

North Dakota State University
Department of Civil Engineering

ECS 740 Environmental Management
(3 credits)
Fall 2007

Date/Time/Place: Friday/12:00 Noon - 2:30 PM/CIE 101

Instructor: Dr. Achintya N. Bezbaruah, a.bezbaruah@ndsu.edu

Office: CIE 201G, Phone: 701- 231-7461, Fax: 701-231-6185

Office Hours: Tue and Thu. 11:00 AM - 1:00 PM, or by appointment (Drop-in too!)

Texts, References, and other Resources:

No formal text book is required for this course. As the course will cover topics presently scattered in various books and journals, regular handouts/ blackboard reading materials will be provided. There will be reference books for students to read as a particular topic is discussed in the class. Students are expected to use the internet extensively.

The following books/journals will be used as references:

- (1) Environmental Management (Journal), Springer-Verlag, New York (NDSU Library subscribes to it).
- (2) Total Quality Environmental Management: An ISO 14000 Approach by V. N. Bhat, Quorum Books, 1998.
- (3) Introduction to Environmental Engineering and Science by Gilbert Masters, Prentice Hall, 1997.
- (4) Managing Environmental Issues – A Casebook by R. Buchholz, A. Marcus and J. Post, Prentice Hall, 1992.
- (5) Environmental Management: Principles and Practice by C.J. Barrow, Routledge, New York, 1999.
- (6) Biological Risk Engineering Handbook: Infection Control and Decontamination by Martha J. Boss and Dennis W. Day (eds), Lewis Publishers, 2003.
- (7) Environmental Management Strategies: The 21st Century Perspective by Gabriele Crognale (ed), Prentice Hall, Upper Saddle River, NJ, 1999.
- (8) Streamlined Life-Cycle Assessment by Thomas E. Graedel, Prentice Hall, Upper Saddle River, NJ, 1998.
- (9) Solders in Electronics: A Life-Cycle Assessment by USEPA, Publication EPA 744-R-05-001, 2005.
- (10) Integrated Environmental Management: Implementation Guide by USEPA, Publication EPA 744-R-00-011, 2000.
- (11) Integrated Environmental Management Systems: Company Manual Template for Small Business by USEPA, Publication EPA 744-R-00-012, 2000.
- (12) Guidance Manual for Developing Best Management Practices (BMP) by USEPA, Publication EPA 833-B-93-004, 1993.

Some more to be added as the course progresses.

Students will use scientific calculators and personal/university computer resources for basic computing.

Teaching Technique:

Inductive teaching methods will be adopted. We will try to create a community environment during ‘teaching’. Student participation is a must to achieve this.

Course Content:

This course provides a broad overview of an array of environmental management topics. Topics include introduction to regional and global environmental issues, policies, and regulations; Integrated approach to control and prevention of environmental degradation; Introduction to ISO 14000 series and Life-Cycle Assessment; General overview of methods for environmental data collection, analysis, and management; Introduction to environmental modeling, environmental risk assessment, feasibility study, and decision making. Guest lectures on various topics of relevance.

Course Objectives:

The course is intended to give students an understanding of current environmental issues and tools for analysis of data for environmental management. The issues are examined from the worldwide perspectives of science, engineering, business, and society. Environmental Management is a priority area in the government, business, and non-profit sectors. The course will help prepare students for jobs in these sectors. The course would be useful to students from science and engineering. It would also be useful for scientists, engineers, decision-makers, regulators, and consultants.

Course Outcomes:

Upon completion of this course, students will have a broad knowledge of integrated environmental management issues and methodologies with a global perspective. This knowledge will help them in environmental decision-making from a socio-economic and environmental standpoint. Students will obtain basic skills on collection, analysis, and management of environmental data. They will learn techniques for environmental assessment and feasibility studies. Most importantly, through this course the students will be able to correlate their research and course works to the big picture of the environment.

Course Grading:

Written analyses (including presentation there of) will be assigned that will enable students to become personally engaged in the issues covered in the course. Students will also be asked to read books relating to the environmental issues discussed in the class.

Grades will be based on the following:

Assignments	30%
Class Tests/Quizzes/Exams	20%
Final Examination	10%
Project(s)	40%

Grades:	A:	90+ to 100%
	B:	80+ to 90%
	C:	70+ to 80%
	D:	60+ to 70%
	F:	0 to 60%

Special Needs Students:

There may be need for special considerations for individual students on different occasions. Students will discuss such needs as soon as possible communicating with the instructor through phone, e-mail, or in person. The university policy and precedence will be followed in such situations. Such situations may include impairments, medical conditions, funerals, family weddings, study tours, family responsibilities, etc. These and other situations should be discussed with the instructor.

General Requirement:

A list of reference books is provided. Because it will be impossible to cover every topic in great detail, students are required to read a lot. The information contained in the reference books/articles, the

internet, and lectures may be used to develop homework or exam questions. **This is an advanced level course and students are expected to read journal articles and browse the internet extensively.**

Homework:

Homework assignments and due dates will be announced in class. Homework problems will not be accepted for grading after the specified due date. A 48-hour allowance may be given with prior permission from the instructor and with a 50% deduction in grade.

Quizzes/Tests/Exams:

Quizzes/Tests/Exams will be given as indicated on the course outline and they may be ‘in class’ or ‘take-home’. In addition, unannounced quizzes may be given at the instructor’s discretion. In general, quizzes/exams may be open book, closed book, or a combination of open and closed book. The format of each exam will be announced in class prior to the exam. Use of internet is also not allowed in a closed book quiz/test/exam.

Projects:

Individual and group projects will be assigned during the semester. Requirements for each project will be discussed when assigned.

Civil Engineering Undergraduate Technical Elective:

ECS 740 has been approved as a technical elective for Civil Engineering undergraduates.

Academic Honesty and Responsibility:

All works in this course must be completed in a manner consistent with NDSU Senate policy, Section 335: Code of Academic Responsibility and Conduct (found at <http://www.ndsu.nodak.edu/policy/335.htm>)

Class tests, final examination, individual assignments, and projects are to be done by each student independently unless otherwise advised by the instructor.

Class interactions with other students and the instructor should be done in a responsible manner such that such interactions are academically enriching to the class/course.

Cell Phone/Pager/MP3/Laptop Uses:

Use of Cell Phones, Pagers, MP3 Players, and any other similar devices are not allowed in the class without the permission of the instructor. Please put your devices in mute mode to show respect to others. In case of unavoidable and necessary needs for use of such a device, please inform the instructor beforehand. If you use your laptop to take notes in the class, please discuss with the instructor beforehand.

Special Accommodations:

Students with disabilities please contact the instructor for appropriate accommodations. Other accommodations for Projects/assignments/tests/quizzes/exams will be made as per the relevant university policies.

ECS 740: Environmental Management**Fall 2007**

<u>Dates</u>	<u>Topics</u>
1 08/24/07	Introduction to Environmental Management; National and international perspectives of environmental management; world and regional environmental issues (population and poverty; world economic order, and the environment)
2 08/31/07	Environmental degradation (biodiversity and ecological destruction; global warming; natural resources depletion and contamination); Role of regulatory agencies and non-profits in environmental management (USEPA; state agencies; United Nations; World Bank; NGOs); Prevention and control of environmental degradation (Scientific principles and techniques; case studies); Evolution of environmental policies, regulations, and management
3 09/07/07	Life-Cycle Assessment (LCA)
4 09/14/07	ISO 14000 Series; ISO 9000 Series (Guest: Dr. Kambiz Farahmand); LCA (continued); Class Test 1; Paula Palmer, Executive Director, Global Response will interact with the class live on telephone at 2:00 PM (Topic: Steps for creating a successful environmental campaign).
5 09/21/07	Economic values of biodiversity and scenery (Guest: Dr. Robert Hearne); Possible LCA Projects (Guest: Dr. Wei Lin, Director, ECS Program)
6 09/28/07	Integrated environmental management (socio-economic and environmental perspective; case studies); Best Management Practices (Principles; case studies; manifestations of BMPs to the environment)
7 10/05/07	Environmental Management at Phoenix International Corporation at Fargo (Guest: Mr. Victor Peterson); Class Test 2
8 10/12/07	Environmental assessment (General framework; ecological risk assessment)
9 10/19/07	Environmental assessment (continued) Modeling Ecosystem Services Using the Mallard Model (Guest: Mr. David M Mushet, USGS)
10 10/26/07	Environmental modeling (Purpose of models; types of models; use of GIS and remote sensing in models; models as decision making tool; model demonstration)
11 11/02/07	Governing the International Commons with special focus on biodiversity, whaling, Antarctica and toxic trade (Guest: Dr. Manjusha Gupte); Environmental feasibility study (General framework; case studies) Class Test 3
12 11/09/07	Concept of reliability for management applications (Guest: Dr. Om Yadav)
13 11/16/07	Environmental decision making (Frameworks under which decisions are made; models and processes for decision making; decision communication)
14 11/23/07	Thanksgiving Holiday: No Meeting
15 11/30/07	Collection, analysis, and management of environmental data. Transfer of research findings/technology to the field
16 12/07/07	Class Presentation

Homework To be assigned from time to time.

P.S. The sequence of topics may be changed. We will discuss whether we need to cover any other topics.