

## 1. Course Details

MESS04. Sustainability Science

Level: Advanced (second cycle); 7.5 Higher education credits.

Syllabus approved by the Vice Chancellor of Lund University 2008-05-08 and effective from 2007-07-01.

## 2. General Information

The major is *Environmental Studies and Sustainability Science*. The course constitutes the 4<sup>th</sup> course at LUMES, Lund University International Master's Programme in Environmental Studies and Sustainability Science (level: 1 – 30 Higher education credits in Environmental Studies and Sustainability Science).

The course is compulsory for all the LUMES students. The course is conducted entirely in English.

## 3. Learning outcomes

### *Knowledge and Understanding*

On completion of the course the student shall

- have a deeper understanding of the concepts of sustainable development, sustainability, and what may constitute sound and sustainable management of natural, societal and human resources
- have knowledge and understanding of how various sustainability indicators are identified, constructed and used to assess sustainability in various systems at various levels
- understand sustainability issues from an analytical and open-ended perspective, including trade-offs and constraints of sustainability, as a way of supporting decisions and policy evaluations.

### *Skills and Abilities*

On completion of the course the student shall

- be able to discuss issues and values associated with different pillars of sustainability as well as the interactions between them, at the local, national, regional and international level
- be able to perform a systemic sustainability analysis, including identifying trade-offs and constraints.

### *Judgement and Approach*

On completion of the course the student shall

- be able to critically assess the concepts of sustainable development and sustainability in relation to society, science and value systems.

#### **4. Course Content**

Challenges of Sustainable Development; Concepts of Sustainable Development and Sustainability; Sustainable Futures; Pillars of Sustainability: Different approaches to Economic, Social, Cultural, Institutional, and Ecological Sustainability; Sustainability Indicators and Indicator Frameworks; Decision Support Tools; Rational Choice and Decision Making; Sustainability Analysis; System Analysis; Integrated Sustainability Assessment.

#### **5. Teaching and Assessment**

The course is comprised of lectures, seminars, group discussions, students' presentations, and individual assignments/papers. An overall attendance rate of 80 % in scheduled sessions is required, and attendance is mandatory in the group discussions, students' presentations, and seminars, and active participation is required in those sessions.

Assessment is carried out by means of evaluation of individual assignment/s.

For a passing grade the student must (a) have pass marks on all the assignments; (b) have participated in the mandatory sessions; (c) have an adequate overall attendance rate.

#### **6. Grades**

The grades are fail, pass, and high pass. Students will be given the opportunity of requesting a supplementary ECTS grading at the start of the course. Students not successfully fulfilling all the course requirements within the regular time frame have the option of reaching agreement with the course director or director of studies on how to complete the course requirements in a timely manner.

#### **7. Course Admission Requirements**

Admittance to the course requires previous enrolment and participation in the courses MES 121 or MESA01, MES 122 or MESS02 in addition to MES 123 or MESS03, and the successful acquisition of at least 7.5 Higher education credits from these courses.

#### **8. Literature**

For reading lists and other relevant educational materials see the appendix 1.

#### **9. Further Information**

The course replaces MES 124.

The Reading List has been approved by the Vice Chancellor of Lund University 2008-05-08 and is effective from 2007-07-01.

### **Reading List – Sustainability Science (MESS04)**

Bell, S. and Morse, S. (2003). *Measuring sustainability. Learning from doing.* Earthscan Publications.

#### **Introduction**

Clark & Dickson (2003) Sustainability science: the emerging research program. PNAS. 100 14.

Kates, et.al (2001) Sustainability Science. Science Magazine. 292, 641.

Kates, et al. (2005) What is Sustainable Development? Goals, Indicators, Values and Practice. Environment. 47, 3.

#### *Reference literature:*

Stockholm Declaration 1972

WCED (1987): *Our Common Future*, World Commission on Environment and Development.

#### **Indicators**

##### *Reference literature*

#### **EEA Report: Core Set of Indicators**

#### **Sustainable Development in Switzerland – Indicators and Comments**

+ other weblinks (see LUVIT)

#### **Sustainable Production - Industrial Ecology**

Erkman, S. & R. Rameshwamy (2003): *Applied Industrial Ecology. A New Platform for Planning Sustainable Societies.* (<http://www.roi-online.org/bookchapters.asp?bid=1>)

Jakobsen, N.B. (2006): Industrial Symbiosis in Kalundborg, Denmark: A Quantitative Assessment of Economic and Environmental Aspects. *Journal of Industrial Ecology* 10:1-2:239-255

#### **Sustainable Consumption**

Annika Carlsson-Kanyama, Rebecka Engström, Rixt Kok Indirect and Direct Energy Requirements of City Households in Sweden: Options for Reduction, Lessons from Modeling, *Journal of Industrial Ecology*, Jan 2005, Vol. 9, No. 1-2, Pages 221-235  
(<http://www.mitpressjournals.org/toc/jiec/9/1-2;jsessionid=i0-JNMcbVjY9Tyt-0P>)

Durk S. Nijdam, Harry C. Wilting, Mark J. Goedkoop, Jacob Madsen: Environmental Load from Dutch Private Consumption: How Much Damage Takes Place Abroad? *Journal of Industrial Ecology*, Jan 2005, Vol. 9, No. 1-2, Pages 147-168

(<http://www.mitpressjournals.org/toc/jiec/9/1-2;jsessionid=i0-JNMcbVjY9Tyt-0P>)

Hertwich, E.G. Consumption and Industrial Ecology, *Journal of Industrial Ecology*, Jan 2005, Vol. 9, No. 1-2, Pages 1-6. (<http://www.mitpressjournals.org/toc/jiec/9/1-2;jsessionid=i0-JNMcbVjY9Tyt-0P>)

Jesper Munksgaard, Mette Wier, Manfred Lenzen, Christopher Dey: Using Input-Output Analysis to Measure the Environmental Pressure of Consumption at Different Spatial Levels, *Journal of Industrial Ecology*, Jan 2005, Vol. 9, No. 1-2, Pages 169-185 (<http://www.mitpressjournals.org/toc/jiec/9/1-2;jsessionid=i0-JNMcbVjY9Tyt-0P>)

Lebel, L. Transitions to Sustainability in Production-Consumption Systems, *Journal of Industrial Ecology*, Jan 2005, Vol. 9, No. 1-2, Pages 11-13

(<http://www.mitpressjournals.org/toc/jiec/9/1-2;jsessionid=i0-JNMcbVjY9Tyt-0P>)

Shanahan, H. & A. Carlsson-Kanyama (2005): Interdependence between consumption in the North and sustainable communities in the South *International Journal of Consumer Studies* 2,4:298-307 (<http://www.blackwell-synergy.com/doi/pdf/10.1111/j.1470-6431.2005.00439.x#article>)