SDEV W2300 CHALLENGES OF SUSTAINABLE DEVELOPMENT

Spring 2016

Module I: Economic Tools for Sustainable Development

**Instructor:** Jason C. Wong  
**Email:** Jason.Wong@columbia.edu  
**Office Hours:** M 10am-4pm, by appointment  
**Office:** Interchurch 401

Module II: Human Population and Sustainable Development

**Instructor:** Prof. Joel E. Cohen  
**Email:** cohen@mail.rockefeller.edu  
**Office Hours:** MW 10-11am, by appointment  
**Office:** Hogan B17

Module III: Problems and Solutions in Sustainable Development

**Instructor:** Dr. Kathryn Vasilaky  
**Email:** katyav@iri.columbia.edu  
**Office Hours:** MW 10-11am, by appointment  
**Office:** Hogan B19

Course Meeting Time and Location: MW 8:40-9:55 am, Location: 209 Havemeyer

Course Description:
This course provides an introduction to the interdisciplinary field of sustainable development, drawing on the recent developments in social and natural sciences. The course describes the interactions among the demography of the human population (population size, spatial distribution, age structure, fertility, mortality, migration), the environment (physical, chemical, and biological), economics (measures of wealth, well-being, sustainability, and their distribution within and among countries; trade; energy use), and culture (education, law, religion, language, politics, technologies, and human values), and stresses the ways in which each affects the others and vice versa. Ecological constraints (climate, disease ecology, physical resources such as soils and energy sources, topography and transport conditions) significantly shape economic development, demography, wealth and poverty. Human activities (farming, resource use, demographic change, and energy production and consumption) change the environment. The course offers an introductory, broad survey of the field and aims to provide students with some of the fundamental concepts, vocabulary, and analytical tools that will enable them to pursue further understanding of the conjoined problems of population, economics, environment, and culture, all of which are fundamental to an understanding of the challenges of sustainable development.

Course Webpage:
All students should have access to the Columbia Courseworks site at http://www.courseworks.columbia.edu/
Learning Outcomes: By the end of this course, students should:

- Be able to analyze an array of sustainable development issues using economic tools
- Be able to illustrate and analyze the complex interactions among the human population, the environment, cultures, and the economy
- Be well-versed in the global patterns of development and the solutions to the obstacles of sustainable development

Required Reading: There is one required textbook for this course. All other readings will be provided to you via Courseworks.


Recitation Leaders: Your Recitation Leaders will serve as your mentors for the course. They each run two recitations. You are required to attend one recitation each week.

Steffen Merte

- Email: sm3624@columbia.edu
- Office Hours and Location: MW afternoon, by appointment. Lehman Library

Carolyn Hayek

- Email: ch3062@columbia.edu
- Office Hours and Location: W afternoon, by appointment. Lehman Library

Recitations Sections: All students must be registered to one of the four recitation sections:

<table>
<thead>
<tr>
<th>Section</th>
<th>Recitation Leader</th>
<th>Day/Time</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Steffen</td>
<td>W 3-4 pm</td>
<td>424 Pupin</td>
</tr>
<tr>
<td>2</td>
<td>Steffen</td>
<td>W 4-5 pm</td>
<td>424 Pupin</td>
</tr>
<tr>
<td>3</td>
<td>Carolyn</td>
<td>R 1:30-2:30 pm</td>
<td>467 Schermerhorn</td>
</tr>
<tr>
<td>4</td>
<td>Carolyn</td>
<td>R 2:30-3:30 pm</td>
<td>467 Schermerhorn</td>
</tr>
</tbody>
</table>

Registration is available on Courseworks. Each Section has a maximum capacity of 25.
Course Assistants and Academic Workshops: Your Course Assistants will be in charge of grading all the Assignments and most of the examinations of the course. They will also run workshops on use of spreadsheet programs and basic research and academic skills. You are encouraged to attend them. You will find a Workshop Schedule at the end of the Syllabus. The schedule will be updated periodically and you are requested to look up the latest schedule on Courseworks and in the Syllabus. The date and time for the workshops will be listed and updated there.

Sophia Davis Email: sgd2122@columbia.edu
Varlee Sannor Email: vas2127@columbia.edu

Grading Policy: You will be evaluated based on the following three course components. No extra credit will be provided.

1. 15%: 9 Assignments (lowest one will be dropped)
2. 60% 3 Module Exams (Highest score: 25%; 2nd Highest: 20%; Lowest: 15%)
3. 25% Learning Portfolio and Participation (in Lecture and in Recitation)

![Grading Pie Chart]

Figure 1: How you will be evaluated

Important Dates:

- Module 1 Exam ................. M February 22nd, 2016
- Module 2 Exam ................. W March 30th, 2016
- Module 3 Exam ................. W May 11th, 2016
- Portfolio Components ................. Varies
- Final Portfolio ..................... M May 2nd, 2016
Course Policies:

- You may appeal your grade to a graded component of the course up to one week after it has been returned to you. You must submit, in writing, a detailed explanation why you should have been awarded credit for your answers, along with your original work. The Instructors reserve the right to review the entire graded component and the outcome of your appeal could be either no change, grade increase, or grade decrease.

- You are strongly encouraged to take notes with pen and pencils. Use of electronic devices is permitted as long as the Internet functionality is turned off during class time. Some interactive components of the course may require laptop or Internet-enabled devices; the Instructors will inform you when you may use such devices.

- In general, no make-up exams will be held and no extensions will be provided. If you have religious observances during the scheduled grading events of this course, please let the Instructors know during the first week of class. In case of a medical or personal emergency you are asked to alert the Instructor as soon as conveniently possible and provide proof. Exceptions are provided on a case-by-case basis.

Policy on Late Work:

- The deadlines listed in the Syllabus for all coursework are hard deadlines. No late work will be accepted. However, the lowest of the 9 Assignments will be dropped. Portfolio Components are not dropped and must be turned in on time; late work will result in a 0.

Assignments (15%): There are 3 Assignments in each Module, a total of 9 Assignments for the course. The lowest Assignment grade will be dropped. Assignments consist of various problems such as quantitative reasoning, data manipulation and display, as well as short-answer questions to test conceptual understanding. Some basic research skills will be developed through them as well.

Module Exams (60%): There are 3 Module Exams for the course. Each Exam will feature question types such as short IDs, short answer questions, graphical interpretation, quantitative reasoning, as well as short essays. With the exception of the essay component of the exams, the Module Exams are non-cumulative.

Individual Learning Portfolio (25%, 5% each): The goal of the individual learning portfolio is to help guide you through the course material and develop some basic research and writing skills. You are asked to maintain the portfolio throughout the term and the Portfolio may be requested at various times to ensure progress. The Portfolio consists of 5 components (primarily a series of 1-5 page documents). Separate instructions will be provided. The portfolio components are described as follows:

- 3 Module Reflections - you are to provide a thoughtful and critical 1-2 page reflections to certain themes or articles in each Module. You are required to submit one reflection in each Module. Your recitation leaders will provide prompts each week.

- Issue of Sustainable Development - you are to develop basic literature review on an issue of sustainable development that interests you, in consultation with your recitation leaders.

- Data Visualization - you are to identify potential sources, collect some data, and visualize how you could answer your question.
• Final Report - you are to summarize and reflect upon what you have learned through this mini-research project, and how you plan to learn more about the subject in the future.

• Participation in lecture activities and recitations - (See below)

Participation in Lecture and Recitations:

• How would participation in lecture be evaluated? Regular attendance is essential and expected. Active learning is a vital component for this course. In all Modules, you will be asked to participate in lecture activities. These will appear in two main forms. First, you will be asked to participate in Polls. **We will make use of PollEverywhere this semester and you will be able to register with your university email, so that we can keep track of your participation in lecture.** Second, you will be asked to write 1-5 minute papers in lecture. Prompts will be provided and these papers aim to help you reflect on what you have learned in that lecture or in the readings due that day. You are also invited to give your personal reaction. For example, was there sufficient evidence? What ideas do the material contradict? How can we implement them in practice?

• Recitations in this course will complement the content of the course and provide a platform for interactive learning and critical thinking. Your attendance is recorded for recitations. You have one unexcused absence for recitations. Recitation Leaders serve as your mentors for your learning portfolios and guide you through the mini-project.

• Assessment of participation is formative. You will be graded on a check-basis, so don’t worry if you don’t have enough time to produce very polished responses. We want to know you are actively thinking and developing.

Academic Integrity: Please familiarize yourselves with the Academic Integrity Policy at Columbia.

As members of an academic community, each one of us bears the responsibility to participate in scholarly discourse and research in a manner characterized by intellectual honesty and scholarly integrity.

Scholarship, by its very nature, is an iterative process, with ideas and insights building one upon the other. Collaborative scholarship requires the study of other scholars’ work, the free discussion of such work, and the explicit acknowledgement of those ideas in any work that inform our own. This exchange of ideas relies upon a mutual trust that sources, opinions, facts, and insights will be properly noted and carefully credited.

In practical terms, this means that, as students, you must be responsible for the full citations of others’ ideas in all of your research papers and projects; you must be scrupulously honest when taking your examinations; you must always submit your own work and not that of another student, scholar, or internet agent.

Any breach of this intellectual responsibility is a breach of faith with the rest of our academic community. It undermines our shared intellectual culture, and it cannot be tolerated. Should we detect any student misconduct, we will report the incidents swiftly to the Directors of Undergraduate Studies, in accordance to Columbia Procedures. Infractions may result in grade reductions, written warnings, disciplinary probation, suspension, or dismissal.

Accommodations: If you are a student with a disability and have an DS-certified Accommodation Letter please come to office hours to confirm your accommodation needs. If you believe that you might have a disability that requires accommodation, you should contact Disability Services at 212-64-2388 and disability@columbia.edu.
Course Outline: A detailed outline with reading assignments due are posted on Coursework’s Syllabus Tab. Please refer to Courseworks for the latest outline and reading assignments, as they are subject to change.

Module 1: Economic Tools
1. The Journey Toward Sustainable Development; Pessimists, Optimists, Realists?
2. Basic Tools of Microeconomics; Market Failure and Externalities
3. Public Goods, Property Rights, and the Tragedy of the Commons
4. Trade, Growth, and the Environment
5. Poverty Trap and Inequality: An Introduction
6. Climate Change
7. Addressing Externalities; Green and Competitive?
8. Weak and Strong Sustainability; The Sustainable Development Goals
9. GDP and Measurements of Well-Being; Economics of Happiness

Module 2: Human Populations
1. Introduction
   (a) Population, economics, environment, and culture: 4 facets of sustainable development
   (b) Is there a population problem? Are there population problems?
2. History of human populations
   (a) Human origins
   (b) Demographic transitions
   (c) How many people have ever lived?
   (d) Major global migrations
3. Human populations today: a heterogeneous world
   (a) Demography of the rich, the poor, and the middle class
   (b) What kills people
   (c) Contraception: technology, culture, ethics; unintended pregnancy
   (d) National family planning programs, reproductive rights
   (e) Migrants and refugees
4. Future of human populations
   (a) Global models, cohort-component models
   (b) Population projection: assumptions, techniques, time horizons, limitations
   (c) Bigger, more slowly growing, more urban, older
5. Human carrying capacity
   (a) Diverse approaches, assumptions, and conclusions; "footprint" models
   (b) Problems with concepts of human carrying capacity
   (c) Dynamic models

6. Population, food, and water
   (a) Was Malthus right?
   (b) Hunger amid plenty
   (c) Domestic animal populations
   (d) Global trade in food and water

7. Population, energy and climate
   (a) Demography of energy consumption
   (b) How people affect climate
   (c) How climate affects people

8. Population and human quality
   (a) Education
   (b) Health
   (c) Equity
   (d) Sustainability, nations, and globalization: can we have them all?

Module 3: Problems and Solutions

1. The Development Debate
   (a) Aid and the Threshold Effect (Sachs, Easterly)
   (b) Reversing the Divergence (Collier)
   (c) Randomized Controlled Trials (RCTs) and the Graduation Approach (Karlan, Duflo, Banerjee)

2. Institutions, Agriculture, Inequality: Age of Agriculture and Property Rights
   (a) Food Production and Inequality (Diamond)
   (b) Industrial Evolution and Inequality (Deaton)

3. Primer on Evaluations
   (a) Impact Evaluations, Randomized Control Trials
   (b) Explaining an Average Treatment Effect

4. RCT Examples
   (a) “Worm Wars,” Progressa, MATLAB, The Orange Sweet Potato (IFPRI), Clinical Trials on Vitamin A, Bednets
5. Rural vs Urban Development and Social Networks

(a) The Agricultural Household Model.
(b) What is the role of social networks and social learning in adopting beneficial agricultural technologies?
(c) What is the role of social networks in urban slums?

6. Gender Divide and Technology (Information Communication Technologies)

(a) Can Technology expedite development?
(b) Is there a gender gap in development?
(c) Can technology exacerbate or close that gap?

7. Lending and Giving Money

(a) Does Microfinance work?
(b) Should cash be distributed with conditions (BOLSA) or unconditionally (Give Directly)?
(c) Why is takeup of micro-insurance low? Or is it?

8. The Millenium Villages Project

(a) The goal of the MVPs
(b) Evaluating the MVPs

9. Nudges, Perceptions and Change at the Individual Level

(a) How much does itself affect individual cognition?
(b) Can government nudges affect individuals behavior in our conservation of resources? (Opower, White House Social and Behavioral Sciences Team)
Assignment and Portfolio Schedule:
You are responsible for adhering to the Assignment deadlines. Late assignments are not accepted.

Module Assignments Due Dates
Module Assignments are due by lecture time (8:40am) on Mondays, to be submitted on Courseworks.


Portfolio Component Due Dates
Portfolio Components are due by recitation time (except when noted otherwise), to be submitted in hardcopy.

1. Module 1 Reflection, due 2/17-18
2. Issue of Sustainable Development, due 3/2-3
3. Module 2 Reflection, due 3/23-24
4. Data Visualization, due 4/6-7
5. Module 3 Reflection, due 4/27-28
6. Final Portfolio and Final Report, due Monday May 2nd, Last Day of Classes, in Lecture
**Workshop Schedule**: In addition to weekly recitations, you can attend skills-based workshops. These workshops are optional but you may find them helpful to help build academic skills. Please refer to Courseworks for the latest Workshop Information, where time and location will also be posted.

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<th>#</th>
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<td>Excel 102: Basic Data Manipulation</td>
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<td>How to cite: Academic Practices</td>
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<td>2/29</td>
<td>5</td>
<td>Excel 103: Basic Statistics</td>
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<td>3/7</td>
<td>6</td>
<td>Maps: An Introduction with CartoDB (or QGIS)</td>
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<td>3/21</td>
<td>7</td>
<td>Other ways to visualize data</td>
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<td>3/28</td>
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<td>Resume and Cover Letter/ How to score an internship?</td>
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<td>4/11</td>
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<td>Excel 104: Basic Linear Regression</td>
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