

Metal oxide semiconductors: Theory and Applications

Overview

Metal oxide semiconductors (both p- and n-type) are increasingly important for thin film-based device applications. Intrinsic defects and surface phenomena tend to dominate their electronic properties. In this course, these oxides are described from the standpoint of the basic physical and chemical mechanisms involved. Special attention is paid to band structures in solids that provide the necessary elements to study carrier dynamics and both bulk and surface phenomena. The role of defects on the electrical conductivity of these oxides is also discussed. These ideas are then used to describe how a semiconductor film can sense gases. Practical sensing examples that indicate the complexity and subtlety of phenomena that take place at semiconductor interfaces are described.

Modules	A: Review of solid-state physics : Dec 5 B: Semiconductor materials : Dec 6-7 C: Devices and applications : Dec 8-9 Course will be in offline mode. Number of offline participants will be limited to seventy.
You Should Attend If...	<ul style="list-style-type: none">▪ you are a senior undergraduate student (BTech and BSc), or graduate student at the MSc, MTech, MS, and PhD level▪ you are a students or faculty from Metallurgical, Materials, Chemical, Chemistry, Physics, Electrical, Engineering Design, and allied departments▪ you are an engineers, physicist, chemist, or researcher working in the area of semiconductor physics and devices.
Fees	<p>The participation fees for taking the course is as follows: For 1 week course, student fee will be Rs. 1000.</p> <p>The above fee includes all instructional materials for the course.</p> <p>Modes of payment: <u>Online transfer:</u> Account Name: CCE IIT Madras Acc. No: 36401111110 Branch: SBI, IIT Madras Branch, Chennai IFSC Code: SBIN0001055 Swift Code: SBININBB453</p> <p>Note: The participants should be mentioned the purpose of GIAN while the transaction and have to send the transaction details to gian@iitm.ac.in</p> <p style="text-align: center;">OR</p> <p>Demand draft in favour of “CCE IIT Madras” payable at Chennai. The demand draft is to be sent to the course coordinator at the address given below.</p> <p><u>Address of the Course Coordinator:</u></p> <p>Dr. Parasuraman Swaminathan Dept. of Metallurgical and Materials Engineering Room no. 229, New Academic Complex, Indian Institute of Technology (IIT), Madras, Chennai – 600036, Tamil Nadu, India</p>

Accommodation	<p>The participants may be provided with hostel accommodation, depending on availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel/</p>
Registration Procedure	<p>Please follow the following steps for the registration:</p> <ol style="list-style-type: none">1. Go to GIAN website (https://gian.iitkgp.ac.in) First time users need to register and pay a one-time fee of INR 500 /2. Enroll for the course: Metal oxide semiconductors: Theory and Applications Once you enroll for the course, an Enrollment/Application number will be generated, and the course coordinators will be notified.

The Faculty



Prof. Celso Aldao is a Professor of the Department of Physics at the School of Engineering, University of Mar del Plata, Argentina. He specializes in the physics and chemistry of surfaces and interfaces, with special emphasis on semiconductors.



Dr. Parasuraman Swaminathan is an Associate Professor of the Indian Institute of Technology, Madras. His research interests include printed electronics with a focus on sensors and display.

Course Co-ordinator

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<https://gian.iitkgp.ac.in>