

Short-Term Course

on

Fluid Mechanics for Biomimetic Lab on a Chip

August 20-24, 2018

Sponsored by
Technical Education Quality Improvement Programme (TEQIP III)

Coordinator: Dr. Aditya Bandopadhyay

Co-coordinator: Prof. Suman Chakraborty

Course Aim: The course aims at introducing the participants to various concepts of transport phenomena prevalent in biomechanical systems. With the ever growing emphasis on modelling 'on-chip' devices, i.e. devices which can mimic various biophysiological processes such as flow through arteries, oxygenation etc., the course offers an introduction to the theory of internal flows and their numerical simulation. Then the focus will shift to understanding the various intricacies of low Reynolds number hydrodynamics because of the small lengthscales and low velocities involved. Next, surface tension and its role in driving multiphase flows will be discussed with regard to passive pumping technologies owing to the large surface area to volume ratios achieved in microscale transport. We will then study electrochemical transport because ionic transport is important for almost all biological transport phenomena. Emphasis will then be on understanding coupled ionic transport and fluid flow – electrokinetics. The course will conclude by a preliminary discussion on physiological fluid dynamics and flow through deformable channels.

Topics: Introduction to internal flows (theory and practice); Low Reynolds number hydrodynamics; Introduction to surface tension; Surface tension driven flows; Introduction to electrochemical transport; Modelling ion pumps, Electrokinetics in microfluidics; Physiological fluid dynamics; Flow through deformable channels.

Target Audience: Senior undergraduate and postgraduate students, working professionals involved in teaching and research. The course is FREE for participants from TEQIP III institutions. However, there is a course fee for other participants. Priority will be given to applicants from TEQIP III institutions.

Lecturers for the course:

Dr. Aditya Bandopadhyay (Mechanical Engineering, IIT KGP)

Dr. Jeevanjyoti Chakraborty (Mechanical Engineering, IIT KGP)

Prof. Suman Chakraborty (Mechanical Engineering, IIT KGP)

Instructions:

All participants from TEQIP III institutions (List can be found [here](#)) must submit the certificate from the institute authority indicating that the institute is a TEQIP III institute.

As there are only a few seats available, early-bird registrants will be given preference. However, there will be a rigorous selection process for the course.

All participants (excluding TEQIP III institutions) will be responsible for all the expenses, including accommodation, travel, and food.

On successful completion of the course, certificate of participation will be issued to all the candidates by the Continuing Education Office, IIT Kharagpur, on the recommendation from the Coordinator. Attendance of each of the candidates will be taken regularly.

All the selected participants must bring the original identity card. Please note that the last date of registration is August 13, 2018.

Registration Procedure:

The entire procedure is now online.

Follow the registration link: <https://erp.iitkgp.ac.in/CEP/courses.htm>

You will have to create an account and then upload the documents.

You will select your category and pay the required fees (if applicable).

You will also specify whether accommodation will be required or not.

Appendix A: Additional Information

COURSE FEE

TEQIP III College Students and Teachers

There is no registration fee. Local hospitality including accommodation and food will be covered free of charge. Participants are supposed to meet their own travel cost.

Other Participants

- (a) Sponsored Industry/Research Organizations: Rs 25,000
- (b) Self-sponsored Participants: Rs 1,500

The above fee does not include TA/DA/Accommodation for non-TEQIP III participants. However, accommodation for these participants can be booked on payment basis. Such participants should inform their accommodation requirements immediately.

Follow the link: <https://erp.iitkgp.ac.in/CEP/courses.htm>

You will have to create an account and then upload the documents and pay the fees (if applicable).

ADDRESS FOR COMMUNICATION

Dr Aditya Bandopadhyay
Department of Mechanical Engineering
Indian Institute of Technology Kharagpur,
Kharagpur – 721302, West Bengal, India.
Phone: 03222 282978
Mobile: 9932990007
email: aditya.iitkharagpur@gmail.com

ABOUT IIT KHARAGPUR CAMPUS

The Indian Institute of Technology Kharagpur, more commonly known as IIT KGP is situated about 120 km west of Kolkata. Kharagpur can be reached in about two hours by express trains from Howrah railway station of Kolkata or about two and half hours by car from Kolkata airport. Kharagpur is also connected by direct train services to most major cities of the country. The institute is about 15 minutes drive (5 km) from the Kharagpur railway station. Private taxi, auto- rickshaw or cycle-rickshaw can be hired to reach the institute.