ESM 271 Carbon Footprints and Carbon Accounting

Instructor: Sangwon Suh
Bren hall 3422, suh@bren.ucsb.edu

Course hours: Wed and Fri 12:45pm – 2:00pm
Sept. 29 – Oct. 29

Course location: Bren 1424 (except for Oct. 1 and Oct. 15, which will be Bren 1414)

Final exam: Oct. 29 (during the course hours)

Assessment:
- Homework (1 for each week @10%): 40%
- Personal carbon account (report): 30%
- Final exam: 30%

Course schedule

Week 1:
- Introduction to carbon footprint and carbon account
  - Background: carbon awareness, major drivers; Major sources of GHG emissions: GHG inventory of the U.S. v.s. the article, “Are services good for climate change?”

- Introduction to national and international specifications and standards
  - PAS 2050, ISO 14067, GHG protocols.

- Introduction to the personal carbon account project

Homework (due next Wed): find out a report or a web site about carbon footprint results of a product or of a company. Write a two page report on the report or the web site including the followings: (1) general description of the product/company and the project, main motivations and objectives; (2) which standard is used, if any?; (3) main results?; (4) any personal reflections?

Week 2:
- Goal and scope definition
  - Scope I, II and III distinction; drawing system boundary; cut-off criteria and materiality threshold; temporal and geographical system boundary; boundary between the nature and the economy

- Calculation of carbon footprint
  - Process flow diagram approach

Homework (due next Wed): draw a process-flow diagram of croissant using the “worked example” of the PAS2050 (Guide to PAS 2050, pp. 47-54), and accompany a excel spreadsheet that follows the calculation.
Week 3:
Calculation of carbon footprint (continued)
- Effect of land use change
- Allocation
- Introduction to generalized carbon accounting framework

**Homework** (due next Wed): Establish a draft personal carbon account of yourself for the month of Sept 2010 following the generalized framework taught in the class. All material, energy and service inputs as well as general overhead spending and direct emissions should be noted. Using materials provided, emission factors and embodied GHG emissions in products are applied to calculate draft carbon footprint. Delivered in an excel spreadsheet.

Week 4:
Interpretation of the carbon footprint results
- Identification of hotspots
- Envisaging the effect of changes
- Identification of effective strategies to reduce carbon footprint
- Sensitivity analysis
- Uncertainties

**Homework** (due next Wed): Revise the draft personal carbon account using the comments received, and identify hotspots, envisage effect of changes, perform sensitivity analysis, report uncertainties and describe what would be the effective strategies to reduce carbon footprint of yourself (revised excel spreadsheet where a new tab is added for each of the items mentioned above, plus 2-3 page report on main findings).

Week 5:
Reporting and communication of carbon footprint results
- International standards on reporting and communication

**Final exam:** Oct. 29 12:45pm – 2:00pm.

**Final exam instruction**
The exam will be about basic knowledge on the concept and the terms of carbon footprint, carbon accounting and associated standards. Short answers and multiple choices will be used.

**Personal carbon footprint report instruction**
Follow one of the international standards for reporting LCAs or carbon footprint results. Use CEDA 3.0 Academic as the main database (provided for this course). The report should be no more than 10 pages (11 pt font size with multiple line spacing of 1.15). **The report is due by Nov 5** (submitted via e-mail). Evaluation criteria: (1) conformity to the standard; (2) clarity of the presentation; (3) use of the materials and techniques covered during the class; (4) validity of the procedure and the results.