JEE 671 Life Cycle Assessment 3 (3-0)

Course title : JEE 671 – Life Cycle Assessment

Division : Environnent

Lecturer: Prof. Dr. Shabbir H. Gheewala

Prerequisite : None

Course Description

The objective of this course is to introduce the students to the concept of life cycle thinking. The systems approach to dealing with environmental pollution problems is highlighted and Life Cycle Assessment (LCA) is introduced as an assessment tool. The course details are as follows. LCA: Introduction; methodology – goal, scope, inventory analysis, impact assessment; software; improvement analysis, such as identification of environmental "hotspots". Application of LCA to waste management and energy conversion systems. Product stewardship and design for environment. The course is structured to have more emphasis on actual case studies, class assignments and particularly important is a term project where the students are required to select a topic in the first few weeks of the beginning of the course and should follow the LCA methodology as it is discussed in the lectures. They are also given guidance on the term project all through the course so that they can learn the concepts discussed in the class by practical application to their individual topics.

	Subject Outline	**Hours**
1.	Overview of LCA	3
2.	Goal and scope definition	3
3.	Scope definition (contd.)	3
4.	Allocation in LCA	3
5.	Allocation (contd.)	3
6.	Step-by-step exercise on LCA	3
7.	Impact assessment – midpoint methods	3
8.	Impact assessment – endpoint methods	3
9.	Impact assessment – resource depletion	3
10.	Application of LCA in strategic environmental assessment	3
11.	Application of LCA in waste management	3
12.	Application of LCA in assessing energy systems	3
13.	Carbon footprint	3
14.	Water footprint	3
15.	Special lecture	3
	Total	**45**

Textbooks

1. Environmental Life Cycle Assessment: Measuring the Environmental Performance of Products (Editors: Rita Schenck and Philip White, American Center for Life Cycle Assessment. ISBN: 978-0-9882145-3-8)
2. Life Cycle Assessment - A Guide to Best Practice, Walter Kloepffer and Birgit Grahl, Wiley (ISBN: 9783527329861)
3. Wenzel, H., Hauschild, M. and Alting, L. (1997) Environmental Assessment of Products. Chapman & Hall, London. ISBN 0-412-80800-5
4. Baumann, H., and Tillman, A. (2004) The Hitch Hiker's guide to LCA : an orientation in life cycle assessment methodology and application. Studentlitteratur AB, Lund. ISBN 9144023642
5. Bellandi, R. (2004) Strategic environmental management for engineers. John Wiley & Sons, Hoboken, NJ. ISBN 0471092215
6. Sonnemann, G., Castells, F., Schuhmacher, M. (2004) Integrated life-cycle and risk assessment for industrial processes. Lewis Publishers, Boca Raton. ISBN 1566706440

Journals

1. Journal of Cleaner Production
2. International Journal of Life Cycle Assessment
3. Journal of Industrial Ecology

Grading system (tentative)

Mid-term exam: 30%
Final exam: 40%
Term project: 30%