INTRODUCTION

The basic goal of the proposed short term course is to deal with fundamentals of momentum, heat and mass transport giving special emphasis on quantitative approach through tutorial sessions. Module 1 will be dealing with fluid flow and Module II will be dealing with heat and mass transfer. In tutorials, practical problems from engineering in general and also from Metallurgical and Materials engineering in particular will be dealt through hands on problem solving sessions.

COURSE CONTENTS

The short term course aims to include the following topics

Module I

- Importance of fluid flow in metallurgical & materials engineering.
- Bernoulli's equation. Concept of friction factor for internal and external flows. Flow through conduits. Pressure drop across packed beds and fluidized bed. Application in piping design, sand casting and blast furnace.
- Compressible flow. Supersonic nozzle design in LD/BOF process, vacuum lines.
- Concept of viscosity. Newtonian and Non-Newtonian Fluids
- Shell Momentum Balance. Equation of continuity and Navier-Stokes equation.

Module II

- Importance of heat transfer in metallurgical & materials engineering.
- Fourier's law of conduction. Steady state 1-D conduction. Application to fins.
- Transient conduction. Lumped capacitance approach. Error function solutions and Heisler's charts. Application in heat treatment operations and solidification.
- Introduction to convective heat transfer. Correlations for forced and free convection. Application i n heat treatment, continuous casting, cooling panels, heat exchangers etc.
- Radiative heat transfer. Application in furnaces, semi-conductor processing etc.
- Mass transfer. Fick's law of diffusion. Application in carburization of steels.
- Mass transfer coefficient correlations. Application in reduction of iron ore.

WHO WILL BENEFIT

Metallurgical or Materials Engineers are often restricting themselves only to problems related to materials. However, in a plant environment they should have sufficient expertise in understanding the operation and control of processes, trouble shooting, process modifications and process design. Understanding of fluid flow, heat transfer and mass transfer is the first step towards such an expertise. In this course, some of the common engineering calculations needed in a plant will be dealt in a quantitative manner through specially designed tutorial sessions. Hence, this course will benefit any engineer who deals with processes which involves fluid flow, heat transfer and mass transfer.

ACCOMMODATION

Guest House facility in the campus is available for limited number of participants on nominal charges on first-come-first served basis.

REGISTRATION FEE

The fee per participant

Module I	**–**	**Rs. 10,000/-**
Module 2	**–**	**Rs. 10,000/-**
Module 1 & 2	**-**	**Rs. 15,000/-**

Kindly note that no income tax is to be deducted at source from course fee payment, as I.I.T. Bombay is exempt from the same.

REGISTRATION FORM

CEP on

TRANSPORT PHENOMENA FOR METALLURGICAL AND MATERIALS ENGINEERS

December 4-15, 2006

NAME (PRINT) :

_____ Gender: M / F

DESIGNATION :

_____

ORGANIZATION:_____

MAILING ADDRESS: _____

_____

_____

I would like to participate in Module1/Module2/Module1 & 2 (Please tick the appropriate one)

TELEPHONE: _____ (O) _____ (R)

FAX: _____ MOBILE: _____

EMAIL: _____

PAYMENT: D.D. No.: _____ Dt.: _____

Rs.: _____ (DD in favour of `Registrar, IIT Bombay – CEP a/c')

IIT Guest House accommodation required? : YES / NO

(Guest House bill to be paid directly by the participant.)

Date: Signature of the Applicant

(PHOTOCOPY ADDITIONAL COPIES OF THIS FORM, IF NEEDED)

Completed Registration form can be sent to

Prof. N. N. Viswanathan
Course Coordinator:
Dept. of Met. Engg. & Mats. Sci.
Indian Institute of Technology, Bombay
Powai, Mumbai – 400 076
Phone: (022) 2576-7611 Fax: (022) 2576-4650
Email: vichu@iitb.ac.in

For information on other Continuing Education Programmes at IITB, contact:

PROF-IN-CHARGE ,
OFFICE OFCONTINUING EDUCATION PROGRAMME(CEP),
INDIAN INSTITUTE OF TECHNOLOGY,POWAI, MUMBAI -400 076.
Tel. No. : 2572 6199 (D), 2576 7060. Fax : 2572 3480 Email :
cep@admin.iitb.ac.in

For latest information on CEP, please visit our home page at:
http://www.iitb.ac.in/~cep

HOW TO APPLY

Those desiring to attend the course may act now by filling in the attached registration form and mailing it to the Coordinator along with the course fee.

LAST DATE

Last Date for the Receipt of Application:30th October, 2006. (Enroll today through Fax or pre-registration followed by confirmation by post as the registration will be stopped once the requisite number of participants are registered.)

DEADLINES

For submitting application: 30st Octr, 2006
For notification of acceptance: 10th Nov, 2006
For further details:
http://www.met.iitb.ac.in/~vichu/cep_tp
http://www.iitb.ac.in/~cep/

FACULTY

Prof. N. B. Ballal, Prof. N. N. Viswanathan and Prof. S. Mishra (Met. Engg. & Mats. Sci.)

Prof. S. T. Mahesh (Chemical Engg.)

DATE & TIME OF REPORTING

4th December, 2006, 9.00 AM at Seminar Hall, Guest House, IIT Bombay.

CEP SHORT TERM COURSE

on

TRANSPORT PHENOMENA FOR METALLURGICAL AND MATERIALS ENGINEERS

Module 1: 4th - 9th December, 2006
Module 2: 11th - 15th December, 2006

Coordinators

Prof. N. N. Viswanathan
&
Prof. N. B. Ballal

Department of Metallurgical Engineering &
Materials Science
Indian Institute of Technology Bombay
Powai, Mumbai 400 076