Cover/Signature Page - Abbreviated Template/Abbreviated Template with Curriculum

Institution Submitting Request: University of Utah
Proposed Title: Interdisciplinary Graduate Certificate in Sustainability
Currently Approved Title: N/A
School or Division or Location: Graduate School
Department(s) or Area(s) Location: Graduate School
Recommended Classification of Instructional Programs (CIP) Code (for new programs): *30.3301*
Current Classification of Instructional Programs (CIP) Code (for existing programs): *00.0000*
Proposed Beginning Date (for new programs): *08/15/2014*
Institutional Board of Trustees' Approval Date: *MM/DD/YEAR*

Proposal Type (check all that apply):

| Regents' General Consent Calendar Items | | |
|---|---|---|
| *R401-5 OCHE Review and Recommendation; Approval on General Consent Calendar* | | |
| SECTION NO. | | ITEM |
| 5.1.1 | ☐ | Minor* |
| 5.1.2 | ☐ | Emphasis* |
| 5.2.1 | ☐ | Certificate of Proficiency* |
| 5.2.3 | ☒ | Graduate Certificate* |
| 5.4.1 | ☐ | New Administrative Unit |
| | ☐ | Administrative Unit Transfer |
| | ☐ | Administrative Unit Restructure |
| | ☐ | Administrative Unit Consolidation |
| 5.4.2 | ☐ | New Center |
| | ☐ | New Institute |
| | ☐ | New Bureau |
| 5.5.1 | ☐ | Out-of-Service Area Delivery of Programs |
| 5.5.2 | ☐ | Program Transfer |
| | ☐ | Program Restructure |
| | ☐ | Program Consolidation |
| 5.5.3 | ☐ | Name Change of Existing Programs |
| 5.5.4 | ☐ | Program Discontinuation |
| | ☐ | Program Suspension |
| 5.5.5 | ☐ | Reinstatement of Previously Suspended Program |
| | ☐ | Reinstatement of Previously Suspended Administrative Unit |

*Requires "Section V: Program Curriculum" of Abbreviated Template

Chief Academic Officer (or Designee) Signature:
I certify that all required institutional approvals have been obtained prior to submitting this request to the Office of the Commissioner.

_____
Signature Date: *MM/DD/YEAR*

Printed Name: *Name of CAO or Designee*

PROPOSAL TO ESTABLISH AN
INTERDISCIPLINARY GRADUATE CERTIFICATE IN SUSTAINABILITY

February 2014

## Section I: Request

This proposal requests the establishment of an Interdisciplinary Graduate Certificate in Sustainability, to be awarded by the Graduate School, with the Global Change and Sustainability Center (GCSC) providing faculty and staff to support administrative and advisory needs, effective upon approval.

### Faculty Consultation

Many faculty from a wide range of Colleges and Departments were consulted during the process of developing this proposal. This proposal was developed by: 1) a committee of interdisciplinary faculty from the GCSC (Brenda B. Bowen, GCSC Associate Director and Associate Research Professor of Geology and Geophysics, Jim Ehleringer, Distinguished Professor of Biology and GCSC Director, and Keith Bartholomew, Associate Professor of Urban Planning and GCSC Executive Committee representative for the College of Architecture and Planning) and 2) the Sustainability Curriculum Development (SCD) Co-Directors (Dan McCool, Professor of Political Science and Director of the Environmental and Sustainability Studies Program, and Steve Burian, Associate Professor of Civil and Environmental Engineering and GCSC Associate Director) and their Graduate Research Assistant (Mercedes Ward, PhD student in Anthropology).

In crafting the Certificate proposal this group consulted with the Dean of the Graduate School (Dean David Kieda, former Dean Charles Wight and former Interim Dean Donna White, now Associate Dean of the Graduate School), members of the President's Sustainability Advisory Board (e.g., Chris Hill, Amy Wildermuth, and David Chapman), the Office of Sustainability (i.e., Myron Willson and his staff; now the Sustainability Resource Center), and many faculty from departments across campus. The purpose of these consultations was to align the proposed program with the broader vision related to sustainability at the University, to encourage faculty support and engagement with both the design and implementation of the Certificate, to vet the proposed administrative and curricular structure of the Certificate, and to develop the impact that this program will have on the University's STARS (Sustainability Tracking, Assessment, and Rating System) ranking.

Formal meetings were organized by the SCD co-directors around the themes of water sustainability and sustainability leadership to gain faculty input. Additional faculty engagement came through informal conversations and email exchanges. The attendees at the formal meetings are listed below.

| Water Sustainability | |
|---|---|
| Jim Ehleringer | Biology |
| Keith Bartholomew | City and Metropolitan Planning |
| Ramesh Goel | Civil and Environmental Engineering |
| Jim Vanderslice | Family and Preventive Medicine |
| Rod Larson | Family and Preventive Medicine |

| | |
|---|---|
| Bill Johnson | Geology and Geophysics |
| Bob Adler | Law |
| Brooke Thorn | Mission-Based Management |
| Ed Barbanell | Philosophy |

| Sustainability Leadership | |
|---|---|
| Nan Ellin | City and Metropolitan Planning |
| Stephen Goldsmith | City and Metropolitan Planning |
| Tariq Banuri | City and Metropolitan Planning |
| Heather Canary | Communication |
| Cathleen Zick | Family and Consumer Studies |
| Bill Hesterly | Management |
| Tina Diekmann | Management |
| Alan Lindsay | Master of Science and Technology Program |
| Thomas Hethmon | Mining Engineering |
| Maximilian Werner | Writing |

Additionally, the proposal was discussed with those within University-wide sustainability leadership positions including the President's Sustainability Advisory Board (PSAB) (see Appendix A for letter of support from the PSAB), the GCSC Executive Committee (which includes faculty representatives from each of the affiliated Colleges), and the Sustainability Deans. The individuals who were present at these meetings are listed below.

| President's Sustainability Advisory Board | |
|---|---|
| Chris Hill, Chair | Distinguished Professor, Biochemistry |
| David Chapman | Professor, Geology & Geophysics |
| Frank Brown | Dean, College of Mines and Earth Science |
| Jerry Basford | Associate Vice President of Student Services |
| Bruce Gillars | Director Space Planning and Management |
| Lynette Seebohm | Assistant Vice President for Strategic Planning Health Sciences |
| Talley Goodson | CEO, 3form |
| Joan Gregory | Associate Director Info Resources and Facilities, Eccles Library |
| Susie Petheram | Doctoral student in Metropolitan Planning |
| Jack Reneo | Goldman Sachs, Chair of GS Env. |
| Amy Wildermuth | Associate Vice President, Academic Affairs |
| Rober Adler | Professor, Law |
| Anya Plutynski | Associate Professor, Philosophy |
| Marlene Plumlee | Associate Professor, Accounting |
| Jai Bashir | Undergraduate representative |

| Global Change and Sustainability Center Executive Committee | |
|---|---|
| Jim Ehleringer | Director, Biology |
| Brenda Bowen | Associate Director, Geology & Geophysics |
| Steve Burian | Associate Director, Civil & Environmental Engineering |
| Keith Bartholomew | College of Architecture & Planning |
| Dave Bowling | College of Science |
| Andrea Brunelle | College of Social and Behavioral Science |

| | |
|---|---|
| Lincoln Davies | College of Law |
| Paul Jewell | College of Mines and Earth Sciences |
| Eric Pardyjak | College of Engineering |
| Myron Willson | Director, Office of Sustainability |
| Cheri Daily | Director, National Corporate and Foundation Relations |

| Sustainability Deans | |
|---|---|
| Brenda Scheer | Dean, College of Architecture + Planning |
| Rich Brown | Dean, College of Engineering |
| Jay Graves | Dean, College of Health |
| Mark Bergstrom | Associate Dean, College of Humanities |
| Rick Lake | Assistant Dean of Operations, College of Business |
| Robert Adler | Professor and Representative from College of Law |
| Jim Ehleringer | Distinguished Professor of Biology and GCSC Director |
| Myron Willson | Director, Office of Sustainability |
| Bill Johnson | Professor and Representative from College of Mines and Earth Science |
| Cheri Daily | Director, National Corporate and Foundation Relations |

## Section II: Need

### Sustainability

This Certificate program addresses the need for a collaborative, interdisciplinary program that will give students grounding in the overlap between science, society and policy that will prepare them to address global change and sustainability issues. In recent years the word *sustainability* has taken on a variety of meanings as it is applied across a broad range of contexts by people working from multiple perspectives. The University of Utah has adopted the following definitions, developed by committees of faculty, for "sustainability in the curriculum" and "sustainability related research."

> *Sustainability is the harmonious and equitable interaction among ecological, social, and economic systems that provides resources for current generations and leaves future generations with no less access. Sustainability curriculum provides the necessary breadth and depth of knowledge, skills, and critical and creative thinking to implement solutions for, and adapt with, the interconnected ecosystems for present and future generations.*
>
> *Sustainability research investigates responsible management and the viability of natural, social, and economic systems so that future generations may have the same opportunities to live, work, and play that we enjoy*.

These definitions reflect the broad consensus that approaches to creating a more sustainable future require that a balance be achieved between the competing interests of environmental stewardship, economic stability and social justice. These "three pillars" of sustainability are "glued together" by the good governance that recognizes the interwoven political, social, technical, and economic challenges of preserving natural ecosystems while using the Earth's resources to support humanity. These definitions also share a concern for intergenerational equity – yet the Interdisciplinary Graduate Certificate in Sustainability will encourage and empower students to move beyond the limitations of this framing so that they can envision and create a *better* world with *improved* access, opportunities, and well-being for all.

These are the core principles that frame the Interdisciplinary Graduate Certificate in Sustainability proposed for the University of Utah.

While several departments on campus are engaged in educational initiatives that relate to sustainability, this Certificate will fill a unique niche in that it will provide a mechanism for graduate students across campus to complement their area of expertise with interdisciplinary literacy in sustainability themes. For those students gaining expertise in social science and humanities, the Certificate program will provide scientific and technical literacy. Conversely, the program will expose natural scientists and engineers to issues such as social and environmental justice. The Certificate will not compete with any existing department or college, but will complement and strengthen their programs by building linkages between academic communities and encouraging students to engage in courses outside of their home department and college.

## Purpose

The purpose of the Interdisciplinary Graduate Certificate in Sustainability is to develop students' *interdisciplinary* sustainability skills and knowledge so that they are better equipped to address the complex problems facing our planet that are beyond the scope of any single discipline. The Certificate will train students learning the mechanics of academic research to link and collaborate across broad disciplinary boundaries. The interdisciplinary awareness, skills, and literacy that they develop through the Certificate will enhance their graduate education without compromising their disciplinary area of graduate expertise acquired through their major course of study. The program also aims to provide students with opportunities to be involved with campus and community sustainability efforts. Through the program students will expand their career opportunities as well as their capacities to be agents of transformational change within their communities and institutions.

## Program description

The Interdisciplinary Graduate Certificate in Sustainability will provide students with an advanced interdisciplinary education on a comprehensive spectrum of sustainability topics and give students a basic grounding in global change and sustainability science, technology, policy, and application. The Certificate will be awarded by the Graduate School, with the Global Change and Sustainability Center (GCSC) providing faculty and staff to support administrative and advisory needs. The Certificate is designed for students enrolled in graduate degree programs at the University of Utah, but the program is also open to non-degree-seeking students. The Certificate requires a minimum of 16 credit hours, which are distributed between a series of core and elective courses. Students will take an interdisciplinary seminar course, an interdisciplinary project-based course, a "gateway" course into one of three tracks, and three approved electives drawn from over two dozen departments on campus. The integrated program emphasizes teamwork and is designed to bring together students from across campus to participate in a shared core curriculum and cohort experience.

Because the interconnections between economic, social, and environmental systems must be recognized and understood by sustainability practitioners and researchers, the core curriculum emphasizes systems-thinking and the elective curriculum is designed around these "three pillars." Students completing the requirements of the Interdisciplinary Graduate Certificate in Sustainability will be able to:

1. Demonstrate both *breadth* in sustainability literacy and key concepts and *depth* in a particular thematic area of expertise
2. Utilize *systems thinking, life cycle analysis, and other concepts and tools* to analyze the complex interconnections among social, economic, and environmental systems

3. Communicate and collaborate across disciplinary boundaries
4. Reflect deeply about the ethical practice of sustainability (e.g., recognize inherent conflicts of interest, trade-offs, and moral dilemmas – and discuss them in a way that shows an ability to weigh the pros and cons of complex sustainability strategies, recognize different stakeholder perspectives, and understand that costs and benefits are not equally distributed).
5. Imagine, evaluate, and implement visions of sustainable practices and values through the translation of *knowledge of sustainability* into *actions for sustainability*.

To ensure that students gain depth in a cross-disciplinary area of expertise, the Certificate will offer three distinct tracks: 1) Leadership, 2) Water, and 3) Global Change. However, the program will be flexible enough to allow students to explore issues in ways that are most meaningful to them, and that fit within the broad range of demands of degree programs across campus. Therefore students may be allowed to design unique tracks in consultation with the Program Director and the Interdisciplinary Graduate Certificate in Sustainability Advisory Committee. A parallel group has been created to advise the newly created undergraduate Integrated Certificate in Sustainability program and the two advisory groups may be combined in the future for efficiency. As the Interdisciplinary Graduate Certificate in Sustainability is implemented and matures, new tracks may be added in the future as strategic areas of interest are identified.

## Need

### University Mission

According to the University of Utah's Strategic Vision (June 2012), the University maintains seven core commitments, including "the pursuit and practice of sustainability" through the promotion and coordination of "interdisciplinary and cross-campus sustainability research, learning, and programs." The Interdisciplinary Graduate Certificate in Sustainability is one concrete way that the University can demonstrate that this core commitment is being realized.

In addition to the University's core commitment to sustainability, the University of Utah's Mission includes the "advance [of] rigorous interdisciplinary inquiry, international involvement, and social responsibility" – and it encourages its faculty, staff and students "to contribute time and expertise to community and professional service, to national and international affairs and governance, and to matters of civic dialogue." Several recent developments on campus – such as the creation of the Office for Global Engagement and the opening of the editorial office for the international journal, *Development* – reflect these aspects of the U's Mission and create new opportunities for faculty and students to engage in global sustainability initiatives. The Interdisciplinary Graduate Certificate in Sustainability will similarly further advance the Mission of the University through its interdisciplinary approach and development of new sustainability scholars and practitioners on campus, in the Salt Lake community, and across the world. Moreover, because the Certificate will create a new educational opportunity for not only matriculated students but also non-degree-seeking students, it will help the University meet the Governor's call for creating an educated citizenry and workforce such that "at least 66% of Utahns ages 20 to 64 will have a postsecondary degree or certificate" by 2020 (Governor's Education Excellence Commission 2011).

### Demand for Interdisciplinary Sustainability Education

There is widespread recognition of the importance of interdisciplinary education for sustainability, and research indicates that sustainability curriculum programs are growing nationally. Research conducted by the Council of Environmental Deans and Directors (CEDD) of the National Council for Science and the

Environment found that since 2008 the number of interdisciplinary environmental (IE) and sustainability degree programs among four-year colleges and universities in the U.S. increased by 57% -- and the number of schools hosting such programs increased by 29% (Vincent et al. 2012). The study's authors also observed that, "[t]he last few years have seen an expansion of IE and sustainability schools and colleges and an emergence of degree-granting institutes and centers. IE and sustainability institute and centers are an increasingly popular academic home for IE and sustainability degree progams at all types of institutions" (*Ibid*., p. 5). CEDD also conducted a study of growth in enrollment in broadly interdisciplinary environmental degree programs in the U.S. and found that "58% report a growth trend in enrollment from 2003-08 and another 29% reported steady enrollment for that period" (Vincent 2009, p. 3).

These trends also reflect the growing job opportunities in sustainability and the "green economy." For example, recent survey data acquired by the Bureau of Labor Statistics (BLS) on green jobs, when matched with BLS employment data, indicate that green industries are growing faster than the overall economy – and U.S. states that have stronger green economies have fared better during the economic recession (Pollack 2012). The executive director of the Association for the Advancement of Sustainability in Higher Education (AASHE), Paul Rowland, explains what some employers are looking for when hiring:

> *What I hear, and I've had conversations with people at Dow, in the wind industry and your typical utility folks . . . I would say they agree that they're looking for people with a skill set aimed toward problem solving in teams, across disciplinary boundaries, and are able to understand the classic triple bottom line: economics, but also environmental and social impacts* (Eshelman 2012).

Indeed, according to Vincent (2009, p. 3), "the U.S. Department of Labor projects a 25% increase in the number of environmental scientists and specialists positions by 2016 and the online job site search engine SimplyHired.com indicates a large number of current postings (>125K) for environmental positions." A SimplyHired.com search on 12-14-12 for the key word "environmental" produced 138,856 job postings and a search for "sustainability" produced 120,997 job postings from across the web.

The growth in interdisciplinary environmental and sustainability programs also reflects the emerging consensus among sustainability researchers and practitioners about the importance of bringing together people from diverse disciplinary backgrounds to work collaboratively. Both the National Science Foundation (NSF) and the National Institutes of Health (NIH) increasingly require research grant proposals to incorporate interdisciplinary approaches. This reflects the research value of interdisciplinary collaboration: "At NSF, we see the transformative research of the future emerging at the boundaries between the traditional scientific and engineering disciplines, and climate change is no exception. Some of the most compelling and paradigm-changing research results have come from multidisciplinary teams that include the human science aspect" (http://www.nsf.gov/news/special_reports/climate/people_background.jsp). And the NIH recognizes that human well-being is connected to economic and environmental systems (the three pillars of sustainability):

> *The NIH's mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce the burdens of illness and disability. However, recently there has been an increased understanding that economics, environmental health and human well-being are all interconnected and interdependent. Protecting the environment has become NIH's priority as well.* (http://www.nems.nih.gov/Sustainability/Pages/sustainability.aspx)

The connection between Earth systems and human systems is of critical importance, as the Environmental Protection Agency (EPA) points out: "Extreme weather events, sea level rise, shifting precipitation and runoff patterns, temperature changes, and resulting changes in water quality and availability contribute to a complex scenario of climate change challenges that have potentially significant implications for the sustainability of the water sector" (http://water.epa.gov/infrastructure/watersecurity/climate/index.cfm). Global change, climate, water, and human well-being are all interconnected – and these are all areas of scholarly strength at the University of Utah.

And because sustainability thinking recognizes multiple systems (social, economic, and environmental), it is a framework of particular importance in the interconnected, globalized world of the 21st century. Effective leaders must be able to understand and navigate through these complex relationships without losing sight of the long-view. Good leadership is more than a job skill; it is, as former Secretary General of the United Nations, Boutros Boutros-Ghali, said: "an essential ingredient at all levels of human life" (Boutros-Ghali 1998, p. 6). He continued:

> *In this time of historic transition, we urgently need leadership that, while constantly and closely attuned to the rapidly changing pulse of human affairs, can project a comprehensive, coherent, and compelling vision of human society, communicate that vision convincingly to the world's peoples, foster its implementation through cooperative endeavor, and make and follow through on the hard decisions that will inevitably arise. The quality of leadership we engender – globally, nationally, and at the grass-roots level – will determine the kind of world we live in, and the state of the world that future generations will inherit.*

In the summer of 2012, sustainability was identified by the President of the University of Utah as one of the seven core values associated with the University's strategic vision. The integrated and interdisciplinary education of future sustainability experts and leaders is a widely recognized and important goal – and one which the University of Utah recently acknowledged with the establishment of an undergraduate Integrated Certificate in Sustainability (http://ugs.utah.edu/sustainability-certificate/). In addition, sustainability has been identified as an essential emerging field by the University of Utah J. Willard Marriott Library, which published a "Sustainability Collection Development Policy Report" in October of 2012 and is working to expand the University's resources in this area (see Appendix A for letter of support from the Deans of the Marriott Library). The proposed Interdisciplinary Graduate Certificate in Sustainability is a logical extension of the recently established undergraduate certificate to the graduate student population, and aligns well with the priorities emphasized by the administration.

Student Interest at the U

The undergraduate Integrated Certificate in Sustainability began enrolling students in Fall 2012, and according to the program advisor, there are currently 6 students enrolled (E. Barbanell, personal communication, October 30, 2013). An informal survey conducted among students in the Global Change and Sustainability Seminar (Spring 2013) asked, "If the University does offer [the Interdisciplinary Graduate Certificate in Sustainability], would you be interested in participating in it?" Seven students (58%) responded "yes," 4 students (33%) responded "maybe," and only one student (8%) said "no." A similar informal survey conducted in the Hydrotopia course (Spring 2013, and the proposed introductory course for the water track) produced similar results with 15 students (65%) stating they would be interested in the proposed Certificate. This, combined with student responses to other survey questions in both courses, suggests that there is student interest in the Certificate. The level of interest is expected to rise once students are provided with full program details at the beginning of their graduate studies and can plan their

course of study accordingly. Similar graduate sustainability programs offered at other PAC-12 institutions provide some indication of the level of student demand that can be expected. For example, the 2010-2011 students in UCLA's Leaders in Sustainability Certificate program came from 30 different fields (Jau and Truong 2011), with 16 students in the 2013 graduating class (the 6th graduating class; Martin 2013). And the University of Arizona's Global Change PhD Minor, according to the program's website, currently has 21 students enrolled from 10 different degree programs.

Existing Graduate Sustainability Programs

During the development of this Certificate proposal, a web survey of existing sustainability-related programs in Utah and within the PAC-12 was conducted. The results show that there is currently a dearth of interdisciplinary programs at the graduate level with an explicit focus on sustainability in the state of Utah (Appendix B). Among the University's peer institutions (specifically, the PAC-12), there are many innovative interdisciplinary programs that relate to sustainability (Appendix C), although none quite like what is being proposed here. It is important that the University of Utah keep pace with its peers and fill a void in the available programs in the State of Utah.

In particular, the research found:

- There are no existing interdisciplinary graduate certificates in sustainability in the State of Utah.
    - Weber State University has a graduate certificate in Environmental Sustainability for Business, but the curriculum is geared towards MBA students and is primarily focused on business and economics (although non-MBA students may also complete the certificate).
    - Utah State University has many programs related to environment and sustainability, but these programs tend to emphasize engineering and / or natural resource management. The most relevant program is a Master's and PhD program in Human Dimensions of Ecosystem Science and Management.
    - Westminster College offers an MA and certificate in Community Leadership. However, although students may choose to focus on sustainability issues, it is not a required focus.
- There is a variety of interdisciplinary sustainability-related graduate programs among PAC-12 institutions, suggesting that (1) there is widespread recognition of the value of an interdisciplinary approach to sustainability curriculum design, and (2) the University of Utah is in good company as it moves forward with an interdisciplinary sustainability graduate certificate.
- None of the existing PAC-12 programs are designed quite like the one being proposed here. Rather than creating several separate certificates, the proposal will create one Interdisciplinary Graduate Certificate in Sustainability *with multiple tracks*. The integrated curriculum recognizes that sustainability issues intersect all dimensions of society and environment, regardless of how each discipline prefers to carve up the issues. An essential part of being a successful interdisciplinary collaborator is simply appreciating the different epistemological and methodological approaches of disciplines other than one's own (Strober 2010). The advantages of an integrated program have also been recognized by the Faculty Environmental Network for Sustainability at MIT who have recently proposed a Certificate of Advanced Graduate Study in Environment and Sustainability. The proposed MIT interdisciplinary program would be campus-wide, open to all graduate students regardless of home department, and require a sub-specialization in one of 8 (or more) areas (such as Design and Management of Sustainable Systems, Water Policy and Landscape Design, or Urban Sustainability). The MIT program would, like the program being proposed here, not be housed within a single academic department or college because doing so "would directly contradict

the inclusive multidisciplinary nature of the learning experience they were trying to create" (MIT Faculty Environmental Network for Sustainability n.d.).

- The most relevant existing programs among the PAC-12 are presented in Table 1.

Table 1. Most-similar interdisciplinary sustainability graduate certificate programs at PAC-12 institutions.

| Institution | Program | Type | Units |
|---|---|---|---|
| Oregon State University | Water Conflict Management and Transformation | Graduate Certificate | 18 |
| UC-Berkeley | Leadership in Sustainability and Environmental Management | Professional Program through Berkeley-Extension | 8 |
| | Responsible Global Change Management | Professional Program through Berkeley-Extension | 58 hrs instruction |
| UCLA | Global Sustainability | Certificate through Extension UCLA-Extension | 36 |
| | Leaders in Sustainability | Graduate Certificate | 16 |
| University of Arizona | Connecting Environmental Science and Decision Making | Graduate Certificate | 15 |
| | Global Change | PhD Minor | 13 |
| | Water Policy | Graduate Certificate | 12 |
| University of Colorado at Boulder | Environment, Policy and Society | Graduate Certificate | 18 |
| | Sustainable Practices | Professional Certificate | 3 core courses |
| University of Oregon | Oregon Leadership in Sustainability | Graduate Certificate | 33+ |
| University of Southern California | Sustainable Cities | Graduate Certificate | 14-15 |
| University of Washington | Climate Science | Graduate Certificate | 17 |
| | Decision Making for Climate Change | Certificate offered through Professional and Continuing Education Program | N/A |
| | Environmental Management | Graduate Certificate | 17 |
| | Interdisciplinary and Policy Dimensions of the Earth Sciences | Graduate Certificate | N/A |
| | Wetland Science and Management | Certificate offered through Professional and Continuing Education Program | N/A |

For additional details about sustainability-related programs, see Appendix B (Utah programs) and Appendix C (PAC-12 programs). The lists in these appendices do not include traditional disciplinary programs such as Environmental Engineering or Ecology, although these programs may cover sustainability issues. Of special interest (for comparison to what is being proposed here) are those graduate-level programs that are (1) explicitly focused on sustainability, (2) explicitly interdisciplinary in their approach to environmental and sustainability issues, and/or (3) explicitly related to global change, water and climate, or sustainability leadership. A few other semi-related programs (e.g. Applied Environmental Geoscience) are included only to broaden the perspective of what the University's peer institutions are doing when it comes to sustainability programs.

## Section III: Institutional Impact

### Audience

The program is open to (1) degree-seeking graduate students from any Department or College at the University of Utah and (2) non-degree-seeking students with Bachelor's degrees. However, the program is not explicitly designed to meet professional student needs (e.g. night or online courses) or interests (e.g. Executive Education).

### Rationale

There is no single profession or discipline that exclusively focuses on fostering sustainability. Sustainability professionals work in a wide range of private and public sectors, including science, engineering, law, architecture, planning, business, medicine, health care, development, tourism, natural resources, education, and media/communication. The overarching objective of the Interdisciplinary Graduate Certificate in Sustainability is to give students across campus, as well as professionals within the local community, the opportunity to expand their educational experience beyond their area of disciplinary expertise. For example, a graduate student focusing on environmental engineering or natural science would benefit from the exposure to social science, economics, and policy; a graduate student focusing on communication or humanities would benefit from the exposure to ecology and earth systems science; and a working professional or community organizer involved with making environmental and sustainability decisions would benefit from both the breadth and the depth of the curriculum. While students could select interdisciplinary coursework by themselves, the structure, advising, and cohort experience provided by the Certificate framework offer a clear pathway to an interdisciplinary graduate education in sustainability, which will be recognized in the form of a Certificate noted on students' transcripts.

### Administration

The University of Utah Graduate School will be the administrative home of the Interdisciplinary Graduate Certificate in Sustainability (IGCS) and grant the Certificate. The Global Change and Sustainability Center (GCSC) will provide the faculty and staff support to conduct the Certificate administration, marketing, and student advising. Specifically, the Program Director is proposed to be a GCSC Associate Director, and overarching program planning, advising, implementation and assessment will occur through the IGCS Advisory Committee, comprised of the Program Director and Assistant (GCSC staff), the Dean (or Associate Dean) of the Graduate School, a GCSC faculty representative, and Faculty Advisors for each of the tracks solicited from GCSC affiliates and the broader university community (volunteer faculty service) (Figure 1; see Appendix A for letters of support from David Kieda, Dean of the Graduate School, and Jim Ehleringer, Director of the GCSC).

The Advisory Committee will be responsible for overseeing the IGCS program, student recruitment, admissions, student advising, coordination, and program assessment. The content and learning outcomes of the core courses and applicable electives will be reviewed and approved by this committee. The Program Director and Assistant will create and update the program website, communicate with departments about curricular requirements and course scheduling, help to advise the students about elective courses and scheduling, etc. The Program Director will also organize and/or teach core courses, and oversee improvement of the program annually in response to assessment. The Certificate builds on the existing interdisciplinary graduate courses developed by the GCSC, and will draw electives from existing courses in over two dozen departments on campus (see Table 2).

Rationale

The truly interdisciplinary nature of sustainability themes warrants the unique need to host this program, and other related certificates and/or degree programs that might emerge, outside of a single College or Department. Sustainability cross-cuts all disciplines – and it is important that all feel welcome to participate in creating a more sustainable future. This proposal is for *a broadly interdisciplinary program that extends across colleges*, not only across departments within a college. Communication, cooperation, and collegiality across traditional disciplines are fundamentally important to sustainability, and achieving these goals warrants a relatively unique administrative structure.

A similar administrative structure exists for the Master of Statistics (MStat) program at the University of Utah. The Graduate School is home to the MStat program (and provides some base funding), but the University Statistics Committee was formed specifically to administer the MStat program. This committee consists of a chair, one regular voting member from each of five tracks, and ad hoc members (either from the tracks or from among faculty that have an interest in statistics and / or teach for the program; see http://mstat.utah.edu/committee-procedures.php for further administrative details). However, although the University Statistics Committee is interdisciplinary, the MStat degree is granted in the department corresponding to the track the student has chosen (e.g., the MStat in Sociology is granted in the Department of Sociology). Because there are no corresponding departments to the tracks of the Interdisciplinary Graduate Certificate in Sustainability, the Certificate will be awarded by the Graduate School.

About the GCSC

In 2009, united by a shared interest in interdisciplinary research and graduate training, faculty from four colleges founded the Global Change and Ecosystem Center. Membership has since expanded to represent a broader spectrum of faculty interested in sustainability, dynamics and adaptation in ecological systems, climate systems, and how global changes impact society. To better reflect the range of interests, in April, 2012, the name was changed to The Global Change and Sustainability Center (GCSC). The center promotes interdisciplinary research by faculty and students on the structure and functioning of both natural and human built systems and on the impacts of global changes on these systems. The GCSC currently has over 75 affiliated faculty members that represent 8 colleges on the University of Utah campus (Colleges of Science, Mines and Earth Science, Social and Behavioral Science, Engineering, Architecture and Planning, Law, Humanities, and Health). The affiliate faculty have notable interdisciplinary strengths in: water and climate, ecological dynamics, environmental change, humans and their environment, and environmental policy and law. The GCSC is dedicated to providing an interdisciplinary community to promote multi-investigator cross-cutting research initiatives on campus, and to promoting interdisciplinary research and training opportunities for students. The GCSC currently hosts two interdisciplinary courses

that are required for students who receive GCSC fellowships and open to students from across campus: the GCSC seminar (currently listed as BIOL 6964) and Global Changes and Society (currently listed as BIOL 7961-2). In the Fall 2012 semester, the GCSC seminar had 16 graduate students from 7 different departments enrolled in it.

Figure 1. Administrative organizational structure of the Interdisciplinary Graduate Certificate in Sustainability. All program development and decision-making will occur through the IGCS Advisory Committee.


New Course Designator Request

This proposal requests a new course prefix of SUST ("Sustainability") for the core courses that are not tied to a single department. These courses are (1) broadly interdisciplinary, (2) involve co-teaching and/or

involvement of multiple faculty from different departments, and (3) do not belong to any one department or college, and as such there is no other appropriate existing course designator. The SUST prefix will be associated with an official UGS (Undergraduate Studies) course designator, and student credit hours (SCH) generated through the SUST core courses will be returned to the department of the course instructor (see Appendix A for letters of support from Martha Bradley, Dean of Undergraduate Studies and Ed Barbanell, Associate Dean of Undergraduate Studies). All courses with the SUST designator will go through an annual review and approval process through the Interdisciplinary Graduate Certificate in Sustainability Advisory Committee and the GCSC Executive Committee (a group of interdisciplinary faculty that includes representation from all of the affiliated Colleges).

## Student Advising

The students enrolled in the Certificate program will work closely with the Interdisciplinary Graduate Certificate in Sustainability Advisory Committee as they develop a curriculum plan that is best suited to their academic interests and departmental requirements. This group (identified in Figure 1) will assist in reviewing graduate student applications, recommending courses to meet the Certificate requirements, and for general support in helping students to understand how they will meet the requirements of the Certificate program.

## Admission Requirements

### Matriculated Graduate Students

All graduate students at the Universtiy of Utah will be eligible for the Certificate program. Ideally, the application process will take place in the Spring for admission the following Fall semester. Some students may opt to apply at the end of their first year, and start the Certificate program in their 2nd year. Flexibility will exist for the start date and duration of the Certificate program, but there will be an expectation of 2 years for completion and a maximum of 4 years for completion. An online application form will be developed for interested graduate students to apply.

The application requirements include: (1) documentation of undergraduate work, including a bachelor's degree from a fully accredited college or university and an undergraduate GPA of at least 3.0, (2) a description of relevant / related undergraduate or graduate coursework completed, (3) an essay describing the applicant's interest in interdisciplinary inquiry and collaboration and reason for pursuing the Certificate, and (4) two letters of recommendation (including one from their major advisor). The Interdisciplinary Graduate Certificate in Sustainability Advisory Committee will review all applications and determine acceptance based on academic background and interdisciplinary interest. Students may elect to enroll in the core courses without being officially enrolled in the Certificate program.

### Non-degree-seeking Students

While the primary audience of the Certificate is new and continuing graduate students at the University, there may be professionals within the community that would be excited for the opportunity to develop their literacy in interdisciplinary sustainability systems. While the proposed Certificate program is not designed particularly for this population of students (e.g., courses will not necessarily be offered in the evening and are not currently offered online as is common for professional-focused certificate programs), these students will be welcome into the program. Students applying for the Certificate who are not matriculated graduate students must establish their status as students with the Office of the Registrar and apply for admission to the Certificate program. The online application system described above will apply to these students as well (although letters of recommendation will not come from a faculty / major advisor), and the requirements regarding tuition and credit transfer will be unambiguously stated on the website.

## Assessment

### Summative Assessment

The summative assessment will be completed at two time periods. First, as students complete the certificate requirements they will meet with the program director and provide responses to a set of exit interview questions. The questions will solicit feedback on course, curriculum, instructor, and other elements of the program. Second, every two years program alumni will be asked to respond to a survey seeking similar feedback to the exit interview and feedback on how they have used their knowledge and skills gained during their certificate experience and what they wished they had learned in the program.

### Formative Assessment

Achieving course and program learning objectives will be assessed using embedded indicators (e.g., sustainability literacy pre- and post-program surveys, homework tasks, in-class assessments, exam questions, essays, and so on) placed in the "Gateway" course, the GCSC seminar, and the interdisciplinary "Global Changes and Society" Project course. Program outcomes will also be assessed using a curriculum matrix to confirm students have achieved the desired cognitive level for each stated learning objective (learning objectives for each track are listed below) based on the compiled performance on the embedded indicators. Through the embedded indicators, students will be assessed for their performance abilities, their substantive knowledge and their capacity for theoretical and critical reflection.

## Potential Impact on Student Enrollment

While there will be no firm limit on the numbers of new Certificate students at the start of the program, limits may be imposed depending on demand and resources. The existing core courses could potentially accommodate up to ~30 students per year.

The Interdisciplinary Graduate Certificate in Sustainability Curriculum contains three core courses (7 credit hours), plus three elective courses (9 credit hours), for a total of 16 credit hours. The core curriculum includes one semester of the GCSC Seminar (http://environment.utah.edu/seminars/seminars.html), one semester in "Global Changes and Society," an interdisciplinary project-based course offered through the GCSC, and one semester in one of the designated "gateway" courses (Global Sustainable Development, Hydrotopia, or Global Climate Change) depending on the selected emphasis track. The three electives may be selected from a list of appropriate existing courses from across campus that cover the three pillars of sustainability (Society, Economics, and the Environment) for each of the emphases (Leadership, Water, and Global Change). In addition, the Interdisciplinary Graduate Certificate in Sustainability Advisory Committee may approve new courses as well as other existing courses not on the list shown in this proposal as appropriate electives. Because students are required to take elective courses from outside of their home Departments, any given Department has the potential to have their own students take a few courses outside it but also to gain enrollment from students from other Departments. Additionally, because the Certificate is open to non-degree-seeking students, the program has the potential to increase enrollment in courses independently of other graduate programs. There is thus an incentive for Departments to have their courses included in the elective curriculum. All Colleges and Departments are welcome to contribute to the curriculum.

## Impact on STARS

The University of Utah participates in the Sustainability Tracking, Assessment & Rating System (STARS), a program of the Association for the Advancement of Sustainability in Higher Education (AASHE). STARS is "a transparent, self-reporting framework for colleges and universities to measure their sustainability

performance" and share the results with the broader higher education community (Association for the Advancement of Sustainability in Higher Education 2013). The Administration of the University of Utah has prioritized achieving a higher ranking than the U currently has (i.e., a "Gold Star" instead of a "Bronze Star"). Myron Willson, the Director of the Office of Sustainability, helped to identify the potential impact of an Interdisciplinary Graduate Certificate in Sustainability on the University's STARS ranking. As new courses are created with a sustainability focus and as students graduate from a "degree program" (includes majors, minors, concentrations, and certificates) with sustainability as a learning outcome, the more STARS' points earned. Thus, establishment of the Interdisciplinary Graduate Certificate in Sustainability will help the University to achieve its goal of a higher STARS ranking.

## Section IV: Finances

The current structure of the Graduate School and the GCSC will facilitate many of the needs for this program, however there will be some resource needs associated with development of a strong Interdisciplinary Graduate Certificate in Sustainability.

### Certificate Program Costs

| | | |
|---|---|---|
| | $30,000 | 0.25 FTE Director (Faculty) |
| | $10,000 | 0.25 FTE Staff |
| Total | $40,000 | |

Director Duties: Teach graduate project course every spring semester, coordinate seminar during fall and spring semesters, chair curriculum advisory committee, seek external funding to support certificate program (fundraising and grant proposals), improvement of the program annually in response to assessment.

Staff Duties: assist the Program Director in the admission process, creation and maintenance of the program website, communication with departments about curricular requirements and course scheduling, certificate administration, student advising, marketing, assessment coordination. We anticipate that this could be a portion of a full time staff member's duty.

The funding table below shows an estimate of the enrollment expectations for a 5-year trial period. There are many uncertainties, but the number of students enrolled in the Certificate is expected to start at approximately 10-15 (typical number of students in the Global Changes and Society course). Each year the number of students is expected to increase, especially after year 2 when the marketing has taken hold and departments across campus become familiar with the program and begin to advise students of its existence. In addition, the emphasis initially will be on matriculated and new students. As the program grows, greater emphasis will be placed on recruiting non-matriculated students especially to the leadership track. The necessary base funding is expected to decrease as the student enrollment grows and additional sources of funding are acquired during the 5-year trial period with the goal of eventually eliminating the need for base funding. Possible additional sources of funding to be explored by the Director are a certificate fee, external grants, fundraising, and contributions from other entities on campus that may have an interest in a particular interdisciplinary track. Restructuring of the certificate curriculum and course requirements may be needed as the program grows to eliminate bottlenecks and provide for a more attractive experience for students.

## Funding

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| Productivity Funds (SCH)* – GCS course (3 credits) | $4,500 (20 students) | $6,750 (30 students) | $9,000 (40 students) | $11,250 (50 students) | $13,500 (60 students) |
| Productivity Funds (SCH)* – GCSC Seminar (1 credit) | $1,500 (20 students) | $2,250 (30 students) | $3,000 (40 students) | $3,750 (50 students) | $4,500 (60 students) |
| Base Funding from Graduate School** | $10,000 | $10,000 | $10,000 | $10,000 | $10,000 |
| Base Funding from Senior Vice President for Academic Affairs*** | $24,000 | $21,000 | $18,000 | $15,000 | $12,000 |
| Total | $40,000 | $40,000 | $40,000 | $40,000 | $40,000 |

* productivity funds estimated as $75/credit hour
** base funding from graduate school to help support staff administrative support
*** base funding from SVP AA to partially support program director in combination with productivity funds

## 4th Year Program Review

In the fourth year of the five-year trial period, a subcommittee of the Graduate Council will initiate a review of the Certificate program and make a recommendation to the Senior Vice President for Academic Affairs regarding the long-term prospects for the Certificate program. Several factors will be considered in the review: (1) student enrollment, (2) finances, (3) summative and formative student assessments (see Section III above), and (4) any program changes that may have been implemented during the trial period (e.g., the creation of a new Track such as Green Technology). Consideration of the latter point is important to assess the capacity of the program to respond dynamically and adaptively to meet student needs and to maintain a viable Interdisciplinary Graduate Certificate in Sustainability.

# Section V: Program Curriculum

## All Program Courses

| Course Prefix and Number | Title | Credit Hours |
|---|---|---|
| Required Courses | SUST xxxx: GCSC Seminar | 1 |
| | SUST xxxx: Global Changes and Society- Project course | 3 |
| | SUST xxxx/DEPT xxxx: "Gateway" to track course | 3 |
| | Sub-Total | 7 |
| | | |
| Elective Courses | Elective 1- Environment | 3 |
| | Elective 2- Society | 3 |
| | Elective 3- Economics and Policy | 3 |
| | Sub-Total | 9 |

| Course Prefix and Number | Title | Credit Hours |
|---|---|---|
| | | |
| | Sub-Total | |
| | Total Number of Credits | 16 |

Example Program Schedule

Year 1:

Fall: DEPTXXXX / SUST 6XXX: "Gateway" to track course
SUST 6XXX: GCSC Seminar

Spring: Elective 1
SUST 6XXX: Global Changes and Society- Project course

Year 2:

Fall: Elective 2

Spring: Elective 3

See Appendix D for an Academic Program Completion Plan for the Interdisciplinary Graduate Certificate in Sustainability.

Program Requirements

Tracks

The breadth of sustainability related themes warrants the identification of specific areas of emphasis or "tracks" through which students can focus their studies. Three tracks have initially been identified based on perceived interest (from faculty and students) and course availability. Each track includes core and elective components (see below). The specific nature and the number of the tracks will likely evolve as faculty engagement grows and student interests and needs change over time.

The learning objectives of the three initial tracks are:

1) Learning Objectives – Leadership Track

Students completing the requirements of the Interdisciplinary Graduate Certificate in Sustainability – Leadership Track will be able to:

- Explain sustainability definitions and concepts (e.g., cradle-to-grave, whole systems thinking, triple bottom line, social justice)
- List and describe characteristics of effective sustainability leaders
- Articulate sustainability values and communicate distinctions from other ideological perspectives
- Describe and apply traits associated with effective leadership according to leadership theories
- Use principles of environmental communication to create effective sustainability messages for specific audiences
- Demonstrate effective facilitation, communication, conflict-resolution, and organizational skills to achieve consensus in groups through participatory and transparent processes
- Identify strategies for sustainability that balance environmental, economic, and social well-being, evaluate their effectiveness at achieving this balance, and assess alternative strategies
- Lead diverse groups in creating sustainability visions and achieving sustainability goals

2) Learning Objectives – Water Track

Students completing the requirements of the Interdisciplinary Graduate Sustainability Certificate – Water Track will be able to:

- Describe water planning, management, administration, and infrastructure elements
- Explain key water allocation policies
- Analyze water management decisions using computer modeling tools
- Engage in dialogue leading to conflict resolution related to water resources
- Assess implications of water management solutions in an economic, environmental, and societal context and judge tradeoffs among the three
- Articulate and recommend a vision for sustainable water systems and effectively communicate with others to plan and design multi-objective water resources solutions
- Plan, analyze, or design a water system or element taking into consideration life-cycle assessment and triple bottom line

3) Learning Objectives – Global Change Track

Students completing the requirements of the Interdisciplinary Graduate Sustainability Certificate – Global Change Track will be able to:

- Describe global change drivers and their relationships to human activities
- Explain carbon cycle and carbon producing activities
- Acquire tools and data resources available from international networks on global change and associated impacts
- Assess potential and limitations of instruments and computational methods used to analyze past, on-going, and future global change
- Synthesize available data to analyze global change trends, inter-relationships, and uncertainty
- Communicate strategies to counteract global change activities
- Judge sustainability tradeoffs of global change mitigation measures including policy, technologies, and social change
- Collaborate with diverse stakeholder groups to develop approaches to address global change challenges locally, regionally, and globally

<u>Core Curriculum (3 courses, 7 credit hours)</u>

The core curriculum is designed to bring students together from across campus to create a cohort experience, and it will emphasize systems thinking, interdisciplinary communication and collaboration skills, and teamwork. These courses will be reviewed annually and approved by the Interdisciplinary Graduate Certificate in Sustainability Advisory Committee.

The core curriculum consists of 1) a 3-credit "gateway" course for each track, 2) a 1-credit GCSC semester seminar, and 3) a 3-credit interdisciplinary project-based course.

1) Gateway Course (SUST 6XXX / DEPT XXXX) – 3 credits
   - Students will be required to take one 3-credit "gateway" course that serves to provide a shared in-depth foundation in each of the tracks. Existing courses were identified to serve this purpose, and the Certificate's Advisory Committee will work with the faculty teaching these courses to ensure that they meet the learning objectives of each track. The faculty currently teaching these courses have indicated that they are willing to modify their course to meet the desired learning objectives

(see Appendix A for letters of support from faculty currently teaching these courses). These courses will be cross-listed as SUST graduate level courses.

- Leadership Track: Global Sustainable Development (CMP 6960-002) - Tariq Banuri (City and Metropolitan Planning)
    - Course Description: This is the first course in a sequence that will examine the concept and practice of sustainable development at global, national, and metropolitan/ local levels. The first course in the series, "Global Sustainable Development", is located in what can be called "the 200-year present". It starts literally with the present, namely the current global economic crisis, which serves as the axial point for moving backward and forward – juxtaposing the history of crises and solutions of the past century with the scenarios of the next. The course employs a theoretical/historical approach and introduces strategic planning framework and the role of stakeholders, drawing lessons from successful integration of the three classic dimensions of sustainable development.
    - Course Objectives: The objective of the course is to enable students to grasp the complexity of sustainability, its relationship with different disciplines and frameworks—and indeed its ability to transcend and bridge them—and the elements that are most useful for their disciplinary or policy concerns. The course seeks to stimulate a joint inquiry into a better understanding of conceptual, political, and social trends.

- Water Track: Hydrotopia: Water Management in the West (CVEEN 6480 / PHIL 5540) - Steve Burian (Civil and Environmental Engineering) and Ed Barbanell (Philosophy)
    - Course Description: Interdisciplinary case study analysis of historical and emerging water issues and water engineering projects in the western United States. Case studies cover a range of topics such as water conservation, water supply, water-energy nexus, climate change, water and ecology, and water and society as related to specific water problems or water engineering projects in the western United States. Within the context of these case studies students learn the fundamental and advanced concepts related to water resources planning and management, water law, water resources engineering, water management modeling, and engineering and environmental ethics.
    - Course Objectives: The American West can be understood best by seeing *aridity* as its defining physical feature; this is because one can most fruitfully describe the culture of the west -- its past, its present, and its future -- as a hydraulic society. The goal of this course is to develop the next generation of professionals responsible for leading the planning, designing, managing, and operating water resources systems and facilitating the interaction of those systems with society in the west.

- Global Change Track: Global Climate Change (GEOG 5210) - Andrea Brunelle (Geography)
    - Course Description: Climate change has been occurring throughout Earth's history. Inherent processes such as the planet's tectonic activity, the Earth's relationship to the Sun and other extraterrestrial bodies, as well as atmospheric and hydrological processes have dictated an ever-changing climate pattern over a variety of time scales. Humans are altering the atmosphere in an unprecedented manner, and stand to suffer greatly from even relatively minor alterations in climate. Yet the complexity of the issue, the inertia of industry and energy use, and the reluctance of policymakers to

risk economic backlash has created a politically charged atmosphere surrounding the study of global climate change. In this class, students will be introduced to the methods and review the evidence used to study climate changes of the past, and will examine the data being used to forecast climate change into the future.

- Course Objectives: By the end of the semester you should understand: 1) the role of $CO_2$ in regulating the Earth's climate; 1) the long-term cycles of the Earth in and out of icehouse and greenhouse phases; 2) the cycles of glacial and interglacial periods within icehouse phases; 3) the effects of orbital variation on the Earth's climate, and 4) the current concern about climate change.

2) GCSC Seminar (SUST 6XXX) – 1 credit (1 semester)
   - This seminar is currently offered as BIOL 6964 and is now in its third year. The GCSC seminar series presents some of the best global change and sustainability researchers from around campus and across the country in bi-monthly hour-long lectures. Attendance is commonly ~80 faculty and students (http://environment.utah.edu/seminars/seminars.html). Enrollment in the Seminar is currently required for GCSC Graduate Fellows, and several other graduate students from across campus take it for credit as well. Certificate students will be required to enroll for at least 1 semester of this seminar at some point during the duration of their graduate career. This seminar will be offered every semester and will be coordinated by the Interdisciplinary Graduate Certificate in Sustainability Program Director.
   - As speakers are typically scheduled bi-weekly (every 2 weeks), students are engaged in interdisciplinary discussions and in-class activities in the "off weeks." Activities include introduction to each other's departments, colleges, and research disciplines, discussion of the speaker's publications and interdisciplinary research focus, and engagement in sustainability-related campus activities (e.g., with the Office of Sustainability). These experiences help to build a cohort and develop a sense of community among the disciplinarily diverse students.

3) Global Change and Society - Project (SUST 6XXX) – 3 credits
   - Course Description: This course was piloted in Spring 2012 as BIOL 7961-2 "Global Changes and Society," by Jim Ehleringer (GCSC Director and Distinguished Professor of Biology), and is currently being taught (Spring 2013) by Brenda Bowen (GCSC Associate Director and Associate Research Professor of Geology and Geophysics). This course will be offered every Spring semester and will be taught by the Interdisciplinary Graduate Certificate in Sustainability Program Director. This is a project-based course in which students work collaboratively on an interdisciplinary research-based, hands-on project related to a relevant sustainability theme. The theme of the project is identified collaboratively between the students and faculty. Students pursuing the Certificate will be required to tailor their contributions to the project according to their chosen track. Participation in this hands-on course will give the students an opportunity to build a cohort with a collection of diverse students, each bringing their unique perspective and expertise to bear on environmental and sustainability problems and solutions. Currently, this course is required for GCSC Graduate Fellows (http://environment.utah.edu/students/fellows.html).

     Example*:* In the Spring 2012 course, the students in this course represented Geography, Civil and Environmental Engineering, City and Metropolitan Planning, Geology and Geophysics, Mechanical Engineering, Biology, and Mathematics. Together, these students identified the opportunities for research, education, and outreach that would be possible with the Red Butte Creek riparian system. They developed a report about the untapped potential of the stretch of Red Butte Creek

that flows through the heart of campus, and began a dialog among the University administration, colleges and departments, the student body, and other stakeholders about recognition, revitalization, and incorporation of this asset (http://environment.utah.edu/students/rbcp.html). This project is moving forward with great momentum and is a part of overall GCSC-related initiatives to develop the campus environment as a living laboratory, to promote the University as a steward of the unique natural environment of Utah, and to help incorporate sustainability-related themes into multiple aspects of the University and the student experience.

Elective Curriculum (3 courses, 9 credit hours)

In addition to the core curriculum, the Interdisciplinary Graduate Certificate in Sustainability will require completion of a minimum of 9 credit hours through the completion of at least 3 elective courses. One of these courses may be within the student's home Department, one may be within the student's home College but outside of the student's home Department, and one must be from outside of the student's home College. These courses will be selected based on the student's chosen Sustainability track: Leadership, Water, or Global Change. Within each track, the electives must include courses focused on the 1) environmental, 2) societal, and 3) economic and policy aspects of sustainability (Figure 2). Because of the integrated nature of environmental, social, and economic systems, many courses cover several of these dimensions. However, at least three courses must be taken in total. In cases where the course taken is less than 3 credits, the student may make up the difference by either taking additional elective courses or by taking additional GCSC Seminars. This decision should be made in consultation with the Certificate Program Director.

Figure 2. Overview of Tracks and Electives for the Interdisciplinary Graduate Certificate in Sustainability.

| | Track | *Leadership* | *Water* | *Global Change* |
|---|---|---|---|---|
| Sustainability themes | *Environment* | Elective 1: Environment / Leadership | Elective 1: Environment / Water | Elective 1: Environment / Global Change |
| | *Society* | Elective 2: Society / Leadership | Elective 2: Society / Water | Elective 2: Society / Global Change |
| | *Economics & Policy* | Elective 3: Economics & Policy / Leadership | Elective 3: Economics & Policy / Water | Elective 3: Economics & Policy / Global Change |

The electives listed in the proposed curriculum were selected based on: 1) appropriate sustainability-related themes and learning outcomes; and 2) graduate-level courses that *do not have prerequisite requirements* that would prevent a student from an outside discipline from taking and being successful in the course. The identified elective courses that meet the above criteria include selections from 27 different departments / programs and 11 different colleges across campus (Table 2). Flexibility will exist to allow students to substitute if an applicable course elsewhere on campus is identified. For example, while the listed courses (Table 3) represent those that would be appropriate for *any* University of Utah graduate student to take to fulfill the Certificate requirements, some students may have the prerequisites needed for other appropriate courses that are not on this list. Given the diversity of graduate student background and interest, students will have the opportunity to customize their selected electives through an approval process with the Interdisciplinary Graduate Certificate in Sustainability Advisory Committee.

Table 2. Departments and Colleges on Campus From Which Listed Electives are Drawn

| Department or Program | College |
|---|---|
| City and Metropolitan Planning | Architecture + Planning |
| Real Estate Development | Business |
| Educational Leadership and Policy | Education |
| Civil and Environmental Engineering | Engineering |
| Health Promotion and Education | Health |
| Parks, Recreation and Tourism | Health |
| Communication | Humanities |
| History | Humanities |
| Humanities | Humanities |
| Philosophy | Humanities |
| Writing | Humanities |
| Law | Law |
| Family and Preventive Medicine | Medicine |
| Atmospheric Sciences | Mines and Earth Sciences |
| Geology and Geophysics | Mines and Earth Sciences |
| Metallurgical Engineering | Mines and Earth Sciences |
| Ethnic Studies | Office of the Associate Vice President for Diversity |
| Biology | Science |
| Anthropology | Social and Behavioral Science |
| Economics | Social and Behavioral Science |
| Environmental Studies | Social and Behavioral Science |
| Family and Consumer Studies | Social and Behavioral Science |
| Gender Studies | Social and Behavioral Science |
| Geography | Social and Behavioral Science |
| Political Science | Social and Behavioral Science |
| Public Administration | Social and Behavioral Science |
| Sociology | Social and Behavioral Science |

Table 3. Example Electives for the Interdisciplinary Graduate Certificate in Sustainability

Where,
Env = explicit focus on physical environment
Soc = explicit focus on society and social issues (especially equity, justice, and human well-being)
Econ = explicit focus on economic and policy issues
Track = L (leadership), W (water), GC (global change)
Prerequisites = the prerequisites for the course

| Course # | Title | Credits | Env/Soc/ Econ | Track | Prerequisites |
|---|---|---|---|---|---|
| ANTH 6186 | Human Ecology | 3 | Env, Soc | GC | |
| ATMOS 5400 | The Climate System | 3 | Env | GC | MATH 1050 |
| ATMOS 6030 | Climate Dynamics | 3 | Env | GC | Graduate Standing. |
| ATMOS 6100 | Atmospheric Chemistry | 1.5 | Env | W | Graduate Standing |
| BIOL 5460 | Plant Ecology in a Changing World | 3 | Env | GC | Recommended: BIOL 2010 |
| CMP 6030 COMM 6030 | Leadership and Public Participation (Public Participation and Consensus Building) | 3 | Soc | L | |
| CMP 6330 | Urban Growth Management | 3 | Econ | L, GC | |
| CMP 6350 | Public Lands and Environmental Policy | 3 | Env, Econ | L | |
| CMP 6360 LAW 7632 | Environmental Planning Law and Policy | 3 | Econ | L, W, GC | |
| CMP 6371 CVEEN 6661 GEO 6341 | Complexity and Systems Thinking | 3 | Env, Soc | L, W, GC | |
| CMP 6380 | Green Communities | 3 | Soc, Econ | L, GC | |
| CMP 6390 | Sustainability Planning | 3 | Econ | L, W, GC | |
| CMP 6500 | Preservation Theory and Practice | 3 | Soc | L | |
| CMP 6720 | Land Use and Transportation Planning | 3 | Econ | L, GC | |
| CMP 6960-2 | Special Topics: Global Sustainable Development | 3 | Soc, Econ | W, GC | |
| COMM 6360 | Environmental Communication | 3 | Env, Soc | L | |
| COMM 6490 | Communication and Social Justice | 3 | Soc | L | |
| COMM 7210 | Seminar: Managing Environmental Conflict | 3 | Soc | L | Graduate standing |
| CVEEN 6480 PHIL 5540 | Hydrotopia: Water Management in the West | 3 | Env, Soc, Econ | L, GC | Graduate standing |

| | | | | | |
|---|---|---|---|---|---|
| ECON 6260 | Energy Policy Options for Utah | 3 | Econ | L, W, GC | |
| ECON 6560 GNDR 5560 | Gender and Economic Development in the Third World | 3 | Soc, Econ | L | |
| ELP 6400 | Foundations of Educational Organizations, Policy and Leadership | 3 | Soc | L | |
| ELP 7480 | Leadership, Diversity and Social Justice in K-12 and Higher Education | 3 | Soc | L | |
| ENVST 5365 | Environmental Justice | 3 | Soc, Econ | L, W, GC | |
| ETHNC 5800 | Theories and Research on Social Inequality | 3 | Soc, Econ | L | |
| FCS 6600 | Environments and Human Behavior | 3 | Soc | L | |
| FCS 6630 | Healthy Communities | 3 | Soc | L | |
| FCS 6730 | Community Development and Environmental Change | 3 | Soc | L, GC | |
| FP MD 6530 | Global Health | 3 | Soc | L, W, GC | |
| FP MD 6700 | Environmental Public Health | 3 | Env, Soc | L | |
| GEOG 5205 | Regional and Global Climates | 3 | Env | GC | |
| GEOG 5210 | Global Climate Change | 3 | Env | L, W | Recommended: GEOG 1000 |
| GEOG 5250 | The Crystal Desert: Antarctica and Global Change | 3 | Env | GC | GEOG 1000 OR Instructor's Consent |
| GEOG 5290 | Water in Utah | 3 | Env, Soc, Econ | W | Recommended: GEOG 1000 |
| GEOG 5370 | Utah's Energy Landscape | 3 | Econ | L, W, GC | Recommended: Entry-level economics and mathematics class |
| GEOG 5375 | Sustainable Transportation | 3 | Soc, Econ | L, GC | |
| GEOG 5380 | Wilderness Issues and Management | 3 | Econ | L, W | |
| GEOG 5385 | Environmental Assessment and Impact Analysis | 3 | Env, Econ | L | |
| GEOG 6275 | Vegetation and Climate Change | 3 | Env | GC | GEOG 3270 or BIOL 1210 or Instructor's Consent |
| GEOG 6460 | Popular Literature on Global Change: A Geographic Perspective | 3 | Env, Soc | GC | GEOG 5210 or GEOG 5205 or Instructor's Consent |

| | | | | | |
|---|---|---|---|---|---|
| GEOG 6520 | Economic Geography, Industrial Location, and Regional Development | 3 | Econ | L | |
| H EDU 5050 | Health Concerns in the Developing World | 3 | Soc | L, W | |
| HIST 6840 | Global Environmental History | 3 | Soc | GC | |
| HUM 6103 | Ecology of Residency | 3 | Soc | L | |
| LAW 7200 | Natural Resources | 3 | Env, Soc, Econ | L, W, GC | |
| LAW 7230 | Water Law | 3 | Econ | W | |
| LAW 7240 | Environmental Law and Policy | 3 – 4 | Econ | L, W, GC | |
| LAW 7250 | Advanced Natural Resource Topic | 2 – 3 | Soc, Econ | L, GC | |
| LAW 7769 | Law of Climate Change | 2 | Econ | GC | |
| LAW 7790 | Energy Law | 3 | Econ | GC | |
| LAW 7831 | Climate Change Think Tank | 2 | Econ | L, GC | Year-long course. |
| LAW 7874 | Ocean and Coastal Law | 3 | Env, Soc, Econ | W, GC | |
| MET E 6320 | Materials Engineering and Environment | 2 | Env, Econ | GC | |
| PADMN 6565 | NGO Development and Leadership | 3 | Soc, Econ | L | |
| PHIL 6540 | Engineering, Ethics, and Society | 3 | Soc | W | |
| POLS 5500 | The Politics of Public Lands Management | 3 | Soc, Econ | L, W, GC | |
| POLS 5510 | The Politics of Western Water Policy | 3 | Soc, Econ | W | |
| POLS 6322 PADMN 6322 | Environmental and Sustainability Policy | 3 | Soc, Econ | L, W, GC | |
| PRT 6055 | Seminar in Sustainable Tourism and Ecotourism | 3 | Env, Soc, Econ | L | General Tourism course or Department approval. |
| PRT 6170 | Foundations of Environmental Education | 3 | Env | GC | |
| PRT 6420 | Ecology and Management of Wildland Recreation Settings | 3 | Env, Econ | L, W, GC | |
| REDEV 6200 | Urbanization | 3 | Soc, Econ | L, GC | |
| SOC 6657 | World Populations Policies and Problems | 3 | Soc | L, GC | |
| SOC 6674 | Global Health | 3 | Soc | L, GC | |
| WRTG 6080 | Nonfiction Environmental Writing | 3 | Env | L | Graduate Standing OR Instructor Consent. |

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Appendix A: Letters of Support From:

1) President's Sustainability Advisory Board (see letter for names of Board members)
2) Rick Anderson and Catherine Soehner, Deans of the University of Utah Marriott Library
3) Jim Ehleringer, Director of the GCSC and Distinguished Professor of Biology
4) Martha Bradley, Dean of Undergraduate Studies
5) Ed Barbanell, Associate Dean of Undergraduate Studies
6) Tariq Banuri, faculty in City and Metropolitan Planning (Leadership track "gateway" course instructor)
7) Steve Burian, faculty in Civil and Environmental Engineering (Water track "gateway" course instructor)
8) Andrea Brunelle, faculty in Geography (Global Change "gateway" course instructor)

The University of Utah
Department of Biochemistry

Christopher P. Hill, D.Phil
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chris@biochem.utah.edu

Department of Biochemistry
15 N Medical Dr. East, Rm 4100
Salt Lake City, Utah 84112-5650
Phone (801) 581-2117
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December 24, 2012

Dr. Brenda B. Bowen, Associate Director
Global Change and Sustainability Center

Dear Brenda,

Thank you for making a presentation of the proposed interdisciplinary Graduate Certificate in Sustainability at the December meeting of the President's Sustainability Advisory Board (PSAB). We have shared relevant documentation with the advisory board members that were not able to attend the meeting in person.

Discussions at our meeting and subsequent e-mails indicated considerable enthusiasm, and **we have voted unanimously to endorse the proposal**.

The new certificate program will offer graduate students from across campus the opportunity to extend beyond their area of expertise into the broad realm of sustainability, while also providing depth in "focus areas". Core courses will provide an opportunity to develop interdisciplinary cohorts of students, and will provide new and valuable connections between colleges and departments. Moreover, given the rapidly evolving and highly interdisciplinary nature of sustainability, the commitment to a certificate program with the flexibility to respond to emerging interests is a notable strength. We support the proposal to host this program through the Global Change and Sustainability Center, which has emerged as a hub for interdisciplinary environmental research, training, and engagement on campus. We also encourage the administration to provide the necessary resources to develop and mature the Sustainability Certificate. The proposal offers an opportunity to emulate other leading schools, including PAC-12 members, who have already developed strong programs in sustainability, and we are especially enthusiastic about the approach taken to promote interdisciplinary study between different colleges.

Sincerely,

Chris

Christopher P. Hill
Distinguished Professor of Biochemistry and Co-Chair
Leo T. and Barbara K. Samuels Presidential Chair
Chair, President's Sustainability Advisory Board

**President's Sustainability Advisory Board**

**Members**

Hill, Christopher – (Chair) Distinguished Professor
Chapman, David – (Past Chair) Professor Geology and Geophysics
Basford, Jerry – Assoc. Vice President of Student Services
Gillars, Bruce – Director Space Planning and Management
Goodson, Talley – CEO, 3form
Gregory, Joan M.– Assoc Director Info Resources & Facilities, Eccles Lib
Brown, Frank – Dean, College of Mines & Earth Sciences
Petheram, Susie – Doctoral student in Metropolitan Planning
Reneo, Jack – Goldman Sachs, Chair of GS Env.
Seebohm, Lynette Stewart – Assistant V. P. for Strategic Planning Health Sciences
Wildermuth , Amy – Associate Vice President; Academic Affairs
Robert Adler – Professor of Law
Anya Plutynski – Associate Professor, Philosophy
Plumlee, Marlene – Associate Professor
Jai Bashir – Undergraduate student

**Ex-Officio**

Bowen, Brenda – Associate Director, GCSC Research
Thompson, Geneva President ASUU student government & affairs
Boyer, Allison – ASUU Sustainability rep student government & affairs
Ehleringer, James R – Distinguished Prof., GCSC Research
Scheer, Brenda – Dean, College of Architecture and Planning
Motta, Karla – Manager, Office of Admissions Diversity
Burian, Steven – Sustainability Curriculum Dir., Assoc Prof; Civil Eng Curriculum
McCool, Dan – Sustainability Curriculum Dir, Prof - ENVST Curriculum
Daily, Cheri – Director, Corporate & Foundation Development, Development
Goldsmith, Stephen – Univ Prof for Campus Sustainability, Metro Planning UGS
Allred, Alma – Director, Commuter Services
Willson, Myron – Director, Office of Sustainability
Higgins, Cory –Director, Plant Operations, Facilities Management

THE UNIVERSITY OF UTAH

J. Willard Marriott Library
295 South 1500 East Salt Lake City, Utah 84112-0860 (801) 585-9521

January 17, 2013

Graduate Council, University of Utah
John R Park BLDG
201 S. Presidents Cir. RM 302

Dear Council:

The Marriott Library is pleased to offer support for the proposed *Interdisciplinary Graduate Certificate in Sustainability*. The Library is committed to supporting the pursuit and practice of sustainability as part of the University of Utah Strategic Vision and has already taken some significant steps towards establishing library collections and services that support interdisciplinary sustainability research, learning, and programs.

In response to a growing campus-wide interest in sustainability issues, and the recent implementation of an undergraduate certificate in sustainability, the Marriott Library has formed an active Green Team and recently appointed a librarian liaison (Amy Brunvand) to Environmental Studies, Environmental Humanities and Sustainability programs on campus. In October a team led by Brunvand received a grant from Chevron Corporation to complete an extensive *Sustainability Collection Development Report* (31 Oct, 2012). Available: http://content.lib.utah.edu/cdm/ref/collection/ir-eua/id/2620

Our report evaluated library holdings that support sustainability study and research. One important finding is that sustainability is an emerging area of study, and that researchers are still defining the canon; each sub discipline has its own foundational texts. Sustainability also has a strong regional component—also referred to as localization or re-localization, and as such, it is impossible to maintain a one-size-fits-all canon without reference to specific geographic regions.

In response to these findings the Library has been working to identify materials that specifically support sustainability initiatives at the University of Utah. The library recently purchased $5000 worth of core sustainability books and reference materials that were identified from various bibliographies and course syllabi. Since the 1990s, many new journals with a focus on sustainability have begun publication which have not yet established significant impact factors even though they are likely to become important in sustainability research. The Library is currently working to identify core journals that support specific sustainability programs on campus and are seeking faculty input regarding possible new journal and database subscriptions. Therefore, there is some work to be done in order to identify new journal subscriptions that would specifically support the emphasis areas of Leadership, Water and Climate, and Global Change.

On a national level, librarians are petitioning the American Library Association to start a new Sustainability Round Table and are becoming involved in the Association for the Advancement of Sustainability in Higher Education (AASHE) to assure that library resources are part of STARS evaluation.

The Marriott Library is proud to play an active role in sustainability initiatives at the University of Utah. We look forward to working with faculty in the Graduate Certificate Program in order to continue building collections and services that will enable a sustainable future.

Yours truly,

Rick Anderson
Acting Dean
J. Willard Marriot Library

Catherine Soehner
Associate Dean, Research and Learning Services
J. Willard Marriott Library

Global Change & Sustainability Center
THE UNIVERSITY OF UTAH

257 South 1400 East, 522 ASB
Salt Lake City UT 84112-0840
Phone: (801) 581-6414 Fax (801) 581-4665
environment.utah.edu

January 16, 2013

Dr. Brenda Bowen
Associate Director GCSC
University of Utah
Campus

Dear Brenda and Sustainability Curriculum Co-Directors,

I am pleased to provide a letter of support for the proposal to create a new Interdisciplinary Graduate Certificate in Sustainability at the University of Utah. The Global Change and Sustainability Center (GCSC) looks forward to formalizing and broadening our efforts in interdisciplinary graduate training and curriculum development through the creation of this Certificate program, and the GCSC will be proud to host, administer, and award the Certificates. We have the infrastructure in place to coordinate this activity and to ensure that there is an open communication line among students, faculty, and the central administration. Hosting the Certificate program within the Center will allow us to strengthen our long-term mission of providing interdisciplinary opportunities that unite faculty and students across campus, especially to those that are enthusiastic about solving some of the difficult environmental challenges that our planet faces. Hosting this Certificate program will complement our other graduate student related activities, including 1st-year graduate student recruiting and the development of both multi-PI research projects and training projects that support sustainability research. We recognize that hosting this program will require new resources, and have already begun to communicate with the University administration about the needs associated with expanding the role of the GCSC in this direction.

Within the GCSC, we strive to create a welcoming and campus-wide community and look forward to continued growth and new opportunities for making a positive impact for the students, faculty, campus, community, and beyond. Supporting the Interdisciplinary Graduate Certificate in Sustainability is consistent with that mission.

Sincerely yours,

James Ehleringer
Distinguished Professor of Biology
Director, Global Change and Sustainability Center

THE UNIVERSITY OF UTAH

January 9, 2013

To Whom it May Concern:

I am writing to express the support of the Office of Undergraduate Studies to the proposed Interdisciplinary Graduate Certificate in Sustainability. Last academic year, 2012-2012, the Undergraduate Council voted its approval of the undergraduate certificate in sustainability that will be hosted in the future through the Office of Undergraduate Studies. In addition, UGS will be offering the Block U in Sustainability and the Integrated Minor in Sustainability.

We believe these programs promote the core commitment embedded in the University of Utah's strategic vision--the "pursuit and practice of sustainability." We are confident that these programs will inspire students to participate in the production of new knowledge about sustainability and engage in best practices, in the wording of the strategic vision, in "protecting and enhancing the natural and built environment on the campus and environs."

UGS will host the sustainability curriculum, including posting descriptions and establishing course numbers.

We fully support this most recent proposal for the way it furthers the important work of sustainability on this campus and commit our resources to making these courses available to our students.

Sincerely,

Martha Bradley Evans

Martha Bradley-Evans
Senior Associate Vice President of Academic Affairs
Dean of Undergraduate Studies

**Office of Undergraduate Studies**
University of Utah
195 S Central Campus Dr
Salt Lake City, UT 84112-0511
(801) 581-3811
FAX (801) 585-3581

THE UNIVERSITY OF UTAH

Office of Undergraduate Studies
195 S. Central Campus Drive Salt Lake City, UT 84112-0511 (801) 581-3811 FAX (801) 585-3581

January 16, 2013

TO: Dr. Brenda B. Bowen
Associate Director, Global Change and Sustainability Center

FR: Ed Barbanell, Ph.D.
Associate Dean for Undergraduate Studies
Director of the Integrated Certificate in Sustainability

**RE: Support for an Interdisciplinary Graduate Certificate in Sustainability**

---

I have reviewed the details of the proposed Interdisciplinary Graduate Certificate in Sustainability, and I believe that the proposed Certificate program will complement the Integrated Undergraduate Sustainability Certificate Program that I direct. Additionally, I support the plan to host the Certificate program through the Global Change and Sustainability Center (GCSC). I am aware of the work of the GCSC as a key sustainability integrating entity on campus, and its position in this capacity makes it a logical location. Directing the undergraduate certificate program has made me keenly aware of resource needs to implement and manage a program of this nature, so I support your requests for resources to be directed to support this new program. Lastly, in my role as the Curriculum Administrator, your request for a specific course designator for the certificate core courses is both feasible and appropriate.

THE UNIVERSITY OF UTAH

February 11, 2013

Graduate Council
University of Utah
Salt Lake City, UT 84112

RE: Interdisciplinary Graduate Certificate in Sustainability

Dear Graduate Council,

I am writing to express my support for the proposal to establish an Interdisciplinary Graduate Certificate in Sustainability. It is a thorough and well-prepared proposal. I appreciate in particular two elements of the strategy, namely the intention to build on the existing strengths of the University, and the proposal to offer a single certificate course with multiple branches. These will, on the one hand, provide an incentive for faculty members to incorporate sustainability considerations in their course content, and on the other hand ensure that the attempt to build an integrated syllabus will not get fragmented itself.

I would also like to express my support in furthering this agenda, in order to put into practice President Pershing's goal of sustainability and prepare our students for the challenges of the 21st century.

I wish to indicate that one of my courses, CMP6960-2, Global Sustainable Development (offered in Fall 2012), will be a gateway course for the Sustainability Leadership Track. I am committed to working with the curriculum committee to ensure that this course provides the basic foundations for the track.

More generally, I would also like to indicate my availability to help support this endeavor in any other way that me be useful.

Sincerely,

Tariq Banuri, Ph.D.

**Department of City and Metropolitan Planning**
375 S. 1530 E., Rm. 235ARCH
Salt Lake City, Utah 84112-0370
(801) 585-1858
FAX (801) 581-8217

THE UNIVERSITY OF UTAH
Department of Civil & Environmental Engineering
110 South Central Campus Drive, Suite 2000 Salt Lake City, Utah 84112 (801)581-6931

**February 10, 2013**

**TO:** Dr. Brenda Bowen,
Associate Director, Global Change and Sustainability Center

**FROM:** Steven Burian, Ph.D., P.E.
Co-Director, Sustainability Curriculum Development
Associate Professor, Civil and Environmental Engineering

**SUBJECT:** Support for Interdisciplinary Graduate Certificate in Sustainability

---

I have helped you to prepare the proposal for the Interdisciplinary Graduate Certificate in Sustainability (IGCS). As part of the preparation we identified the need for three gateway courses to serve as entry into each of the three thematic tracks of the IGCS. One of the proposed tracks is water. We identified the *Hydrotopia: Sustainable Water Management in the American West* as the gateway course. This course was created by me and my co-instructor Ed Barbanell with funding support from an Interdisciplinary Teaching Grant. With this letter I commit to slightly modifying the Hydrotopia course to serve as the IGCS Water Track. Ed Barbanell and I have discussed this potential modification and are confident it will work well. We fully support the proposal and its use of our course.

THE UNIVERSITY OF UTAH

February 8, 2013

Graduate Council
University of Utah
Salt Lake City, UT 84112

Dear Graduate Council,

I am writing in support of the Interdisciplinary Graduate Certificate in Sustainability. I think this certificate will allow students to focus on the critical topic of sustainability in an interdisciplinary way that also adds the marketable addition of a certificate to their existing degree program. I believe this will be particularly valuable as sustainability continues to become more central across the boundaries of life and career.

I also want to indicate that one of my courses, Global Climate Change (GEOG 5210) will be a gateway course for the Global Change track. I'm committed to working with the certificate curriculum committee to make sure the class provides the foundation needed for that track.

Sincerely,

A Brunelle

Dr. Andrea Brunelle

**Department of Geography**
260 S. Central Campus Dr., Rm. 270
Salt Lake City, Utah 84112-9155
(801) 581-8218
FAX (801) 581-8219

THE UNIVERSITY OF UTAH

**MEMORANDUM**

**To:** Dan McCool, Sustainability Curriculum Co-Coordinator
Steven Burian, Sustainability Curriculum Co-Coordinator

**From:** Ruth V. Watkins
Senior Vice President for Academic Affairs

**Date:** April 4, 2014

**Re:** Interdisciplinary Graduate Certificate in Sustainability

It is my pleasure to lend the support of the Office of the Senior Vice President for Academic Affairs to the proposed Interdisciplinary Graduate Certificate in Sustainability. The Certificate fills an important space by providing one of the first widely interdisciplinary graduate programs in sustainability at the University of Utah. The proposal has strong support from a wide range of stakeholders on campus. I hope it is the beginning of more sustainability-related curriculum efforts across campus.

Accompanying the support of my office, I also commit to providing funds in the amount of $24,000 for year 1, and additional funding in years 2 through 5 ($21,000, $18,000, $15,000, $12,000, respectively) as noted in the proposal. This base funding will help the Certificate Program get established. After the fourth year, the Graduate School will administer an evaluation and recommendations beyond the fifth year. Based on the anticipated trajectory of the program, it is anticipated that after five years the program will be funded through other sources.

THE UNIVERSITY OF UTAH

February 3, 2014

The Graduate Council
University of Utah
201 S. Presidents Circle
Salt Lake City, Utah 84112

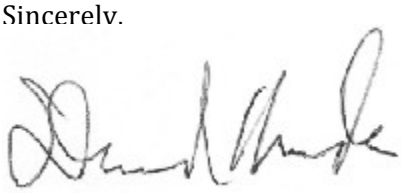
Dear Members of the Graduate Council-

The Graduate School of the University of Utah is pleased to support the proposed *Interdisciplinary Graduate Certificate in Sustainability* as part of the University of Utah's Strategic Vision. The proposed certificate program contains faculty, courses and emphases that are drawn from across the University, making it difficult to associate this graduate certificate program with a particular College or Department. The feasibility of coordinating this degree program across these administrative boundaries has previously frustrated the administrative approval of this certificate program.

Due to its strong dedication to the quality of graduate education in the State of Utah, and its campus-wide role at the University of Utah, the Graduate School can serve as an natural incubator for the pilot phase of the *Interdisciplinary Graduate Certificate in Sustainability*. If this graduate certificate is approved, the Gradate School will serve as the administrative home of the proposed *Interdisciplinary Graduate Certificate in Sustainability*. We will provide administrative oversight and support for this certificate program, as outlined in the certificate's R401 proposal. We will the $10k of administrative support per year during the 5-year pilot phase of the certificate, as outlined in this proposal. In addition, the Graduate Council will supervise a comprehensive program review of the academic and financial sustainability of the program at the beginning of the 4$^{th}$ year of the pilot phase. Renewal of support beyond the 5$^{th}$ year is contingent upon the results of this report, and the availability of funding.

In closing, I thank you for your detained consideration of the merits of this important University-wide initiative.

Sincerely,



Prof. David Kieda
Dean, The Graduate School
Professor of Physics and Astronomy
University of Utah
dean@gradschool.utah.edu

Appendix B: Existing Sustainability-Related Graduate Programs in Utah

| Institution | Program | Type | Notes | Interdisc. |
|---|---|---|---|---|
| Brigham Young University | Environmental Science | MS | "provides students with research and education opportunities in environmental protection and remediation and in plant growth and physiology."; preparation for environmental or agricultural consulting | only within the sciences |
| | Wildlife and Wildlands Conservation | MS, PhD | "emphasizes the scientific method in developing critical thinking and analytical skills applied to conservation and management problems related to wildlife ecology, wildlands, restoration science and/or rangeland ecology" | only within the sciences |
| Dixie State College | | N/A | | N/A |
| LDS Business College | | N/A | | |
| Salt Lake Community College | | N/A | There is an undergraduate certificate in sustainability as well as an AS in Environmental Geology; the Green Academy offers a variety of technical certificates in different "green" topics. | |
| Snow College | | N/A | | N/A |
| Southern Utah University | | N/A | There is an undergraduate minor in sustainability studies and an undergraduate Leadership Certificate) | N/A |
| University of Utah | Environmental and Natural Resource Law | Certificate, LL.M. | the Master of Laws is in "Environmental and Resource Law" | no |
| | Environmental Humanities | MA, MS | | humanities focused |
| | Global Health (link opens pdf) | Certificate | currently enrolled or non-matriculated students; no explicit focus on environmental issues | ~yes |
| | Human Development and Social Policy | MS | "involves research and study on important policies and issues in the family, community and social life"; no explicit focus on environmental | yes |

| | | | | |
|---|---|---|---|---|
| | | | issues | |
| | Master of City & Metropolitan Planning | MCMP (PhD in Metropolitan Planning, Policy and Design) | MCMP "emphasizes ecological resiliency, economic efficiency, and social justice through effective communication, collaboration, and innovation" | ~yes, but coursework primarily within department |
| | Professional Master of Science and Technology | MST | Environmental Science Track available | yes |
| Utah State University | Applied Environmental Geoscience | MS | 2 tracks: Energy Track, Environmental Track; program is designated as a Western Regional Graduate Program (meaning that students from participating western states qualify for in-state tuition); available online through USU's Regional Campuses and Distance Education program | Geoscience focused |
| | Biological Engineering | MS, PhD | "Our research concentrates on the cellular and sub-cellular level, exploring the engineering of microbes to create new products and industries that are bio-based, sustainable, and non-exploitive. Our areas of focus are health and medicine, the environment and renewable energy." | yes, but limited to science and engineering |
| | Bioregional Planning | MS | jointly administered by Dept of Environment and Society and Dept of Landscape Architecture and Environmental Planning; requires coursework in biophysical, social, and economic areas | yes |
| | Climate Science | MS, PhD | focus on biometeorology, "the study of the connections between living systems and the atmosphere"; program is designated as a Western Regional Graduate Program (meaning that students from participating western states qualify for in-state tuition) | unclear but emphasis definitely on science |
| | Cooperative Extension's Water Quality | N/A | provides information to public on water quality issues and Utah's watersheds | |

| | | | | |
|---|---|---|---|---|
| | Website | | | |
| | Extension Sustainability | N/A | provides information to the public: "designed to provide credible information and trainings fostering increased awareness and behavioral change to improve environmental, social, and economic conditions"; topics areas = land, water, air, food, energy; some lesson plans available | yes |
| | Fisheries Biology | MS, PhD | students study river, lake, & wetland ecosystems; no specialization required, but options include conservation biology and fisheries management | maybe |
| | Geography Peace Corps Master's International Program | MS | students pursue MS while also serving in Peace Corps; students choose 1 of 3 areas to focus on, including *sustainable livelihoods and community development OR social and development aspects of natural resource management* | yes, but degree is in geography |
| | Horticulture | MPSH (Master of Professional Studies) | requires a specialization in water-efficient landscaping; primary purpose is "to prepare students for positions in urban water conservation"; program is designated as a Western Regional Graduate Program (meaning that students from participating western states qualify for in-state tuition) | unclear |
| | Human Dimensions of Ecosystem Science and Management | MS, PhD | lots of flexibility for students to select courses that suit their interests (e.g. water, wildlife, education, conflict management) | yes |
| | Irrigation Engineering | MS, PhD | | no |
| | Master of Natural Resources | MNR | professional degree program; non-thesis; offered by College of Natural Resources rather than any individual department; available using online, on-campus, or short-courses; affiliated with the Natural Resources Distance Learning Consortium; students can get | yes |

| | | | | |
|---|---|---|---|---|
| | | | specialization in NEPA Certificate | |
| | National Environmental Policy Act Certificate Program | Certificate | "designed to prepare natural resource and environmental professionals to meet the challenges of complying with the [NEPA] act"; collaboration with Shipley Group, Inc.; courses may also be applied toward a Master's of Natural Resources in Ecosystems Management | possibly, depending on the electives chosen; focus in on NEPA |
| | Natural Resources and Environmental Education | Certificate | students must be enrolled as grad students at USU; students learn how to communicate science in ways appropriate for general public | yes |
| | Watershed Science | MS, PhD | part of Western Regional Graduate Program (students from participating western states get in-state tuition rates) | yes, but mostly science except for specialization in watershed management |
| | Wildlife Biology | MS, PhD | focuses on "management of human-wildlife conflict" | |
| Utah Valley University | | N/A | No related graduate programs; there are several related undergraduate programs: interdisciplinary minor in Environmental Studies or Peace and Justice Studies, certificate in Water and Wastewater Operations, and an extra-curricular Leadership Certification Program | |
| Weber State University | Environmental Sustainability for Business (link opens PDF) | Certificate | "enables practitioners to explore and evaluate how their organizations can address environmental issues to meet societal needs while creating competitive advantages that enhance their bottom line"; can be completed as a stand-alone graduate certificate or in conjunction with MBA program; application process | unclear; emphasis definitely on economics |
| Westminster College | Community Leadership | MACL (Master of | 3 MA tracks: comprehensive track, international track, and arts and | yes, focus on leadership |

| | | | | |
|---|---|---|---|---|
| | | Arts in Community Leadership), Certificate | cultural leadership; certificate is 20-21 credits focusing on leadership and management, community organizing and advocacy, and communications; collaborative program drawing from business, education, arts and sciences, and nursing and health sciences | skills |
| | Mastering Leadership | Certificate | Executive Education program; built around 10 two-day courses; project-based learning | no |

Appendix C: Existing Sustainability-Related Graduate Programs in the PAC-12

| Institution | Program | Type | Notes | Interdisc. |
|---|---|---|---|---|
| Arizona State University | Community Resources and Development | MS, PhD | 'Sustainable Communities' is one of four areas of emphasis | yes but focus on recreation, leisure and tourism |
| | Design, Environment and the Arts | PhD | 2 goals, including "to educate people who will emphasize sustainability, innovation, community building, cultural and contextual awareness"; Emphasis in Healthcare and Healing Environments available | yes |
| | Environmental Life Sciences | PhD | "a focus will be collaborative and integrative study of the effects of environmental variation on fluxes of materials and energy across scales ranging from the organism to the globe" | yes |
| | Environmental Social Science | PhD | 2 concentrations available: urbanism and complex adaptive systems science** | yes |
| | Executive Masters for Sustainability Leadership | EMSL | "prepares experienced professionals to significantly advance sustainability practices in the workplace by leading institutional and cultural change"; 1 year curriculum focusing on leadership, strategy, communications, and global context | no |
| | Global Health | MS, PhD | PhD concentrations in complex adaptive systems science, health and culture, and urbanism | yes |
| | Global Sustainability Leadership | Certificate | No longer accepting applications; designed to provide training to U.S. Army and National Guard leaders to enhance their ability to instill sustainability practices (admission requirements included being in Army or National Guard) | |
| | Human and Social Dimensions of | PhD | course curriculum includes sustainability courses, but not overt emphasis of program | yes |

| | | | | |
|---|---|---|---|---|
| | Science and Technology | | | |
| | IGERT in Urban Ecology | N/A | "As IGERT2 is coming to an end, a new graduate student organization [Graduates in Integrative Society and Environment Research] has been implemented to institutionalize IGERT at ASU"; GISER will hold monthly plenary meetings, working groups, and workshops | yes |
| | Social Entrepreneurship and Community Development | Certificate | "This transdisciplinary program . . . [provides] a basis for exploring capacity-building and fostering positive change for organizations, corporations, societies and economies."; no explicit mention of environmental considerations; available online | |
| | Solar Energy Engineering and Commercialization | PSM (Professional Science Master's) | "to enable graduates to pursue careers in industry, government, or the nonprofit sector that involve solar energy and its utilization"; additional program fee applies; 12-month program but is open to part-time students; many online courses | yes |
| | Sustainability | MA, MS, PhD | Complex Adaptive Systems Science PhD concentration available; *"Note: The School of Sustainability will only be accepting/processing Ph.D. applications for Fall 2013 under two specific circumstances: 1) applicants are also applying for the IGERT SUN program or 2) applicants have made prior arrangements with the department regarding identification and commitment of a Ph.D. dissertation committee advisor and a long-term funding source (at least three years)."* | yes |
| | Sustainable Solutions | MSUS (Master's in Sustainable Solutions) | prepares students "to bring sustainability solutions to corporate, government, and NGO sectors"; four tracks: policy and | yes |

| | | | | |
|---|---|---|---|---|
| | | | administration, technology and society, international development, and nonprofit organization | |
| | Sustainable Technology and Management | Certificate | joint effort between 3 schools; can be taken in conjunction with Evening MBA Program; 15 credits online | ~yes |
| | Sustainable Tourism | MAS (Master of Advanced Study), Certificate | online degree program | yes |
| Oregon State University | Biological and Ecological Engineering | MS, PhD | integrates life sciences and engineering applications | ~yes |
| | Environmental Sciences | MS, PhD, PSM | 8 areas of concentration: biogeochemistry, ecology, environmental education, natural resources, PSM, quantitative analysis, social science, and water resources | yes but depends somewhat on concentration |
| | Fisheries Management | Certificate | online and on-campus | yes |
| | Forest Ecosystems & Society | MF, MS, PhD | "Our department brings together biological and social scientists and philosophers to understand ecological systems, social systems, and the interactions between them."; this program replaces the old Forest Science Graduate Program (after winter term 2012) | yes |
| | JD/MS in Water Resources Concurrent Degree Program | JD/MS | "The concurrent degree program offers students to receive a Juris Doctor and a Master of Science in one of the three degree programs of the Water Resources Graduate Program"; degrees received in 4 rather than 5 years | yes |
| | Marine Resource Management | MA, MS | 1 of the 5 concentration areas is Climate Change, Coastal Processes, and Hazards | yes |
| | Natural Resources | MNR | online | yes |
| | Sustainable Forest Management | MF, MS, PhD | 6 areas of concentration: forest operations planning and management; forest policy analysis | probably depends on concentration |

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| | | | and economics; forest biometrics and geomatics; silviculture, fire, and forest health; forest watershed management; engineering for sustainable forestry | |
| | Sustainable Natural Resources | Certificate | 18 credits; online | yes |
| | Water Conflict Management and Transformation | Certificate | 18 credits; "Besides the traditional on campus classes, students can work towards the certificate online, as a stand-alone graduate credential. Those taking online classes do so through OSU-Extended Campus Program, which offers part-time, evening, and weekend professional non-residents, the opportunity to participate" | yes |
| | Water Resources Engineering | MS, PhD | Water Resources Program | no |
| | Water Resources Policy and Management | MS | Water Resources Program | yes |
| | Water Resources Science | MS, PhD | Water Resources Program | no |
| | Wildlife Management | Certificate | expected winter 2014 | yes |
| Stanford University | 3 programs for "emerging leaders": First Nations' Futures, Young Environmental Scholars Seminar Series, and Rising Environmental Leaders Program (RELP) | N/A | programs of the Stanford Woods Institute for Environement; RELP "helps graduate students and postdoctoral scholars hone their leadership and communication skills…[and extends] professional development opportunities including introductions to global leaders"; also has a DC bootcamp on policy | no formal curriculum; experiential; cohort is interdisciplinary |

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| | 4 programs for "current leaders" | N/A | 1-2 week long training sessions or fellowship; programs of the Stanford Woods Institute for the Environment | yes |
| | Earth Systems | MS | coterminal degree (with Bachelor's degree) | yes |
| | Emmett Interdisciplinary Program in Environment and Resources (E-IPER) | PhD, and for grad students in business, law, or medicine: joint MS | PhD has 4 focal areas, each of which is multidisciplinary | yes |
| | Environmental Earth System Science | MS, PhD | | possibly |
| | Geological and Environmental Sciences | MS, Engineer, PhD | | no |
| University of Arizona | Arid Lands Resources Sciences | PhD | mission: "to provide an academic environment in which to examine the economic, ecological, and social factors which determine the long-term sustainable use of arid and semiarid lands" however, not focus on Western U.S. (currently 30 students from 6 continents); 55 faculty from 19 depts involved | yes |
| | Connecting Environmental Science and Decision Making | Certificate | designed for both physical and social science students; for graduate students and professionals with a bachelor's degree; 15 credits, including one course in social science methods, one course in communication, and an internship | yes |
| | Development Practice | MDP | Master's in Development Practice is "a multi-disciplinary approach to sustainable development practice" | yes |
| | Environmental Health Sciences | MS, PhD | | no |
| | Global Change | PhD Minor | 3 core classes (7 units), 2 electives (6 units) | yes |
| | Global Health and | Certificate | focus on working professionals | possibly |

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| | Development | | | |
| | Green Industry | N/A | coursework only, but lots of it offered thru Outreach College | no |
| | Natural Resources | MS, PhD | several options, including: 'Watershed Management and Ecohydrology' and 'Wildlife and Fisheries Conservation and Management' | yes |
| | Soil, Water and Environmental Science | MS, PhD | available track in environmental science; also a joint Master's program with Environmental Science Journalism | no |
| | Sustainability of Semi-Arid Hydrology and Riparian Areas (SAHRA) | N/A | Research center created in 2000 thru NSF funding; worth checking out website | yes |
| | Water Policy | Certificate | intended for 2 groups of people: working professionals and UA graduate student (although there are some administrative differences, both groups must fulfill same reqs); 12 credits | yes |
| | Water, Society, and Policy | MS | "combines graduate coursework in social science, policy and hydrology with professional skill-development activities"; non-thesis program co-managed by 2 colleges | yes |
| University of California, Berkeley | Energy and Resources | MA, MS, PhD | unique structure: "Graduate Group" with degree-granting capacity | yes |
| | Engineering and Business for Sustainability | Certificate | No separate admissions process (open to enrolled grad students); Not currently offered as a distance learning curriculum | yes |
| | Environmental Health Sciences | MS, PhD | | yes, but emphasis on natural sciences |
| | Environmental Science, Policy and Management | PhD | | yes |
| | Global Health and Environment | MS | degree is in "Environmental Health Sciences" | yes |

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| | Landscape Architecture & Environmental Planning | PhD | department "known for the design of compelling spaces that promote ecological integrity and social equity" | ~yes |
| | Leadership in Sustainability and Environmental Management | Professional Program | offered thru Berkeley Extension | ~yes |
| | Master of Development Practice | MDP | launched Fall 2012; "integrating health, natural, social and management sciences for sustainable development practice" | yes |
| | Responsible Global Change Management | Professional Program | offered thru Berkeley Extension | ~yes |
| University of California, Los Angeles | Environmental Health Sciences | PhD | can't find curriculum online | ? |
| | Environmental Science and Engineering | D.Env. | professional doctorate program; administered by Institute of the Environment and Sustainability and offered in collaboration with 12 depts (6 colleges) | yes, but with science and management focus |
| | Global Health | Certificate | curriculum details vague; students must complete departmental project on a global health topic; only for currently enrolled students | ? |
| | Global Sustainability | Certificate | offered thru UCLA Extension; 36 units with 3 core courses; 1 day ethics seminar required | yes |
| | Leaders in Sustainability | Certificate | aimed at grad students in Masters and PhD programs; currently over 100 students participating | yes |
| University of Colorado at Boulder | Development Studies | Certificate | 12 credits, at least 2 of which should be taken in Dept of Geography; currently enrolled students and non-degree seeking students with bachelor's degrees | yes |
| | Engineering for Developing Communities | Certificate, tracks in 4 MS/PhD programs | students must be enrolled in Dept within College of Engineering and Applied Science OR go thru separate application process; very planned curriculum | unclear |
| | Environment, Policy and | Certificate | for students in MA, PhD, and JD programs; 18 credits, no more than | yes |

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| | Society | | 6 of which can be in student's home dept; "a very limited number of students already holding graduate degrees from other institutions may be admitted to the program through the Division of Continuing Education" | |
| | Environmental Studies | MS, PhD, JD/MS, JD/PhD, MS/MBA | | yes |
| | Hydrologic Sciences | Certificate, PhD | certificate is for PhD or Master's students obtaining their degrees from a "participating department" | science and engineering focused |
| | Renewable Energy | Professional Certificate | "designed for online distance learners and provides an in-depth study of renewable energy technologies, policies, and business"; 3 course courses covering energy science and technology, energy policy, and energy industry | yes |
| | Sustainable Practices | Professional Certificate | "Professional growth for sustainable leaders"; non-credit; 100 contact hours must be completed (each course is 10 contact hours); 3 core courses | possibly; emphasis on organizational change and communication |
| University of Oregon | Ecological Design | Certificate | open only to students within School of Architecture and Allied Arts | yes |
| | Environmental Leadership Program | N/A (service-learning opportunity) | how it works: "The ELP is an undergraduate service learning program in which graduate students play a critical role in developing the professional, leadership, communication, and technical skills of our undergraduate students." | yes |
| | Environmental Sciences, Studies, and Policy | PhD | students admitted to "focal" department and fulfill its reqs and the enviro studies program reqs | yes |
| | Environmental Studies | MA, MS | students can design their own areas of concentration | yes |
| | Food Studies | Graduate | New 2013; open to students from | yes |

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| | | Specialization | all disciplines; 18 credits | |
| | Oregon Leadership in Sustainability | Certificate | 1 yr full-time program offered thru Dept of Planning, Public Policy, and Management | yes |
| | Sustainable Business Practices | MBA specialization | New 2013 | business focused |
| University of Southern California | Environmental Risk Analysis | MS | very quantitative-oriented | ~yes |
| | Environmental Studies | MA | 3 concentrations: global environmental issues and development; law, policy, and management; and environmental planning and analysis; two core courses in 2012 required that students participate in blog | yes |
| | Global Medicine | MSGM, Certificate | MSGM = Master of Science in Global Medicine | possibly |
| | Green Technologies | MS | 18 out of 27 units must be within School of Engineering; | engineering focused |
| | Marine and Environmental Biology | Progressive MS | This program is open to undergraduate students who want to complete most of an MS while also completing bachelor's degree | ~yes |
| | Sustainable Cities | Certificate | open to current and non-matriculated students (must apply for admission); USC also has Center for Sustainable Cities | yes |
| University of Washington | Aquatic and Fishery Sciences | MS, PhD | | ~yes |
| | Climate Science | Certificate | created "to provide an interdisciplinary training in methods, research issues, and communication of climate science"; capstone project in Communicating Climate Science; quantitative prerequisites | yes, but mostly science-focused |
| | Conservation of Living Systems | N/A | Graduate Program with coursework, but no certificate or degree awarded (yet) | yes |
| | Decision Making for Climate | Certificate | offered thru Professional and Continuing Education | yes |

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| | Change | | | |
| | Environmental and Forest Sciences | MS, PhD | | ~yes |
| | Environmental Health Nursing | Certificate | | yes |
| | Environmental Horticulture | MEH | | ~yes |
| | Environmental Management | Certificate | core courses in environmental policy, business and the environment, and science application; only open to enrolled grad students (not a stand-alone program) | yes |
| | Global Health | MPH, PhD | "emphasizes a social justice approach . . . with a focus on the social, economic, and political determinants of health"; several track options, including Leadership, Policy & Management | yes |
| | Interdisciplinary and Policy Dimensions of the Earth Sciences | Certificate | new; very little information available on the web | yes |
| | Law of Sustainable International Development | LLM | | ~yes but focus on law |
| | Marine Affairs | MMA | | yes |
| | Master of Forest Resources | MFR | SAF-accredited | ~yes |
| | Quantitative Ecology and Resource Management | MS, PhD | | yes, but science-focused |
| | Sustainable Transportation | MS, two certificates | Two certificates with noncredit or graduate credit options: Environmental Issues and Impacts, OR Planning and Livable Communities; offered thru Prof & Cont Ed AND, in case of MS, also with Dept of Civil & Enviro Engineering | yes |
| | Wetland | Certificate | offered thru Prof & Continuing | yes |

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| | Science and Management | | Education | |
| Washington State University | Environmental and Natural Resources Sciences | PhD | | ~yes |
| | Environmental Science | MS | | ~yes |
| | Global Justice and Security | Certificate | does not seem that environmental concerns are an explicit component of curriculum | no (courses from only 2 departments) |
| | Natural Resource Sciences | MS | | ~yes |
| | Sustainable Agriculture | Certificate | available to degree-seeking and non-degree-seeking students | yes |

Appendix D: Academic Program Completion Plan for the Interdisciplinary Graduate Certificate in Sustainability

Student Name _____ Student uNID _____

Student Email _____ Phone _____

Home Department/Program _____ Home Degree _____

| Requirements | Course Name and Number | Credit Hours | Grade | Term Fulfilled |
|---|---|---|---|---|
| Interdisciplinary Seminar | SUST xxxx: GCSC Seminar – 1st semester | 1 | | |
| | | | | |
| Interdisciplinary Project | SUST xxxx: Global Changes and Society | 3 | | |
| | | | | |
| "Gateway" into track | SUST xxxx/DEPTxxxx: "Gateway" course | 3 | | |
| | | | | |
| Elective Courses | Environment: | 3 | | |
| | Society: | 3 | | |
| | Economics and Policy: | 3 | | |
| | | | | |
| | Total Number of Credits | 16 | | |

Chosen Certificate Track _____

Planned Completion Semester and Year _____

Student Signature _____ Date _____

Home Department/Program Advisor Signature _____ Date _____

Program Director Signature _____ Date _____