

**A EUROPEAN M.Sc. COURSE**  
**SUSTAINABILITY OF PROCESSES AND PRODUCT**

**MODULE SPECIFICATIONS**

**1. Module title: Sustainability of processes and product**

**2. Credits:** 6 ECTS Credits

**3. Keywords**

Sustainability, Life Cycle Assessment, Processes and Products.

**4. Pre-requisites:** (none)

**Co-requisites:** A number of the elective modules concerning basic specializations such as Solar Thermal Engineering, Wind Energy Technologies, PV, Biomass, etc.

**5. Summary**

Sustainability is becoming the new-age goal. This module has been designed to give anybody an opportunity to comprehend the meaning of sustainability, to analyse the sustainability aspect of a process or product and to realise the opportunities to improving existing or new processes or products.

**6. Learning Objectives/Skills Development**

**On successful completion of this module students should be able to:**

1. Sustainability and its metrics.
2. Critical sustainability analysis and evaluation of manufacturing processes.
3. Critical sustainability analysis and evaluation of manufactured products.
4. Life cycle assessment of processes
5. Life cycle assessment of products
6. Sustainability of sustainable energies

**7. Content/Knowledge Base.**

1. Metrics and systems of performances
2. Sustainability indicators
3. Sustainability Assessment techniques and tools
4. Modelling critical parameters of manufacturing processes
5. Sustainability audits
6. Rational issues of sustainability; reliability of sources, data and indicators.

**8. Learning Strategies/ Activities**

	<b>Hours</b>	<b>Comments</b>
Lectures	30	
Practical/Laboratories	20	
Tutorials/Seminars	10	

Student managed learning	40
<b>Total hours</b>	<b>100</b>

<b>9. Assessment</b>	<b>Weight %</b>	<b>Comments</b>	<b>Outcomes Tested</b>
Assignment 1	40	<i>In class with any ref. Available</i>	<i>3 to 5 objectives in no.4 and 5</i>
Assignment 2	40	<i>Assigned to each student</i>	<i>1 or 2 objectives in no.4</i>
Lab work	20	<i>Lab experiments</i>	<i>Sustainability assessment of a manufacturing process</i>

### **10. References.**

1. IEEE Environmental, *Health and Safety Committee. White Paper on Sustainable Development and Industrial Ecology.* Washington DC: IEEE; 1994. BRE 1995
2. F. Jovane, E. Westkamper, D. Williams, *The Manufuture road*, Springer, 2009
3. Tukker, ed. , *Handbook on Life Cycle Assessment*, Kluwer Academic Publishing, 2004
4. I.S. Jawahir ; O.W. Dillon, Jr. ; *Sustainable Manufacturing Processes: New Challenges For Developing Predictive Models and Optimization Techniques*; First International Conference on Sustainable Manufacturing , Canada, 2007
5. Hazel Ann Nash; *The European Commission’s sustainable consumption and production and sustainable industrial policy action plan*; *Journal of Cleaner Production*; 2009
6. CLIMATE VISION 2007 – Progress report ; Feb. 2008; [http://www.climatevision.gov/pdfs/CV\\_TrackingReport\\_2002-2006.pdf](http://www.climatevision.gov/pdfs/CV_TrackingReport_2002-2006.pdf).

### **11. Learning Resources/Support.**

1. Course material: text books and reference books as in no. 10. Case studies and project reports in various applications.
2. Journals such as: *Renewable and Sustainable Energy*, *Journal of Cleaner Production*, *Environmental Management*, *Environmental Development and Sustainability*.
3. Proceedings of Conferences e.g. SEEP’s; etc. Seminars, Symposia and Workshops.
4. A variety of LCA software.
5. Models of Manufacturing products using semi-formal modelling techniques.

### **12. Thesis Projects, Case studies, Publications, Reviews and other issues related to the module**

1. DASSISTI M., 2009, “Eco-Approaches For Manufacturing: Old Concepts For A New Era Of Sustainable Technologies?”, *Proceedings of the 3rd International Conference on Sustainable Energy & Environmental Protection*, GLASNEVIN Pub. – Vol.1, Dublin, ISBN 978-0-9555781-2-0, pp.157-161
2. Outcomes of the SEEP2010 conference <http://seep2010.poliba.it>