Circular Manufacturing – Processes and Technologies

Overview

Today's rapidly growing consumption-driven society is fueled by the exponentially increasing use of resources and energy. However, this approach, without considering the societal and environmental impact, is not sustainable in the long run. The traditional linear model of making, using, and discarding a product needs to morph into a more holistic approach involving the product's reuse, remanufacturing, and recycling multiple times. A paradigm shift towards sustainability can only be enabled by rediscovering and repurposing our existing technologies to introduce circularity in the manufacturing process, viz., Circular Manufacturing.' This requires a rethink and redesign of a product starting from its birth and the judicious use of the available energy and resources to make the manufacturing process more efficient and cost-effective. Finally, the proper end-of-life treatment of the product to make it viable to be reused again, either for the same or different purposes, must be considered. This course will focus on the basic principles of sustainable manufacturing and the fundamentals behind multiple product life cycle systems. It will also look at the technological aspects which are required to achieve circularity in manufacturing. Eventually, how this can lay the foundation for achieving the goal of a circular and sustainable economy will be discussed through industry perspectives.

The primary objectives of the course are as follows:

- a) Exposing participants to the growing demand of the circular economy and the role of manufacturing in it.
- b) Getting the participants to be familiar with the technology and processes driving the idea of circular manufacturing
- c) Providing national and international industry perspectives through case studies and industry lectures
- d) Enabling the participants to apply these concepts towards the drive for sustainability in their respective domains.

Course Information	Course: Circular Manufacturing – Processes and Technologies Date: June 9 – June 13 (one week)				
Course Schedule				Speaker	
	Day 1	Forenoon	Registration		
			1. Introduction to Circularity	IIT Hyderabad Faculty	
		Afternoon	2. Concepts of Circular and Sustainable manufacturing	Prof. Shozo Takata	
			3. Material and Process Selection for	IIT Hyderabad Faculty	
			Circularity – Part 1 (paradigms and principles)		
			Introduction to Participants' activity		
	Day 2	Forenoon	4. Design for life cycle	Prof. Shozo Takata	
			5. Material and Process Selection for	IIT Hyderabad Faculty	
			Circularity – Part 2 (enabling technologies)		
		Afternoon	6. Life cycle evaluation	Prof. Shozo Takata	
			Participants' Activity		
	Day 3	Forenoon	7. Life Cycle Management	Prof. Shozo Takata	
			8. Energy Efficient Process and Tools for	IIT Hyderabad Faculty	
			Manufacturing		
		Afternoon	Participants' Activity		
	Day 4	Forenoon	9. End of life management	Prof. Shozo Takata	

			Industry case studies	Industry Personnel			
		Afternoon	Participants' Activity				
		Forenoon	10. Development of life cycle engineering in	Prof. Shozo Takata			
			Japan				
	Day 5		Participants' Presentation				
		Afternoon	Participants' Presentation				
			Conclusion				
You Should	 If you are an engineering professional or researcher from manufacturing indust 						
Attend If	government organizations, including R&D laboratories.						
	 If you are a faculty or a student (BTech/MTech/PhD) from a reputed academic and technical 						
	institution.						
Fees	The participation fees for taking the course is as follows:						
	Particip	Participants from abroad : US \$100 + 18% GST					
	Industry/ Research Organizations: INR 3000 + 18% GST Academic Institutions (Faculty Members): INR 2000 + 18% GST						
	The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges 24 br free internet facility. The participants will be provided						
	with accommodation on payment basis.						
	Modes of payment:						
	Online Transfer						
	Payment Link:						
	https://	https://payments.billdesk.com/bdcollect/bd/iitof/16215					
Registration	Please till in the google form after payment of fees:						
Procedure	https://forms.gie/Pbw6kdqoXfETsU2B9						

The Faculty



Prof. Shozo Takata is a professor emeritus at Waseda University, Japan. His research interests are life cycle engineering and life cycle maintenance for providing needed functionality to users with less material consumption and environmental load.



Dr. Anurup Datta is an assistant professor in the Department of Mechanical and Aerospace Engineering at IIT Hyderabad. His research interest includes Laser based Micro-manufacturing and

Optimization of Manufacturing processes.



Prof. N. Venkata Reddy is a professor in the Department of Mechanical and Aerospace Engineering at IIT Hyderabad. His research interests are Predictive modeling for Digital Fabrication and

Analysis (Numerical as well as Experimental) of Manufacturing Processes, Design and Development of Rapid Response, Resource Saving, and Hybrid Manufacturing Processes at multi-scale.



Prof. S. Suryakumar is a professor in the Department of Mechanical and Aerospace Engineering at IIT Hyderabad. His research interests are Additive Manufacturing of Metallic Objects, particularly large sized; Hybrid Techniques for AM (multi-process; multi-

material form; multi-scale)

Course Coordinator

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Course co-coordinator

Prof. N. V. Reddy E-mail: <u>nvr@mae.iith.ac.in</u>

Registration link: https://forms.gle/P6w6kdqoXfETsU2B9