

Registration Details

Registration Fee :

▪ Industry personnel	: Rs. 6000
▪ Faculty	: Rs. 4000
▪ IIT Kharagpur Faculty	: Rs. 3000
▪ IIT Kharagpur Non-Faculty	: Rs. 2500
▪ IIT Kharagpur Students (UG & PG)	: Rs. 1000
▪ Outsider Students (UG & PG)	: Rs. 1500
▪ Research Scholars	: Rs. 2000

In order to register please visit following web address :

<https://erp.iitkgp.ac.in/CEP/courses.htm>

Last date of online registration: October 31, 2025

Steps to be followed :

- Sign-up
- Login
- Fill profile details
- From the dashboard choose "SYMPOSIUM"
- Choose "Symposium on Fractional Order System FOS-25" and click on "APPLY NOW"

Accommodation includes lodging only. Breakfast and dinner are not included in accommodation.

Accommodation will be provided from 2:00 pm **06-11-2025** to 11:00 am **10-11-2025**.

Working lunch will be provided to all, with or without AC-accommodation

For any further query, please mail to

jmahatodeep@iitkgp.ac.in / indrani@ee.iitkgp.ac.in

For more details visit :

<http://www.facweb.iitkgp.ac.in/~karabi/SensorsDevelopmentGroup.htm>

Contact : karabi@ee.iitkgp.ac.in

Nature is Fractional

FOS' 25

Symposium on
"Fractional Order System"

📍 Dept. of EE, IIT, Kharagpur

📅 7th – 9th November, 2025

|| 7 Lectures ||

|| Student Presentations ||

|| Discussion on Recent Trends ||



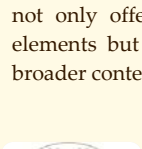
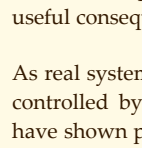
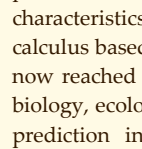
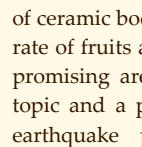
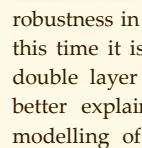
Organised By :

Fractional Order Devices and Circuits LAB

Department of Electrical Engineering,

Indian Institute of Technology Kharagpur





In the past few decades, fractional order (FO) calculus has emerged as a potential tool in various domains of science and engineering. The arbitrariness in the order of the differential equation in FO calculus introduces more degrees of freedom in design and analysis, resulting in more accurate modelling, better robustness in control and greater flexibility in signal processing. By this time it is established that the electrochemical phenomena like double layer charge distribution or the diffusion process can be better explained with fractional order system. As a result the modelling of lithium ion battery, fuel cells, supercapacitors are carried out with fractional differential equation. The characterization of ceramic bodies, fractal structures, viscoelastic materials, the decay rate of fruits and meats, study of corrosion in metal surface are also promising area of its applications. FO system is now an emerging topic and a popular choice to study the real time events such as earthquake propagation, volcanic phenomenon, designing of phermo-kinetics, modelling of human lungs and skin. Even the characteristics of economic market fluctuation adopts fractional calculus based system modelling. So in other words, FO analysis has now reached from the inert physical network to living networks of biology, ecology, physiology and sociology, reminding us Leibnitz's prediction in his letter to L'Hopital (1695) that the fractional differential operator is "an apparent paradox from which one day useful consequences will be drawn"

As real systems are better described by FO structure, they are better controlled by FO controllers. Recent researches on FO controllers have shown promising result in this direction. Many researchers are actively engaged to develop fractional order device/ fractor as this not only offers the possibility of highly useful electronic circuit elements but also allows for the study of complexity in a much broader context.

FOS'25, an initiative of Fractional Order Devices and Circuits Lab, Dept. of EE, IITKGP, gives the unique opportunity to come together and share thoughts, to know each other and discuss the findings of the different research groups. The Symposium will also facilitate to transfer knowledge to the researches who are new to the domain of fractional order system.

FOS' 25

Chairman: Prof. Pranab Kumar Dutta

Convenor : Prof. Karabi Biswas

|| Program Schedule ||

Day 1: 07-11-2025, Friday

Venue: Electrical Engineering Department

9:00 am: Inauguration of FOS'25

9:45 am -11:15 am: **Lecture 1**

Speaker: Prof. Karabi Biswas, IIT Kharagpur

Topic: **Fractional Order Devices and Circuits**

11:30 am -1:00 pm: **Lecture 2**

Speaker: Mr. Shantanu Das, Scientist G, BARC

Topic: **Fractional calculus...a paradox or reality?**

Lunch Recess: 1:00 pm - 2:15 pm

02:30 pm –4:00 pm: **Lecture 3**

Speaker: Prof. Evgeny Denisov, Kazan University

Topic: **Fractional order models in PEMFC diagnostics and their parameters identification**

4:15 pm –5.30 pm:

Presentation by Students/ Discussion

Day 2: 08-11-2025, Saturday

Venue: Electrical Engineering Department

9:30 am -11:00 am: **Lecture 4**

Speaker: Dr. Suraj Damodaran, Cochin University

Topic: **Generalized Methods for Rational Approximation and Controller Design for Fractional-Order Systems with Applications to Mobile Robotics**

Day 2: 08-11-2025, Saturday

Venue: Electrical Engineering Department

11:15 am -1:00 pm: **Lecture 5**

Speaker: Dr. Farooq Ahmad Khanday,

Kashmir University

Topic: **Fractional-order Systems: Integrable Models, Hardware Implementations, and Real-World Applications**

Lunch Recess: 1:00 pm - 2:15 pm

2:30 pm –4:00 pm: **Lecture 6**

Speaker: Mr. Shantanu Das, Scientist G, BARC

Topic: **Few results of application of fractional calculus in science/engineering**

4:15 pm –5.30 pm:

Presentation by Students/ Discussion

Day 3: 09-11-2025, Sunday

Venue: Electrical Engineering Department

9:00 am -10:15 am: **Lecture 7**

Speaker: Prof. Yogesh Vijay Hote, IIT Roorkee

Topic: **Stability Analysis of Fractional Order Systems**

10:30 am - 11.30 pm: **Panel Discussion**

11:45 am -12:45 am: **Lab Tour**

1:00 pm - 1:30 pm: **Valedictory**

