# 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**<br>**Date: June 9 – June 13 (one week)** | | | |
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| **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 Circularity – Part 1 (paradigms and principles) | IIT Hyderabad Faculty |
| | | | Introduction to Participants' activity | |
| | Day 2 | Forenoon | 4. Design for life cycle | Prof. Shozo Takata |
| | | | 5. Material and Process Selection for Circularity – Part 2 (enabling technologies) | IIT Hyderabad Faculty |
| | | 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 Manufacturing | IIT Hyderabad Faculty |
| | | Afternoon | Participants' Activity | |
| | Day 4 | Forenoon | 9. End of life management | Prof. Shozo Takata |

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| | | | Industry case studies | Industry Personnel |
| | | Afternoon | Participants' Activity | |
| | Day 5 | Forenoon | 10. Development of life cycle engineering in Japan | Prof. Shozo Takata |
| | | | Participants' Presentation | |
| | | Afternoon | Participants' Presentation | |
| | | | Conclusion | |

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| **You Should Attend If…** | ▪ If you are an engineering professional or researcher from manufacturing industries or government organizations, including R&D laboratories.<br>▪ 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:<br>**Participants from abroad : US $100 + 18% GST**<br>**Industry/ Research Organizations: INR 3000 + 18% GST**<br>**Academic Institutions (Faculty Members): INR 2000 + 18% GST**<br>**Students: INR 1000 + 18% GST**<br><br>The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.<br><br>Modes of payment:<br>Online Transfer<br><br>Payment Link:<br>**https://payments.billdesk.com/bdcollect/bd/iitof/16215** |
| **Registration Procedure** | **Please fill in the google form after payment of fees:**<br>**https://forms.gle/P6w6kdqoXfETsU2B9** |

# 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

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