

Process Engineering Principles and Software for Pyrometallurgical Processes for Metal Extraction

Overview

This course is designed to cover the important field of Pyrometallurgy – smelting and refining at high temperatures. The steel industry uses these processes exclusively to make steel and they are also dominant in the production of copper, aluminium, ferro-alloys, titanium, and many other metals. All aspects of our work in teaching and research at Universities have been transformed by the digital revolution, and powerful software packages are now available to assist engineers to improve and optimize existing processes and to design new ones. However this in no way mitigates the need for a good understanding by the process engineer of the fundamentals of chemical thermodynamics and chemical engineering – it will be assumed that the fundamentals have already been covered by the students in their “standard” undergraduate courses. By combining application of the fundamentals with the use on the software packages the students will understand and actually visualize how processes work, and they will work on assignments that reflect the complexity of actual processes. The course will involve inputs on fundamental aspects of pyrometallurgy applied to high temperature metal extraction process on one hand and application involving computing approach using software like METSIM/FactSage/FlowBaletc on the other hand. The students will be taught about how to use the FREED, Therbal, Flowbal, FactSage, METSIM and Steel University software packages, and apply them to processes for smelting and refining of metals, especially in iron and steelmaking/non-ferrous extraction. Fundamentals will be covered as necessary during the software instruction. Course participants will learn these topics through lectures and hands-on experiments. Also case studies and assignments will be shared to stimulate research motivation of participants.

Dates for the Course	02nd December, 2016 to 16th December, 2016
Host Institute	IIT Madras
No. of Credits	2
Maximum No. of Participants	40
You Should Attend If...	<ul style="list-style-type: none"> ▪ Shop floor engineers, managers, and R&D professionals working in the area of iron and steel production as well as non-ferrous extraction/production. ▪ Student or faculty from academic institution working in the area of process metallurgy/iron and steelmaking/metal extraction. ▪ Scientists and Engineers working in applied industrial based research organizations involved in the area of metal extraction and refining.
Course Registration Fees	<p>The participation fees for taking the course is as follows:</p> <p>Student Participants: Rs.2000 Faculty Participants: Rs.5000 Government Research Organization Participants: Rs.8000 Industry Participants: Rs.10000</p> <p>The above fee is towards participation in the course, the course material, computer use for tutorials and assignments, and laboratory equipment usage charges.</p> <p>Mode of payment: Demand draft in favour of “Registrar, IIT Madras” payable at Chennai</p>
Accommodation	<p>The participants may be provided with hostel accommodation, depending on the availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel</p>

Course Faculty



Dr. David G. C. Robertson graduated from Imperial College, London, in 1963, and then attended the University of New South Wales, Sydney, Australia, where he obtained his Ph.D. in 1968. He then joined the faculty at Imperial College and remained there until 1986, when he became Director of the Center for Pyrometallurgy at the University of Missouri-Rolla (now the Missouri University of Science and Technology). Dr. Robertson's teaching has focused on the application of engineering principles to metallurgical processes for smelting, refining, and solidification. Since 2005 Dr. Robertson has travelled widely to give lectures, take part in Conferences, and visit companies. In 2006, Dr. Robertson worked at the BHP Billiton Newcastle Technology Center, as a Senior Principal Engineer in the Technical Marketing Team. In 2008 he visited Anglo Platinum for six weeks and was a Visiting Professor at Tohoku University for four months. In 2009 he was Visiting Professor at the University of Science and Technology Beijing (USTB) for two weeks and at Chongqing University (CQU) for two months. In 2009-10 Dr. Robertson was Visiting Professor at IIT Kanpur for five months



Dr. Ajay Kumar Shukla, is Assistant Professor in the Department of Metallurgical and Materials Engineering, IIT Madras. He received his B.Tech and Ph.D. from IIT Kanpur. His research interests include process modeling, control and optimization of iron and steelmaking as well as non-ferrous extraction. He has spent almost one decade in steel industry at various managerial and technical capabilities (nine years in SAIL-Durgapur Steel Plant and almost one year at National Metallurgical Laboratory, Jamshedpur). He is currently involved with number of applied industrial research based projects with various steel plants.

Course Coordinator

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