



PROSPECTUS

M.Phil DEGREE COURSE
(BIO-MEDICAL
TECHNOLOGY)
2014 SESSION



**SREE CHITRA TIRUNAL INSTITUTE FOR
MEDICAL SCIENCES & TECHNOLOGY**
TRIVANDRUM- 695011, INDIA

INTRODUCTION

The Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) is an Institute of National Importance under Govt. of India with the status of University by an Act of Parliament in 1980. It conducts Post Doctoral degree and certificate courses and awards DM and MCh Degree in advanced medical specialties and PhD in medical related disciplines and in biomedical technology. The Institute is a member of the Association of Indian Universities and the Association of Commonwealth Universities. The objectives of the Institute are to:

- Promote biomedical engineering and technology
- Provide and demonstrate high standards of patient care in advanced medical specialties
- Offer post graduate training of the highest quality in advanced medical specialties, biomedical engineering & technology.

The Institute consists of the Hospital Wing, the Biomedical Technology Wing (BMT Wing) and the Achutha Menon Centre for Health Science Studies (AMCHSS).

- Hospital wing is a tertiary referral centre for advanced treatment for diseases of the brain and the heart.
- BMT wing was set up with a mandate to develop technologies to meet the health care needs of India.
- AMCHSS is for research, teaching and consultancy in Public Health. It has been recognized as a Centre of Excellence for public health training by the Ministry of Health, Govt. of India.

BIOMEDICAL TECHNOLOGY WING

Vision

To establish globally competitive science and technology base for development of medical devices in the country.

Mission

- Develop technologies which are competitive in the international market.
- Carry out research in frontier areas of health care technology.
- Provide testing support conforming to national/international standards.

A team of scientists, engineers and technical staff work here in multidisciplinary areas, ranging from biomaterials development and characterization to medical devices development, evaluation and technology transfer. Over the last 25 years, a number of products have been successfully developed and commercialized, catalyzing the growth of medical device industry in India.

In the current context of globalization, a quality management system for its testing services conforming to ISO/IEC 17025 has been implemented, enabling international acceptance of test results. This system is now accredited by Le Comite Francais d'Accreditation (COFRAC) of France.

High quality research and publications have led to peer recognition as a valued scientific research institution nationally and internationally. This has resulted in many international collaborative research programs.

Research Opportunities and Facilities:

Biomedical Technology Wing aims to bring advances in research outcomes of the laboratory into the clinical setting to benefit patients at the earliest opportunity. The exceptional infrastructure facilitated in the campus underpins biomedical research and enables advances to improve the patient care. Institute has focused on creating resources to develop technologies that are cost-effective, accessible and responsive to the clinical needs of our population.

The material research group has proven record of research towards synthesis and characterization of biomedical polymers, their characterization and testing for biocompatibility to qualify the material for medical applications. The engineering & device development group has successfully developed and commercialized critical products which include blood bag, artificial heart valve, and oxygenator.

Major programs include development of materials for orthopedic and dental applications, cardiovascular device fabrication, drug delivery systems, nanomedicine, sensors and tissue engineering scaffolds. Biological research focuses on culture and differentiation of adult stem cells for regenerative medicine, *in vitro* tissue engineering, development of bio therapeutics and diagnostic reagents.

Sophisticated analytical equipments are available in the campus for characterization of materials which include scanning and transmission electron microscopes, Raman & FT-Raman spectroscope, atomic force microscope, ICP, X-ray diffraction, micro computerized tomography, chromatography systems such as HPLC, gas chromatography and LCMS. Other routinely used and well-maintained equipments and facilities are available in all labs.

Important biological research equipments available are confocal microscope, environmental SEM, fluorescent activated cell sorter (FACS), Real Time PCR, ultra centrifuge and continuous flow centrifuge, Imaging systems for fluorescence/ luminescence/ radioisotope detection, live cell imaging, and facilities for proteomic and genomic analysis etc apart from routinely used equipments that are available in almost all labs. Excellent cell culture and analysis facilities are present in almost all cell biology research labs.

The well-maintained small and large animal experimental facility with excellent animal operating rooms provides the *in vivo* evaluation support. Toxicological evaluation of materials is done under GLP compliance. Tissue analysis is done to evaluate the results of experimental research using state-of-art histological/immunochemical/imaging techniques facilitated with sophisticated sample processing and analysis tools.

Above all, BMT Wing harness the academic and technological expertise of its multidisciplinary research faculty to conduct high-quality, patient-focused translational research. This involves taking research from the laboratory to the patient's bedside.

M.PHIL DEGREE COURSE IN BIOMEDICAL TECHNOLOGY

Objectives of this high quality academic and research training are:

1. Provide an excellent background in biomedical research with integration of chemical, biological and physiological aspects in a unified approach.
2. Emphasize an investigative as well as an empirical approach to the practical problems encountered in experimental and human biomedical science.
3. Training on research methodology, which includes development of research hypothesis, work plan, experimental methods, data analysis and reproducibility and finally report preparation.
4. Impart theoretical and practical knowledge and competence that will prepare the student for employment in a variety of biomedical environments.
5. Improve communication skill through oral and poster presentations.

Expected outcome:

1. The set of lecture and laboratory training courses are designed to strengthen their basic science background at the graduate level.
2. Each student will complete one project during the year, designed to give practical experience of laboratory research. Each project will be written up and formally evaluated.
3. The experience gained will help in developing and focusing research skills in modern biomedical research laboratories.
4. Students will be encouraged to write competitive examinations conducted by various government agencies to obtain fellowships for pursuing a Ph.D. program within the Institute or outside.
5. Students will gain awareness to determine if he or she really wants to make the commitment and pursue a lifelong research career.

Duration

12 months (August 2014 -July 2015)

Minimum educational qualifications for admission

M.Sc. First class in Biological Sciences or Chemical/Physical Sciences (including Polymer Science/Chemistry **but** excluding Plant Sciences and Bioinformatics)

Upper age limit

No age limit

Method of selection

1. The course is notified and the applications are called for in the prescribed format.
2. Applications received with all required enclosures are screened by the authorized committee of this Institute.
3. The selection will be based on the performance in written test and interview. The candidates who fulfill the minimum educational qualifications will be admitted for written test.
4. Those who qualify the written test will be called for interview.
5. Based on the performance in the interview a panel of students is selected and waiting list will be prepared for admission.
6. Verification of the original certificates against the submitted copies will be done at the time of admission.

Submission of Application

1. The application has to be submitted by online using our Website: <http://www.sctimst.ac.in>.
2. Candidate should be ready to upload passport size photograph (35 mm x 45 mm (50kb max) - as jpeg image) and Demand Draft for the application fee drawn in favour of the Director, SCTIMST payable at Thiruvananthapuram before filling the application. The application fee is Rs 500/- (For SC/ST candidates Rs 400/-).
3. Candidates are provided with a "Login" facility after successful submission of their application and can take print out of the same by entering the Application Number, Email Id and Date of Birth which is provided at the time of submission of application.
4. Hard copy of the duly signed application form along with prescribed fee by Demand Draft drawn in favour of the Director, SCTIMST payable at Thiruvananthapuram with copies of relevant documents to be sent to following address to reach before the last date.

**The Deputy Registrar
Division of Academic Affairs
Sree Chitra Tirunal Institute for Medical Sciences and
Technology , Trivandrum - 695011, Kerala, India.**

5. The envelope containing the application should superscribe as "Application for Admission to M.Phil Degree in Biomedical Technology-2014."
6. Enclosures check list:
 - a. Bank Demand Draft (Original) drawn in favour of The Director, SCTIMST and payable at Thiruvananthapuram. Mention Course Name, Applicant Name and Application Number on the back side of Demand Draft.
 - b. Copy of document to prove age.
 - c. Caste certificate for SC/ST candidates (issued by Revenue authorities not below the rank of Tahsildar).
 - d. "No Objection Certificate" in case of employed/sponsored applicants.
 - e. Copies of certificates to prove academic qualifications.
7. Candidates eligible for the entrance examination can access and download admit cards by 15 June 2014 from our website. <http://www.sctimst.ac.in>
8. Important dates:

Last date of receipt of completed Application form by online : 31 May 2014
 Last date of receipt of hard copy of the Application with enclosures : 07 June 2014
 Downloading admit cards : 15 June 2014
 Date of written test : 25 June 2014
 Date of Interview : 26 June 2014 (10 a.m.)
 Publication of selection list : 27 June 2014
 Date for admission : 01 August 2014

Syllabus for Entrance Examination

Syllabus for Written Test : UGC/CSIR
Subjects/Options for the test : Chemical Sciences or Physical Sciences or Biological Sciences
Format for Written Test : Multiple Choice Questions (No negative marks)
Duration : 2 hours

Accommodation

To find accommodation outside the campus 15% of the stipend will be provided in case of shortage of accommodation in student's hostel.

Library

A collection of various books in different disciplines are available. Facility for use of internet is also available at the library.

Stipend

Rs. 5000/- per month.

Fee structure

Online Application fee*	: 500
Admission fee	: 1000
Course fee	: 5000
Caution Deposit	: 1000
Examination fee	: 1000
I.D. Card	: 220
Student Welfare Fund	: 500
Certificates	: 500
* for SC/ST candidates	: 400

Administration

- Candidates will be allowed to take 10 days Personal Leave and 10 days sick leave, other than the Institute holidays during the course.
- Special leaves will be given to appear for any National/University level examination like UGC/CSIR NET or GATE for academic improvement subject to a maximum of six days.
- Students will be encouraged to participate in national conferences and present research papers based on the quality of research output if recommended by the guide. The decision on this will be taken by the Head BMT Wing & The Director
- The student will have to sign a confidentiality agreement and assignment on the Intellectual Property Rights (IPR).
- No intimation will be sent to candidates not called for Entrance Examination or not selected and no correspondence on this subject will be entertained.
- In case the student discontinues the course after 30 August 2014, the student has to pay the penalty of six months stipend.
- The rules are subject to change in accordance with decisions of the Institute taken from time to time.
- The students should produce No Objection Certificate, surrender the Students Identity Card and vacate the hostel immediately after completion of the course.

Course structure

Total credits required for completion of the course	: 40 credits
Course on research methodology (compulsory)	: 6 credits
Course on subjects (Biology/Material science/Inter disciplinary)	: 13 credits
Lab training	: 6 credits
Project work	: 15 credits

A. Research Methodology : Six courses in this part are compulsory to all candidates in a batch. Each course carries 1 credit each.

Course on subjects (Biology/Material science/Inter disciplinary)-teaching

B. Biological Science There are 6 courses in biology which are designed for students with biology background, out of which students may elect three to five courses. They are allowed to elect courses from other disciplines (C or D) if they wish to fill up the number of courses and get total of 13 credits.

C. Material Science: There are 5 courses in material sciences which are designed for students with any discipline of chemistry/physics/material science background and from which students may elect 3 to 6 courses. They are allowed to elect courses from other disciplines (B or D) if they wish to fill up the number of courses and get a total of 13 credits.

D. Inter-disciplinary: There are 3 courses in this section which are designed to suit students from material science and biological science background. Students are allowed to elect courses from this discipline also to fill up the number of courses and get a total of 13 credits.

Students may thus elect courses from group B, C or D to add up and get 13 credits. They may take advice from the mentor in selecting the appropriate course based on their interest and research topic.

Lab training

Tissue culture & sample preparation for cell based assays, experimental pathology & microscopy, proteomics, genomics, immunology & microbiology, spectroscopy, electron microscopy, chromatography and physical mechanical & thermal properties of materials.

Project work

The student has to undertake a research project under the supervision of a faculty and submit the thesis at end of June 2015 for evaluation.

Course implementation

- i. The duration of the course is 12 months beginning from August 2014. During the first 5 month (equivalent to one semester) will be dedicated for course work & lab-training in selected areas. There will be 15-18h of teaching per week. For each credit of course work, 8 h will be allotted for teaching and discussion on assignments. In addition, student seminar is included in each course schedule. The project work will be taken up after the completion of course work & laboratory training.
- ii. Each student will be assigned with a Mentor for project work, who is a senior faculty of BMT Wing.
- iii. Detailed syllabus for each course work will be given to the candidates at the time of joining and he/she should choose courses relevant to their research project, in consultation with the Mentor.
- iv. All students are encouraged to attend all classes, provided they have genuine interest in the subject.

- v. Each course will have course co-coordinator/s and students are expected to take special permission from the coordinator if they want to attend classes, which are not to be considered for their exams/credits.
- vi. Class tests and assignments will be given periodically by the course coordinator. The student has to give seminars in each course. The performance in class tests, assignments and seminars will be accounted for the evaluation for internal marks.
- vii. There will be final written examination at the end of each course, which will be conducted by the Division of Academic Affairs and M.Phil Coordinator.
- viii. Project work has to be completed with thesis submission at the end of June 2015.
- ix. The student has to present and defend the Project work before the Examiners for evaluation in July 2015.

For further enquiries, please contact:

The Deputy Registrar
Division of Academic Affairs
Sree Chitra Tirunal Institute for Medical Sciences and Technology
Trivandrum – 695011, Kerala, India
Tel: (0471) 2524140, 2524269, 2524289
E-mail: dreg@sctimst.ac.in