

## Organising Committee

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**Mr. M. C. Shaji**  
Scientist and Head, LMAC, Materials and Minerals Division, NIIST, Trivandrum - 695 019

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**Dr. Manoj Raama Varma**  
Scientist, Materials and Minerals Division, NIIST, Trivandrum - 695 019

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**Dr. S.V.S. Narayana Murty**  
Scientist, Materials and Metallurgy Group, VSSC, Trivandrum - 695 022

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Scientist, Materials and Minerals Division, NIIST, Trivandrum - 695 019

### Coordinator, METWORK 2010

**Dr. M. Ravi**  
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To

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## Registration and Course Fee

Rs. 5000/- per participant. Maximum intake - 60 participants

Course fee includes course materials, tea and working lunch on all days.

Course fee can be paid through a DD in favour of **The Indian Institute of Metals**, Trivandrum chapter, payable at Trivandrum.

The last date for registration : 20th November 2010

## Accommodation

A range of accommodation is available in Trivandrum. Normal rate is Rs. 500/- and above per single room. Cheaper accommodation can be arranged in guest houses on request depending upon availability.

*For details of the workshop contact :*

Visit our website : [www.iimtm.org](http://www.iimtm.org)

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# METWORK 2010

## Workshop

on

## METALLURGY FOR NON-METALLURGISTS

8 - 10 December 2010

at

**National Institute for  
Interdisciplinary Science & Technology**  
(Formerly Regional Research Laboratory)  
**CSIR, Trivandrum**



Organized by

**THE INDIAN INSTITUTE OF METALS  
TRIVANDRUM CHAPTER**

## Registration Form

Name of the Participant : .....

Designation : .....

Affiliation : .....

Address for communication : .....

.....

.....

.....

Phone Off : .....

Phone Res : .....

Fax : .....

Mobile : .....

E-mail : .....

### Payment Details

Registration fees : Rs ..... Vide DD No.....

dated .....

on ..... Bank is enclosed.

Accommodation required :  Yes  No

Tariff range : Rs. ....

Signature

Date

## Course Content

1. Introduction to Metals and Materials : Characteristics of metals, atomic arrangements and bonding, crystal structures of metals and alloys, Imperfections in crystals, strengthening mechanisms in materials.
2. Phase Diagrams and Phase Transformations : The phase rule, binary phase diagrams, Microstructural changes during cooling, Types of phase changes, Diffusion in solids, Nucleation and Growth kinetics, Solidification, Iron-carbon phase diagram, Pearlitic transformation, Bainitic transformation, Martensitic transformation.
3. Mechanical Properties : The tensile test, stress-strain behavior, hardness, wear, fatigue, fracture and creep.
4. Microstructural Characterization : Optical microscopy, X-ray diffraction, Scanning electron microscopy, Transmission electron microscopy and related techniques, Advanced characterization techniques.
5. Metal Forming : Forging, rolling, extrusion, powder metallurgy, stamping, coining, spinning and other techniques.
6. Metal Casting Processes : Sand casting, Die casting, Pressure Die casting, Semi-solid processing, Investment casting, New casting processes
7. Heat Treatment : Processes, , Precipitation hardening, Recovery, recrystallization and grain growth, steel, cast iron, super alloys and non-ferrous alloys such as Al and Ti
8. Metal Joining : Techniques of welding, brazing, and soldering Science and Technology Welding.
9. Corrosion and Corrosion Prevention : Causes of corrosion, types of corrosion, corrosion testing, corrosion prevention, surface engineering.
10. Advanced Materials and Processes : Composites, ultrafine grained nano materials, grain boundary engineering.
11. Non-Destructive Evaluation : Dye Penetrant testing, Ultrasonic testing, Eddy current testing, Magnetic particle inspection, X-ray Radiography, Holography
12. Failure Analysis : Failure analysis of engineering components and structure case studies.

Metals and alloys are used in the greatest variety of application of all engineering materials. It is essential for those involved in design and manufacturing, to have an understanding of what metals are, how they behave and why they behave differently than other materials. It is also important to understand how they can be made stronger or more corrosion resistant, how they can be shaped by casting, forging, machining or welding and how these processes can alter properties.

The three day workshop is designed with emphasis on Physical Metallurgy and Mechanical Metallurgy. The course topics will cover the ways in which metal alloys are structured, how the structure affects their performance, how mechanical properties of metals are measured, and what influences these properties, how the environment affects the performance and durability of materials.

### Faculty

Prof. K.A. Padmanabhan, Central University of Hyderabad

Prof. E.S. Dwarakadasa, Formerly IISc, Bangalore

Prof. T.K.G. Namboodiri, formerly BHU, Varanasi

Dr. R.V. Krishnan, Formerly NAL, Bangalore

Prof. K. Kamaraj

Prof. V. Muthupandi, NIT, Trichy

Prof. K. Narayan Prabhu, NIT, Surathkal

Dr. M.R. Suresh, VSSC, Trivandrum

Dr. Manoj Raama Varma, NIIST, Trivandrum

Sri. S. Saratchandran, VSSC, Trivandrum

Dr. Bhanu Pant

Dr. S. V.S. Narayana Murthy, VSSC, Trivandrum

### Who Should Attend

Design Engineers

Process Engineers

Manufacturing Engineers

Product Development Engineers

Mechanical Engineers

Quality Control Engineers

Researchers

Technicians and individuals without formal education in Metallurgy