MHRD Scheme on Global Initiative on Academic Network (GIAN)

"PROCESS METALLURGY FOR 2016 AND BEYOND"

Indian Institute of Science, Bangalore, June 27 – July 8, 2016

1. Overview and Objectives

Among the fastest growing economies in the World, India looks to its manufacturing sector to play an ever-increasing role; indeed, this realization forms the core of the Make in India initiative. Within the manufacturing sector, primary processing of materials has the potential for continued rapid growth (for example, India's steel production is projected to grow by a factor of three in the next decade to about 200 million tonnes). This course aims at training engineers who will help realizing this potential.

This course widens the scope and perspectives of Process Metallurgy to processing of both conventional metals and functional materials. While ferrous process metallurgy (raw material handling to steel refining) will form its core, the course integrates Materials Process Science with Materials Science, and demonstrates their interlinkage and mutual dependence. Its coverage includes:

Process fundamentals: The course will start with an introduction to metallurgical processes, with a focus on principles of thermodynamics, transport phenomena, kinetics, and interfacial phenomena.

Process Phenomena: In this part, the course will focus on micromodeling of reactions in iron and steelmaking, and in non-ferrous metal extraction. The discussion will then proceed from micro to macroscales, reactor designs, fluid dynamics calculations and exposure to relevant software.

Industrial Processes: This part will cover salient features of ferrous and non-ferrous processes, followed by a wide-ranging discussion of issues such as implementation of new process concepts, up-scaling, process economics, . problems in today's industries (ferrous) and possible solutions, and environmental concerns in materials process industries.

2. Who should attend the course?

The course is broad-based and aims to address practicing engineers and researchers in industry and R&D labs , teachers, research scholars, and senior undergraduate students.

3. Teaching Faculty

The course will be led by **Professor Seshadri Seetharaman**, Royal Institute of Technology, Stockholm, Sweden. Prof. Seetharaman is one of the world's leading authorities in the field of Process Metallurgy. His research interests span process metallurgy, as well as in the areas of novel and innovative process solutions for energy and environmental optimization of high temperature processes for steelmaking and waste management, and new approaches to bulk production of nanoalloys and composites. With over four decades of teaching, research, and scholarship, Prof. Seetharaman has guided over 30 PhD graduates, and has published over 350 papers. In addition to co-authoring a book chapter (with Prof. K.P. Abraham) on the "Thermodynamic Properties of Oxide Systems" (1980), he has edited several books. The recent book, "Treatise on Process Metallurgy" (2013), of which he is the Editor-in-Chief, has

the most comprehensive and up-to-date treatment with contributions from many stalwarts in the field, including several from India.

His awards include an Honorary Doctorate from Aalto University (formerly Helsinki Institute of Technology, Finland) and a Distinguished Alumnus Award of the Indian Institute of Science. He is also the recipient of the Best Teacher award many times in the last three decades. Prof. Seetharaman has held visiting professorships in leading universities in many countries; in India, he has spent several stints in recent years as a Visiting Professor / Distinguished Visiting Professor at IISc, IIT-B, IIT-K and IIT-M.

For this course, Prof. Seetharaman will lead a faculty team that includes Prof. S. Subramanian (IISc), Prof. Nurni N. Viswanathan (IIT-Bombay), and other leading researchers from industry, R&D labs and academia.

4. Coordinators

Prof. S. Subramanian, Prof. G.S. Gupta, and Prof. T.A. Abinandanan ((Sc)
Prof. N.N. Viswanathan (IIT-B)

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5. Registration Fees

Students:	Rs. 5,000
Faculty members and Researchers in government labs	Rs. 10,000
Participants from industry (1 week)	Rs. 10,000
Participants from industry (2 weeks)	Rs. 20,000
Participants from abroad:	US $ 400

The Registration fee covers the cost of lectures, tutorials, demonstrations, course material, lunch and snacks, and social events. Participants may avail on-campus accommodation on payment basis.