

A. General Information

1. Academic Unit	SCHOOL OF ENGINEERING – SCHOOL OF BUSINESS					
2. Degree	ENGINEERING – BUSINESS					
3. Code	RIC166					
4. Number of classes per week	2					
5. Location in Curriculum	5th year					
6. Credits	10					
7. Classes by Professor	Theory	2	Practice			0
8. Classes by Teaching Assistant	None					
9. Course Type	Mandatory		Elective	X	Optional	
10. Prerequisite	None					

B. Contribution to the Graduate's Profile

Sustainability, innovation and climate change are 3 mayor trends today. However, this begs the question: Where should we innovate to construct a better world? This, among others, is one of the topics this course will cover. Recycling & Upcycling (RUP) is a course that study different topics and challenges related to recycling (plastics, metals, clothing, glass and other materials recycling). For this, several cases of innovation in RUP are studied in different industries. It is important to have a frame of reference regarding what the current state and strengths of recycling are, as well as which areas we should consider in order to add value, innovation and further development regarding our social and environmental Impacts.

At the end of the course, students are expected to know a wide array of Recycling and sustainability principles and its current state, allowing a better idea as to which areas need further contribution and innovation. This course is designed to encourage, give tools and challenge students to change the world through Recycling and Upcycling

C. General Learning Objective of the Course

- **Learning Objective:** To Study and learn a wide array of Recycling principles and the current state of the art in some areas, allowing a better idea as to which areas need further contribution and eco-effective innovation. At the end students will be able to analyze and propose improvements to certain challenges in sustainability and recycling.

D. Units Content and Learning Objectives

Content of Units/Units	Learning Objective
Unit I: Introduction to Sustainability	Learn an array of sustainability principles and see and observe the implications of this concept in the world we live in.
Unit II: Nutrients in recycling	Incorporate this concept as a usual term and apply it to real challenges in sustainability
Unit III: Recycling materials	1. Plastics , 2. Metals, 3. Organic Nutrients, 4.Textiles, 5.Hybrids (cars, mixtures, etc)
Unit IV: Upcycling, Innovation in Recycling	Present techniques to develop innovations in Recycling.
Unit V: Eco-Design (circular economy)	Study the current advances in this area and try to apply it to our current life behavior (as student, citizens or professionals)
Unit VI: Leadership in Sustainability and Recycling	Study the efforts of world leaders (B. Obama, Pope Francis, William McDonough, COP 21, etc.)

E. Teaching Strategies

The teaching method will encourage participation in class. Before some classes students will study one publication-investigation given by the teacher, and will expose about that publication to the class (oral presentations). Students that assist and participate in the class will gain points, that can increase the marks of the evaluations.

Students will analyze challenges of the industry, where the conceptual knowledge acquired can be applied and innovation is needed.

The course is structured around different methodologies that include:

1. Lectures, supported by software such as PowerPoint, videos, practical activities and debates.
2. Guest speakers
3. Investigation project (Group work among students)
4. Field trip (to a recycling plant)
5. Small day-to-day questions or challenges in recycling

F. Evaluation

20 % Cumulative tests (midterms), each with a weight of 10% of the course grade

20 % Participation in classes (in every class points will be given)

30% Investigation project

30 % Final exam

Attendance Requirement: *Students must attend 75% of the classes and the field trip is mandatory.*

MANDATORY READING:

- 1.-Cradle to Cradle: Remaking the Way We Make Things; McDonough & Braungart; North Point, Press, USA, 2002.
- 2.- Encyclical Letter Laudato si'; Pope Francis; Vatican, 2015
- 3.- Lubin, David (2010). The Sustainability Imperative

SUPPLEMENTAL READING:

- 1.- Peter Senge (2008). The Necessary Revolution: How Individuals and Organizations Are Working Together to Create a Sustainable World, Peter M. Senge, Bryan Smith, Nina Kruschwitz, Joe Laur.
- 2.-Allen (2015), The Water-Wise Home: How to Conserve, Capture, and Reuse Water in Your Home and Landscape
- 3.-Ries, Eric (2011). The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses.
- 4.-Jon Kolko (2011). Thoughts on Interaction Design.
- 5.-Osterwalder (2013). Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers.
- 6.- T Brown, J Wyatt (2015) Design thinking for social innovation - Annual Review of Policy Design