

TWO PHASE FLOW AND HEAT TRANSFER

Overview

Multiphase flow or simultaneous flow of several phases is commonly encountered in a variety of engineering processes. The power generation, nuclear reactor technology, food production, chemical process, aerospace and automotive industries are all driving forces in this complex field. Due to its universality in applications, a thorough understanding of multiphase flow is of utmost important. Present course is driven by this requirement and distributed broadly into two sub parts. The experimental part will provide knowledge on the selection, installation and use of modern gas-liquid measurement techniques and instruments, such as wire-mesh sensors, needle probes and process microscopy along with the application of data analysis tools. The numerical part will focus on finite-volume methods for Euler-Euler and Euler-Lagrange multiphase flow predictions, and on the associated mathematical models. In this course we will target to teach the participants both experimental and numerical techniques in multiphase flow and, with an overarching goal of providing comprehensive knowledge towards how fluidic systems play a role in disparate length scales.

Internationally acclaimed academic, researcher and practitioner with proven knowledge, experience, and demonstrable ability in teaching, consultancy, research, and training in the field of two phase flow and heat transfer will deliver lectures and discuss cases in the course. The course will be planned and offered as per the norms set by IIT Roorkee

Objectives

The primary objectives of the course are as follows:

- i) Demonstration of a thorough analytical understanding of multiphase flows,
- ii) Introduction with trends in modelling, design, analysis, CFD / CMFD methods and experimentation,
- iii) Presentation of a condensed, critical and updated view of basic knowledge and future developments, in relation to systems and phenomena encountered in industrial applications,
- iv) Competently design multiphase transportation pipelines for oil/gas and gas/condensate duties under steady state and transient operating conditions
- v) Interdisciplinary transfer of knowledge from one area of applications to another related to multiphase flow
- vi) Understanding utility of multiphase flow and its application

Experts in the field of two phase flow and heat transfer will conduct the course which will be planned and offered as per the norms set by the GIAN programme. Course participants will be provided exposure to all the related topics through lectures and hands-on exercises. Case studies and group assignments will also be shared to stimulate research motivation of participants.

Modules	<p>A: Duration : October 23 – November 03, 2017 (12 days)</p> <p>B: Venue : Department of Mechanical and Industrial Engineering Indian Institute of Technology Roorkee</p> <p>Number of participants for the course module will be limited.</p>
You Should Attend If...	<p>Participants from Industry, Research, Government and Non- Government Organizations, Faculty and Students from Institutions all over the world who are interested in the course are welcome to register.</p>
Fees	<p>The participation fees for attending the course are as follows:</p> <p>Participants from abroad: US \$ 500</p> <p>Industry: Rs. 15,000/-</p> <p>Officers of Govt. Organisations/NGOs: Rs. 10000</p> <p>Faculty or Scientists of Research / Academic Institutions: Rs. 10000</p> <p>Students of Academic Institutions-: Rs. 3000</p> <p>The above participation fee includes soft copy of all instructional materials, laboratory and computer use for tutorials and internet facility. The participants will be provided with single/double occupancy accommodation on payment basis at the IITR/NIH guest house. Hotel accommodation may also be arranged on payment basis at nearby places, if requested.</p> <p>For more details please visit www.iitr.ac.in</p>

The Faculty



Prof. **Stéphane Zaleski** is faculty of Mechanics at UPMC – University Pierre et Marie Curie (also known as University of Paris 6) and head of the Jean Le Rond d’Alembert Institute (UPMC & CNRS UMR 7190) one of the largest theoretical and applied mechanics laboratories in France.

He studied for his doctorate at the Physics Department of Ecole Normale Supérieure, rue Lhomond in Paris, then held an assistant professor position at the department of mathematics at MIT and a chargé de recherche position at CNRS. In 1992 he joined the Laboratoire de Modélisation en Mécanique which later became the Jean Le Rond d’Alembert Institute. He investigates various numerical methods for the simulation of multiphase flow with applications for atomization, porous media flow and droplet impact. He currently investigates several variants of the Volume of Fluid method for interface tracking, especially for large density ratio flows, and its connection to multiscale modelling. He has written several computer codes for the simulation of two-phase flow including SURFER (with G. Zanetti, R. Scardovelli and D. Gueyffier) and PARIS Simulator (with R. Scardovelli and G. Tryggvason) He is Associate editor of the J. Comput. Physics and serves on the editorial board of several other journals. He received the Victor Noury prize of the Paris Academy of Sciences and the Silver Medal of CNRS; he is a Fellow of the American Physical Society. He is author of many scientific papers in leading international journals which are pioneering in the field of two phase flow and heat transfer.

Webpage: <http://www.lmm.jussieu.fr/~zaleski/zaleski.html>

Contact email id: stephane.zaleski@upmc.fr



Dr. **Arup Kumar Das** is a Assistant Professor of Thermal Engineering at the IIT Roorkee, Uttarakhand, India. He has received his M.S. by research and Ph.D. degree from Department of Mechanical Engineering, IIT Kharagpur, India.

His research contributions are in the two phase flow and boiling heat transfer. He has published more than 50 research papers in reputed international journals. He is proactive in industrial research and book writing in the area of two phase flow and heat transfer. He is the recipient of prestigious national fellowship from Indian National Science Academy and Indian National Academy of Engineers.

Webpage: <http://twophaseiitr.weebly.com/>

Contact email id: akdasfme@iitr.ac.in

Course Co-ordinator

Dr. Arup Kumar Das
Department of Mechanical and Industrial
Engineering
Indian Institute of Technology
Roorkee, Uttarakhand-247667, India
Phone: +91-1332284802 (O)
+91-1332286424 (R)
+91-8979602679
E-mail: akdasfme@iitr.ac.in
Alternate mail id: arupdas80@gmail.com

REGISTRATION AND ACCOMODATION REQUEST FORM
(To reach electronically by 15th September, 2017)

TWO PHASE FLOW AND HEAT TRANSFER
October 23-November 03, 2017
Department of Mechanical and Industrial Engineering
Indian Institute of Technology Roorkee
Roorkee, Uttarakhand

<p>After Completion, please mail to: Dr. Arup Kumar Das Department of Mechanical and Industrial Engineering Indian Institute of Technology Roorkee Uttarakhand-247667, India Phone: +91-1332284802 (O) +91-1332286424 (R), +91-8979602679 E-mail: akdasfme@iitr.ac.in Alternate mail id: arupdas80@gmail.com</p>	Affix passport size photograph
--	---------------------------------------

1. Name of applicant (in block letters): Ms./Mr. /Dr.

2. Status (Mark anyone): Student....., Not a student.....

(a) If a Student:

Academic program under which registered currently.....
Date since when registered.....
Name of Academic/ Research Institution.....

(b) If not a Student

Nature of employment (Teaching, Research, Govt. service, NGO, Industry).....
Organization where employed.....
Employed since.....
Designation.....
Academic qualifications.....

3. Full Postal Address for Communication:

4. E-mail id:

5. Phone numbers: Mobile....., Landline.....

Date:

Signature of applicant

Note:

- (i) Application should reach MIED Office at the above address latest by 15th September, 2017. Scanned copy may be sent by e-mail.
- (ii) The seats are limited and will be filled generally on the first come first serve basis. Decision of the course coordinator will be final in this regard.
- (iii) Please start your travel to Roorkee to attend the course only if you have received a formal confirmation.