LONG SIGNATURE SHEET

UNC CHARLOTTE

Proposal Number: GES 3– 16- 11

Proposal Title **Establishment of an Interdisciplanary Minor in Environmental Sciences**

Originating Department Geography and Earth Sciences

TYPE OF PROPOSAL: UNDERGRADUATE X **GRADUATE**_____ **UNDERGRADUATE & GRADUATE**____
(Separate proposals sent to UCCC and Grad. Council)

DATE RECEIVED	DATE CONSIDERED	DATE FORWARDED	ACTION	SIGNATURES
9/17/10	12/17/10	3/16/11	Approved	**DEPARTMENT CHAIR** Craig Allan [print name here] Craig Allan
3/18/11	4/15/11		Approved	**COLLEGE CURRICULUM COMMITTEE CHAIR** Print name: Cheryl L. Brown
5/6/11	5/6/11	5/6/11	Approved	**COLLEGE FACULTY CHAIR** Print name:
	10/6/11	10/6/11	Approved Received updated catalog copy	**COLLEGE DEAN** Print name here if signing on behalf of Dean: CHARLES BRODY
	November 2011 reconsidered	2/8/12	Approved	**UNDERGRADUATE COURSE & CURRICULUM COMMITTEE CHAIR** (for undergraduate courses) Janet E. Levy
	2/3/12 with editorial changes		Approved	**GRADUATE COUNCIL CHAIR** (for graduate courses)
			Approved	**FACULTY GOVERNANCE SECRETARY** (noting Faculty Council approval on Consent Calendar)
				FACULTY EXECUTIVE COMMITTEE (if decision is appealed)

I. HEADING AND PROPOSAL NUMBER

A. University of North Carolina at Charlotte

New, Undergraduate

Course and Curriculum Proposal from Department of Geography and Earth Sciences (CLAS)

B. Proposal Number: GES 3-16-10

C. TITLE: Establishment of an Interdisciplinary Minor in Environmental Sciences

II. CONTENT OF PROPOSALS

A. Proposal Summary and Catalog Copy.

1. Summary.

The Geography and Earth Sciences Department and Biology Department propose to create an interdisciplinary Minor in Environmental Sciences that is most appropriate for Earth Sciences majors (earth sciences, geology, and meteorology) and Biology majors, but can be carried out by any undergraduate at UNCC if the required prerequisite classes are taken. Students must have and maintain a GPA of at least 2.75 to participate in the program. Students in the program will complete one required class (Environmental Dilemma, ESCI 2101, 3 credits) and select from a group of optional courses (15 credits) offered by the two participating departments. The proposed new program would rely on existing courses offered by the two departments.

2. Catalog Copy.

MINOR IN ENVIRONMENTAL SCIENCES

The Minor in Environmental Sciences is an interdisciplinary program in the College of Liberal Arts and Sciences that is designed for students pursuing any UNCC degree who are interested in careers related to studying or managing the environment. To obtain a Minor in Environmental Sciences, students will complete 18 credit hours (3 required credits and 15 elective credits) offered in the Departments of

Geography and Earth Sciences and Biology. Participating students have some flexibility in choosing elective courses that reflect their specific area of interest within the environmental field. If students are Geography and Earth Sciences or Biology majors, they must take at least 9 of the 15 elective credits outside of their major. Prerequisites are required for most of the elective classes (notably GEOL 1200 and lab, ESCI 1101 and lab, BIOL 2120, and BIOL 2130 and lab). Classes that are required for a student's major cannot be counted toward the minor as well, but electives taken for a major can also be counted for the minor. Students must have and maintain a GPA of at least 2.75 to participate in the program.

REQUIRED COURSE

ESCI 2101: Environmental Dilemma (3)

GEOGRAPHY AND EARTH SCIENCES ELECTIVES

ESCI 3105: Oceanography (3)
ESCI 3170: Environmental Quality Management (3)
ECSI 3180: Environmental Impact Analysis (3)
ESCI 4140: Hydrological Processes (4)
ESCI 4155: Fluvial Processes (4)
ESCI 4170: Fundamentals of Remote Sensing (4)
ESCI 4210: Soil Science (4)
ESCI 4222: Watershed Science (3)
ESCI 4233: Geoenvironmental Site Characterization (4)
GEOL 3120: Geochemistry (3)
GEOL 3190 Environmental Geology (4)
GEOL 4145: Fundamentals of Hydrogeology (4)
GEOL 4185: Mineralogy, Economics and the Environment (3)
METR 4240: Boundary Layer Meteorology (3)
METR 4150: Applied Climatology (3)
GEOG 2103: Intro to GIScience & Technologies (4)
GEOG 3215: Environmental Planning (3)
GEOG 3250: World Food Problems (3)
GEOG 4040: Transportation Planning (3)
GEOG 4120 (Fundamentals of GIS)
GEOG 4131: Environmental Modeling (4)

BIOLOGY ELECTIVES

BIOL 3144: Ecology (4)
BIOL 3202: Horticulture (3)
BIOL 3222: General Botany (4)

BIOL 3231: Invertebrate Zoology (4)
BIOL 3233: Vertebrate Zoology (4)
BIOL 3236: General Zoology (3)
BIOL 3235: Biology of Insects (3)
BIOL 3229: Field Botany (3)
BIOL 4162: Environmental Biotechnology I (3)
BIOL 4253: Marine Microbiology (4)
BIOL 4111: Evolution (3)
BIOL 4235: Mammalogy (3)
BIOL 4242: The Biology of Birds (3)
BIOL 4243: Animal Behavior (3)

New Course Descriptions

No new courses are required for the proposed degree.

B. Justification.

The environmental sciences field has received a great deal of attention in the Carolinas region, nationally, and internationally over the past decade. An increasing conflict between a desire to find and exploit natural resources and to protect natural habitats and human health has become a major subject of public debate. Attention has been given to environmental issues such as global warming, water and air pollution, resource conservation and sustainable use, dwindling supplies of oil and other natural resources, and reductions in wildlife habitats and concomitant threats to endangered species. Attention to these topics has amplified environmental awareness and concern among the public and government sectors, and this increase in awareness has led to a growing number of job opportunities and a demand for new academic programs to provide graduates who can work in the environmental science field. UNC-Charlotte currently offers no degree program in environmental sciences.

The field of environmental science is inherently interdisciplinary, and the proposed minor program reflects this. Environmental scientists study the physical and biological aspects of the natural world, the interactions between physical and biological processes, and the influence of human activities on these processes. Thus, it is important that students who are interested in environmental science receive instruction from both the Department of Geography and Earth Sciences and the Department of Biology.

The U.S. Department of Labor Statistics reported that the employment outlook for environmental scientists in the U.S. is strong, with the strongest growth in the private sector due to public policy changes that will require companies to comply with environmental regulations, particularly those related to flood control, clean air, and groundwater contamination. In 2004, the Bureau of Labor Statistics reported that 44 % of environmental scientists were employed in State and local governments, 15 % in management, scientific, and technical consulting services, 14 % in architectural, engineering and related services, 8 % in the Federal Government, and the rest worked in other sectors or were self-employed. Median annual earnings of environmental scientists were $51,080 in 2004. The middle 50 percent earned between $39,100 and $67,360, the lowest 10 percent earned less than $31,610, and the highest 10 percent earned more than $85,940. According to the National Association of Colleges and Employers, beginning salary offers in July, 2005 for graduates with bachelor's degrees in environmental science averaged $31,366 a year.

In North Carolina, the mean annual income for environmental scientists was $48,380 in 2001 and $51,370 by 2005 (Bureau of Labor Statistics), and career opportunities in the field have been developing rapidly. For example, in 2005, the Environmental Protection Agency awarded $1 million in grants to North Carolina communities to revitalize former industrial and commercial sites ("brownfields") to transform them into clean community assets.

C. Impact.

1. *Group of students served by this proposal.*

The target audience for this program is undergraduate students who are interested in environmental science. We anticipate that most students will come from the Earth Sciences and Biology programs since these students will have many of the required prerequisite classes, but many may also come from other BS programs, such as Chemistry or Civil Engineering, and also from the University at large.

2. *Effect of proposal on existing courses and curricula.*

This program will rely exclusively on existing courses and curricula.

2.a. *When and how often will added courses be taught?*

No new courses will be required.

2.b. *How will content/frequency of other courses be affected?*

Depending on the popularity of the proposed program, the new degree may create a demand to increase the frequency of some courses, including the single course required by all students in the program (Environmental Dilemma, ESCI 2101).

2.c. *What is anticipated enrollment in courses?*

It is difficult to anticipate enrollment in the minor program. Our goal is to have 15-20 or more new students entering the program each year.

2.d. *Impact on enrollment in other courses? How determined?*

The new minor will increase enrollment in Geography and Earth Sciences and Biology classes that are also required for majors in these programs. The number of students in the program, and therefore the number of students that will be added to these classes, is difficult to determine. Minor students will be dispersed throughout the optional classes shown in attachment #1.

2.e. *If previously offered, give details of experience including number of times taught and enrollment figures.*

No new courses are required for the minor.

2.f. *Identify other catalog copy areas that would be affected.*

The proposed minor degree will have no impact on other course/curricular/catalog copy areas.

D. Resources Required to Support Proposal.

1. Personnel.

All courses for this program are already taught as part of the GES and BIOL curricula. Depending on the popularity of the program, new sections of existing classes may be needed to accommodate the additional students.

2. Physical Facility.

No additional facilities are required.

3. Equipment and Supplies.

No new equipment or supplies are needed.

4. Computer.

There are no computer requirements beyond those available to all students within the department.

5. Audio-visual.

No audio-visual equipment is required beyond what is currently available in classrooms.

6. Other Resources.

No additional resources are required to offer this program.

E. Consultation with the Library and Other Departments or Units.

1. Library Consultation.

Copy of *Consultation on Library Holdings* is attached (attachment #2). No additional library resources are required.

2. Consultation with Other Departments or Units.

Department of Biology

F. Initiation and Consideration of the Proposal.

1. Originating Unit: Program originated within the Department of Geography and Earth Sciences.

2. Other Considering Units.

Department of Biology: Consultation Attached

G. Attachments. 1. Relevant documents.

Attachment #1: Course requirements for Minor in Environmental Sciences

Attachment #2: Consultation on Library Holdings

ATTACHMENT #1:
Course requirements for Minor in Environmental Sciences

UNCCHARLOTTE

Environmental Sciences Minor Program

Requirements
1. 18 total credits (3 required credits, 15 elective)
2. Required Class - all students entering the program: ESCI 2101: Environmental Dilemma (3).
3. An additional 15 credits must be obtained from the list of elective courses below.
4. Prerequisites are required for most of the elective classes; notably GEOL 1200 + lab (4), ESCI 1101 + lab (4), BIOL 2120 (3), and BIOL 2130 + lab (5)
5. Classes that are required for a student's major cannot be counted toward the minor as well. However, electives taken for a major can also be counted for the minor.
6. If students are Geography and Earth Sciences or Biology majors, they must take at least 9 of the 15 elective credits outside of their major discipline from the list below.
7. Students must have and maintain a 2.75 G.P.A. to participate in this program.

add lab hrs

Core Course (required): ESCI 2101: Environmental Dilemma (3)

Approved Elective Class List

- ESCI 3105: Oceanography (3)
- ESCI 3170: Environmental Quality Management (3)
- ECSI 3180: Environmental Impact Analysis (3)
- ESCI 4140: Hydrological Processes (4)
- ESCI 4155: Fluvial Processes (4)
- ESCI 4170: Fundamentals of Remote Sensing (4)
- ESCI 4210: Soil Science (4)
- ESCI 4222: Watershed Science (3)
- ESCI 4233: Geoenvironmental Site Characterization (4)
- GEOL 3120: Geochemistry (3)
- GEOL 3190 Environmental Geology (4)
- GEOL 4145: Fundamentals of Hydrogeology (4)
- GEOL 4185: Mineralogy, Economics and the Environment (3)
- METR 4240: Boundary Layer Meteorology (3)
- METR 4150: Applied Climatology (W, 3)
- GEOG 2103: Intro to GIScience & Technologies (4)
- GEOG 3215: Environmental Planning (3)
- GEOG 3250: World Food Problems (3)
- GEOG 4040: Transportation Planning (3)
- GEOG 4120 (Fundamentals of GIS)
- GEOG 4131: Environmental Modeling (4)

Approved Elective Class List, continued

- BIOL 3144: Ecology (3)
- BIOL 3144L: Ecology Laboratory (1)
- BIOL 3202: Horticulture (3)
- BIOL 3222: General Botany (4)
- BIOL 3231: Invertebrate Zoology (4)
- BIOL 3233: Vertebrate Zoology (4)
- BIOL 3236: General Zoology (3)
- BIOL 3235: Biology of Insects (3)
- BIOL 3229: Field Botany (3)
- BIOL 4162: Environmental Biotechnology I (3)
- BIOL 4253: Marine Microbiology (3)
- BIOL 4111: Evolution (3)
- BIOL 4235: Mammalogy (3)
- BIOL 4242: The Biology of Birds (3)
- BIOL 4243: Animal Behavior (3)
- BIOL 4244: Conservation Biology (3)

ATTACHMENT #2:

J. Murrey Atkins Library, UNC Charlotte
Consultation with Library for Course and Curriculum Proposal

TO: Dr. Craig Allan (Geography and Earth Sciences)

FROM: Barbara G. Tierney
Science Subject Librarian

DATE: January 11, 2012

RE: Date of initiation of consultation with Library Reference personnel: Request received December 19, 2011

Course and Curriculum Proposal from the Departments of Geography and Earth Sciences and Biology to establish an Interdisciplinary Minor in Environmental Sciences. The Geography and Earth Sciences Department and Biology Department propose to create an interdisciplinary Minor in Environmental Sciences that is most appropriate for Earth Sciences majors (earth sciences, geology, and meteorology) and Biology majors, but can be carried out by any major in a Bachelor of Science program.
This program is designed for students pursuing any bachelor of science program who are interested in careers related to studying and managing the environment.

SUMMARY OF REFERENCE LIBRARIAN'S EVALUATION OF HOLDINGS:
Evaluator: Barbara G. Tierney Date: January 11, 2012
Check one: 1. Holdings are superior.
2. **Holdings are adequate** **Please see Comments ***
3. Holdings are adequate only if department purchases additional .holdings
4. Holdings are inadequate

Comments:
After a careful review of relevant library collections, I find current library holdings to be adequate to support this proposed new "Interdisciplinary Minor in Environmental Sciences" program. Specifically, I find that the J. Murrey Atkins Library has adequate print and electronic indexes, databases, journals and books to support this new program. Please see below for details regarding existing relevant library holdings.

Reference Indexes and Databases (electronic) available through Atkins Library (eilectronic)
Academic Search Premier
Environmental Abstracts
Environment Complete
GeoRef
JSTOR
Science Direct
Springer Verlag
Web of Science
Wiley Online Library

Journals Available Through Atkins Library (Electronic)
Of the "top 50 impact factor" environmental science journals listed in the highly regarded database "Journal Citation Reports" (by ISI, the Institute for Scientific Information) Atkins Library subscribes to 36 of these titles (or 72% of them); Atkins Library subscribes to approximately 80% of the total list of 193 environmental science journals included in "Journal Citation Reports." Individual articles from journals to which Atkins Library does not subscribe, however, can be obtained speedily through Interlibrary Loan services. **Please see the attached print-out which lists the Journal Citation Reports top fifty environmental science journals (by impact factor) with an indication of Atkins Library's subscribed titles.**

Books:
A search of the Atkins Library online catalog using the below listed Library of Congress Subject Headings reveals the following current holdings:

L.C. Subject Heading or Keyword	Total # Titles	#Titles 2005+
Acid deposition–Environmental Aspects(Subj.Head.)		
Acid rain (Subj. Head.)	11	0
Air pollution (Subj. Head.)	249	14
Biodiversity conservation (Subj. Head.)	48	8
Bioethics (Subj. Head.)	104	36
Conservation of natural resources (Subj. Head.)	114	14
Coastal zone management (Subj. Head.)	25	2
Coral Reef conservation (Subj. Head.)	8	2
Ecology (Subj. Head.)	296	19
Endangered species (Subj. Head.)	56	5
Environmental auditing (Subj. Head.)	16	4
Environmental degradation(Subj. Head.)	43	13
Environmental education (Subj. Head.)	51	10
Environmental ethics (Subj. Head.)	148	32
Environmental geology (Subj. Head.)	5	1
Environmental impact analysis (Subj. Head.)	50	1
Environmental impact statements (Subj. Head.)	50	2
Environmental law (Subj. Head.)	22	5
Environmental management (Subj. Head.)	53	7
Environmental monitoring (Subj. Head.)	67	10
Environmental protection (Subj. Head.)	213	22
Environmental responsibility (Subj. Head.)	47	24
Environmental sciences (Subj. Head.)	42	7
Environmental sciences – philosophy (Subj. Head.)	21	2
Environmentalism philosophy(Subj. Head.)	6	2
Global warming (Subj. Head.)	159	55
Green Movement (Subj. Head.)	64	13
Nature – Effect of human beings on (Subj. Head.)	218	28
Environmental degradation – moral and ethical aspects (Subj. Head.)	2	1
Environmental ethics (Subj. Head.)	148	32
Environmental responsibility (Subj. Head.)	47	24
Environmental sciences – philosophy (Subj. Head.)	19	5
Environmentalism philosophy (Subj. Head.)	6	2
Green Movement (Subj. Head.)	51	10
Groundwater pollution (Subj. Head.)	72	4
Hazardous wastes sites (Subj. Head.)	22	0
Marine pollution (Subj. Head.)	37	6
Nature – Effect of human beings on (Subj. Head.)	218	28
Noise control (Subj. Head.)	63	2
Oil pollution of the sea (Subj. Head.)	10	0
Oil spills (Subj. Head.)	14	0
Refuse and refuse disposal (Subj. Head.)	76	4
Sediment control (Subj. Head.)	6	1
Shore protection (Subj. Head.)	13	0
Stream restoration (Subj. Head.)	2	1
Sustainable development (Subj. Head.)	369	94
Water pollution (Subj. Head.)	128	6
Wildlife conservation (Subj. Head.)	90	5

Although the J. Murrey Atkins Library currently has adequate library holdings to support the proposed new "Interdisciplinary Minor in Environmental Sciences" program,, it is recommended that the Departments of Geography and Earth Sciences and Biology continue to purchase additional current books in the above listed subject areas to further support the proposed program.

Barbara Tierney *Barbara Tierney*

January 11, 2012

Signature of Evaluating Librarian Date

Allan, Craig

From: Knoblauch, Cy
Sent: Monday, November 01, 2010 10:18 AM
To: Allan, Craig
Subject: RE: Environmental Sciences Minor

Craig

The Biology Department has reviewed your proposal for an Environmental Sciences minor and is happy to support it.

Cy

From: Allan, Craig
Sent: Monday, October 25, 2010 3:31 PM
To: Knoblauch, Cy
Subject: Environmental Sciences Minor

Hi Cy
I hope all is well with you. I am writing to ask if we might get a memo of support from Biology for the Environmental Sciences minor. We would like to begin to move this through the curriculum process. I believe John Chadwick has worked with your interested faculty and that they have agreed on the curriculum.

Craig