

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

REVISION OF ELECTIVE COURSE

Course Title	Sustainable Manufacturing	Course Code	ME5XXX			
Dept./ Specialization	Mechanical Engineering	Structure (LTPC)	3	1	0	4
To be offered for	UG/PG	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Dr. Senthilkumaran K	Type	New <input type="checkbox"/>		Modification <input checked="" type="checkbox"/>	
Recommendation from the DAC		Date of DAC	01-06-2021			
External Expert(s)	Professor Ramesh Babu, Department of Mechanical Engineering, IIT Madras.					
Pre-requisite	CoT	Submitted for approval			45 th Senate	
Learning Objectives	<p>The objectives of this course are to train the students.</p> <ul style="list-style-type: none"> To introduce the concept of sustainable manufacturing To enable them to analyse the impact of various decisions on sustainability. To evaluate options in a global context that minimize the impact of manufacturing activities on society, the environment, and resources 					
Learning Outcomes	<ul style="list-style-type: none"> Students would be able to identify various alternatives in design, materials, and process to make informed trade-off decisions that will minimize energy use, water use and emissions during product life cycle stages 					
Contents of the course <i>(With approximate break-up of hours for L/T/P)</i>	<p>Three pillars of sustainability, sustainable manufacturing practices and reductionist approach followed in manufacturing industries (5L +1T)</p> <p>Product life cycle and Sustainable product design and development (5L +1T)</p> <p>Reducing human environmental exposures in an industrial environment and worker's safety, sustainability assessment of products in-use stage (3L+1T)</p> <p>Practical techniques for energy and emission reduction, green productivity (2L+1T)</p> <p>Life Cycle Analysis (LCA) and other environment management tools (5L+1T)</p> <p>Environmentally benign factory layout and operations, energy, and material flow analysis in factory operations (5L +1T)</p> <p>Unit process analysis, life cycle inventory for manufacturing processes (5L +1T)</p> <p>Exergy analysis of manufacturing processes (5L +1T)</p> <p>Green supply chain, extended producers' responsibility, eco-labels, sustainability in transportation and packaging, remanufacturing, and recycling (5L+1T)</p> <p>Techniques and tools for sustainability measurement and key performance indicators (3L+ 1T)</p> <p>Case studies on sustainability reporting and information systems (3L)</p>					
Text Book	1. Dornfeld, David A., ed. Green manufacturing: fundamentals and applications. Springer Science & Business Media, 2012.					
Reference Books	<p>2. Bakshi, Bhavik R., Timothy G. Gutowski, and Dušan P. Sekulić, eds. Thermodynamics and the Destruction of Resources. Cambridge University Press, 2011.</p> <p>3. Ashby, Michael F. Materials and the environment: eco-informed material choice. Elsevier, 2012.</p> <p>4. David R. Hillis and J. Barry DuVall, Improving profitability through green manufacturing: Creating a profitable and environmentally compliant manufacturing facility, Wiley, 2012</p> <p>5. Rob Thompson and Martin Thompson, Sustainable Materials, Processes and Production, Thames and Hudson, 2013</p>					