

# GIAN Sponsored Online course (Funded by Ministry of Education)

On

## Rheology and Heat Transfer of non-Newtonian Fluids (online)

[17-21 Jan, 2022]



Organized by:

**Department of Mechanical Engineering**  
*National Institute of Technology*  
*Jamshedpur, Jamshedpur*



### Organizing Committee

Patron: Prof. Karunesh Kumar Shukla  
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### Resource Persons



**Prof Robert J Poole** is EPSRC Complex Fluids & Rheology Fellow, The Harrison Chair Professor and Head of Department for Mechanical, Materials and Aerospace Engineering at University of Liverpool, UK. He has a pioneer researcher in viscoelastic fluid flows and rheology, experimental fluid mechanics for turbulent flows and heat transfer. He is editor of Journal of Non-Newtonian Fluid Mechanics.

### For

Research scholars (PG/Ph.D.), faculty members of Science/Engineering, Industry personnel and Scientists of Mechanical/Chemical/Material/Chemistry /food processing.

**You are an interested in rheology, flow and heat transport in non-Newtonian fluids.**

### Important dates

Registration Closes on: **10 January, 2022**

### Notes:

- Nominal registration fees.
- **No TA/DA will be provided.**
- Certificate will be provided to all successful participants.
- **Interactive session with lab exposure.**
- Recorded videos and lecture materials will be provided.

### Registration Fee

The participation fees for the complete course is as follows:

- Participants from abroad: **US \$50**
- **Industry/ Research Organizations: INR 1000**
- Faculty Members: **INR 500**
- **Students/Research Scholars: INR 200**

### Fee to be paid to:

A/C No. 40620620216

A/C Name: OUTREACH MED NITJSR

IFSC Code: SBIN0001882

Bank / Branch: SBI, NIT Campus, Jamshedpur

### Coordinators



**Dr. M. A. Hassan** is a faculty in department of Mechanical Engineering at National Institute of Technology Jamshedpur. His research interest is nanofluids, complex fluid rheology and its thermos-fluid behavior.



**Prof Sanjay** is a Professor of Mechanical Engineering at National Institute of Technology Jamshedpur. His research interest is Gas turbine, combined cycle power plants, Energy exergy analysis of complex systems and nano materials application in combustion.

**About Institute and Jamshedpur:**

National Institute of Technology Jamshedpur was originally founded as the Regional Institute of Technology in 1960. Later upgraded to National Institute of Technology on 27th December 2002, with the status of Deemed University. It is now totally under the control of the Ministry of Human Resources Development (MHRD), Government of India, New Delhi, Since April 2003. The institute offers B. Tech, M. Tech., Ph. D., M.C.A., and M.Sc. degrees in various disciplines of Engineering, Sciences, and Humanities.

**About the Department:**

The Department of Mechanical Engineering offers an undergraduate program in Mechanical Engineering and postgraduate programs in Computer Integrated Design and Manufacturing, Thermal Engineering and Energy System Engineering, and a Ph.D. program in various research areas. The department also runs three-year certificate course in Mechanical Engineering for the employees of Tata Steel under Continuing Education Program. The Department has experienced faculty and well-established laboratories to meet the requirement of UG, PG, and Ph.D. students.

**Objective:**

The world is full of non-Newtonian fluids both in nature and manmade categories. Their rheology both at macroscopic and microscopic level plays a significant role in defining its flow and thermal transport behavior. The influence of time on apparent viscosity variation is complex to achieve and with little accuracy by theoretical models.

Investigations on heat transfer and flow characteristics with non-Newtonian fluids are as old as the studies on their rheology and fluid dynamics, and over the years there have been several reviews on the topic. As with Newtonian fluids, research and the solution of engineering problems on heat transfer and flow friction of non-Newtonian fluids can be carried out experimentally, theoretically and analytically. However, there is an important difference between Newtonian and non-Newtonian studies rooted in the non-linear nature of the latter. Such fluids find applications in chemical processes, cosmetics and food processing, pharmaceutical products and flow dynamics of geophysical materials nanofluids, and hybrid rocket fuels.

Conventional thermo-fluid analysis does not hold good for such systems. Seeding such materials with nano-particles is an efficient way of fine-tuning thermo-fluid capability of these fluids. Mixing of nano-particles significantly changes the rheological properties and enhances the complexity of the problem. It would be interesting to introduce rheology and heat transfer behavior using experimental and computational analysis techniques. Course participants will learn these topics through online interactive lectures and hands-on experiments.

**Module:**

A: Non-Newtonian Rheology: 17-18 Jan, 2022

B: Thermo-fluid transport of non-Newtonian fluids: 19-21 Jan, 2022

❖ **The course is offered in online mode only.**

**Number of seats:**

limited to 100 participants only on first come first serve basis

**Accommodation:**

No provision for accommodation as the course is offer in online mode only.

**Registration:**

- **Registration can be done online through a google form. The link is given below:**

<https://forms.gle/VY1MUXW2tMuZJdDN7>

- **A scanned copy of the payment receipt may be forwarded to:**

hassan.me@nitjsr.ac.in

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