Whom will the course benefit?

Faculty members from Fluid Mechanics and Chemical Engineering disciplines.

Course Objective:

An introduction to Transport Processes.

Course Contents:

1. Introduction, Dimensional analysis & Correlations; Dimensional analysis: Physical interpretation.
2. Convection & Diffusion. Diffusion as a molecular process. Diffusion due to random motion. Derivation of diffusion coefficients from molecular perspective. Diffusion in gases and liquids. Turbulent diffusion.
3. Steady and unsteady diffusion in one dimension from a flat plate. Solution of unsteady balance equations in finite domain; separation of variables. Oscillatory flow; use of complex variables.
4. Shell balances & conservation equations in cylindrical co-ordinates. Heat transfer across pipe wall. Viscous heating pipe. Steady conduction in a cylinder. Shell balance in spherical co-ordinates. Heat transfer from a spherical particle. Unsteady mass diffusion from a point source.
5. Effect of pressure and body forces in fluid flow. Steady & unsteady flow down inclined plane. Complex analysis for oscillatory flow. Boundary layer analysis. Flow through porous media.
6. Conservation equations in Cartesian and cylindrical co-ordinates. Spherical co-ordinate system. Conservation equations in vector notation; simplifications of mass and energy conservation. Brief description of incompressible Navier-Stokes.
7. Heat transfer in Cartesian co-ordinates. Separation of variables. Heat transfer in spherical co-ordinates. Thermal conductivity of a composite.
8. General solution for diffusion equation in spherical co-ordinates. Delta function representation of point source. Multipole representation of higher harmonics. Method of images. Greens function in bounded domains. Boundary integral technique.
9. Boundary layer theory. Heat transfer in flow past a flat plate. Correlations for heat exchanger. Heat transfer from heated sphere. Mass transfer from falling film.
10. Forced convection boundary layer for an object of arbitrary shape. Natural convection- Boussinesq equations. Boundary layer equations at high Grashof number.

Faculty:

IISc faculty will deliver the lectures.

Eligibility:

The course is meant for faculty of engineering colleges recognized by All India Council for Technical Education(AICTE), National Institutes of Technology(NIT's) and National Institute of Technical Teachers' Training & Research (NITTTRs). Selected teachers will be paid TA at actual subject to the limit of Three tier AC train/bus fare by the shortest route from the place of work to Bengaluru and back. **However, the maximum TA payable is Rs.3000/-.** They will be provided with a daily allowance of Rs.500/-   (for 5 days only) towards boarding and lodging as per QIP rules, and will be supplied with the course materials. **The lodging charges will be Rs.300/- per day. Local participants will be paid DA @ Rs.150/- per day for 5 days.**

In addition, a few seats are available for non-sponsored (self-support) teachers, scientists from research labs, practicing engineers from industries and other interested persons on payment basis as under.

Course Fee:
Academic Institutes, Govt. R&D Labs: 10,000 INR
Private Industries : **15,000 INR**
This will entitle them to participate in the course and receive the course material. Single room **accommodation** is available on the Institute campus at the **Hoysala House.** The participants have to request in advance along with the registration form for such accommodation. The lodging charges will be **Rs.1000/- per day,** for self-support college teachers and **Rs.1500/- per day** for Industry participants, subject to availability of accommodation.

CENTRE FOR CONTINUING EDUCATION
Indian Institute of Science,
Bengaluru –560 012

QIP Short Term Course On
"TRANSPORT PROCESS"

24-28 July 2017

Registration Form
(Please mail to reach before 24 June 2017)

1. Name……………………………………………..
2. Age:……………….   Sex: Male/Female
3. Office address

   …………………………………………………………
   ……………………………......…………………………
   …………………………………………………………
4. Landline No. with STD code:…………………………
5. Mobile No. ………………………………………….
6. Email ID:……………………………………………….
7. Academic Qualifications

Degree	subject	year	University

   Diploma/B.Sc./B.A…………………….………………..
   B.E/B.Tech/M.Sc. …………………………………………
   M.E/M.Tech./M.Phil……………………………………. ..
   Ph.D. Completed/Pursuing/Intend pursuing:…………………
   Thesis title/Proposed Research Area:………………………...
   …………………………………………………………………
   ………………………………………………………….
8. Teaching Experience……………………(Years)
9. Industry Experience ………………………(Years)

10. Course taught/professional responsibilities……………
………………………………………………………………
………………………………………………………………
………………………………………………………………
……………………………………………………………..

11. Accommodation required   Yes / No

12. Self-support candidate

Academic Institutes, Govt. R&D Labs: **Rs. 10,000**
Private Industries   : **Rs. 15,000**

Demand Draft No………………… dated…………

I agree to abide by the rules of the QIP courses. If selected, I shall participate in the course for the entire duration.

Date:
Place: Signature

The applicant Mr/Ms…………………………......
………………………………………………………………
from our institution will be permitted to attend the QIP Short Term Course on **"Transport Process"** to be held during **24-28 July 2017** at the Indian Institute of Science, Bengaluru, if selected. He/she will be granted necessary leave of absence.

It is certified that our college is recognized by AICTE Order No:………………………Date:……………..

Place:

Date:
                         Signature of Head of the
                                  Department

                         Signature and Seal of the
                         Principal of the Institution

(Xerox copy of this form may also be used)

Intending participants may use the attached application form or a xerox copy of the same. Applicants from AICTE recognized colleges, NIT's and NITTTRs are required to submit their applications sponsored by their colleges.

 Non-sponsored (self-support) teacher applicants should send their application along with a **DD for the course fee** drawn in favor of **"Registrar, Indian Institute of Science, Bengaluru -560012"** payable at Bengaluru. The course fee will be **Rs. 10,000** for participants from **academic institutions and government research labs**, and **Rs. 15,000** for participants from **other organizations**.
.
Deadlines:

Receiving completed applications: **24 June 2017**

 Intimation of selection:**29 June 2017**

Please mail the filled-in application form to:

The Officer-in-charge
Centre for Continuing Education
Indian Institute of Science
Bengaluru - 560 012
Telephone: 080-23600911, 22932055
Email: so@cce.iisc.ernet.in/
           office@cce.iisc.ernet.in

To reach on or before: 24 June 2017