

## **TID8104: Lifecycle Analysis and Sustainability**

### **Short description**

This is the investigation and valuation of the environmental impacts of a given product or service caused or necessitated by its existence or the total cost of ownership over the life of an asset, also commonly referred to as "cradle to grave" or "womb to tomb"

### **Course objectives:**

This course offers understanding in life cycle analysis for cradle to grave of products, and how sustainable this tool can be.

### **Learning outcomes:**

By the end of this course the student should be able;

- i) Analyze the sustainability of product and service developments.
- ii) To apply life cycle analysis tool to any product and service.
- iii) To make an impact analysis of the products lifecycle of products to the environment.
- iv) To cost the product or services at every process, and be able to make decisions using lifecycle tools and management strategies.

### **Methods of course delivery:**

The teaching of students will be conducted through lectures, tutorials, short classroom exercises, case studies, group discussions among the students and projects aimed at solving real life problems. The lecture material will be availed to the students in advance to enable them have prior reading. Solving real life problems in each theme or a number of topics will enhance the students' understanding of the problem based learning techniques

### **Method of assessment**

Assessment will be done through coursework which will include assignments, class room and take home tests, project work and presentations and a written examination. Course work will carry a total of 40% and written examination carries 60%. Coursework marks will be divided into; Assignments 5%, Tests 10% and Practical Work 25%.

### **Course content**

The content of this course covers the topics of sustainability in product and service development (6 hours), eco-efficiency, resource efficiency, life-cycle processes and modeling, input-output analysis (9 hours), life-cycle environmental assessment (6 hours), value chains, life-cycle costs, activity-based costing, risks and uncertainties (9 hours), decision making tools, and product life-cycle management strategies and cases (9 hours). Seminars (6 hours)

### **Basic reading list/references**

1. [Wolter J. Fabrycky](#), Benjamin S. Blachard; (2005) *Life-Cycle Cost and Economic Analysis*. Prentice Hall International Series in Industrial and Systems Engineering)
2. Takata, Shozo; Umeda, Yasushi (Eds.). 2007. *Advances in Life Cycle Engineering for Sustainable Manufacturing Businesses*. Springer.
3. Brissaud, Daniel; Tichkiewitch, Serge; Zwolinski, Peggy (Eds.). 2006. *Innovation in Life Cycle Engineering and Sustainable Development*. Springer