

<b>Course Code</b>	CP310			
<b>Course Title</b>	Sustainability Assessment and Eco-innovation			
<b>No. of Credits</b>	3			
<b>Pre-requisites</b>	None			
<b>Compulsory/Optional</b>	Compulsory			
<b>Aim(s):</b> To introduce assessment tools for sustainability of products and processes thereby develop solutions using eco-innovation concepts.				
<b>Intended Learning Outcomes:</b> On successful completion of the course, the students should be able to; ILO 1: Analyze the sustainability aspects of a given system using tools such as material flow analysis (MFA), life cycle analysis (LCA), life cycle costing (LCC) and foot print analysis (FPA). ILO 2: Propose the ways and means to enhance the sustainability of a given product/ process using eco-innovation concepts.				
Topics	Time Allocation/Hours			
	L	T	P	A
<ul style="list-style-type: none"> <li><b>Introduction</b> Global environmental issues and manufacturing and chemical industry, sustainability intervention, decoupling economic development and resource usage, circular economy, Sustainable Development Goals.</li> </ul>	02			
<ul style="list-style-type: none"> <li><b>Sustainability assessment tools</b> Multi-criteria decision making, Material Flow Analysis, Life Cycle Assessment, Life Cycle Costing, Footprint Analysis, Environmental Impact Assessment,.</li> </ul>	16			26
<ul style="list-style-type: none"> <li><b>Eco-innovation and design for sustainability</b> Green chemistry/green engineering principles, Eco-innovation principles, Design for sustainability, Chemical Leasing, Biomimetic principles and design, Process intensification. Holistic Waste Management; Industrial ecology/industrial symbiosis</li> </ul>	14			
<b>Total equivalent hours</b>	<b>32</b>			<b>13</b>
<b>Recommended Texts:</b>				
<ul style="list-style-type: none"> <li>Baumann, H., Tillman, A., The Hitch Hiker's Guide to LCA, (1 Ed), Studentlitteratur AB, 2004.</li> <li>El-Halwagi, M. M., Sustainable Design Through Process Integration, (2 Ed), Elsevier, 2012.</li> <li>Lehmann-Waffenschmidt, M., Sustainability and Innovation- Innovations Towards Sustainability: Conditions and Consequences, (1 Ed), Physica-Verlag Heidelberg-A Springer Company, 2007.</li> <li>United Nations Environmental Programme, Eco-innovation Manual, URL: (<a href="http://orbit.dtu.dk/files/103602545/Eco_Innovation_Manual_Tools_Instructions.pdf">http://orbit.dtu.dk/files/103602545/Eco_Innovation_Manual_Tools_Instructions.pdf</a>, 2014)</li> </ul>				
Assessment	Percentage Mark			
<b>In-course</b>			50	
Tutorials/Assignments/Quizzes /Design Report	25			
Mid Semester Examination	25			
<b>End-semester</b>			50	

