

Physics, maths and more

The Tata Institute of Fundamental Research embraces world-class standards, and also offers effective training to youth

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One of the most renowned centres for science research in our country is the Tata Institute of Fundamental Research. It began functioning on the campus of the Indian Institute of Science, Bangalore, in June 1945 and moved to Mumbai in October that year. Apart from the main campus in Mumbai (Homi Bhabha Road, Mumbai-400 005, website: www.tifr.res.in), the institute has campuses in Pune, Bangalore, and Hyderabad.

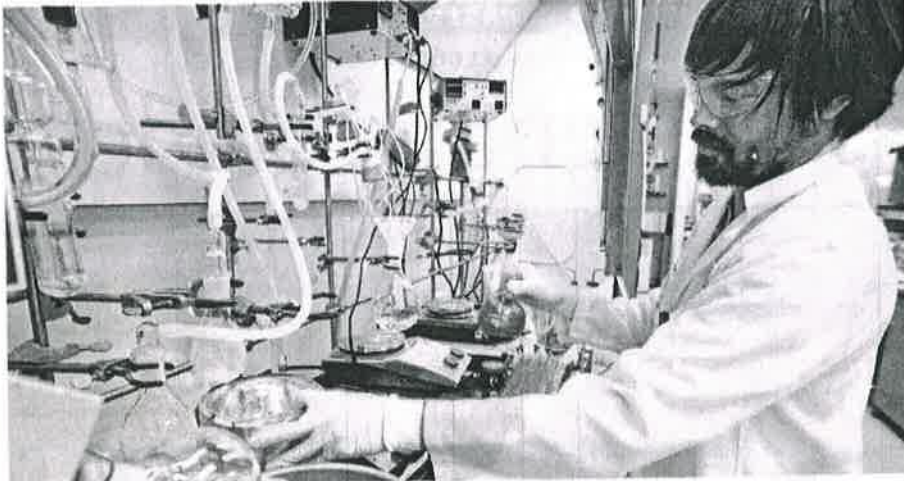
It is a national centre funded by the Union Government through the Department of Atomic Energy. The institute made a start with the Cosmic Ray Group. The Nuclear Emulsion/Electron Magnetism Group was set up in 1953. Computer Science and Technology came up at the centre in 1954. The main building at Colaba was inaugurated by the then Prime Minister, Jawaharlal Nehru, in 1962.

In the 1960s, the institute expanded to include the Molecular Biology Group and the Radio Astronomy Group. The 1970s saw further expansion of the institute by adding the Theoretical Astrophysics and the Homi Bhabha Centre for Science Education.

Over the next two decades, TIFR established new national centres – the National Centre for Radio Astrophysics in Pune, the Centre for Applicable Mathematics in Bangalore, and the National Centre for Biological Sciences in Bangalore. The International Centre for Theoretical Sciences was established as part of the TIFR in 2007.

The TIFR embraces world-class research in all areas of fundamental sciences, with a commitment to train youth in the fascinating world of science research.

The TIFR is a deemed university that runs programmes leading to the award of M.Sc., Ph.D., and integrated M.Sc.-Ph.D. degrees. It provides opportunities for basic and advanced



research in physics, chemistry, biology, mathematics, computer science, and science education for talented and strongly motivated students.

Its distinguished faculty, world-class facilities, and stimulating research environment offer a fine platform for aspiring young men and women to make a career in science research. Let us look into the details of the research opportunities in the various units.

Research facilities

- There are opportunities for Ph.D. and integrated Ph.D. in:
 - Mathematics: School of Mathematics, Mumbai; Centre for Applicable Mathematics, Bangalore.
 - Physics: Department of Astronomy and Astrophysics, Mumbai.
 - Department of Condensed Matter Physics and Materials Science, Mumbai.
 - Department of High Energy Physics, Mumbai
 - Department of Nuclear and Atomic Physics, Mumbai.
 - Department of Theoretical Physics, Mumbai.
 - National Centre for Radio Astrophysics, Pune.
 - Biophysics: Department of Chem-

ical Sciences, Mumbai; National Centre for Biological Sciences, Bangalore.

- Chemistry: Department of Chemical Sciences, Mumbai.
- Biological Chemistry at National Centre for Biological Sciences, Bangalore.

- Biology: Department of Biological Sciences, Mumbai; National Centre for Biological Sciences, Bangalore.

- Computer and Systems Science: School of Technology and Computer Science, Mumbai.

- Science Education: Homi Bhabha Centre for Science Education, Mumbai.

- Also, Material Science, Optics and Biology at TCIS, Hyderabad, and Physics, Chemistry, Mathematics and Biology at the International Centre for Theoretical Sciences, Bangalore.

Now we shall go into the details of research facilities in different schools and facilities.

- School of Technology and Computer Science

This school, located in Mumbai, offers programmes leading to a Ph.D. in two speciality streams: computer science and systems science. Candidates with the following qualifi-

cations are eligible for admission to the programmes:

- BE, B.Tech., ME, M.Tech., MCA, and M.Sc. computer science, electrical engineering, electronics engineering and information technology with a consistently good academic record. Exceptionally well-qualified students with BE, B.Tech., ME, M.Tech., M.Sc., or equivalent degrees in other disciplines will also be considered.

There will be an entrance examination and an interview for admission. As part of the programme, students have to complete an exploratory project for one semester. Those who have completed a two-semester project as part of their ME or M.Tech. degree may apply for a waiver in the project requirement.

Path to Ph.D.

Pass the qualifying examination. Seek registration for Ph.D. by applying to the subject board within six months. Show the name of the thesis contemplated, the name of the adviser, and a broad description of the topic of research in the letter.

After the completion of the Ph.D. research work, get the permission of the thesis adviser and forward a synopsis of the thesis to the subject

board for obtaining approval for submission to the university office. Repeat the same procedure to obtain prior approval for submission of the thesis.

After the subject board approves the submission of the thesis and the award of the Ph.D. degree will follow as per university guidelines.

• School of Mathematics

The school runs a graduate programme leading to the award of a Ph.D. degree. With its faculty engaged in high-quality research in a broad spectrum of areas, the school provides a stimulating environment for pursuing doctoral studies.

The minimum qualification for admission to the Ph.D. programme is a Bachelor's degree in mathematics, statistics, science, and technology (BA, B.Sc., B.Math., B.Stat., BE, and B.Tech.).

Those without a Master's degree are encouraged to undertake the M.Sc. programme of the school as well.

Candidates who are interested in applied mathematics may seek admission in the TIFR Centre for Applicable Mathematics, Bangalore.

All about Kishore Vaigyanik Protsahan Yojana

The annual national-level aptitude test Kishore Vaigyanik Protsahan Yojana (KVPY) is conducted by the Indian Institute of Science, Bangalore, for high school and college students who are interested in a research career in basic sciences, engineering, and medicine.

The examination has various streams:

- **Stream SA:** For students enrolled in the class 11 in basic science subjects during the current academic year who have secured minimum 80 per cent (70 per cent for those belonging to the Scheduled Castes and the Scheduled Tribes) marks in aggregate in mathematics and science subjects in the 10th standard board examinations.

- **SX:** For students enrolled in class 12 during the current academic year and aspiring to join undergraduate programmes in basic sciences (B.Sc., BS, or integrated M.Sc.) with minimum 80 per cent (70 per cent) marks in aggregate in mathematics and science subjects in the 10th standard board examinations.

- **SB:** For students enrolled in the first year B.Sc., BS, or integrated M.Sc. programme during the current academic year with at least 60 per cent (50 per cent) marks in aggregate in science subjects in the class 12 board examination.

- **SP (basic sciences and engineering):** For students enrolled in standards 11 or 12 or the first or second year of the B.Sc., BS, integrated M.Sc., or BE, B.Tech., or B.Arch course during the current academic year with minimum 60 per cent (50 per cent) marks in aggregate in the 10th and 12th board examinations. Additionally, students enrolled in second year B.Sc., BS, integrated M.Sc., BE, B.Tech., or B.Arch programme with at least 60 per cent (50 per cent) marks in the first year examinations.

- **SP (medicine):** Students enrolled in the first or second year of the MBBS, BDS, B.V.Sc., or B.Pharm. course during the current academic year with at least 80 per cent (70 per cent) marks in aggregate in science subjects of the standard 12 board examination.

Students enrolled in the second year of these programmes must have secured 60 per cent (50 per cent) marks in the first year examination.

Those who qualify in the KVPY examination are eligible to get national scholarships and fellowships if intercasted in research careers. The Department of Science and Technology of the Union government offers fellowships ranging from Rs.4,000 to Rs.7,000 a month and annual contingency grants equivalent to four months' fellowships to students studying in 11th standard and B.Sc., BS, integrated M.Sc., B.V.Sc. or B.Pharm., BE, B.Tech., B.Arch., MBBS, MDS, or BDS programmes. Selection is based on academic excellence and demonstrated interest in research.

Details can be had from www.kvpy.org.in