

SPARC Sponsored Course

"Heterogeneous Reaction Engineering"

4th-8th December 2023

Department of Chemistry, National Institute of Technology

Tiruchirappalli, Tamil Nadu – 620 015



This short-term course overviews today's most important industrial heterogeneous catalytic processes: fossil fuel reforming, ammonia synthesis, methanol synthesis, Fischer-Tropsch process, and fluid catalytic cracking. It also describes current ammonia, methanol, and hydrogen economies. Finally, it shows the key role of catalysis in today's energy, emission control, and chemical production challenges.

The Faculty



Dr. Francisco R Garcia Garcia is a Lecturer in Chemical Reaction Engineering at the School of Engineering at University of Edinburgh. He holds an MSc in Chemistry by the Autónoma University of Madrid and a PhD in Chemical Engineering by the Institute of Catalysis and Petroleum-chemistry, **CSIC.** He gained his first post-doctoral experience

working at the Department of Chemical Engineering of Imperial College London. In this period, he focused in the design and development of catalytic multifunctional reactors for hydrogen production. Afterwards, he worked as a Senior Scientist at Johnson Matthey in the Emissions Control Department. Despite having a very rewarding experience working in industry, he soon realized that he preferred to be involved in more fundamental science and he moved back to the academia. Hence, he joined the UK Catalysis Hub as a research fellow working at the Chemical Engineering Department at Cambridge University, and at the Chemical Engineering Department at Newcastle University. During this time his research focused in chemical looping reforming for syngas and hydrogen production.

Course Co-Ordinator

Dr. S. Velmathi.

Professor, Department of Chemistry, NIT-T, Tiruchirappalli- 620015, E-mail: velmathis@nitt.edu





You Should Attend If...

- Undergraduate, postgraduate, PhD students and Faculty in Chemistry/Physics/Material science, and allied engineering disciplines.
- · Early career, Middle level and senior scientists working in the field, heterogenous catalysis requiring an in-depth understanding thermodynamics and kinetics of of heterogenous molecules can learn and gain competitiveness.
- Scientists and research fellows from Government/Public sectors research organisations.

REGISTRATION

All participants must register by paying the registration fee and completing the Google form, the link to which is provided below. (Registration can be done by scanning the QR code or by using the below link.) https://forms.gle/mur4gGics923s1NEA

PG/ PhD students: Rs. 1500/-		Accommodations will be
Faculty	: Rs. 2500/-	provided on the basis of
Industry	: Rs. 5000/-	extra payment

For Registration









SPARC Sponsored Course on "Heterogeneous Reaction Engineering"

DAY-1 (04/12/2023)



United Kingdom

Venue: A11 Hall, Admin Block ; Date: 04/12/2023 Time: 10.30 am to 12.00 pm



Scheme for Promotion of Academic and Research Collaboration

No Registration Fee for **NIT-T Students/ Faculty**



> **SPARC** Sponsored Course "Heterogeneous Reaction Engineering"

> > DAY-1 (04/12/2023)



Thermodynamics vs kinetics (quick understanding of a chemical reaction)

> by Dr. Francisco R Garcia Garcia, Senior Lecturer in Engineering, School of Engineering, The University of Edinburgh, **United Kingdom**

Venue: A11 Hall, Admin Block ; Date: 04/12/2023 Time: 2.00 pm to 3.30 pm



Scheme for Promotion of Academic and Research Collaboration

No Registration Fee for **NIT-T Students/ Faculty**



> **SPARC Sponsored Course** on "Heterogeneous Reaction Engineering"

> > DAY-2 (05/12/2023)

Heterogeneous catalysis - I (fundamentals)

by Dr. Francisco R Garcia Garcia, Senior Lecturer in Engineering, School of Engineering, The University of Edinburgh, **United Kingdom**

Venue: A11 Hall, Admin Block ; Date: 05/12/2023 Time: 10.30 am to 12.00 pm





Scheme for Promotion of Academic and Research Collaboration

No Registration Fee for **NIT-T Students/ Faculty**



> **SPARC Sponsored Course** on "Heterogeneous Reaction Engineering"

> > DAY-2 (05/12/2023)

Heterogeneous catalysis -II (fundamentals)

by Dr. Francisco R Garcia Garcia, Senior Lecturer in Engineering, School of Engineering, The University of Edinburgh, **United Kingdom**

Venue: A11 Hall, Admin Block ; Date: 05/12/2023 Time: 2.00 pm to 3.30 pm



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> **SPARC Sponsored Course** on "Heterogeneous Reaction Engineering"

> > DAY-3 (06/12/2023)

Fluid motion (fundamentals) by Dr. Francisco R Garcia Garcia, Senior Lecturer in Engineering, School of Engineering, The University of Edinburgh, **United Kingdom**

Venue: A11 Hall, Admin Block ; Date: 06/12/2023 Time: 10.30 am to 12.00 pm



Scheme for Promotion of Academic and Research Collaboration

No Registration Fee for **NIT-T Students/ Faculty**



> **SPARC Sponsored Course** on "Heterogeneous Reaction Engineering"

> > DAY-3 (06/12/2023)



External and Internal Mass Transfer by Dr. Francisco R Garcia Garcia, Senior Lecturer in Engineering, School of Engineering, The University of Edinburgh, **United Kingdom**

Venue: A11 Hall, Admin Block ; Date: 06/12/2023 Time: 2.00 pm to 3.30 pm



Scheme for Promotion of Academic and Research Collaboration

No Registration Fee for **NIT-T Students/ Faculty**



> **SPARC Sponsored Course** on "Heterogeneous Reaction Engineering"

> > DAY-4 (07/12/2023)



Reaction rate on the catalytic surface by Dr. Francisco R Garcia Garcia, Senior Lecturer in Engineering, School of Engineering, The University of Edinburgh, **United Kingdom**

Venue: A11 Hall, Admin Block ; Date: 07/12/2023 Time: 10.30 am to 12.00 pm



Scheme for Promotion of Academic and Research Collaboration

No Registration Fee for **NIT-T Students/ Faculty**



> **SPARC Sponsored Course** on "Heterogeneous Reaction Engineering"

> > DAY-4 (07/12/2023)



Heterogeneous catalytic reactors by Dr. Francisco R Garcia Garcia, Senior Lecturer in Engineering, School of Engineering, The University of Edinburgh, **United Kingdom**

Venue: A11 Hall, Admin Block ; Date: 07/12/2023 Time: 2.00 pm to 3.30 pm



Scheme for Promotion of Academic and Research Collaboration

No Registration Fee for **NIT-T Students/ Faculty**



> **SPARC Sponsored Course** on "Heterogeneous Reaction Engineering"

> > DAY-5 (08/12/2023)



Multifunctional heterogeneous catalytic reactors - I by Dr. Francisco R Garcia Garcia, Senior Lecturer in Engineering, School of Engineering, The University of Edinburgh, **United Kingdom**

Venue: A11 Hall, Admin Block ; Date: 08/12/2023 Time: 10.30 am to 12.00 pm



Scheme for Promotion of Academic and Research Collaboration

No Registration Fee for **NIT-T Students/ Faculty**



> **SPARC Sponsored Course** on "Heterogeneous Reaction Engineering"

> > DAY-5 (08/12/2023)

Multifunctional heterogeneous catalytic reactors - II

by Dr. Francisco R Garcia Garcia, Senior Lecturer in Engineering, School of Engineering, The University of Edinburgh, **United Kingdom**

Venue: A11 Hall, Admin Block ; Date: 08/12/2023 Time: 2.00 pm to 3.30 pm





Scheme for Promotion of Academic and Research Collaboration

No Registration Fee for **NIT-T Students/ Faculty**