S h o r t   C o u r s e
COMSOL MULTIPHYSICS SIMULATION OF
THERMOFLUIDIC PROBLEMS
(Basic/Advanced)
Organized by: DCE, BUET

Pre-registration Going On

Key highlights:
• **Format**: The course will be physical. Each participant will access a high speed desktop PC for hands-on training session.
• **Software Access**: Participants will have to acquire all software licenses independently. Organizers have no responsibility to provide any software, but will assist the participants to get the software.
• **Expert Instruction**: The training sessions, hands-on exercises, and demonstrations will be led by an experienced COMSOL Application Instructor (Professor Dr. Sumon Saha).
• **Language**: Bengali and English
• **Resource Material**: Hardcopy of lecture materials, and all simulation or source files will be provided.
• **Registration Material**: Registration kits (bag, pen, notebook) and nametag will be provided.
• **Food Arrangement**: Refreshment and lunch will be served during the short course.
• **Certification**: Depending upon completion of the short course, participants will be awarded a certificate (attendance to play a vital role).
• **Course Duration**: 2 days (Schedule will be announced soon)

Who Should Attend?
✓ Undergraduate and Postgraduate Students, Chemical/Mechanical/Civil/Biomedical Engineers
✓ Engineering Enthusiasts, Professionals Seeking Skill Enhancement
✓ Aspiring CFD Researchers, Young Faculties, Mathematician, Cross-Disciplinary Learners
✓ Anyone Interested in Engineering Simulation with Fluid Dynamics Background

Pre-Registration Link: **https://forms.office.com/r/6qjPJm5220**

Pre-Registration Form of
Upcoming Courses (No Payment
Required)
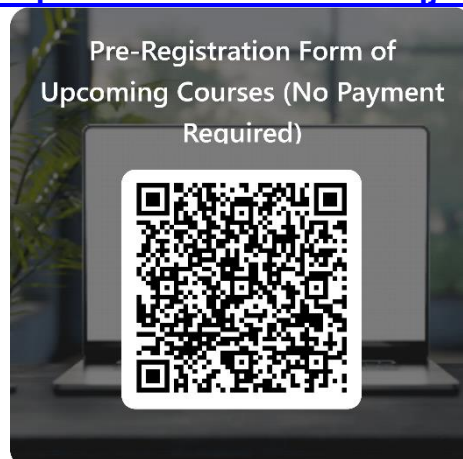
Short Course on

COMSOL Multiphysics Simulation of Thermofluidic Problems (Basic Level)

Venue: UG Computer Lab (Room # 409), *3rd Floor, ME Building, BUET*

PROGRAM SCHEDULE

Day	Time	Topics
Day 01 Thursday	9:00 am- 9:15 am	**Registration**
		Module 1: Computational heat transfer and mathematical modeling
	9:15 am-10:15 am	1.1 Introduction to Computational Heat Transfer and its Modern Trends
	10:15 am-10:30 am	**Tea Break**
	10:30 am-12:30 pm	1.2 Modeling and Dimensional Analysis of Thermofluidic Problems
	12.30 pm-2:00 pm	**Lunch and Prayer Break**
		Module 2: Hands-on comsol multiphysics simulation
	2.00 pm-3.00 pm	2.1. COMSOL Multiphysics Simulation, Meshing and Solving Benchmark Problem
	3:00 pm-4:00 pm	2.2. COMSOL Multiphysics Simulation (Dimensional vs Non-dimensional Simulation)
	4:00 pm-5:00 pm	2.3. Hands-on Training Using COMSOL Multiphysics (Validation and Post Processing) – I https://doi.org/10.1007/s40032-020-00618-y
Day 02 Friday		**Module 3: Simulation of Basic Thermofluidic Problems**
	9.15 am- 10.15 am	3.1. Hands-on Training Using COMSOL Multiphysics (Validation and Post Processing) – II https://doi.org/10.1016/j.applthermaleng.2007.03.018
	10.15 am-10.30 am	**Tea Break**
	10:30 am-11:30 am	3.2. Common Natural, Forced, and Mixed Convection Problems Inside Cavities
	11.30 am- 12.30 pm	3.3. Non-dimensional Simulation on "Investigation of heat transfer enhancement of Cu-water nanofluid by different configurations of double rotating cylinders in a vented cavity with different inlet and outlet ports" https://doi.org/10.1016/j.icheatmasstransfer.2021.105432
	12.30 pm-2:00 pm	**Lunch and Prayer Break**
	2.00 pm-3.00 pm	3.4. Non-dimensional Simulation on "Conjugate mixed convection heat transfer with internal heat generation in a lid-driven enclosure with spinning solid cylinder" https://doi.org/10.1016/j.heliyon.2022.e11968
	3:00 pm-4:00 pm	3.5. Non-dimensional Simulation on "Analyzing overall thermal behaviour of conjugate MHD free convection in L-shaped chamber with a thick fin" https://doi.org/10.1016/j.csite.2023.103137
	4:00 pm-5:00 pm	3.6. Non-dimensional Simulation on "Entropy generation on magnetohydrodynamic conjugate free convection with Joule heating of heat-generating liquid and solid element inside a chamber" https://doi.org/10.1016/j.csite.2023.103711
	5.00 pm-5:30 pm	**Tea and Prayer Break**
	5:30 pm~	Closing Ceremony and Certificate Distribution

CONTINUING EDUCATION
Path to Excellence

Short Course on

COMSOL Multiphysics Simulation of Thermofluidic Problems (Advanced Level)

Venue: UG Computer Lab (Room # 409), *3rd Floor, ME Building, BUET*

PROGRAM SCHEDULE

Day	Time	Topics
Day 01 Thursday	9:00 am- 9:15 am	**Registration**
		Module 1: Mathematical Modeling of Advanced Thermofluidic Problems
	9:15 am-10:15 am	1.1 Modeling of Conjugate MHD Convection with Joule Heating and Internal Heat Generation, Convection with Radiation, Double Diffusive Convection, Marangoni effect
	10:15 am-10:30 am	**Tea Break**
	10:30 am-12:30 pm	1.2 Modeling of Complex Fluid Flow (Nanofluid, Ferrofluid, Hybrid Nanofluid, Ternary Hybrid Nanofluid, Non-Newtonian Fluid, Micropolar Fluid), Porous Medium, Bio-convection, Unsteady Flow, Oscillating Flow
	12.30 pm-2:00 pm	**Lunch and Prayer Break**
		Module 2: Hands-on COMSOL Multiphysics Advanced Simulation
	2.00 pm-3.00 pm	2.1. Non-dimensional Simulation of "Mixed convection flow caused by an oscillating cylinder in a square cavity filled with Cu-Al$_2$O$_3$/water hybrid nanofluid" https://doi.org/10.1007/s10973-019-08012-2
	3:00 pm-4:00 pm	2.2. Non-dimensional Simulation of "Pure mixed convection in a non-Newtonian fluid filled lid-driven chamber with discrete bottom heating" https://doi.org/10.1016/j.csite.2023.103183
	4:00 pm-5:00 pm	2.3. Non-dimensional Simulation of "Thermo-bioconvection of oxytactic microorganisms in porous media in the presence of magnetic field" https://doi.org/10.1108/HFF-07-2020-0410
Day 02 Friday		**Module 3: Introduction to Post Processing Techniques**
	9.15 am- 10.15 am	3.1. Hands-on Training Using COMSOL Multiphysics (Advanced Post Processing): Stream & Heatlines, Entropy Generation
	10.15 am-10.30 am	**Tea Break**
	10:30 am-12:00 pm	3.2. Hands-on Training Using xyExtract 3.3. Hands-on Training Using Tecplot: 2D Plotting
	12.00 pm- 12.30 pm	3.4. Hands-on Training Using Polymath Professional 3.5. Hands-on Training Using MATLAB (3D Plotting)
	12.30 pm-2:00 pm	**Lunch and Prayer Break**
		Module 4: Introduction to Scientific/Research Paper Writing
	2.00 pm-3.00 pm	4.1. Smart Literature Review, Finding Research Gap, Selection of a New Problem
	3:00 pm-5:00 pm	4.2 Writing a Research Article, Simulation and Post-Processing, Important Tips, Questions and Answers Session
	5.00 pm-5:30 pm	**Tea and Prayer Break**
	5:30 pm~	Closing Ceremony and Certificate Distribution

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COMSOL Multiphysics Simulation of
Thermofluidic Problems (Basic/Advanced)
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COURSE COORDINATOR & INSTRUCTOR

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Biography

Dr. Sumon Saha received his Ph.D. in Engineering from the University of Melbourne, Victoria, Australia, in 2014. He completed his B.Sc. and M.Sc. in Mechanical Engineering from Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh in 2004 and 2007 respectively. His primary field of study is the numerical analysis of thermo-fluidic problems. He is now working as a Professor in the Department of Mechanical Engineering of Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh. He is the founder and principal investigator of the Computational Fluid Dynamics and Heat Transfer (**CFDHT**) Research Group at BUET. He has published over **209 research papers** in International Journals and Conference Proceedings (**23 articles already published in Q1 journals in 2024**). He is the co-author of two books in the engineering field. His fields of interest are turbulent flows, computational fluid dynamics, computational heat transfer, and particle deposition. Dr. Saha is the editor of one international journal and the reviewer of several international conference proceedings and journals. He is a senior member of the International Association of Computer Science and Information Technology (IACSIT), Singapore. Moreover, he is a life member of the Bangladesh Solar Energy Society. He has received many professional awards, including the International Postgraduate Research Scholarship by the Australian federal government, the Melbourne International Research Scholarship by the University of Melbourne, the RHD Studentship by the University of Melbourne, and so on. He has been awarded the highest financial incentive (2023-2024) funded by BUET for publishing **38** articles in **Q1** and selected index journals. Besides, he has received a crest of appreciation for his contribution to **BUET Research Milestones** by BUET Teachers Association Executive Committee, 2024.

Google Scholar: https://rb.gy/4huqd9