
Information and Announcements



Institute of Radio Physics and Electronics

University of Calcutta, Calcutta 700 009, India.

The Institute of Radio Physics and Electronics (INRAPHEL) was established in 1949 by the University of Calcutta. The foundation stone was laid on April 21, 1949 by Bidhan Chandra Roy, the then Premier of the Government of West Bengal. The Institute is the first of its kind in India and was created at a time when the only special establishment for radio-electronic research under the Government was the Electronics Division of the National Physical Laboratory.

The Institute was created by sharing the resources of the Wireless Laboratory of the Department of Physics and of the Communication Laboratory of the Department of Applied Physics, University of Calcutta. In laying the foundation stone of the Institute, B C Roy stated “ I have planted a seed which will grow into a mighty tree spreading its branches much beyond the borders of your present expectation. The Institute will become not only an all India Centre of Study and Research but will also attract earnest seekers after truth from beyond the boundaries of India”.

The Institute is proud to have fulfilled the expectation expressed above, thanks to the dynamic leadership of its Founder Prof. Sisir Kumar Mitra and his successor Prof. Jatindra Nath Bhar. It has supplied teachers to all the premier Institutions in India and also trained manpower for various National Laboratories, Government departments and industries. The UGC recognized it as a Centre of Advanced Study in 1962 and is still continuing its support under CAS/special assistance programme.

The Institute is a post-graduate department of the University of Calcutta, offering 3 year B. Tech, 1½ year M. Tech and Ph. D degrees in various thrust areas. Since its inception, the Institute has maintained its special character of admitting only students with B. Sc (Honours in physics) degree. This unique feature and well-formulated course structure, which is updated from time to time, helped its students to become true scientists as well as engineers. The sanctioned faculty strength is about forty at present.

Location and Building

The main old 4 storey building (Sisir Mitra Bhavan) is located within Razabazar Science College Campus (now Rashbehari Siksha Prangan) at 92 Acharya Prafulla Chandra Road. There is also a 7 storey building just outside the campus. The buildings are well connected to all important places in the city. There is an Ionosphere Field Station and Radio Astronomy Centre at Haringhata, nearly 30 kms away from the City.

Teaching Activities

B. Tech Programme:

Intake: 44 students, minimum qualification: B. Sc (with Honours in physics) with mathematics as a pass subject. Admission is strictly on merit; reservation for SC/ST candidates is as per Government rules; 2 additional seats are earmarked for foreign students. Two seats are reserved for students coming from Universities other than Calcutta University (CU). Two CU students and two outside students are awarded UGC (CAS) fellowships.

Courses and Labs: The whole course is divided into three parts with examinations held at the end of each year. Theoretical courses offered cover: mathematics, electromagnetics, electrical machines, network analysis and synthesis, analog circuits, pulse and switching circuits, semiconductor physics and devices, communication theory and systems, high frequency electron devices, materials science and technology, audio and video engg., digital communication, optoelectron-

ics and optical communication, computer organization and architecture, microprocessors, advanced digital circuits, antennas and radio wave propagation, guided wave transmission, microwave and mm wave engg., industrial economics and management, communication links and networking, computer aided analysis and design, microelectronics and VLSI, instrumentation and measurement, control theory and systems, process control, power and industrial electronics, radar and navigational electronics, digital signal processing, artificial intelligence and neural networks.

Lab. courses cover circuit elements and measurements, communication circuits and systems, mechanical and electronic workshop, computer practice, engineering drawing, solid state devices and technology, machines and power electronics, digital techniques, microwave engg., microprocessors, digital communication and computers; a major project work forms an integral part of the program.

M. Tech Programme:

Intake: 25 inclusive of SC/ST quota; Preference is given to GATE qualified students.

Courses: 1st semester (1/2 year): 4 compulsory papers on advanced engg. mathematics, computer software, systems theory, and optoelectronics and optical communication and 4 elective papers. 2nd semester (1/2 year): 6 compulsory papers on VLSI technology and design, modern electronic devices, information technology and space application technology, seminar and practical paper on ad-



vanced circuits and systems and 2 elective courses; 3rd semester (1/2 year): Project work. 6 Elective courses are to be chosen from 26 courses.

Ph. D Programme:

The programme is entirely flexible and there is no course work. There are available 4 CAS fellowships out of which 2 are awarded to non-INRAPHEL students. A number of UGC fellowships given to Calcutta University are also available. In addition, students selected for UGC, CSIR, DAE, and other fellowships can do their Ph.D work under the supervision of a faculty member at any time in the year.

Research Activities

The research in the Institute is conducted in the following thrust areas: space science and communication, solid state and microelectronics, system science and computers, and microwave, millimeterwave and optoelectronics.

Laboratories

The Institute has well equipped research laboratories in the following areas: aeronomy, biomedical electronics, digital communication, ionospheric and atmospheric studies, microprocessors and microcomputers, microwaves and mm waves, optoelectronics and optical communication, radar engineering, radiowave propagation, CAD/CAM, solid state devices and environmental studies.

Major Facilities: Over the years the Institute has generated important research facilities through grants received from the UGC, DoE, DST, MHRD, AICTE, DRDO, DAE and other Government and non Government agencies. A partial list of important acquisitions includes: diffusion furnace, mask aligner, thermocompression and ultrasonic bonding units, RF sputtering units, network analyser, microwave power meter, spectrum analyser, signature analyser, gas chromatograph, optical time domain reflectometer, SUN workstation, Karl Suss mask aligner, tektronix curve tracer, rapid thermal annealing machine, vacuum coating unit with e-beam heating and RF sputtering, cryo vacuum pump, semiconductor characterisation unit, Agfa reduction camera, ICOM communication receiver, 300 MHz digitizing oscilloscope, HP 1 GHz vector voltmeter, strip chart recorder, rubidium frequency standard, He-Ne and semiconductor lasers, 4 GHz spectrum analyser and X-band sweep oscillator.

Other Centres: In addition to the UGC/CAS there exist the following research and training centres: Centre for Research and Training in Radar and Communication, Centre for Microelectronics and Training Centre for MM-wave communication and Technology. The Eastern Centre for Radio Astronomy (ECRA) is also located in the Institute.

Infrastructural Facilities

Library: The department has a separate library of its own, catering to the needs of its

students and faculty. At present, the total number of books is 18000. Most of the journals related to physics, electronics, computers and communication are available in the library. However, since 1991, a common campus library has been created in which the journals subscribed by the Institute as well as allied departments are available. Copying facilities are available in both the department and campus libraries.

Computer Facilities: There is a HP mainframe computer in the computer centre of the University, a few terminals of which are located in the department. In addition there is a separate computer laboratory in the department where a number of PCs are available for use by students.

e-mail and Internet: These facilities are available in the Institute.

Achievements

The teachers and research workers developed or fabricated devices and equipment and also recorded events for the first time in India. Mention may be made of analog computer, manual Ionosonde used for ionospheric investigation, carbon microphone and loudspeakers, vacuum tubes type 80 and 6C5, 10 cm Magnetron, sudden enhancement of atmospherics caused by nuclear explosion in the atmosphere, set-up for measurement of hot electron galvanomagnetic coefficients of semiconductors, solar radio bursts at 100 MHz recorded at Haringhata, equipment for measurement of Hall mobility of semicon-

ductors using a new microwave technique developed at the Institute, Gunn diode and oscillator, Faraday rotation and scintillation of 136 MHz transmission from INTELSAT, mm wave Doppler RADAR, mm wave ISDN and infrared collision avoidance system.

Also, some of the workers carried out pioneering research in the thrust areas mentioned before. The faculty members earned many distinctions, awards, fellowships of prestigious societies in India and abroad and also patent rights. They served as editorial board members and reviewers of many internationally reputed journals. A number of books, monographs and contributed chapters in monographs authored by the teachers have been published by international publishing houses. The total number of research publications by the teachers during the last five years is around 150 with about equal number of conference presentations.

Support to New Departments

The Institute took active part in and creation of new departments of the University. The departments of computer science and technology and of electronic science were offspring of the Institute and the teachers of both the departments, at the time of establishment, were the faculty members of this Institute. A new department of information technology is being planned to be created with active support of the Institute. Students and researchers in neighbouring Universities are given training from time to time.



Collaboration and Consultancy

A link programme existed between the Institute and the University of Sheffield, and of North Wales, UK under British Council/Overseas Development Authorities; also work under the support from Air Force Cambridge Research Lab (USA), Stiftung Volkswerk (Germany) and Alexander von Humboldt Stiftung (Germany) was conducted by the faculty members. An exchange programme is now in operation between Rutherford Appleton Lab, UK and the atmospheric & mm wave technology group of the Institute. Besides, collaborative work with NPL, TIFR, GMRT, IUCAA and Philips Laboratory, USA, is regularly conducted by the staff of the Institute.

Industrial consultancy services are also provided by the teachers of the Institute.

Schools, Workshops and Conferences

The Institute conducts regular training schools under the Research and Training Centres scheme. In addition, a number of research schools, workshops and conferences have been and are being conducted in the Institute. Mention may be made of the conferences to commemorate the birth centenary of S K Mitra, in memory of the late J N Bhar and A K Choudhury.

The golden jubilee of the Institute was celebrated by holding an international workshop entitled Nanostructures, Applications & Goals (NAG) with support from ICTP, Trieste, followed by a 4 day international conference entitled Computers and Devices for Communication (CODEC). During the year, another symposium entitled "In memory of the Founders" was held. The golden jubilee celebration concluded with a workshop entitled 'Frontiers of Electronics (FRONTEL)' in March 1999.

Reports

The Institute releases annually a report on its activities and achievements under the Centre of Advanced Study Programme.

Further Information

Further information about the Institute may be obtained by contacting :

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