



UNIVERSITY OF KENTUCKY

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COLLEGE OF ENGINEERING

Cleophus Price, Associate Dean
The Graduate School
Gillis Building
University of Kentucky
Lexington KY 40506-0033

Subject: Review of Environmental Systems Graduate Certificate

Dear Cleo:

Please find enclosed for review by the Graduate School and the Graduate Council my report on the activities of the Graduate Certificate in Environmental Systems covering the period from the 2001 through 2006. Please contact me at gbrion@enr.uky.edu or 257.4467 at your convenience if you need additional information for your review or clarification of the enclosed report. I look forward to constructive suggestions by the Graduate School and the Graduate Council to strengthen the Environmental Systems Graduate Certificate.

Sincerely,

Gail Brion, Raymond-Blythe Professor
Director, Environmental Systems Graduate Certificate

Department of Civil Engineering
161 Raymond Building • Lexington, Kentucky 40506-0281
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Environmental Systems Graduate Certificate
The Graduate School
University of Kentucky
Certificate Review: Spring, 2007

Current Director (Spring 2005 to present): Gail Brion, Raymond Blythe Professor, Dept. of Civil Engineering, College of Engineering; Joint Appointment Dept. of Preventive Medicine and Environmental Health, College of Public Health

Prior Director: Tom Greider, Associate Professor, Department of Rural Sociology, College of Agriculture, retired

Purpose

The purpose of the Environmental Systems (ES) Graduate Certificate is to offer degree-seeking graduate students and Certificate-seeking professionals an interdisciplinary, graduate-level curriculum that integrates the many disciplines and professional areas of law, policy, and the sciences in the study of environmental problems and the successful management of complex environmental systems. The ES Graduate Certificate improves: communication among environmental professionals in all academic disciplines and professional areas; understanding of research findings from diverse environmental specialties and the application of these findings in the management of environmental systems; and success in managing and solving complex environmental problems. The UK Environmental Systems Graduate curriculum is the only opportunity in the Commonwealth to obtain a graduate-level interdisciplinary Certificate in Environmental Systems. The Environmental Systems Graduate Certificate is administered, managed by, and awarded by the Graduate School.

Historical Overview

The multidisciplinary and campus-wide Environmental Systems (ES) Committee was established in 1987 by the Vice President for Research and Dean of the Graduate School. The Committee was charged with evaluating the need for teaching, research, and service in Environmental Systems. After deliberating for over a year, the Committee recommended a teaching curriculum emphasizing graduate-level interdisciplinary courses and seminars in Environmental Systems and the ES Certificate, to be awarded to graduate students who completed the ES requirements. The ES curriculum and Certificate were approved and offered in 1989, and have been offered every academic year thereafter.

When the ES Certificate was originally offered, only degree-seeking graduate students in relevant academic programs were eligible to receive the Certificate. In response to demands from governmental and private-sector organizations, the ES Certificate became available in the early 1990s to Certificate-seeking professionals enrolled in the Graduate School as post-baccalaureate students.

Table 1 in Attachment 1 contains a summary totals for the Environmental Systems Certificates awarded to date. Table 2 in Attachment 1 shows the diversity of the students that have been awarded certificates by college and discipline for the years between 2001 and 2006. Students from 5 colleges, 1 school, 1 interdisciplinary graduate program, and post baccalaureate status are interested in adding an environmental aspect to their education. The last time this program was reviewed was in Spring of 2001 and at that time a constant number of students awarded the certificate were from the Martin School of Public Administration. Since the formation of the College of Public Health, and the listing of the ES610 and ES630 as electives for degree seeking students, a steady number of Public Health students are being awarded the certificate.

The Environmental Systems Curriculum

The ES curriculum consists of three core courses and a Fall/Spring series of one-hour topical seminars in Environmental Systems. The three core interdisciplinary courses are: Engineering and Physical Sciences in Environmental Systems (ES 610); Natural, Biological, and Medical Sciences in Environmental Systems (ES 620);

and Legal, Economic, and Social Sciences in Environmental Systems (ES 630). ES 610 is offered every Fall semester; ES 630 is offered every Spring semester; the one-hour topical ES seminar (ES 600) and ES 620 are offered every semester. A new course in the ES series (ES640) is under development resulting from a split of the current ES610 class into two separate courses covering the “Physical/Natural Sciences” and “Engineered” Environmental Systems. This change is expected to be implemented by Spring '08.

Requirements for Admission to the Certificate

To be admitted to the ES Certificate, a degree-seeking student must be accepted by the Graduate School and the graduate academic program in which the student is or will be enrolled; a Certificate-seeking professional must have a Bachelor of Science or Arts degree (or equivalent), a minimum of 2.75 undergraduate GPA, and be accepted by the Graduate School as a Post-Baccalaureate student. The GRE (or equivalent) examination is required for degree-seeking applicants; the GRE is not required for Certificate-seeking professionals. The current Application for Admission to the Environmental Systems Certificate is contained herein as Attachment 2.

Requirements for Completion and Award of Certificate

To be eligible to be awarded the ES Certificate, a degree-seeking student's graduate program must contain the following elements: (1) completion of two of the three core Environmental Systems courses outside the student's academic discipline; (2) participation in the one-hour Environmental Systems Seminar for two semesters (Fall and Spring); and (3) completion of one additional three-hour course focused on environmental systems prior to the award of the Certificate. The Certificate-seeking professional must complete: (1) the three core Environmental Systems courses; and (2) two one-hour Environmental Systems Seminars. Award of the Certificate occurs at the time of the completion of the ES Certificate requirements for both degree-seeking students and Certificate-seeking professionals. Completion of the ES Certificate requirements is verified by the Director on the Graduate Certificate Completion Form, which is contained in Attachment 3. The Completion Form is submitted to the Graduate School, whereupon the Certificate (see Attachment 4) is awarded and the title of the Certificate appears on the student's official transcript.

Environmental Systems Certificates Awarded

Attachment 5 contains the Names, Academic Areas, Award Date, and Identifying Number of the recipients of the Environmental Systems Certificate from 1990 through April 2007.

Participating Faculty and Professionals

Faculty and professionals who currently participate in the Environmental Systems Curriculum, and their rank among the UK Graduate Faculty, are as follows.

Director and Curriculum Coordinator: Dr. Gail Brion, Raymond-Blythe Professor, Raymond Blythe Professor, Dept. of Civil Engineering, College of Engineering; Joint Appointment Dept. of Preventive Medicine and Environmental Health, College of Public Health. *Full Graduate Faculty*

ES 600: Environmental Systems Seminar: Core concepts: Environmental Ethics, Justice, and Sustainability
Coordinator/Instructor: Dr. David Atwood, Associate Professor, Chemistry, College of Arts and Sciences. *Full Graduate Faculty.*

Participating Faculty:

Dr. Gail Brion, Raymond-Blythe Professor, Raymond Blythe Professor, Dept. of Civil Engineering, College of Engineering; Joint Appointment Dept. of Preventive Medicine and Environmental Health, College of Public Health. *Full Graduate Faculty*

ES 610: Engineering and Physical Sciences in Environmental Systems: Core concepts: Mass Balance and GIS

Coordinator and Instructor: Dr. Gail Brion, Raymond-Blythe Professor, Raymond Blythe Professor, Dept. of Civil Engineering, College of Engineering; Joint Appointment Dept. of Preventive Medicine and Environmental Health, College of Public Health. *Full Graduate Faculty*

Participating Faculty:

Dr. Danita La Sage, Assistant Professor, Eastern Kentucky University, *Associate Graduate Faculty*

Dr. James Dinger, State Geologist, Kentucky Geological Survey, *Associate Graduate Faculty*

ES 620: Natural, Biological, and Medical Sciences in Environmental Systems: Core concepts Risk Assessment and Health Policy

Coordinator and Instructor: Dr. Kiyoun Lee, Assistant Professor, Preventive Medicine and Environmental Health, College of Public Health. *Associate Graduate Faculty.*

Participating Faculty:

Dr. Gail Brion, Raymond-Blythe Professor, Raymond Blythe Professor, Dept. of Civil Engineering, College of Engineering; Joint Appointment Dept. of Preventive Medicine and Environmental Health, College of Public Health. *Full Graduate Faculty.*

ES 630: Legal, Economic, and Social Sciences in Environmental Systems: Core concepts Law and Policy Controls

Coordinator and Instructor: Michael P. Healy, Esq., Associate Dean for Academic Affairs, Dorothy Salmon Professor of Law, College of Law, *Full Graduate Faculty.*

Rationale for Continuation of the Environmental Systems Certificate

For more than a decade, the Environmental Systems Certificate has successfully exposed graduate students and professionals to a systems approach for investigating and managing complex environmental problems in Kentucky, the region, and the nation. Feedback from graduate students and post-baccalaureate candidates has been overwhelmingly positive and has resulted in the incorporation of the systems approach into theses, dissertations, and practice. The Certificate is currently the only identified curricula on campus that allows for a fully interdisciplinary educational experience under the environmental umbrella. The certificate program could become the cornerstone for a full fledged graduate program in Environmental Systems and Sustainability. As the certificate adds new courses, like the planned ES640, Natural Environmental Systems, 15 hours of the core components of an interdisciplinary Masters degree will be in place. The goal of a new Masters Degree program in Environmental Systems and Sustainability would be in line with UK's Strategic Plan that identified the "Environmental and Energy" as a priority area for future development. Before this happens, the certificate program has to obtain buy-in from departments interested in developing research and educational areas involving the environmental and energy and overcome silo issues. One way to start the process is to have the departments involved become owners of the certificate program. The Director has made strides to integrate some of the program components into existing departments (e.g.: crosslisting ES610 with CPH601) and separate courses into components that could easily be integrated into existing departments (e.g. Splitting ES610 into separate physical science and engineering components). These actions should allow greater access to the graduate student pool and a truer immersion into the mindset of the disciplines involved. The Director plans to meet with the Martin School and several departments on campus to see if courses they are developing that involve sustainability and other environmental topics could become part of a roster of acceptable electives for replacement for one or more of the three core ES courses.

Promotional Brochure

A promotional brochure for the Graduate Certificate in Environmental Systems was developed, printed, and distributed in 2000. The brochure is included herein as Attachment 6. New brochures should be printed after curricular changes have been incorporated into the program.

Attachment 1

Table 1: Environmental Systems Certificates Awarded:
1991-92 Academic Year through March 2007.

Table 2: Distribution of Environmental Systems Certificates Awarded by Year and Discipline

Table 1. Environmental Systems Certificates Awarded: 1990 through April 2007

YEAR	CERTIFICATES AWARDED
1990	2
1991	6
1992	3
1993	15
1994	22
1995	0
1996	10
1997	10
1998	6
1999	4
2000	6
2001	3
2002	3
2003	6
2004	13
2005	4
2006	6
2007	2
Total	121

Table 2. Distribution of Environmental Systems Certificates Awarded by Year and Discipline (2001-2006)

		2001	2002	2003	2004	2005	2006
Engineering	Civil				1		
	Bio and Ag				1		
	Mining					1	1
A&S	Biology			1		1	
	Chemistry				2		
	Communications				1		
	Geography			1			
	Geology		1				
	Toxicology					1	
Agriculture	Ag. Econ				1		
	Crop Science				1		
	Rural Sociology						1
	Plant & Soil Sci.				1		
Martin Sch.	Public Admin.	3		3	2		
CPH	Public Health		2	1	1	1	2
Business	Economics				1		
Interdisc.	Nutr. Sci.						1
None	Post Bac				1		1

Attachment 2

Application for Admission into Certificate Program:

Application for Admission/Certification

Environmental Systems Certificate Program

Graduate School
University of Kentucky

Print this application form and send to address at bottom, or fill in and email as appropriate

Name: _____

2. Social Security No: _____

3. B.S. Degree/Institution: _____

4. M.S. Degree/Institution: _____

5. Mailing Address: _____

6. Local Phone No: _____

7. Permanent Phone No: _____

8. Masters or Doctorate Dept: _____

9. Date Applied: _____

10. Date Accepted: _____

11. Anticipated Date of Completion: _____

12. Major Professor/Env. System Advisor: _____

13. Phone: _____

14. Proposed Courses for Environmental Systems Certificate Program (No. and Title):

15. Other Graduate Courses in Program at University of Kentucky or other institutions:

16. Thesis Topic (If no thesis, list additional courses in lieu of thesis and/or topic of the focused paper to be prepared as part of the program.):

17. ATTACH COPY OF TRANSCRIPTS OF WORK COMPLETED AT ALL OTHER NON-UK INSTITUTIONS IF APPLICABLE.

Mail To:

Dr. Gail Brion, 161 Raymond Bldg., Dept. Civil Engineering, Lexington, KY 40506-0281

Or Email to:

gbrion@engr.uky.edu

Attachment 3

Application for Certificate Award:

Environmental Systems Certificate Program

Graduate School

University of Kentucky

1. Name: _____

2. Social Security No: _____

3. B.S. Degree/Institution: _____

4. M.S. Degree/Institution: _____

5. PhD. Degree/Institution: _____

6. Permanent Mailing Address: (This is where your certificate is to be sent)

7. M.S. or Ph.D. degree granting Dept.: _____

8. Anticipated Date of Completion: _____

9. Major Professor/Env. System Advisor: _____

10. Thesis/dissertation Topic (If no thesis, list additional courses in lieu of thesis and/or topic of the focused paper to be prepared as part of the program.):

11. Proposed Courses for Environmental Systems Certificate Program:

Course	Year	Semester	Grade
ES600		F	
ES600		S	
ES610			
ES620			
ES630			

Fill in the above table with the ES courses you have taken. For degree seeking students in programs that contain an environmental systems component, the Director may substitute an appropriate 600 level course from your major area for one of ES610, ES620, or ES630. You may indicate in the table above courses that you would like considered for such a substitution.

You may fax, email, or snailmail the above form to the following addresses.

Mail To:

Dr. Gail Brion
 Director of the Environmental Systems Certificate Program
 University of Kentucky-Dept. Civil Engineering
 161 Raymond Bldg
 Lexington, KY 40502-0281

Email submission to: gbrion@engr.uky.edu

Fax submission to: (859) 257-4404, Att: Dr. Gail Brion

Attachment 4

Sample Certificate:
To be printed on Award Paper



To the Friends of Learning Everywhere, Greetings:

Be it known that

This Great Student

having completed the prescribed graduate courses
is this day presented the

Environmental Systems Certificate

Awarded this 20th day of March, 2007



Gail Brion, Director, Environmental Systems Certificate

Jeannine Blackwell, Dean, The UK Graduate School

Attachment 5

List of Awardees

ENVIRONMENTAL SYSTEMS CERTIFICATES
AWARDED (as of April 2007)

NAME	ACADEMIC AREA	AWARD DATE
Borges, Harold T.	Toxicology, Ph.D.	Jan 1990
Williams, Michael E.	Chemical Engr., Ph.D.	May 1990
Clark, Carolyn J.	Public Administration, M.A.	Jan 1991
Gardner, James S.	Mining Engineering, M.S.	Jan 1991
Mathur, Rohit	Chemical Engr., Ph.D.	Jan 1991
Wade, Kenneth W.	Post Baccalaureate	Jan 1991
Moore, Daniel J	Geology, M.S.	May 1991
Stone, David B.	Public Administration, M.A.	May 1991
Mitchell, Linda K.	Agronomy, M.S.	Jan 1992
Morgan, Kevan F.	Post Baccalaureate	Jan 1992
Shergill, Birinder S.	Geology, Ph.D.	Jan 1992
Alexander, Martha D.	Public Administration, M.A.	Jan 1993
Beach Andrew C.	Toxicology, Ph.D.	Jan 1993
Hatt, Deborah T.	Public Administration, M.A.	Jan 1993
Horn, Linda G.	Public Administration, M.A.	Jan 1993
Inamdar, Shreeram	Agriculture Engr., M.S.	Jan 1993
Kuhn, Christine	Patterson School, M.A.	Jan 1993
Morin, Stephen R.	Anthropology, M.A.	Jan 1993
Ombres, Deena G.	Environmental Health, M.S.	Jan 1993
Osborne, Billy R.	Civil Engr., M.S.	Jan 1993
Salcedo, Jamie A.	Civil Engr., M.S.	Jan 1993
Saluja, Gurprett K.	Environmental Health, M.S.	Jan 1993
Smith, LaMont D.	Environmental Health, M.S.	Jan 1993
Struttman, Timothy W.	Environmental Health, M.S.	Jan 1993
Wang, Daqing	Mining Engr., M.S.	Jan 1993
Thompson, Jennifer A.	Geology, M.S.	May 1993
Bell, Ann M.	Sociology, M.S.	Jan 1994
Borman, Amy L.	Chemistry, M.S.	Jan 1994
Chinnatimareddygar, R.	Civil Engr., M.S.	Jan 1994
Gumpper, Michael R.	Economics, M.A.	Jan 1994
Liu, Yumin	Civil Engr., M.S.	Jan 1994
Roper, Jackson M.	Anthropology, M.A.	Jan 1994
Rosc, Talina R.	Economics, Ph.D.	Jan 1994
Siegel, Erik C.	Public Administration, M.A.	Jan 1994
Singh, Indrapal	Material Science Engr., M.S.	Jan 1994
Smith, Mark T.	Post Baccalaureate	Jan 1994
Wasdovich, Michael A.	Preventive Medicine, M.S.	Jan 1994
Bawa, Rajesh	Civil Engr., M.S.	May 1994
Bowden, Ruth J.	Agriculture Engr., M.S.	May 1994
Gabbard, Howard D.	Civil Engr., M.S.	May 1994
Gawthrop, Janet L.	Post Baccalaureate	May 1994
Gremos, Diane K.	Geology, M.S.	May 1994
Newsom, Michael A.	Economics, M.S.	May 1994
Pratt, Jeffrey W.	Civil Engr., M.S.	May 1994
West, Stephen D.	Chemical Engr., Ph.D.	May 1994
Zuiderveen, Jeffrey A.	Toxicology, Ph.D.	May 1994
Adams, June	Post Baccalaureate	Dec 1994

Dzioubinski, Oleg	Patterson School, M.A.	Dec 1994
Chirwa, Evans M.N.	Civil Engr., M.S.	Aug 1996
Clark, Cathleen J.	Chemistry, M.S.	Aug 1996
Dawson, Sara K.	Preventive Medicine, M.S.	Aug 1996
Haight, John O.	Preventive Medicine, M.S.	Aug 1996
Herald, Tim D.	Forestry, M.S.	Aug 1996
Mawhinney, Susan M.	Chemical Engr., M.S.	Aug 1996
O'Dell, Gary A.	Geography, M.S.	Aug 1996
Paxton, Mark S.	Economics, Ph.D.	Aug 1996
Sirek, Nicholas S.	Geology, M.S.	Aug 1996
Sorokina, Marina N.	Agronomy, M.S.	Aug 1996
Anstine, Jeffrey D.	Economics, Ph.D.	Aug 1997
Barton, Christopher D.	Plant and Soil Sci., M.S.	Aug 1997
Byars, Thomas R.	Ag Economics, M.S.	Aug 1997
Dupont, Bernadette S.	Civil Engr., M.S.	Aug 1997
Giambri, Dominic G., Jr.	Preventive Medicine, M.S.	Aug 1997
Jackson, Matt	Public Health, M.S.	Aug 1997
Justice, Scott E.	Anthropology, M.S.	Aug 1997
Patton (Shane), Julia P.	Ag Economics, M.S.	Aug 1997
Powell, Traci M.	Civil Engr., M.S.	Aug 1997
Singh, Sumit Kumar	Chemical Engr., M.S.	Aug 1997
Durbin, Dean C.	Master's Business Administration	May 1998
Fredenburg, Andrea M.	Toxicology, Ph.D.	May 1998
Klich, Kataryzna	Public Administration, M.A.	May 1998
Wallin, Eric J.	Geology, M.S.	May 1998
Gotpagar, Jayant K.	Chemical Engr., Ph.D.	Aug 1998
Gunter, Michael M., Jr	Political Science, Ph.D.	Aug 1998
Keatley, Aaron	Master's Public Administration	May 1999
Price, Ronald Thomas	Master's Public Administration	May 1999
Lyle, Lola Williamson	Master's Public Administration	May 1999
Houston, Robert G.	Economics, Ph.D.	Dec 1999
Blevins, Robin Emerson	Master's Public Administration	May 2000
Clements, Christopher J.	Master's Public Administration	May 2000
Pike, Jerry D.	Public Administration	May 2000
Wallingford, Martin M.	Master's Public Administration	May 2000
Pilkenton, Stephen E.	Public Health, M.S.	Aug 2000
Mayer, Gregory D.	Biological Sciences, Ph.D.	Dec 2000
Carney, Georgina C.	Master's Public Administration	May 2001
Tyndall, Patrick L.	Master's Public Administration	May 2001
Roberts, Shelley R.	Public Administration	Dec 2001
Hittepole, Bridget B.	Master's Public Health	May 2002
Cornett, Gregory C.	Geological Sciences, M.S.	Aug 2002
Ellis, Peggy A.	Master's Public Health	Dec 2002

Cleland, Mark J.	Master's Public Administration	May 2003
Perry, Benjamin B.	Masters Geography	May 2003
Withrow, Lydia B.	Master's Public Health	May 2003
Crumrine, Patrick W.	Biological Sciences, PhD	June 2003
Smith, Amanda	Master's Public Administration	June 2003
Thompson, D. Patrick	Master's Public Administration	Nov 2003
Byrd, Eric J.	Post Baccalaureate	Jan 2004
Day, Kyle C.	Agricultural Economics, M.S.	Jan 2004
Ingram, Wayne	Plant and Soil Science, M.S.	Jan 2004
Haghighshahir, Shabnam	Chemistry, PhD	Feb 2004
Steinmen, Margaret	Public Health, MPH	Feb 2004
Chaisamrej, Rungrat	Communications, PhD	Mar 2004
Kowsuvon, Noppadon	Civil Engr, M.S.	Mar 2004
Long, Phillip	Crop Science	May 2004
Chang, Xiaoyang	Public Health Administration	Jun 2004
Venkatachalam, Karthik	Chemistry	Jun 2004
Agouridis, Carmen T.	Biosystems and Ag Engr, PhD	Aug 2004
Cave, Lisa A.	Economics, PhD	Aug 2004
Widmer, Maria	Masters Public Administration	Dec 2004
Stemm, Davinia N.	Toxicology, PhD	Oct 2005
True, Andrew	Mining Engr., M.S.	Jan 2005
Brammell, Ben	Biology	Dec 2005
Johnson, Owen Stafford	Public Health, DrPH	Apr 2005
New, Andrea	Post Baccalaureate	Jun 2006
Mitra, Bhaskar	Mining Engr, M.S	May 2006
Al-Rayyes, Yahya Omar	Public Health, MPH	Oct 2006
Payne, Deborah Claire	Public Health, MPH	Oct 2006
Jones, Donna	Rural Sociology, PhD	Oct 2006
Bunaciu, Rodica Petruta	Nutritional Sciences, PhD	Oct 2006
Hunt, Kevin	Mining Engr, M.S.	Feb 2007
Jiumpyararach, Waripas	Ag Economics, PhD	Feb 2007

Attachment 6

Current Environmental Systems Certificate Brochure