



Greening the Operations & Supply Chain

Faculty Name(s):	Haritha Saranga
Designation:	Professor
Teaching Area:	Production & Operations Management
This course may be offered to:	GNAM Course
Credits (No. of hours):	3 credits
Term / Quarter:	GNAM Weeks
Course Type:	Elective
Offered as:	GNAM course: 5-day continuous course in IIM Bangalore
Grading Norms	Qualitative
Are there any financial implications to this course?	Costs pertinent to GNAM week. No additional course costs
Additional information required	This course is designed as an experiential course, involving classroom sessions, field visits and workshops

Course Summary

Climate change is one of the most serious challenges facing humanity today. Hence the ability to build or transform existing businesses into environmentally sustainable businesses has become a critical capability for today's leaders and managers. The consequences of climate change are being felt by everyone across the value chains. Unless serious efforts are made to reduce greenhouse gas emissions (GHG), extreme events will only increase in both frequency and intensity, which necessitates immediate decarbonization of operations and production processes. While some industries, such as Education, IT, hospitality, and service-based industries are better able to reduce

their GHG emissions, the hard to abate industries like Cement, Chemicals, Fertilizers and Steel etc. are finding it difficult to decarbonize.

In recent years, there have been significant efforts worldwide to reduce industrial emissions through operational efficiency and technological advancement. Fundamental principles of operations management such as Energy Efficiency, Energy Productivity, Resource Optimization, Lean Manufacturing, Waste Elimination, Reverse Logistics and Circular Supply Chains are being deployed not only to minimize cost of operations but also to reduce waste and GHG emissions. Electrification of machinery and equipment followed by transition to renewable energy are the other strategies being adopted by firms in various manufacturing sectors for quick decarbonization.

This course tries to bring together these efforts through case studies of such organizations, especially focusing on the Indian context. Firstly, it covers the various best practices and technologies used for emission and waste reduction in various industries, including Agriculture, Cement, Electrical Equipment, Real Estate, Steel and Textiles. Secondly, the course will demonstrate how the time-tested concepts and ideas from the field of Operations Management can be adopted to greening the processes and value chains to produce products and services in a sustainable fashion. The course will also create awareness about the environmental footprint of individuals and how one can reduce it through mindful living. Finally, the course will provide an overview of various sustainability standards, regulations and frameworks that can be utilized for designing and implementing processes that improve environmental performance of organizations.

Learning Objectives / Outcomes

The course is designed with the following specific objectives and learning outcomes:

- a. Provide an overview of the various decarbonization strategies being currently adopted by the Indian manufacturing and service sector firms
- b. Enable understanding of the various challenges involved in reducing the carbon footprint at the individual, community and societal level
- c. Learn the various ongoing innovations and technological developments in the sustainability landscape to produce greener products and processes
- d. A good comprehension of the various tools and techniques that can help reduce the GHG emissions across industry sectors
- e. Gain an understanding of the various sustainability standards, regulations and certifications applicable to organizations operating in India

Pedagogy

The course is designed to be experiential in nature. Therefore, the sessions are designed as a combination of lectures, case discussions, field visits, workshops and guest talks. Students will also be able to learn the challenges and opportunities available for decarbonizing the Indian and global industry, by interacting with peers and experts, engaging in classroom discussions related to cases/experiential sessions/workshops and by undertaking project work.

Session-wise plan*

Day		9 - 10:15	10:30 - 11:45	12 - 1:15	2:15-3:30	3:45 to 5	
0	Topic	Arrival Day					
1	Business Case for sustainability	Inauguration Experiential Component The Perspectivity Game - An interactive way to learn the political, social and economic behavioural challenges around sustainability and building resilience.		Game debriefing	Impact of Climate Change on the environment	Business Case for sustainability & Project Discussion	
2	Decarbonizing the Real Estate Sector	Experiential Component Campus Walk - Visiting IIMB's green initiatives	How to build low carbon residential & commercial buildings? Case: Decarbonizing the Real Estate – One Building at a time		Experiential Component Visit to Mahijaa – Consultants for mud blocks and building alternatives & Material testing laboratory		
3	Net Zero goals, Roadmaps & Sustainability Regulations in India	Debriefing & experience sharing on sustainable practices in the Real Estate sector	How to decarbonize hard to abate industries like Cement? Case: Gray to Green Transition - The Sustainability Journey of Dalmia Cement. Talk by Puneet Dalmia (recorded)		Guest Session On Sustainability standards & regulations in India	Experiential Component Soil & Water Rejuvenation through Collective Action	
4	Circular Economy Models for Sustainable Businesses	Debriefing & experience sharing about collective action for sustainability	How can you make use of circular business models to reduce the environmental impact of Fast Fashion? Case: Saahas Zero Waste: Breaking the spell of Fast Fashion with Circularity		Experiential Component Visit to Saahas Zero Waste's Textile segregation & Electronics recycling units		
5	Building Sustainable Operations & Supply Chains	Debriefing & experience sharing on circularity & Course wrap-up	Project work		Student Presentations + Certificate Presentations		

*Tentative plan. Subject to change

Course Evaluation & Grading

Individual Component	Group Component	Weightage
In-class Quizzes on cases		15%
Class Participation		25%
Write-ups on experiential components		20%
	Group Project	40%
	Total	100%

In-class Quizzes on cases (15 marks)

Each student is expected to read the assigned cases and come prepared to the class discussion. There will be a short and simple quiz (5 marks each) on each of the 3 assigned cases at the beginning of the class to ensure that everyone comes prepared to the class.

Class Participation (25 marks)

Each student will get marks based on the value they add to the class discussion. Only constructive remarks and queries will be rewarded, and marks awarded will depend on the quality of the remark/query.

Group Project (40 Marks)

Students are expected to work in groups of 5 on projects related to sustainability and decarbonization in real organizations. The project may involve creating a decarbonization roadmap for an organization that is newly starting their sustainability journey or focusing on one specific lever for decarbonization if it has already begun its low carbon journey. The project can also be targeted towards other environmental sustainability aspects, such as waste management, water management, transition towards renewable energy etc. The group will discuss the project topic and scope with the instructor before finalizing it.

Write-ups on experiential components (20 Marks)

Students will be required to make a submission at the end of each experiential component, answering the following questions briefly. Each submission carries 5 marks and should not exceed 200 words.

1. Perspectivity Game

- a. Consider your home state (country) or a state (country) that you are most familiar with. Identify an industry or a company (could be public or private sector), whose operations and/or supply chain have resulted in vast amounts of greenhouse gas (GHG) emissions and/or pollution. What type of natural or manmade disasters have occurred or likely to occur due to this industry/company? What is their impact on business and economy?

- b. Determine how to reduce the damage being caused to the environment in the above scenario. Have there been any recent technological advancements that can eliminate or reduce the GHG emissions and/or the pollution in this context? If so, what are they, and are they being adopted in India (or in your own country), and in this context specifically? If not, why not?
- c. What are your recommendations for reducing the environmental footprint of such industries/companies' operations and supply chains?

2. Visit to Mahijaa Workshop

- a. Based on class discussion and visit to Mahijaa, what in your opinion are the two easiest ways to reduce the carbon emission contribution by the real estate industry in India (in your country)?
- b. Identify two new green features that were not discussed during the class/visit, which have great potential for revolutionizing the green building industry in your country/world.
- c. Describe one important regulation/mechanism through which governments can incentivize either the producers or the customers towards green homes.

3. Visit to Saahas Zero Waste (SZW) textile segregation center

- a. Identify two ways in which SZW can improve their cloth collection drives in Bangalore and other cities in India.
- b. Suggest two strategies for improving the operations in SZW's cloth segregation center.
- c. Recommend a regulation or incentive (not discussed in the class) that will induce the big brands to take responsibility for the textile waste they are generating.

4. Visit to Puttenakere Lake

- a. What was the most striking aspect of this lake rejuvenation for you?
- b. Do you think it is possible to scale up such initiatives through collective action in other cities as well? If so, provide a brief working plan for the same, assuming that you will get the necessary support from the municipal authorities.
- c. What implementation related challenges do you envisage to implement the above plan?



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Dr. Haritha Saranga is a Professor at Production and Operations Management Area at Indian Institute of Management Bangalore. She has been awarded ***IIMB Chair of Excellence*** for her contribution to research and teaching excellence at IIM Bangalore. She currently chairs the ***Sustainability Taskforce*** at IIM Bangalore.

Dr. Saranga's research interests include studying quality, productivity and sustainability aspects of firms operating in agricultural, automotive, pharmaceutical and healthcare supply chains in India and abroad. She uses both empirical and analytical methods in her research, including data envelopment analysis, multiple regression, Time series, panel data and optimization. Haritha Saranga is a Fellow of MIRCE Academy, Exeter, UK. She has published several articles in refereed international journals, such as *Production and Operations Management*, *Journal of International Business Studies*, *European Journal of Operational Research*, *MIT Sloan Management Review* and *Journal of Operational Research Society*. She also co-authored a book, titled *Reliability and Six Sigma*, published by Springer and has written many cases and book chapters.

Dr. Saranga has conducted several training programs for organizations such as Tata Motors, Maruti Suzuki, Hyundai, Bosch, Apollo Hospitals, Motherhood Hospitals, Deloitte Consulting and Indian Defence Accounts Services. She has also carried out consulting projects and conducted case studies with organizations such as Ace Designers, Akshaya Patra, Apollo Hospitals, Bosch, CII Foundation, Looms of Ladakh and Suzlon etc. She has served as board member in the boards of Cyient DLM Pvt. Ltd, Looms of Ladakh and IIM Bangalore.

Dr. Saranga is very passionate about addressing the sustainability and climate crisis related issues humanity is facing currently. After taking over as Chairperson of Sustainability Taskforce at IIM Bangalore, she has been spearheading several initiatives within and outside IIMB in a bid to create awareness about the need for change towards sustainable lifestyles, as well as to reduce the carbon footprint of IIM Bangalore and the communities in the neighborhood.

Articles in Popular Press

1. Can children make parents adopt more sustainable lifestyles? What is the role of New Education Policy? Times of India, 28 February 2023. <https://timesofindia.indiatimes.com/blogs/voices/can-children-make-parents-adopt-more-sustainable-lifestyles-what-is-the-role-of-new-education-policy/> (with Satyajit Roy and Kanchan Mukherjee)
2. The need for, and strategies to boost the low rate of cadaveric organ donations, Economic Times

Healthworld.com, August 31, 2022.

https://health.economictimes.indiatimes.com/news/industry/the-need-for-and-strategies-to-boost-the-low-rate-of-cadaveric-organ-donations-in-india/93896152?utm_source=linkedin_web&utm_medium=social&utm_campaign=socialsharebu ttons (with Akansha Misra)

3. Staggering Work and Home Quarantine: A Strategy for Measured Relaxation of Lockdown, in Forbesindia.com, 6th May, 2020.
<https://www.forbesindia.com/article/iim-bangalore/staggering-work-and-home-quarantine-a-strategy-for-measured-relaxation-of-lockdown/59195/1> (with Sreelata Jonnalagedda)
4. Misaligned agriculture – A major source of India’s water problems, in Forbesindia.com, 10th July 2018. <http://www.forbesindia.com/article/iim-bangalore/misaligned-agriculture-a-major-source-of-indias-water-problems/50693/1> (with Spoorthi Ananda Kumar)
5. Let us make ‘small-scale farming’ a viable enterprise, in Forbesindia.com. 19th January, 2018.
<http://www.forbesindia.com/article/iim-bangalore/let-us-make-smallscale-farming-a-viable-enterprise/49147/1>