics, solid-state physics, optics, and experimental techniques, while simultaneously being introduced to quantum computation. In the second semester, the student covers various aspects of quantum technologies, such as quantum optical communication, quantum metrology, and quantum devices, while simultaneously being exposed to the physics of information. The students, in parallel, gets to perform several fundamental experiments and write elementary quantum computational codes as part of the curriculum. The student can also choose one elective from a range of courses directly related to quantum technology in the second semester. The second year of the course is dedicated to the final year project, where the student will carry out academic and research and development-based activity in any of the relevant quantum technology related areas. The work carried out will have the potential to be publishable, with implications for the development and application of quantum technology.

IIST PG Admission Statistics

M.Tech /Master of Science Admission 2020-2021				
SI No	Programme	GATE SCORE CUT - OFF		
		GENERAL	OBC - NCL	SC/ST /PWD
1	Aerodynamics and Flight Mechanics	500	450	250
2	Structures and Design	500	450	250
3	Thermal and Propulsion	500	450	250
4	Control System	500	450	250
5	Digital Signal Processing	450	405	225
6	RF and Microwave Engineering	425	382	212
7	Power Electronics	500	450	250
8	VLSI and Microsystems	450	405	225
9	Materials Science and Technology	450	405	225
10	Astronomy and Astrophysics (GATE)	425	382	212
	Astronomy and Astrophysics (JEST)	JEST Rank up to 300		
11	Earth System Science	490	441	245
12	Geoinformatics	450	405	225
13	Machine Learning and Computing	550	495	275
14	Optical Engineering	450	405	225
15	Solid State Technology	425	382	212

M.Tech /Master of Science Admission 2021-2022				
Sl No	Programme	GATE SCORE CUT-OFF		
		GENERAL	OBC-NCL/ EWS	SC/ST/ PWD
1	Aerodynamics and Flight Mechanics	450	405	225
2	Structures and Design	450	405	225
3	Thermal and Propulsion	450	405	225
4	Control System	500	450	250
5	Digital Signal Processing	475	427	237
6	RF and Microwave Engineering	425	382	212
7	Power Electronics	500	450	250
8	VLSI and Microsystems	450	405	225
9	Materials Science and Technology	425	382	212
10	Astronomy and Astrophysics (GATE)	425	382	212
11	Earth System Science	425	382	212
12	Geoinformatics	490	441	245
13	Machine Learning and Computing	550	495	275
14	Optical Engineering	425	382	212

M.Tech/Master of Science Admission 2022-2023				
Sl No	Programme	GATE SCORE CUT-OFF		
		GENERAL	OBC-NCL/ EWS	SC/ST/ PWD
1	Aerodynamics and Flight Mechanics	350	315	175
2	Structures and Design	350	315	175
3	Thermal and Propulsion	350	315	175
4	Control System	350	315	175
5	Digital Signal Processing	350	315	175
	Power Electronics	350	315	175
6	RF and Microwave Engineering	350	315	175
8	VLSI and Microsystems	350	315	175
9	Materials Science and Technology	350	315	175
10	Astronomy and Astrophysics (GATE)	425	382	212
	Astronomy and Astrophysics (JEST)	JEST Rank up to 300		
11	Earth System Science	350	315	175
12	Geoinformatics	350	315	175
13	Machine Learning and Computing	450	405	225
14	Optical Engineering	350	315	175
15	Quantum Technology	350	315	175

JOINING IIST

Candidates, who have accepted the seat allotment and completed the certification verification procedure, are required to report at IIST on dates specified in Table. During the joining process, Medical verification, issue of photo-identity cards, allotment of hostel rooms, etc. will be organized.

Candidates **ARE REQUIRED** to submit the following documents at the time of joining IIST:

a) SSLC/SSC or equivalent

b) Pre-degree/ Plus-2 or equivalent

c) B.E. / B.Tech / Master of Science, or equivalent degree certificate and consolidated mark sheet containing break up of marks of all semesters. If consolidated mark list is not received, mark sheet of all semesters have to be produced.

d) GATE Score card.

e) OBC-Non Creamy Layer certificate issued by the competent authority issued on or after 01/04/2023, if applicable.

f) EWS Certificate issued by the competent authority issued on or after 01/04/2023, if applicable

g) SC / ST certificate issued by the competent authority, if applicable

h) Transfer / Migration Certificate and Conduct Certificate in original from the Institution last studied.

i) Medical Fitness certificate from a Class 'A' Medical Practitioner

j) Vaccination certificate duly signed (along with seal) by a registered Medical Practitioner in the proforma given in admission portal.

k) No Objection Certificate' from the authorities concerned to your accepting the admission, if you are already under obligation to serve a Central Government Department/Organization/State Government/Public Authority.

Candidates have to make their own arrangements for stay in Thiruvananthapuram or Nedumangad (a nearby town). Hostel accommodation will be available only for students, from the evening of the date of joining, after completion of the admission formalities at IIST. Instructions to reach IIST can be found at https://www.iist.ac.in/aboutus/how-to-reach. Further instructions will be uploaded on the Admission Website.

CONTACT DETAILS

ContactAddress	Chairman, PG Admissions Indian Institute of Space Science and Technology Valiamala (P.O.), Thiruvananthapuram - 695547 Kerala, INDIA
E-Mail	admissions@iist.ac.in **Querieswill be answered via E-mail ONLY**
HelpDesk Contact numbers	**Landline Numbers:**0471-2568477, 478,618,418 (Monday to Friday from 9:30 a.m to 5:00 p.m) Fax:0471-2568556 **Help Desk will assist ONLY in Online Admissio Procedure. Other queries will be accepted an answered over E-mail ONLY.**

DISPUTE REDRESSAL

Any complaints, grievances, etc. related to Admission to IIST must be referred to the Chairman, Postgraduate Admissions-2023, IIST. Director, IIST will be the appellate authority with respect to such complaints. The courts having their jurisdiction at Thiruvananthapuram alone can adjudicate on all matters related to IIST Admission.

For details regarding eligibility, last date of application etc, refer to the Notification

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY

IIST-154-IP-E-03-2023