

*Two-Day Course on*  
**Quantitative Microscopy**  
*Under the ASM-IIM Programme*  
*Teach the Teacher*

**December 12-13, 2013**

*Venue:*  
**IIT Madras**

By  
**Prof. Arun Gokhale, FASM**  
**School of Materials Science and Eng.**  
**Georgia Institute of Technology, USA**

*Organised Jointly by*



**ASM International Chennai Chapter,  
Indian Institute of Metals Chennai Chapter &  
Dept. of Metallurgical and Materials Eng.  
Indian Institute of Technology Madras**

## **Theme and Course Description:**

Microstructure controls the properties of materials to a large extent. An understanding of the microstructure-property correlations is essential for anyone dealing with materials, working in an academic institution, R&D laboratory or an industry. Quantitative evaluation of microstructure can help in quantitative prediction of properties of materials. The present course deals with not only the basic principles of quantitative microscopy but also gives the participants hands-on experience on quantifying the microstructure.

## **Course Content:**

1. Microstructural geometry and statistical sampling of microstructures
2. Estimation of volume fraction of constituent phases in isotropic and anisotropic microstructures, and microstructures having gradients
3. Hands-on estimation of volume fraction
4. Estimation of Total Surface area per unit volume in isotropic microstructures
5. Hands-on estimation of microstructural surface area
6. Estimation of surface area in anisotropic microstructures
7. Hands-on estimation of surface area in anisotropic microstructures
8. Estimation of total length per unit volume
9. Unbiased estimation of number density in 2D and 3D microstructures
10. Topology of grain structure and grain size
11. Hands-on measurements of grain size and number density
12. Reconstruction and visualization of three-dimensional microstructures
13. Quantitative microscopy using EBSD (by Dr. V. Subramanya Sarma, IIT Madras).

## **About Prof. Gokhale:**

Prof. Arun Gokhale received his BTech (1970) and MTech (1972) in Metallurgical Engineering from Indian Institute of Technology, Kanpur, and PhD (1977) in Materials Science from University of Florida. He is internationally renowned for his contributions in the development and applications of quantitative metallography, stereology, and digital image processing for mathematical representation of materials and biological

microstructures; modeling and simulations of microstructures for materials design, and applications of quantitative fractography for characterization of fracture. He received **2013 Henry Clifton Sorby award** of International Metallography Society, which is a life-time-achievement award for contributions in the field of metallurgy. He is a Fellow of ASM International. He has written chapters in ASM Metals Handbook Vol. 9 (Failure Analysis and Prevention, 2002 edition), and Vol. 11 (Metallography and Microstructures, 2004 edition).

### **To Whom the Course would be Useful:**

This programme is highly beneficial for the faculty members of various institutions teaching courses related to metallurgy and materials science, engineers in industry involved in design, development and quality control of materials and researchers in R&D labs involved in the study of microstructure-property correlations.

### **Registration Fee:**

Students:	Rs. 2000/-
Faculty Members:	Rs. 3000/-
Participants from Industry and R&D Labs:	Rs. 4000/-

(More than three participants from an organization can avail 20% concession. Those who pay full registration fee will be given free membership of IIM for one year.)

**The total number of participants will be restricted to 30. Hence the participation would be on a first-cum-first-serve basis.**

DD/Cheque should be in favour of **“Indian Institute of Metals Chennai Chapter” payable at Chennai.**

The filled-in registration forms can be sent to:

### **Prof. B.S. Murty**

Department of Metallurgical and Materials engineering  
Indian Institute of Technology Madras  
Chennai 600036

E-mail: [murty@iitm.ac.in](mailto:murty@iitm.ac.in), [murty.iitm@gmail.com](mailto:murty.iitm@gmail.com)

Phone: 044-22574754, 09444077006

## Registration Form

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**Please register the following participant for the above course.**

*(For multiple registrations use photocopies of this form)*

1. Name : \_\_\_\_\_
2. Designation : \_\_\_\_\_
3. Organisation : \_\_\_\_\_
4. Address : \_\_\_\_\_
5. Phone : \_\_\_\_\_
6. E-mail : \_\_\_\_\_
7. Registration Details  
Amount : \_\_\_\_\_  
Cheque/DD No./Date : \_\_\_\_\_  
Bank : \_\_\_\_\_

Signature of the sanctioning authority with Name : \_\_\_\_\_

Please send completed registration form along with the Cheque/DD to:

**Prof. B.S. Murty**

Department of Metallurgical and Materials Engineering

IIT Madras, Chennai 600 036