

Semester	5		
Course Code:	ENCM 31752		
Course Name:	Green Technology and Eco-design		
Credit Value:	2		
Status	Compulsory for BSc in ENCM degree Optional for BSc Honours in ENCM degree		
Pre-requisites	ENCM 12752		
Co-requisites	None		
Hourly Breakdown	Theory	Practical	Independent Learning
	25	15	60
Intended Learning Outcomes:			
After completion of this course unit, the student will be able to;			
<ol style="list-style-type: none"> 1. estimate Carbon footprint of an institution and propose a Carbon off-set strategic plan, 2. develop a Cleaner Production project and Cleaner Production program plan to measure progress, 3. demonstrate ability to collect, record, process and interpret data relevant to LCA using different qualitative and quantitative techniques. 4. explain greener approaches in industrial settings, 5. discuss the application of green technologies at local and global context, and 6. collaborate effectively with peers in a team accommodating diverse sets of ideas, values, beliefs, and views to develop a new product concept applying global standards and strategies. 			
Course Content:			
<p>Evolution of green technologies as a proactive response to environmental pollution. C footprint: C emission scopes, activity data, data proxy, conversion factors, C estimates, C trading mechanisms exit in the world market, C offsetting. Cleaner Production (CP) Project Development and Implementation: Overview of CP Assessment Steps and Skills, Process Flow Diagram, Material and Energy Balance, CP Option Generation, Technical and Environmental Feasibility analysis, economic valuation of alternatives, Total Cost Analysis, CP Financing. Preparing a Program Plan – Measuring Progress. Green supply chain management and green logistics, Environmental performance of supply chains. Eco design / D4S concept, product life cycle and life cycle thinking, LCA methods and standards, The LCA framework: Goal and scope definition, inventory analysis, impact assessment, and interpretation; Environmental indicators, data and tools, interpreting results, Life Cycle Costing – Eco Labelling. Eco design principles (pre-fabrication, fabrication, distribution, use and end of life). Eco design standards (ISO 14006, IEC 62430), New product concept, Creative thinking, Eco-friendly product design. Sustainable development through green building concept. Green Industrial Processes: Industrial symbiosis, greener approaches in certain industrial processes: dyeing, ecofriendly pesticides, and Chemical leasing. Green technologies in Sri Lankan context. Public policies and market-driven initiatives: local and global.</p>			

Teaching /Learning Methods:

A combination of lectures, field sessions, computer- based learning, self-studies, field- based assignments, Supplementary Lecture Support Materials and reference materials, product design concepts and case studies and small group discussions.

Assessment Strategy:

Continuous assessment and end of semester examination. Percentage given for each subcomponent indicates the percent contribution to the final marks.

Continuous Assessment 20%		Final Assessment 80%		
Details:		Theory	Practical	Other
Quizzes/ Assignments	10%	80%	-	-
New product design concept	10%			

Recommended Readings:

1. Singh R. and Kumar S., (2017), Green technologies and environmental sustainability, Springer,
2. Jayasinghe G.Y, Maheepala S.S, Wijekoon P.C, (2020) Green Productivity and Cleaner Production, 1st edition CRC Press.
3. Carlo Arnaldo Vezzoli , Ezio Manzini, (2008). Design for Environmental Sustainability, Springer.
4. Subramanian, S. M. (2015), Handbook of Life Cycle Assessment (LCA) of Textiles and Clothing, 1st Edition, Woodhead Publishing.
5. Walter, K. & Birgit, G. (2014). Life Cycle Assessment (LCA): A Guide to Best Practice. Wiley-VCH Verlag GmbH & Co. KGaA.