



IIT Indore

Chemical Sensors: Principles, Technologies and Applications



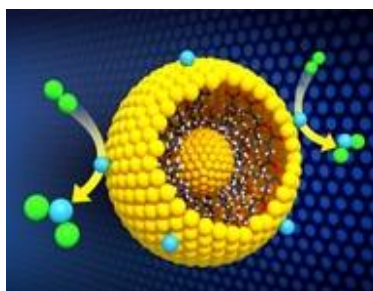
Ministry of Human
Resource Development
Government of India

The development of effective devices for the identification and quantification of chemical substances for process control, environmental monitoring and other advanced applications, is a growing need. The sensitivity and selectivity of such devices can be tailored to a particular application by modifications to the chemical structure of the sensing layer. This course will introduce participants to the recent development in chemical sensing technologies. The course will focus on (1) The classification of various sensors, and (2) the characteristics/mechanism of sensors. Participants will also have an opportunity to have hands on experiments with sophisticated instruments at IIT Indore.

Registrations Open

To Register Please Visit

<http://gian.iiti.ac.in/register.php>



Important Dates

Course Duration
July 1-9, 2016

Last Date of Registration
June 25, 2016

The Faculty



Prof. Giovanni Neri is Full Professor of Chemistry at the Department of Engineering of the University of Messina. His research interests include the synthesis, characterization and application of nanostructured materials for different typologies of chemical sensors (electrical, acoustic (QCM and SAW), colorimetric and electrochemical sensors), for applications in industrial processes control, medical diagnostics, automotive and environmental fields.



Dr. Parasharam M. Shirage is Ramanujan Fellow at Indian Institute of Technology, Indore in Physics and Centre of Materials Science & Engineering. His research interests include nanomaterials from mechanism to applications, superconductors, single crystal growth, novel advanced functional materials, materials under high pressure and high temperature, energy conversion and storage.

Participation Fees

Participants from India:	
Industry/ Research Organizations:	Rs. 10,000:00
Faculties/Scientist:	Rs. 4,000:00
Students:	Rs. 2,000:00
SAARC Countries	US \$100:00
Non-SAARC Countries:	US \$500:00

Please find payment details
<http://iiti.ac.in/GIAN/>

For more details please contact

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Food & Accommodation

- **Accommodation Limited in IIT Indore Hostel on payment and First Come First Serve basis**
- **Registration Fees does not include Food and Accommodation**

Course Structure

I - Course Description

This course is designed to introduce fundamentals of sensors and biosensors. Basic concepts of chemical sensing methods, will be first introduced. Students will learn the basic sensing principles and sensing elements and various application-oriented examples. Recent developments in miniaturized chemical sensors and biosensors will be also given.

The course will also review important concepts of industrial, medical and environmental sensors to guide in the development of new sensing technologies and their applications.

Tentative programme:

Module A: Fundamental of Sensors

Date 1st July, 2016: Friday

Lecture 1: 9:30 hrs to 10:30 hrs: Introduction to Sensors, Terminology and definitions of sensitivity; selectivity; reproducibility; detection limits; response time etc.

Lecture 2: 10:45 hrs to 11:45 hrs: Working and Mechanism of Sensors

Break 12:00 hrs to 14:00 hrs: Lunch Break

Tutorial 1: 14:00 hrs to 16:30 hrs: Problem solving session with examples on sensors

Date 2nd July, 2016: Saturday

Lecture 3: 9:30 hrs to 10:30 hrs: Chemical and electrical considerations in chemical sensing

Lecture 4: 10:45 hrs to 11:45 hrs: Transducer mechanisms; quantitative and qualitative detection; application of chemical sensors.

Break 12:00 hrs to 14:00 hrs: Lunch Break

Tutorial 2: 14:00 hrs to 16:30 hrs: Problem solving session with examples on sensors

Date 3rd July, 2016: Sunday / Examination for the student

Date 4th July, 2016: Monday

Lecture 5: 9:30 hrs to 10:30 hrs: The important concepts of industrial, medical and environmental sensors to guide in the development of new sensing technologies and their applications.

Lecture 6: 10:45 hrs to 11:45 hrs: Basic Concepts of Sensors Design and Principals

Break 12:00 hrs to 14:00 hrs: Lunch Break

Tutorial 3: 14:00 hrs to 16:30 hrs: Problem solving session with examples on sensors

Module B: Introduction and overview of transduction mechanisms

Date 5th July, 2016: Tuesday

Lecture 7: 9:30 hrs to 10:30 hrs: Introduction to principles of chemical sensing; Signal transduction; Sensor types and technologies

Lecture 8: 10:45 hrs to 11:45 hrs: Metal oxides semiconducting (MOS) sensors; Electrochemical sensors; Quartz crystal microbalance (QCM) sensors

Break 12:00 hrs to 14:00 hrs: Lunch Break

Tutorial 4 :14:00 hrs to 16:30 hrs: Lab session to explore sensors, demonstration, operation, data acquisition and analysis

Date 6th July, 2016: Wednesday Holiday/ Examination for the student

Date 7th July, 2016: Thursday

Lecture 9: 9:30 hrs to 10:30 hrs: Field effect transistor (FET) sensors.

Lecture 10: 10:45 hrs to 11:45 hrs: Optical and colorimetric sensors.

Break 12:00 hrs to 14:00 hrs: Lunch Break

Tutorial 5: 14:00 hrs to 16:30 hrs: Lab session to explore sensors, demonstration, operation, data acquisition and analysis

Date 8th July, 2016: Friday

Lecture 11: 9:30 hrs to 10:30 hrs: Sensor engineering: Sensors fabrication

Lecture 12: 10:45 hrs to 11:45 hrs: Bio-Sensors, MEMs sensors

Break 12:00 hrs to 14:00 hrs: Lunch Break

Tutorial 6 : 14:00 hrs to 16:30 hrs: Lab session to explore sensors, demonstration, operation, data acquisition and analysis

Date 9th July, 2016: Saturday

Lecture 13: 9:30 hrs to 10:30 hrs: Application of chemical sensors

Lecture 14: 10:45 hrs to 11:45 hrs: Sensors in: Environmental monitoring; Food quality control; Biomedical sensors; Automotive sensors, etc.

Break 12:00 hrs to 14:00 hrs:

Lunch Break

Tutorial 7: 14:00 hrs to 16:30 hrs: Final Examination for Students