Course Proposal for Global Initiative of Academic Networks (GIAN) Phase IV

WHAT, WHY AND HOW: CRITICAL MINERALS



COURSE COORDINATOR

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1. Course Overview

India's growing economy has offered domestic entrepreneurs and international players multiple opportunities to invest in manufacturing industries. The Government of India (GoI) has realised the significance of the manufacturing industry to the country's industrial development and economic growth; and has taken the necessary steps to increase investment in this sector through launching the 'Make in India' initiative by the Prime Minister of India. Currently, manufacturing and mining together accounts for approximately 20% of country's GDP (see Figure 1) and there is a potential for this sector to account for 25-30% and create up to 90 million jobs by 2025. According to a report by McKinsey and Company, India's manufacturing sector could touch US\$ 1 trillion by 2025.

However, a stronger manufacturing industry calls for a continuous and uninterrupted supply of raw materials (minerals), sound fiscal policy, and resilient and robust infrastructure. Whilst the government is striving hard to establish the latter two, there seems not enough attention is being paid to the issue of ensuring 'continuous and uninterrupted supply of raw materials'.

This 2-week course is aimed to be accessible to a wide-ranging audience, e.g., mining and manufacturing industry leaders, policy makers, and researchers (also a new generation of research students). Lectures and discussions will explore concepts from a physical and applied standpoint, rather than a theoretical perspective. Participants will gain a comprehensive understanding of the current supply and demand dynamics affecting India's critical minerals sector through in-depth sessions and expert-led analysis.

2. Objective

The proposed workshop will involve stakeholders from government, industry, research, and community and professional organizations to:

- discuss the preparedness of the Indian minerals industry to keep in pace with the growing manufacturing industry from different stakeholder perspectives.
- deliberate on potential impacts, challenges and opportunities for the future of the minerals industry and the Indian economy in light of recent 'Make in India' initiative

- examine the geological availability of 'Critical Elements' (including securing their supply from other countries through bilateral relationships), their effective use and finding suitable alternatives
- deliver a plan of action and draft an approach to addressing research and policy gaps identified by participants over the course of the three days.
- appreciate new and innovative ways to extract and process critical minerals

3. Teaching Faculty



Prof Mohan Yellishetty Monash University



Prof Narasimha Mangadoddy IIT Hyderabad



Dr Ashok Kamaraj IIT Hyderabad



Dr. Vamsi Vikram
Gande

IIT Hyderabad



Dr. T. Sreenivas

Prof Bhuvana K

Shanbhag



CEO Tree Green Solutions

Biliangadi

Dr Shashibhushan



Dr. T. SreenivasFormerly BARC,
Outstanding
scientist



Prof. Sapna A.
Narula
Director NIAM,
Ministry of
Agriculture, Nalanda
University, Ministry
of External Affairs,
India

4. Course Details

4.1. Course Duration

11 August 2025 – 22 August 2025

4.2. Lecture Schedule

Day	Topic	Description	
Day 1 & 2 Lecture: 1.5hrs	Understanding current situation: what's out there, what's	Examine the current global landscape in critical minerals mining and production, including critical geopolitical factors impacting the industry	
Tutorial: 2.5hrs	happening, and where are we headed?	Gain insights into where the critical minerals industry is headed in the short and long term both in India and globally	
		What are the major challenges that deter companies from investing in critical minerals and in partnering with investors?	
		Geopolitical factors creating risks, pressures and opportunities in critical minerals	
		Are there any broader obstacles in investing in critical minerals supply chains?	
		Developments in clean energy, recycling, and other environmental issues affecting the critical minerals industry	
Day 3 Lecture: 1hrs	Risk lists of metals and minerals that are	What are critical minerals and why? Opportunities for India on critical materials	
Tutorial: 2hrs	considered to be critical for India	Strategies and research findings for critical material substitutes	
		By-product recovery – a world prospective and prospects for India	
		Identifying key steps to supporting critical minerals industry development growth in India	
Day 4	Indian manufacturing	Indian manufacturing: current state and future trends	
Lecture: 1hrs	and resource intensity: current practices and	Manufacturing and use of minerals	
Tutorial: 2hrs	future trends	Recovery, extraction and separation of mineral ores	

		Alternatives and substitutes	
Day 5 Lecture: 1hrs	What is required to support critical mineral supply in India?	What are the strategies to boosting investment in this industry?	
Tutorial: 2hrs		How can India leverage its competitive advantage in this space?	
		What have been the implications of policy intervention to date, and have they been on balance positive or negative for the market?	
		Planning ahead for the future of the critical mineral industry and its potential impact on India	
Day 6 Lecture: 1hrs	Examining government support for investments	Unpacking government initiatives to help support the industry	
Tutorial: 2hrs	in critical minerals	Development to generate new jobs, drive regional economic growth and accelerate the energy transition	
		Financing junior projects to help diversify global critical minerals supply chains	
		Global ESG trends impacting mining company responsibilities, operations and planning strategies	
Day 7 Lecture: 1hrs	Explore for the future: Examining India's	How to support the next generation of critical minerals discoveries	
Tutorial: 2hrs	critical mineral resources	Analysing the current production of minerals and critical minerals and their locations	
		Improving the bottom line by understanding critical minerals by-product opportunities	
Day 8 Lecture: 1hrs	Accelerating the future of clean energy through critical minerals	Considering the interplay between the critical minerals' investment cycle and clean energy considerations	
Tutorial: 2hrs	investment	Identifying the key governance and risk management issues involved in critical minerals investment to achieve clean energy goals	
Day 9 & 10	Factors playing role in	Market demand and price fluctuation	
Lecture: 1.5hrs Tutorial: 2.5hrs	influencing the global trend in mineral beneficiation and recap	Technological advancements Value addition and diversification	
Tutorial. 2.31115	and close	Value addition and diversification	
		Resource scarcity and complexity	
		Recapping and closing	

5. Who Can and Should Attend?

- Executives, engineers and researchers from mining, manufacturing, service and government organizations including R&D laboratories.
- Student students at all levels (BTech/MSc/MTech/PhD) or Faculty from reputed academic institutions and technical institutions.

Government	University, Research &	Industry	
Organisations	Professional Organisations	Manufacturing	Mining
Indian Bureau of Mines	IITs, NITs and CSIR labs, UGC-	TATA Group, Godrej	National Mineral
and Geological Survey	AICTE Universities & affiliated	Group, Bajaj Group,	Development
of India, Ministry of	colleges, Confederation of Indian	Reliance Industries	Corporation,
Mines, Ministry of	Industry, Federation of Indian	Limited, Larsen &	Aditya Birla
Commerce and Industry,	Mineral Industries, Society of	Toubro, Mahindra	Group, MOIL,
Department of Mines &	Indian Automobile	Group, Bombay	PPCL, Sandur
Geology (of different	Manufacturers, Mining,	Dyeing, Hindustan	Manganese and
States), Mineral	Geological & Metrological	Lever Network, Jindal	Iron Ores, Coal
Exploration Corporation	Institute of India, Institution of	Steel, Videocon	India Limited,
Ltd	Engineers (I), Indian Machine	Group, Asian Paints,	etc.
	Tool Manufacturers' Association	etc.	

6. Registration and Payment:

The workshop is open to a wide audience, including industry leaders, policymakers, researchers, and students. It will feature technical presentations, and workshops addressing current priorities and future directions in the field.

Accommodation & Logistics

Accommodation on-campus is subjected to availability at IIT Hyderabad or at nearby Hotels. Accommodation expenses to be paid by the candidate.

To register for the symposium and workshop, please use the following links:

Fee

• Participants from abroad: US\$100 + 18% GST

• Industry/ Research Organizations: INR 3000 + 18% GST

• Academic Institutions (Faculty Members): INR 2000 + 18% GST

• Students: INR 1000 + 18% GST

Indian Participants: https://payments.billdesk.com/bdcollect/bd/iitof/17707

For foreign participants: https://payments.iith.ac.in/gian_registration