9 January 2015

TO: Sarah Mangelsdorf, Provost and Vice Chancellor for Academic Affairs
   Wendy Crone, Interim Dean of the Graduate School

FROM: Kathyrn VandenBosch, Dean, College of Agricultural and Life Sciences

RE: Landscape Architecture Geodesign Capstone Certificate

At its regularly scheduled meeting on April 21, 2014, the College’s Academic Planning Council approved the Department of Landscape Architecture’s request to create a new, revenue-generating Capstone Certificate in Geodesign. The courses for the certificate have been approved by CALS Curriculum Committee and the College has a fully signed MOU with the department.

We understand Landscape Architecture’s MA/MS programs have no formal program review on file with campus. The department chair, John Harrington, has agreed to submit the department’s self-study to the CALS Dean’s office no later than February 15, 2015. The Dean’s office will ask the review committee to complete their work by April 30, 2015. The department is aware that Graduate Faculty Executive Committee approval of their proposal may be contingent on meeting these deadlines.

Approval of the Certificate requires action by the Graduate Faculty Executive Committee and we ask that it be placed on their agenda at the earliest possible time. Supporting documents are attached. Please feel free to contact me if you have any questions.

cc: John Harrington
    Travis Flohr
    Daniel Kleinman
    Kelly Haslam
    Jocelyn Milner
    Katherine Duren
    Sarah Pfatteicher
    Angela Seitzler
    Richard Straub
Capstone Certificate in Geodesign Program Proposal

John Harrington, Professor, Department Chair
Department of Landscape Architecture
College of Agricultural and Life Sciences
University of Wisconsin-Madison

January 9, 2015
Executive Summary
The proposed Capstone Certificate in Geodesign is a **fully online** capstone certificate program. The capstone certificate is expected to fill the growing demand for integrated geospatial design skills in today’s job market. Geodesign is an exciting trans-disciplinary approach that integrates spatial technology into the design process, in order to effectively and efficiently inventory, represent, analyze, evaluate, and communicate planning and design alternatives. Access to appropriate education and training has been identified as one of the key barriers to such advanced uses of geospatial technology in the design professions\(^1\),\(^2\),\(^3\). Increasingly, design and planning professionals are being required to provide evidenced based, optimized design solutions within social contexts\(^4\). This program will offer a practical, experiential, project-based curriculum to provide the skillsets needed across a spectrum of geodesign contexts, focusing on design and planning solutions.

“Geodesign is a design and planning method which tightly couples the creation of design proposals with impact simulations informed by geographic contexts, systems thinking, and digital technology.”\(^5\)

Geodesign is not a new concept or approach to design or planning. The foundations of geodesign have a long-standing history in Landscape Architecture. Geodesign has evolved into its current form, emphasizing collaboration among the design professions (landscape architects, architects, planners, engineers), the natural and social sciences, and stakeholders because of advances in geospatial systems. Geodesign requires a trans-disciplinary iterative process that relies on social and natural systems knowledge, using both quantitative and qualitative metrics, to rapidly communicate, analyze, and model design impacts throughout the design process – searching for an acceptable optimization of scientific and social systems. In other words, geodesign uses geographic information system (GIS) tools, functions and dashboards throughout the design process to engage and empower stakeholders, represent current conditions, analyze how complex systems function and relate, model and evaluate future design alternatives, and monitor change over time and space. Traditional education does not reflect this environment, as students are educated within a single career path. Geodesign brings these disciplines together to learn geodesign specific methods and technology while working as trans-disciplinary professionals on problem based projects. The effect of geodesign is to create a better, sustainable future for life on earth.

The proposed capstone certificate is a revenue-generating program using a 131-fund structure, requiring it to be economically self-sustaining. Capstone certificate students will take a five course, 14-credit curriculum sequence. In order to enter this capstone certificate, students must demonstrate basic knowledge of Geographic Information Systems (GIS). Students may demonstrate this knowledge through prior coursework, such as UW-Madison Geog 377 or equivalent and a portfolio (i.e. a portfolio is required of all student applicants to ensure current

basic knowledge in GIS). For specific capstone certificate prerequisite competencies, please see the admittance requirements. If students do not have these competencies they must take an Introduction to GIS course before capstone certificate admittance (please note introductory courses in GIS cannot be taken concurrently with Geodesign courses, it is a prerequisite to entering the Capstone Certificate in Geodesign). The Capstone Certificate in Geodesign does not offer remedial GIS courses. Students will be required to maintain grades of B (3.0) or higher for each course to successfully complete the capstone certificate. Students must have a bachelor’s degree and be non-degree seeking students to enroll in the capstone certificate and to take program courses. Courses cannot and will not be offered to students outside of the capstone certificate. We are targeting a Fall 2015 first cohort.
Table of Contents

1. Program Contact Information.................................................................5
2. Anticipated Timeline..............................................................................5
3. Administration and Governance.............................................................7
4. Rationale and Statement of Benefits....................................................10
5. Curriculum...........................................................................................13
6. Relationship to Existing Programs........................................................14
7. Learning Goals, Assessment, and Program Review.............................15
8. Admission Requirements.................................................................18
9. Marketing and Enrollment.................................................................19
10. Progress and Certificate Completion................................................19
11. Advising and Expectations/Substitutions............................................19
12. Financial Aid and Graduate Assistantships.....................................20
13. Budget and Fiscal Structure..............................................................20
14. Ongoing Commitment....................................................................20
15. Implementation Form.................................................................21
Appendix A: Current US Geodesign Programs.....................................25
Appendix B: Current OCP Course Approvals.......................................26
Appendix C: Letters of Support .............................................................29
Appendix D: Geodesign Competency Model........................................36
Appendix E: GIS Program Admittance Prerequisite Competencies ........37
Appendix F: Budget.................................................................................38
1. Name and Academic Home

Certificate Name:  
Capstone Certificate in Geodesign

Home Department and Academic Unit:  
Department of Landscape Architecture (Land Arc – 520)  
College of Agricultural and Life Sciences  
University of Wisconsin-Madison

Faculty Program Director:  
John Harrington  
Professor  
Department Chair  
jaharrin@wisc.edu  
608.263.4587

Program Coordinator (Primary Staff Contact):  
Douglas Hadley  
Email: dbhadley@wisc.edu  
Phone: 608.263.6506

Program Faculty:  
John Harrington, Professor, Department of Landscape Architecture Chair (M.S.)  
Janet Silbernagel, Professor, Department of Landscape Architecture (Ph.D.)  
Samuel F. Dennis, Jr., Associate Professor, Department of Landscape Architecture (Ph.D.)

Program Staff:  
Douglas Hadley, Senior Lecturer, Department of Landscape Architecture (M.A)  
Travis Flohr, Faculty Associate, Department of Landscape Architecture (M.S.L.A., Ph.D. Candidacy ABD intended Summer 2015)

2. Anticipated Timeline

Fall 2013  
• Begin academic approval  
• Develop marketing strategy

Summer 2014  
• Continue academic approval – program  
• Continue course approvals  
• MOU with University of Wisconsin-Madison Geography Department

Fall 2014  
• Completed course approvals, all courses have gained University approval  
• Complete academic and course approval process  
  o Submit and gain GFEC approvals (Oct/Nov/Dec)  
  o Submit and gain UAPC approvals (Dec/Jan)  
• MOU with College of Agricultural and Life Sciences  
• Complete marketing strategy  
• Complete online course conversions  
• Complete online course deployment for Fall 2015 courses
• Complete application procedures and program documentation

Spring 2015
• Complete academic and course approval process
  o Submit and gain GFEC approvals (Oct/Nov/Dec)
  o Submit and gain UAPC approvals (Dec/Jan)
• Complete course deployment portion of the MOU between University of Wisconsin-
  Madison Landscape Architecture and University of Wisconsin-Madison Division of
  Continuing Studies
• Market and recruit for Fall 2015
• Begin accepting applications
• Begin course development for Spring 2016
• Institute advisory board
• Institute program committee
• Complete course development for Fall 2015

Summer 2015
• Market and recruit for Fall 2015

Fall 2015
• Program launch
• First cohort begins coursework
  o Geodesign Fundamentals (Land Arc 630)
  o Geodesign Methods (Land Arc 631)
• Complete course development for Spring 2016
• Begin course development for Summer 2016

Spring 2016
• First cohort second semester coursework
  o Geodesign for Sustainability and Resiliency (Land Arc 633)
  o Geospatial Approaches to Conservation and Adaptation (Land Arc 671)
• Complete course development for Summer 2016
• Complete yearly education innovation grant report

Summer 2016
• First cohort third semester coursework
  o Capstone Project (Land Arc 634)
  o First cohort to earn certificates, upon successful coursework completion
• Steering committee to complete initial internal program review (completed yearly)
• Complete program adjustments
• Update projected budgets (completed yearly)
• Accept second cohort

Fall 2016
• Second cohort begins coursework

Spring 2017
• Second cohort second semester coursework
• Complete yearly education innovation grant report
Summer/Fall 2020

- Steering committee to complete initial internal program review (completed yearly)
- Complete external program review in coordination with the advisory board members (completed every five years)
- Complete Academic Planning Council program review (completed every five years)

3. Administration and Governance

The capstone certificate has a three-tiered governance and administration structure including a(n): program chair, program committee, and advisory board. Figure 1 shows the governance model for the capstone certificate.

Program Chair

The Department of Landscape Architecture chair will be responsible for appointing a faculty member to serve as program chair for three-year terms, subject to the Department of Landscape Architecture executive committee’s approval. John Harrington will serve as the inaugural program chair. The Department of Landscape Architecture’s executive committee will be responsible for annual performance review of the chair. The program chair will meet with The Department of Geography chair to discuss departmental and certificate issues revolving around GIS and geodesign, as per the MOU signed between the two departments.

The role and duties of the program chair are comparable to the role of a faculty director of undergraduate studies or an associate chair with the duties of chairing the curriculum committee. These duties included, but are not limited to calling meetings of the program committee (described below), setting the agendas for such meetings, responding to student grievances and student appeals, and ensuring that program assessment and review occurs in a timely fashion and in keeping with campus policies and procedures. In short, the program chair of the certificate bears the front-line responsibility for the smooth functioning of the certificate and its compliance with campus policies, with the support and collaboration of the program committee and academic staff. This also includes the day-to-day supervision of the lead manager and program coordinator, including performance evaluations. The chair will also be engaged in budgetary decisions.

Program Committee

The capstone certificate program committee serves two functions: oversight of the curriculum for the certificate and advising associated with that curriculum. Curriculum responsibility will include periodically assessing the overall structure of the certificate, the courses required to complete it, certificate learning objectives, student outcomes, and review of student applications for certificate admittance. Details on acceptance requirements and prerequisites are discussed in a later section of the proposal.

The program committee will consist of the following voting members:

- Program chair;
- Three Department of Landscape Architecture faculty;
- Program manager; and
- Program coordinator.

In order to be considered to serve on the program committee faculty must teach courses within the capstone certificate, Landscape Architecture, or have taught courses in Landscape Architecture (must be listed as a Land Arc course in the course catalog), or have a $0.00 appointment with Landscape Architecture. The appropriate by-laws that lay out additional details of term limits, nomination and election procedures for faculty representatives, and related
governance details will be documented during Summer 2014. In formalizing the membership of the program committee, these by-laws will seek to balance two interests: to provide sufficient number of members to effectively represent the range of geodesign interests with the Landscape Architecture department, while also keeping membership small enough to make meeting schedules and decision-making manageable. By-laws will be created in accordance with state statutes, FP&P, and other relevant policies and practices.

Changes to the curriculum may be proposed by the program committee, and would then be subject to review via the governance structure laid out below, which is modeled on existing processes for departmental and certificate programs. In performance of their duties, the program committee members should recognize that their membership would not necessarily reflect the full breadth of geodesign across the university, private and public practices, and industry experts. To accommodate the breadth of practice, methodologies, and technologies beyond the program committee an advisory board will be created, for details on the advisory board please see below.

- Exceptions to standard academic and curricular policies for individual students may be recommended by the advisor, and must then be approved by the program committee (or the program chair on behalf of the committee, where appropriate).
- Minor changes to the capstone certificate (e.g., adding a course or adjusting minor course requirements) may be approved at the program committee level and should then be transmitted to CALS. The graduate school should also be notified and implementation documents should be updated accordingly.
- Modest changes to the capstone certificate (e.g., changing the number of required courses or altering the structure of the capstone certificate courses) must undergo not only program committee review, but also further college level review. The graduate school should also be notified and implementation documents should be updated accordingly.
- Significant changes to the capstone certificate (e.g., establishing prerequisites, enrollment caps, adding courses, options, renaming the capstone certificate, moving the administrative home, etc.) must be approved at the program committee, college, and university level. The graduate school should also be notified and implementation documents should be updated accordingly.

**Advisory Board**

The advisory board will be instituted because the capstone certificate recognizes the depth and breadth of practice centered applications, method development, and technology innovations beyond the Department of Landscape Architecture and academia. The advisory board will provide three functions: provide recommendations on curriculum and practice trajectories within geodesign, provide recommendations within methodological and technological advances within practice, and provide an external review of capstone certificate objectives and students fulfillment of capstone certificate objectives. In short, the advisory board acts similarly to the accreditation team visits that currently happen within the Department of Landscape Architecture. The advisory board shall have a minimum of four members at all times and shall not exceed 15. The advisory board members shall be minimally comprised, of the following:

- One non-UW-Madison academic faculty;
- One private sector;
- One public sector; and
- One technology industry expert.

Program committee members will nominate and vote, using a simple majority, to approve advisory board members. Advisory board members should be nominated for their experience, expertise, and innovation in geodesign theory, methods, curriculum design, application, practice,
and technology. Advisory board members will serve three-year terms and serve in a service capacity. Board members do not have voting privileges or administrative power over the capstone certificate, the board serves in an advisory capacity only. Board members will be convened once a year, in person and/or remotely, to discuss the Program and provide feedback and recommendations on all aspects of the Program. Board members will also be convened, in person and/or remotely to externally review the Program every five years.

Figure 1: Capstone Certificate in Geodesign Governance Model
Program Manager
The program chair and committee will appoint and oversee the program manager. The program manager will be responsible for overseeing the day-to-day of curriculum development documentation, marketing, yearly report writing and documentation, student recruitment, and other responsibilities as assigned by the program chair and committee.

Program Coordinator
The program chair and committee will appoint and oversee the program coordinator. The program coordinator will be responsible for assisting the program manager and coordinate communication between faculty/instructors, provide communication and scheduling between faculty/instructors and DCS, assist in maintaining online course material, assist in marketing and student recruitment, serve as student service provider for capstone certificate students, liaise between students and the program committee and chair for academic advising and student services, maintain capstone certificate paperwork, admittance lists, website, by-laws, course documentation, yearly reports, and communicate with college and university entities regarding to student records, transcripts, and certificates of completion.

Student Services
Three key areas of student services include advising both current and prospective students, assisting students with capstone certificate admittance, and maintaining student records. The program coordinator will provide these functions with oversight by the faculty of the program committee. Ultimate responsibility for ensuring these aspects of student services are provided will reside with the program chair, under oversight by the deans of CALS, though it is expected that the program coordinator will complete the day-to-day management.

4. Rationale, Benefits, and Target Audience
Rationale and Benefits
The proposed Capstone Certificate in Geodesign is a fully online capstone certificate program. The capstone certificate is expected to fill the growing demand for integrated geospatial design skills in today’s job market. Geodesign is an exciting trans-disciplinary approach that integrates spatial technology into the design process, in order to effectively and efficiently inventory, represent, analyze, evaluate, and communicate planning and design alternatives. Access to appropriate education and training has been identified as one of the key barriers to such advanced uses of geospatial technology in the design professions. Increasingly, design and planning professionals are being required to provide evidenced based, optimized design solutions within social contexts. This program will offer a practical, experiential, project-based curriculum to provide the skillsets needed across a spectrum of geodesign contexts, focusing on design and planning solutions.

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“Geodesign is a design and planning method which tightly couples the creation of design proposals with impact simulations informed by geographic contexts, systems thinking, and digital technology.”

Geodesign is not a new concept or approach to design or planning. The foundations of geodesign have a long-standing history in landscape architecture. Geodesign has evolved into its current form, emphasizing collaboration among the design professions (landscape architects, architects, planners, engineers), the natural and social sciences, and stakeholders because of advances in geospatial systems. Geodesign requires a trans-disciplinary iterative process that relies on social and natural systems knowledge, using both quantitative and qualitative metrics, to rapidly communicate, analyze, and model design impacts throughout the design process—searching for an acceptable optimization of scientific and social systems. In other words, geodesign uses geographic information system (GIS) tools, functions and dashboards throughout the design process to engage and empower stakeholders, represent current conditions, analyze how complex systems function and relate, model and evaluate future design alternatives, and monitor change over time and space. Traditional education does not reflect this environment, as students are educated within a single career path. Geodesign brings these disciplines together to learn geodesign specific methods and technology while working as trans-disciplinary professionals on problem-based projects. The effect of geodesign is to create a better, sustainable future for life on earth.

While many GIS certificate programs exist across the country (including the many course offerings of UW-Madison’s Department of Geography), geodesign uses geospatial technology and science to address critical societal needs such as allocating scarce resources, developing well-informed public policy, and designing resilient and sustainable communities. GIS is a tool within geodesign, in many ways GIS certificate programs and basic GIS knowledge are a prerequisite to the Capstone Certificate in Geodesign. Only a handful of geodesign programs exist or are being developed in the United States, allowing the UW program to take a leadership role in this important and emerging area (Appendix A). UW’s program will be one of two being delivered fully online.

The Department of Landscape Architecture is uniquely positioned to offer this capstone certificate. The mission of the Landscape Architecture Department includes an emphasis on environmental sensitivity and providing the highest possible quality of life for humans through landscape design, planning, policy, conservation, and management. Geodesign provides a robust framework for accomplishing these goals through enhanced technology, methodology, communication and decision-making. The department also has a long-standing history and was an early adopter in geospatial technology at UW-Madison. The department is also a nationally ranked accredited Landscape Architecture program.

The capstone certificate will prepare students to use the geodesign work in the evolving multitude of design and planning roles as a(n) (not a comprehensive list):

- Architect
- Civil Engineer
- Conservation Practitioners
- Environmental Engineer
- Environmental Scientist

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Target Audience
The Capstone Certificate in Geodesign is a post-baccalaureate capstone certificate program intended for an international audience of working professionals who wish to acquire new skills in geodesign, allowing them to design and plan within a geodesign framework. Students will gain expertise in geodesign frameworks, theories, processes, methods, and technology and how to apply them in a variety of design contexts. UW will be one of two certificates that are offered entirely online (Appendix A). The proposed Capstone Certificate in Geodesign will be the only one of its kind in the Midwest.

Due to the strong practical focus of the curriculum, including the applied capstone project, an online format will be adopted for course delivery to facilitate the broadest possible access by working professionals and non-traditional students. Potential students will be recruited from a variety of professions; however, the largest portion of students will most likely be design and planning professionals (highlighted in bold), with bachelor degrees in, but not limited to:

- Architecture
- Civil and Environmental Engineering
- Ecology
- Environmental Design
- Environmental Planning
- Environmental Studies
- Geography
- Geological Engineering
- Landscape Architecture
- Park and Recreational Planning
- Urban and Regional Planning
- Urban Design
- Real Estate/Development

An online marketing survey conducted by UW-Madison’s Division of Continuing Studies (DCS) indicates:

- ESRI (a major GIS software company) lists five institutions across the U.S. that offer Geodesign, showing little competition. These institutions are clustered on the eastern and western parts of the country, leaving a gap in the Midwest for this type of program. Only one other program, Penn State, is offering a program entirely online (Figure 2: Geodesign Programs).
- Most occupations that geodesign could be applied towards are projected to grow faster than the average of all other occupations.
- 23% of respondents who use a technological mapping system reported interest in the program.
- 42% of managers stated an interest in the program for their employees.
- Almost half of respondents indicated that the skills gained from the program would be valuable.
29% of respondents submitted their email address to receive future information on the program. Personal finances and time were the top two barriers to enrollment, including the recent end of federal financial aid for capstone certificates. 37% of respondents indicated that their employer provides financial assistance and 26% indicated that their employer provides time off for education and training. Only 10% of respondents indicated that the online format would be a significant barrier to enrollment. Those most likely to enroll are in the Conservation, Environmental Engineering, and Urban/Regional Planning fields and have approximately 11 years of professional experience.

Figure 2: Geodesign Programs

5. Curriculum

Curriculum Overview
The Capstone Certificate in Geodesign is a fully online, fourteen-credit, five-course, sequential curriculum capstone certificate. The capstone certificate will be offered as a post-baccalaureate capstone certificate level because it involves advanced use of GIS and geospatial technologies. Students will be expected to employ geospatial technology in the design fields and exhibit strategic thinking. Students will take two courses in the fall semester, two courses in the spring semester, and one course in the summer semester – completing the capstone certificate in one year’s time. Courses will be offered every fall, spring and summer. All courses will be taught by approved faculty/instructors and will not affect or be affected by existing university departments or unit commitments.

The curriculum will be delivered online using synchronous and asynchronous lectures, labs, project-based activities, readings, and discussions. All course activities will be overseen by the course faculty, until enrollments reach 30 students, at which time the course faculty and program

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revenue will support adding additional TA support to ensure students receive timely and thorough feedback on their assignments. Project-based activities will include lab exercises, course projects, final course projects and a capstone project. The capstone project will engage students in solving real-world design problems using the latest geodesign theories, practices, technologies and methodologies. Courses will be built using online instruction best practices in coordination with the Division of Continuing Studies curriculum development team. Courses will also comply with federal guidelines regarding lecture and homework hours per credit hour.

In order to enter the capstone certificate, students must demonstrate basic knowledge of Geographic Information Systems (GIS). Students may demonstrate this knowledge through prior coursework, such as UW-Madison Geog 377 or equivalent and a portfolio (i.e. a portfolio is required of all student applicants to ensure current basic knowledge in GIS). For specific capstone certificate prerequisite competencies, please see capstone certificate admittance requirements for further details.

**Course Sequence**

**Fall Semester:**
- Land Arc 630: Geodesign Fundamentals (3 cr; Instructor: Doug Hadley)
- Land Arc 631: Geodesign Methods (3 cr; Instructor: Travis Flohr)

**Spring Semester:**
- Land Arc 671: Geodesign for Sustainability and Resiliency (3 cr; Instructor: Travis Flohr)
- Land Arc 633: Geospatial Approaches to Conservation and Adaptation (2 cr; Instructor: Janet Silbernagel)

**Summer Semester:**
- Land Arc 634: Capstone Project (3 cr; Instructors: John Harrington, Janet Silbernagel, Samuel Dennis, Travis Flohr, Douglas Hadley, and others as relevant to each student’s capstone topic choice).

**Matriculation**

Students must take courses in sequence. Students must complete the prescribed coursework receiving grades of B (3.0) or higher for each course. Upon successful completion of the capstone certificate students will receive a printed certificate, provided by the Department of Landscape Architecture.

**6. Relationship to Existing Programs**

The instructional duties and responsibilities are contained within the UW-Madison Department of Landscape Architecture. At this time no other existing degree or capstone certificate relationships are proposed for financial, marketing, instructional, or course development support. The Capstone Certificate in Geodesign acknowledges that there are many ways to teach and apply geospatial theory, methods, and technology. In an effort to ensure that we were not duplicating or impinging upon existing course offerings we contacted the following departments that offer GIS courses and are part of the UW-Madison Geospatial Alliance: Civil and Environmental Engineering, Community and Environmental Sociology, Environmental Studies (Nelson Institute), Forestry and Wildlife Ecology, Geography, Geological Engineering, Geoscience, Soil Science, Urban and Regional Planning, and Zoology. See Appendix B for a list of course approvals and Appendix C for letters of support.
We have worked closely with the College of Agricultural and Life Sciences, College of Letters and Science, and College of Engineering, particularly the Department of Civil and Environmental Engineering and Department of Geography because they, along with Landscape Architecture, provide the most depth and breadth of GIS courses on campus. The Department of Geography offers several levels and types of academic programs in GIS: an undergraduate major (BA/BS) in Cartography and Geographic Information Systems, a capstone (i.e., post-baccalaureate) certificate in Geographic Information Systems, and a MS-Cartography and Geographic Information Systems. We are awaiting their approval of three courses and a letter of support. We worked with Geography to ensure these courses are distinct and provide niche training that does not negatively impact Geography's offerings. We concur with Geography that each of these programs are distinct from each other and provide particular training niches. In order to create a distinct niche and address Geography’s concerns we created agreeable program admittance prerequisites, course prerequisite language, and removed Geography defined core GIS skills from one of the capstone certificate courses. We also signed an MOU with Geography (See Appendix C as part of the letters of Support), requiring the Geography and Landscape Architecture chairs meet to discuss GIS and geodesign concerns and initiatives to ensure each departments needs are being met and resolve any potential conflicts, ensuring each departments offerings are a distinct niche.

Also of note, the UW–Madison Department of Engineering Professional Development (EPD) and its Master of Engineering in Sustainable Systems Engineering Program has acknowledged its support for the development of the Capstone Certificate in Geodesign Program, also through a letter of support for the EI grant. EPD is collaborating with the Geodesign development team on the creation of the Geodesign Fundamentals course for use in the Sustainable Systems Engineering (SSE) program.

7. Learning Goals, Assessment, and Program Review

Learning Goals
The main goal of the Capstone Certificate in Geodesign is to prepare design, planning, and management professionals with the skills necessary to successfully use geodesign frameworks, processes, methodologies, and technologies to solve real world problems.

Students will:

- Be able to demonstrate an understanding of the history and background of geodesign and the emerging role it will play in shaping our environment;
- Understand and demonstrate how to use techniques and research from biological, physical sciences, and social sciences in design, planning, and management contexts to create evidenced based geodesign frameworks, designs and policies;
- Understand, evaluate, select, and use geospatial technologies appropriate for a variety of design, planning, and management contexts, appropriate to geodesign; and
- Understand and evaluate the role of values and ethics in geodesign frameworks relative to design, planning, and management of the built environment within social and natural systems.

During the capstone certificate planning process faculty and staff developed a geodesign competency model (Appendix D). Knowledge domains were identified and learning goals for each domain were listed. Learning goals were subsequently assigned to each of the five capstone certificate courses to ensure the curriculum addressed the entirety of the desired learning outcomes. Learning goals for each course were evaluated based on the degree of cognitive complexity using a system similar to Bloom and Web’s taxonomies. Learning goals overlap between courses in several instances, however, the degree of cognitive complexity increases from
the more introductory level classes in fall courses to the more advanced courses offered in the spring.

Assessment Plan and Program Review
The capstone certificate has a three-tiered assessment plan and program review: student assessment, yearly internal review, and an external program review every five years. However, in the interim there will also be a one-time program and budgetary review during the third year of the program, to ensure instructional, pedagogical, and fiscal responsibility.

Student Assessment:
The capstone certificate curriculum has been designed to reinforce and address knowledge domains based on the Landscape Architecture Body of Knowledge Study Report\textsuperscript{12} and the Department of Labor’s Geospatial Technology Competency Model.\textsuperscript{13} Domains include:

- Geodesign history and criticism
- Planning and design
- Geospatial technology and methods
- Natural science applications
- Cultural and social science applications
- Information science technology and methods
- Communication and professional skills
- Public policy and regulation
- Professional values and ethics

Table 1 shows how knowledge domains will be addressed within the curriculum. Expanded knowledge domains and skills can be found in Appendix D. Students will be evaluated using quizzes, exams, papers, discussion post, and project-based assignments. Student grades will be evaluated as part of the yearly report and tracked from year to year.

Yearly Program Review:
An annual report evaluating capstone certificate effectiveness will be prepared by the program chair, manager, and coordinator and presented to the program committee for review using the following: enrollment numbers and trajectories, internal review of student grades and coursework related to course outcomes, student placement, and post-course student surveys. In addition, building and maintaining student enrollment numbers will be seen as a sign of capstone certificate relevance in providing and meeting current demand for geodesign education. The capstone certificate will be reviewed internally by the program chair, manager, coordinator, committee and submitted as part of the Annual Report due to DCS and EI, to adjust curriculum needs and evaluate student outcomes per the program’s geodesign competency model (i.e. program learning goals and objectives (Appendix D). DCS will be included in this review, to adjust online course delivery as necessary.

Post-course surveys will be conducted for students to evaluate student satisfaction with course content, instructor effectiveness, course delivery, workload, and learning outcomes. While self-reporting is known to not be effective in evaluating pedagogy, it is important to understand course delivery and its effectiveness in engaging students. Instructors will use these surveys to evaluate course instruction performance, and the program coordinator will include summaries in the

\textsuperscript{12}http://asla.dev.1over0.com/uploadedFiles/CMS/Education/Accreditation/LABOK_Report_with_Appendices.pdf

\textsuperscript{13}http://www.careeronestop.org/competencymodel/pyramid.aspx?GEO=Y
Annual Report presented to the program committee. At the completion of the capstone certificate, student exit interviews will be conducted to assess capstone certificate content, logistics, and learning outcomes. Students who withdraw from the capstone certificate will also be surveyed to evaluate the student’s reason(s) for leaving the program.

Placement of students in geodesign careers will be tracked through a placement database maintained by the Program Coordinator. The target goal is to have greater than 75% of certified students employed in geodesign positions. However, it may take several years to effectively track graduate employment.

<table>
<thead>
<tr>
<th>Program Entrance Prerequisite</th>
<th>History and criticism</th>
<th>Planning and design</th>
<th>Geospatial technology</th>
<th>Natural sciences</th>
<th>Cultural &amp; social sciences</th>
<th>Information science</th>
<th>Communication</th>
<th>Policy</th>
<th>Values &amp; ethics</th>
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<td>Conservation &amp; Adaptation</td>
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<tr>
<td>Sustainability &amp; Resiliency</td>
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<td>Capstone</td>
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<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

Table 1: Geodesign Knowledge Domains

Third Year and External Review (every five years):
During the third year and every five years a comprehensive, capstone certificate review will be completed. The program chair, coordinator, and manager will compile course syllabi, assignment statements, student work, enrollment numbers, student surveys, and budgets. A report will be compiled and presented to the program committee and advisory board for discussion and review. This review will fulfill the required APC program review and provide a more robust capstone certificate review. The advisory board, program committee, and appropriate UW governance and committees will be included in the external review process. The program committee will convene board members in person and/or remotely to address areas of concern, e.g. program growth, areas of curriculum concern, future practice and technology directions, opportunities for curriculum development and expansion, predicting program trajectory constraints, and reviewing student learning goals and objectives. The comments from this meeting will be compiled and presented to the appropriate Program and UW administration, including response strategies.
8. Admission Requirements

The Capstone Certificate in Geodesign is a fully online capstone certificate program open to University Special Students (non-degree seeking). Degree seeking students may not participate in the program. This means traditional undergraduate and graduate/professional degree seeking students cannot participate or take classes within this program. Students are eligible for admittance into the capstone certificate if they meet the following criteria:

• Hold a bachelors degree or an equivalent credential from an accredited college or university, with a minimum GPA of 3.0 (out of 4.0) or equivalent.
• Students must demonstrate basic GIS knowledge through prior coursework, such as UW-Madison Geog 377 or equivalent and a portfolio (i.e. a portfolio is required of all student applicants to ensure current basic knowledge in GIS). If students do not have these competencies students must take an Introduction to GIS course before program admittance. The Capstone Certificate in Geodesign does not offer remedial GIS courses. For specific competencies please see Appendix E.
• If students are international students, they must meet the following English proficiency scores and not require visa support:
  o Minimum TOEFL requirement: 100 internet (iBT); 600 paper-based test (PBT);
  o Minimum IELTS requirement: 8.0; and
  o Minimum MELAB requirement: 85.

Admission processes and documentation will be handled according to UW-Madison procedures for post-baccalaureate capstone certificates. Students must enroll in the following: two fall courses, two spring courses, and one summer course in order to complete the program in one year, students may not take one course at a time. International students are also encouraged to apply. Because the Capstone Certificate in Geodesign is fully online, international students are not required to have a visa. The capstone certificate is not offering and cannot offer UW I-20 and will not accept students who would require a visa through the capstone certificate. However, every applicant whose native language is not English, or whose undergraduate instruction was not in English, must provide an English proficiency test score. Students are required to have minimum scores (see above) in order to not need UW English as a Second Language services, as the capstone certificate does not provide funding for these services. The student’s score will not be accepted if it is more than two years old from the start of their admission term. Country of citizenship does not exempt applicants from this requirement. Language of instruction at the college or university level and how recent the language instruction was taken are the determining factors in meeting this requirement. Applicants will be exempt if:

• English is the exclusive language of instruction at the undergraduate institution; or
• They have earned a degree from a regionally accredited U.S. college or university not more than 5 years prior to the anticipated semester of enrollment; or
• They have completed at least two full-time semesters of graded course work, exclusive of ESL courses, in a U.S. college or university, or at an institution outside the U.S. where English is the exclusive language of instruction. Completion of graded course work cannot be more than five years prior to the anticipated semester of enrollment.

The program committee will decide student admissions. The program chair, manager, and coordinator will coordinate admissions with the Adult Career and Special Student Services office.

14 International student information, rules, and guidelines are provided at the following urls:
• http://continuingstudies.wisc.edu/capstone/faq-students.htm
• http://www.admissions.wisc.edu/international.php
in the Division of Continuing Studies (DCS-ACSSS). Special students will apply via the online UW System application by selecting the Capstone Certificate in Geodesign plan code from a list on the application. (This code will be available following UAPC approval; ACSSS will add the new plan code to the UWS e-application.) DCS-ACSSS will enter a final admission decision as directed by the program chair, director, and coordinator. DCS-ACSSS will serve as the advising, admissions, and academic dean's office for all University Special students.

9. Marketing and Enrollment
Based on the enrollment numbers of the existing geodesign programs mentioned earlier, the Capstone Certificate in Geodesign is expected to begin the first year with an enrollment of between 6 and 15 students. As the program becomes established, the enrollment is expected to grow to between 20 and 30 students. Initial enrollment will be limited to no more than 30 students to ensure rigorous and thorough instructional delivery without straining instructional capacity. The enrollment limit will be reassessed during the capstone certificate review. On-time, one-year graduation rates are expected to be around 80% based on numbers from the Capstone Certificate in GIS at UW-Madison.

The capstone certificate development team is working with the DCS to develop and implement a marketing plan. The marketing plan will be completed Fall 2014. Marketing will not begin until full program and course approvals are received. Marketing will be international, but due to current state regulations, at this time we are not able to accept applications to UW-Madison for online courses or programs from students living in or planning to live in the following states while enrolled: Alabama, Arkansas, Kansas, Kentucky, Washington (state). Marketing will be coordinated with UW-Madison to ensure all regulations are being followed.

10. Progress and Certificate Completion
The program chair/director, manager, and coordinator are responsible for monitoring student progress toward certificate completion, administering student records and transcripts, communicating student completion with, CALS Academic Affairs Office, Office of the Registrar, DCS, for coordinating awarding of certificates. Students must maintain a minimum 3.0 GPA to progress within the capstone certificate. Coursework must be completed in sequential order. Students who have not meet matriculation standards will need to be advised by the program chair, manager, and coordinator, with the input of the program committee, to work out a matriculation plan to complete the capstone certificate.

Yearly reports, mentioned earlier, will document who is enrolled and active within the capstone certificate and documenting student progress. A report will be provided to the CALS Academic Affairs Office, Registrar as well as the DCS. The capstone certificate will coordinate the award of certificates. The capstone certificate will be responsible for wording and printing of certificate documents and must follow UW-Madison and DCS guidelines.

Once students have completed all the requirements for the capstone certificate the program coordinator will communicate the necessary records to CALS Academic Affairs Office, who will then report the necessary records to the Registrar’s Office. Certificates will be awarded through the Registrar’s Office, with capstone certificate approval.

11. Advising and Expectations/Substitutions
Students must earn all capstone certificate requirements in residence at UW-Madison. In keeping with other policies, online credits are considered earned in residence. Prior academic work from other universities or taken in the course of a degree-seeking program at UW-Madison or other
institutions may not be used to satisfy capstone certificate requirements. No substitutions are allowed.

The program chair, manager, and coordinator will serve as the advisors for capstone certificate and course related issues, questions, and concerns. DCS-ACSSS will serve as the advising, admissions, and academic dean's office for all University Special students. Students who have not meet matriculation standards will need to be advised by the program chair, manager, and coordinator, with the input of the program committee, to work out a matriculation plan to complete the capstone certificate. Currently the offices responsible for advising have the capacity to do so. However, the program committee will handle assigning additional advising resources as needed. Please note, international students will not be provided support for using UW-Madison’s ESL Center.

12. Financial Aid and Graduate Assistantships
Students enrolled in the Capstone Certificate in Geodesign may be considered for merit-based financial aid by the department or capstone certificate, as of August 2014 the United States Department of Education ruled capstone certificates are not eligible for federal financial. The capstone certificate website will document when and what funds are available to students, with approval from the program committee. The department will be acting as a third party deferral to ensure non-resident student is competitive with our various competitors, since UW-Madison’s current tuition policy for students is on competitive in this market. The department’s third party deferral will be used for tuition only, details provided below. The department will not offer any other financial aid at this time, including no TA, RA, PA or graduate fellowship support, but the department reserves the right do so in the future from program revenues.

13. Budget and Fiscal Structure
The capstone certificate is being built on a program revenue model using a 131-fund structure. Initial start up funding for program salaries, course conversions, course creation, and marketing have been provided by:

- DCS Grant;
- University Education Innovation (EI) Grant;
- College of Agricultural and Life Sciences (CALS) EI Grant; and
- Department of Landscape Architecture course buyouts.

Students will be charged resident ($901.83 per credit\textsuperscript{15}) and non-resident ($1,734.76 per credit\textsuperscript{15}) tuition rates based on the current graduate student tuition rates (https://registrar.wisc.edu/tuition_&_fees.htm), including segregated fees. Non-resident students will be offered a third-party deferral for tuition, with the Department of Landscape Architecture acting as the third party in order to offer competitive market rate tuition. The tuition reduction from the third-party deferral will result in non-resident students paying $1,000.00 per credit, including segregated fees. Our main competitor is Penn State who charges a flat-rate tuition ($870.00), i.e. there is no distinction of resident and non-resident students for their fully online degree programs.

Additional budget detail is provided in Appendix F.

14. Ongoing Commitment
The Department of Landscape Architecture recognizes the resources it takes for a small department to take on additional responsibilities like the Capstone Certificate in Geodesign. To

\textsuperscript{15} Includes segregated fees.
successful take on this additional responsibility the department has increased instructional
capacity by hiring a 100% program manager and a 50% time program coordinator. The proposed
capstone certificate has also received additional commitments from the Department of Landscape
Architecture, CALS, and DCS. They are discussed below:

**Capstone Certificate in Geodesign Program:**
- Ensure the required courses are approved, offered and included in the curriculum;
  including any future changes, approvals, and reviews.
- Maintaining regular contact with the Registrar’s Office, CALS, and DCS; including,
  providing relevant information for the DCS website.
- Maintain capstone certificate requirements, so they are up-to-date and see that curriculum
  changes are approved through the appropriate academic approval processes.
- Notify the Office of Registrar, CALS, Graduate School, and DCS of curricular changes.
  Seek governance approval if the capstone certificate is significantly altering the program,
  suspending admissions, or discontinuing the certificate.
- Maintain a website with current, accurate, and governance approved certificate details.

**Department of Landscape Architecture:**
- Ensure the staffing of the program committee.
- Ensure, through the capstone staff, the required courses are approved, offered and
  included in the curriculum; including any future changes, approvals, and reviews.
  Provide supplemental marketing support for the first three years, on an as needed basis.
- Maintain existing, in place and approved course buyouts for the first three years, to
  support initial capstone certificate course instruction. After the first three years, the
  capstone certificate revenue will support all certificate instruction (assuming minimum
  enrollments).
- Maintain a staff position for the program coordinator, to be supported by certificate
  revenue when initial grant money is exhausted.
- Ensure that certificate instructional obligations are not conflicting with Department of
  Landscape Architecture instructional obligations, including managing teaching loads.

**CALS:**
- Provide an additional $5,000.00 in EI funds for fiscal year 2015.
- Create and setup the appropriate financial accounts and documentation, in coordination
  with the appropriate student tuition and fees collection processes.
- Provide the initial setup for the certificate website.
- Host the certificate website, within the Department of Landscape Architecture website.

**DCS:**
- Allow initial grant funds to rollover from fiscal year 2014 to fiscal year 2015.
- Provide an initial marketing strategic plan and support.
- Provide online curriculum and course development/conversion support
- Provide and maintain online instructional support and infrastructure.
- DCS-ACSSS will serve as the advising, admissions, and academic dean's office for all
  University Special students.
15. Implementation Form

Implementation Form – Capstone Certificates

This form must accompany a capstone certificate proposal. An updated form should be submitted when changes to the certificate are made. It is used by administrative offices to better assist departments and programs with implementation. Questions in this form reflect guidelines in the Full Guidelines for For-Credit Certificates, [http://apir.wisc.edu/certificates.htm](http://apir.wisc.edu/certificates.htm).

Document Date: **02.18.204**  
Name of Capstone Certificate: **Capstone Certificate in Geodesign**  
Faculty Program Director: **John Harrington** [jaharrin@wisc.edu](mailto:jaharrin@wisc.edu) Ph: 608.263.4587  
Primary Faculty/Staff Contact: **Doug Hadley** [dbhadley@wisc.edu](mailto:dbhadley@wisc.edu) Ph: 608.2638.6506  
Home Department/Academic Unit (Name/UDDS): **Landscape Architecture, 520**  
Approval Date: **02.10.2014**  
School/College: **College of Agricultural and Life Sciences and Letters and Science**  
Approval Date: **CALS APC – 04.21.2014**  
**L&S APC – 09.16.2014**  
GFEC Approval Date:  
UAPC Approval Date:  
Implementation Term (typically the fall term after UAPC approval): **Fall 2015**  
Year that first program review is scheduled (usually 5 years after implementation): **Fall 2020-Spring 2021**

**Information to be completed by RO and AIPR:**  
Plan Code (assigned by the Registrar’s Office):  
CIP Code (assigned by Academic Planning and Institutional Research):  
Primary Divisional Disciplinary Assignment (assigned by AIPR for analysis purposes only):  

**Curriculum** (check one):  
_____X_____ Included in detail in the proposal  
_______ A list of required and elective courses and any other program requirements is attached

Credit total required (9-12 credits): **14 Credits**  
Projections for annual enrollment: **20-30 Students**  

Specify overlap provisions – name degree/major, minor or certificate programs that a student may have previously earned that disqualify them from being admitted to the capstone certificate program.  
**There are no disqualifying degree, majors, minor or certificate programs.**
<table>
<thead>
<tr>
<th>Please answer the following:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirm that the capstone certificate is open to only non-degree seeking University Special students who hold a bachelor’s degree.</td>
<td>X</td>
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</tr>
<tr>
<td>Confirm that all credits are required to be earned in residence at UW-Madison.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Will there be limits on enrollment? If Yes, please explain: Please see the capstone certificate in geodesign proposal for further details.</td>
<td>X</td>
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</tr>
<tr>
<td>Confirm that all core/required courses are approved through the school/college curriculum committee.</td>
<td>X</td>
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<tr>
<td>Confirm that courses in curriculum are offered on a regular basis and have space for students in this program.</td>
<td>X</td>
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<tr>
<td>Confirm that required courses in the curriculum are numbered 300 or above.</td>
<td>X</td>
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<tr>
<td>Confirm that courses taken as Pass/Fail or Audit are not included in the curriculum.</td>
<td>X</td>
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<tr>
<td>Are courses taken Credit/No Credit allowed? If yes, specify limits:</td>
<td>X</td>
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<tr>
<td>Confirm that special topics courses are only used if all instances count for the certificate.</td>
<td>X</td>
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</tr>
<tr>
<td>Confirm that, at a minimum, C grades must be earned on all course work attempted for the capstone certificate program. (Only graduate-level work from the capstone that is earned with a grade of B or better is eligible for subsequent application to a UW-Madison graduate degree program.) If other requirements, please specify:</td>
<td>X</td>
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<tr>
<td>Will exceptions to the course core requirements be allowed? If yes, specify limits and process:</td>
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</tr>
<tr>
<td>Confirm that the program/department has a process in place to monitor student progress and to notify the Registrar’s Office when students complete the certificate requirements.</td>
<td>X</td>
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<tr>
<td>Assessment plan – confirm that the proposal includes a plan that describes how the program faculty will regularly evaluate student learning.</td>
<td>X</td>
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<tr>
<td>Confirm that the program/department understands that international students who must request a UW-Madison-issued I-20 (for the F-1 student visa needed for legal study in the US) will only be eligible to participate in the program if it is offered full-time and if the program has been approved by the US government to receive such international students. If the program is offered entirely online or the international student is here legally on another visa (such as the JS, H, etc.) and an I-20 from UW-Madison is not needed, then this provision does not apply.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Will this capstone certificate be implemented as a program revenue program? Has a budget been developed with the Division of Continuing Studies and the sponsoring school/college dean’s office?</td>
<td>X</td>
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</tr>
</tbody>
</table>
Who is the appropriate school/college contact for questions?  
**John Harrington**  
[jaharrin@wisc.edu](mailto:jaharrin@wisc.edu) Ph: 608.263.4587 or Douglas Hadley [dbhadley@wisc.edu](mailto:dbhadley@wisc.edu)  
Ph: 608.263.6506
Appendix A: Current US Geodesign Programs

University of Arizona
MS in Planning with Geodesign concentration
On-campus delivery
http://cala.arizona.edu/planning?destination=node/1033

Northern Arizona University
BS in Geographic Science and Community Planning
4-year program
On-campus delivery
http://nau.edu/SBS/GPR/Degrees-Programs/BS-Geographic-Science-Community-Planning/

Penn State Online (World Campus)
Graduate Certificate in Geodesign
1-year program
Online delivery
http://www.worldcampus.psu.edu/degrees-and-certificates/geodesign-certificate/overview

Philadelphia University
MS in Geodesign
1-year program
On-campus delivery
http://www.philau.edu/msgeodesign/

University of Southern California
BS in Geodesign
4-year program
On-campus delivery
http://spatial.usc.edu/index.php/undergraduate-programs/geodesign/
Appendix B: Online Course Proposal Approvals

Departmental Approvals
- Community and Environmental Sociology
- Civil and Environmental Engineering
- Geography
- Geological Engineering
- Geoscience
- Landscape Architecture
- Urban and Regional Planning
- Zoology

College/Institute Approvals
- College of Agricultural and Life Sciences
- College of Engineering
- College of Letters and Sciences
- Nelson Institute
Appendix C: Letters of Support

Please note: The proposal has undergone revisions during the governance process. Many of these letters of approval were written early in the process. After each revision a new copy was sent to each department listed, requesting an updated letter of support; however, many of these departments either have not responded or asked we use their initial letter because their support has not changed.

<table>
<thead>
<tr>
<th>Department</th>
<th>Chair Name</th>
<th>Chair Email</th>
<th>Letter of Support</th>
<th>Date Received</th>
<th>1st Contact</th>
<th>2nd Contact</th>
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</thead>
<tbody>
<tr>
<td>Civil and Environmental Engineering</td>
<td>Craig H Benson</td>
<td><a href="mailto:benson@engr.wisc.edu">benson@engr.wisc.edu</a></td>
<td>X</td>
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<td>02.21.2014</td>
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<tr>
<td>Community and Environmental Sociology</td>
<td>Jess Gilbert</td>
<td><a href="mailto:gilbert@ssc.wisc.edu">gilbert@ssc.wisc.edu</a></td>
<td>X</td>
<td>02.21.2014</td>
<td>03.03.2014</td>
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<tr>
<td>Environmental Studies - Gaylord Nelson Institute</td>
<td>Paul Robbins</td>
<td><a href="mailto:director@nelson.wisc.edu">director@nelson.wisc.edu</a></td>
<td>X</td>
<td>02.25.2014</td>
<td>02.21.2014</td>
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<tr>
<td>Forestry and Wildlife Ecology</td>
<td>William Karasov</td>
<td><a href="mailto:wkarasov@wisc.edu">wkarasov@wisc.edu</a></td>
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<tr>
<td>Geography</td>
<td>Kristopher N Olds</td>
<td><a href="mailto:olds@geography.wisc.edu">olds@geography.wisc.edu</a></td>
<td></td>
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<tr>
<td>Geoscience</td>
<td>Bradley M Singer</td>
<td><a href="mailto:bsinger@geology.wisc.edu">bsinger@geology.wisc.edu</a></td>
<td>X</td>
<td>02.21.2014</td>
<td>03.03.2014</td>
<td></td>
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<tr>
<td>Landscape Architecture</td>
<td>John Harrington</td>
<td><a href="mailto:jharrington@wisc.edu">jharrington@wisc.edu</a></td>
<td>X</td>
<td>01.31.2014</td>
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<td>Soil Science</td>
<td>William Bland</td>
<td><a href="mailto:wbland@wisc.edu">wbland@wisc.edu</a></td>
<td></td>
<td>02.21.2014</td>
<td>03.03.2014</td>
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<tr>
<td>Urban and Regional Planning</td>
<td>David W. Marcouller</td>
<td><a href="mailto:dwmarcou@wisc.edu">dwmarcou@wisc.edu</a></td>
<td>X</td>
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<td>03.03.2014</td>
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<td>Zoology</td>
<td>Jeff D Hardin</td>
<td><a href="mailto:jhardin@wisc.edu">jhardin@wisc.edu</a></td>
<td></td>
<td>02.21.2014</td>
<td>03.03.2014</td>
<td></td>
</tr>
</tbody>
</table>
September 30, 2014

TO: Kathryn VandenBosch, Dean, CALS
John Harrington, Chair, Department of Landscape Architecture

FROM: John Karl Scholz, Dean

RE: Request to Create a New Capstone Certificate Program in Geodesign (CALS)

CC: Elaine Klein, Assistant Dean for Academic Planning, L&S
Jocelyn Milner, Director, Academic Planning and Institutional Research
Sarah Pfatteicher, Associate Dean for Academic Affairs, CALS
Laura Van Toll, Academic Planner, CALS

On September 16, 2014, the L&S Academic Planning Council again reviewed the proposal to create a new post-baccalaureate capstone certificate in Geodesign. When the L&S APC originally reviewed this request, the council had questions related to the number and nature of GIS-related programs on campus, and encouraged the proposal authors to consider this program array and variety of students served as they make their case for the distinct niche the proposed program would fill. To that end, the APC asked for more information about the audience to be served, and sought a better understanding about how the L&S and CALS departments would communicate with each other about the courses that serve these programs. They hoped that this consultation and communication might enhance communication with appropriate student audiences, reduce duplication of instructional effort, and guard against course and program overlap. The council hopes that every student can be guided to the GIS-related program that serves her/his needs, with as little confusion as possible.

When Associate Dean Greg Downey presented this topic for discussion, he shared the attached Memo of Understanding that describes a process intended to ensure communication between the departments about the programs and course array. The council was satisfied that this arrangement should be sufficient. They also observed that, per usual practice when new programs are established, the program will be evaluated in five years. They strongly
recommend that this MOU be included in the program evaluation, and that the review process include representatives of both departments.

With these observations, the L&S APC approved unanimously a motion not to oppose creation of this program.

ATTACHMENT: MOU, Landscape Architecture and Department of Geography re: Geodesign, 6/3/2014
21 February 2014

Professor John Harrington, Chair
Department of Landscape Architecture
University of Wisconsin - Madison
1 Agricultural Hall
Madison, Wisconsin 53706

Professor Harrington:

RE: Memo of Support for the Capstone Certificate in Geodesign Program

As Chair of Civil and Environmental Engineering, I write in support of your efforts for a Capstone Certificate in Geodesign Program. Based on the proposal provided, the Capstone Certificate in Geodesign Program will not duplicate the offerings from Civil and Environmental Engineering. Moreover, our programs may benefit from a capstone focused on Geodesign, due to increased demand for existing courses and the opportunity to develop new more specialized course offerings.

Sincerely,

Craig H. Benson, PhD, PE, NAE
Wisconsin Distinguished Professor and Chair
Memorandum of Understanding
Department of Landscape Architecture and the Department of Geography
University of Wisconsin-Madison
6/3/2014

Landscape Architecture’s Geodesign Capstone Certificate program seeks to build from rather than duplicate the fundamental GIS training provided by GIScience programs. To avoid duplication and ensure that relevant GIScience training is provided by the Department of Geography, program requirements and syllabi from the previous Fall semester and current Spring semester from each of these two programs will be exchanged between the department chairs of Geography and Landscape Architecture during the first half of February each year. Upon review of these documents, Landscape Architecture may provide feedback to Geography on how any changes in Geography’s program may affect the preparedness of students who later enroll in the Geodesign program. If changes in the Geodesign program raise concerns in Geography about duplication, Geography will seek to resolve these concerns through timely notification and discussion of these with the chair of the Department of Landscape Architecture.

John Harrington
Chair, Department of Landscape Architecture

Kris Olds
Chair, Department of Geography

Date: 3 June 2014
Date: 6 June 2014
March 13, 2014

Professor John Harrington, Chair  
Department of Landscape Architecture  
University of Wisconsin-Madison  
1 Agricultural Hall  
Madison, Wisconsin 53706

Dear Professor Harrington:

I write in support of your efforts for a Capstone Certificate in Geodesign Program. Based on the proposal provided for review, I do not anticipate that it will duplicate our departmental mission.

It is encouraging to see activity and diversity on campus in the geospatial area, particularly for initiatives that are complementary and do not negatively impact existing programs. I wish you success with the Capstone Certificate.

Sincerely,

Jess Gilbert  
Professor and Chair
31 March 2014

To: College of Agricultural and Life Sciences, UW-Madison

From: Paul H. Zedler, Associate Director, Nelson Institute for Environmental Studies, UW-Madison

Re: Capstone Certificate in Geodesign Letter of Support

The Nelson Institute Instructional Committee met on 17 February 2014 and considered the proposal for the Landscape Architecture Geodesign Capstone Certificate. The vote of the committee to support the proposal was unanimous.

The Nelson Institute as an interdisciplinary cross-campus environmentally-focused organization has a strong interest in geo-spatial theory and practice. We believe that the proposed program will be an excellent addition to the curriculum aimed at advanced training in this important area. Students who take this certificate will gain skills that will position them to take jobs in a wide range of fields. The expectation is that geo-spatial technology will find increasing use in all aspects of planning with both government and private sector organizations.

The faculty involved are building on their experience in offering courses of this kind, and we therefore are confident that the program will be of high quality and appropriately rigorous.

We strongly support the approval of the Geodesign Certificate.
March 3, 2013

John Harrington  
Chair, Department of Landscape Architecture  
University of Wisconsin-Madison  
M25Q Agricultural Hall  
1450 Linden Drive  
Madison WI 53706

Dear Dr. Harrington:

On behalf of the Department of Geoscience I am endorsing the Dept. of Landscape Architecture’s proposal for a Capstone Certificate in Geodesign.

Sincerely,

Brad Singer  
Professor and Chair

Department of Geoscience  
Lewis G. Weeks Hall for Geological Sciences  
1215 W. Dayton Street  
Madison, Wisconsin 53706-1692

(608) 262-8960  Fax: (608) 262-0693  E-mail: bsinger@geology.wisc.edu
February 1, 2014

CALS Curriculum Committee
University of Wisconsin-Madison

RE: Letter of Support for Educational Innovation Proposal (Geodesign Certificate)

Dear Committee:

The Department of Landscape Architecture fully supports the development of the Geodesign Capstone Certificate Program at the University of Wisconsin-Madison and happily agrees to be the lead home. The development of this certificate program is a listed Education Innovation objective in the department’s 2013 strategic plan.

The certificate meets the Education Innovation Fund goals of scalable instructional approaches through its use of online learning, its target of nontraditional students and professionals, and the ability to generate new resources. The department sees significant benefits that can occur from future collaborations with other campus units (Engineering Professional Development/Sustainable Systems Engineering, Geography/State Cartographers Office) and UW system institutions (UW-Stevens Point) including access to a large expertise base that is interdisciplinary and potential synergies with several existing related but unique programs. Indeed these collaborations are scalable over time within these initial units and the certificate program framework provides opportunity for additional growth that can include partnerships with other campus units and system institutions.

The department is committed to providing homes and support for the permanent faculty lead and program coordinator. The department has successfully sought cost-sharing funds from CALS, DCS and EI for development and lab modernization grant for a small computer lab for in-house geodesign activities and visiting students of the program.

The design and planning disciplines, with which our department interacts, are increasing their focus on finding design solutions that addresses global goals of population growth and health, climate change and resource demands. Geodesign provides these disciplines an important design framework that utilizes spatial and temporal data and technology for the evaluation of design alternatives that compares their environmental and societal impacts. We are excited to have the opportunity to offer this certificate and look forward to working with our partners in its development.

Sincerely,

John Harrington, Chair
Dear Professor Harrington:

As chair of the Department of Urban and Regional Planning, I write in support of your efforts for a Capstone Certificate in Geodesign Program.

It is my understanding that the Geodesign program is conceived as an interdisciplinary, multi-institution effort of Landscape Architecture at UW-Madison and potentially open to other departments and programs within the UW-System at a future date. This program would offer a significant distance-learning component to serve the needs of a specific professional sector. The Geodesign Capstone is a unique opportunity to model a successful multi-campus educational effort incorporating many of the goals of UW including extending capacity to reach additional learners through online course offerings. This program structure reflects a conscious effort to make courses accessible to non-traditional students and working professionals.

Based on the proposal provided to us for review and discussions within our department, I do not anticipate that the Capstone Certificate in Geodesign Program will duplicate our mission to provide core competencies. Instead, it is possible that our program could benefit from an increased awareness of the role that geospatial technologies play in planning and the complementary nature of geodesign and planning support systems.

Speaking as Chair of the Department of Urban and Regional Planning, it is encouraging to see activity and diversity on campus in the geospatial area, particularly for initiatives that are complementary and do not negatively impact existing programs. Likewise it is important that configuration of input resources (e.g., effort, courses, management) and output resources (e.g., revenue, unit recognition) are shared in appropriate ways. As the Geodesign effort moves forward I anticipate that a discussion of such resource questions will need to occur, and I look forward to that discussion.

Thanks for your time … if you need further information about this stay, please contact me at (608) 262-2398.

Sincerely,

David W. Marcouiller, Professor and Chair
Department of Urban & Regional Planning
Department of Landscape Architecture and College of Agricultural and Life Sciences Memorandum of Understanding (MOU).

Signed copy is on file with the Department of Landscape Architecture and College of Agricultural and Life Sciences.
Memorandum of Understanding Between the College of Agricultural and Life Sciences and the Department of Landscape Architecture related to the establishment of an academic program funded through 131 funding.

Please note that this MOU is contingent upon appropriate review and approval of the proposed academic programs and courses through normal governance procedures.

Description of Academic Program: See attached request for a new Capstone Certificate in Geodesign, to be offered wholly by the Department of Landscape Architecture. Approvals of the certificate by the L&S APC, GPEC, and UAPC are pending. Approvals of the courses in the certificate by CALS Curriculum Committee and the University Curriculum Committee are pending.

- Implementation: September 2015, pending governance approvals.
- Administrative, Academic, and Advising responsibilities will be overseen by: Department of Landscape Architecture
- Department/Program Contact: Prof. John Harrington, program director
- College of Record: CALS

Budget: The original budget, as it appears in the academic program proposal, is attached. The Department has obtained development and initial marketing funds from the Division of Continuing Studies and from CALS Academic Affairs. Beyond these start-up funds, the Program is expected to be fully self-funded.

- Annual operating costs for the program (not including non-resident tuition adjustments) are estimated at $135,000 per year when fully enrolled at 30 students.
- CALS will assess an EI Administrative Fee equal to 10% of the annual operating costs.
- Program revenue must first be directed toward paying the expenses of the program, including both the operating costs and the EI Administrative Fee, as well as any accumulated debt in these areas.
- Any net revenue remaining after operating costs, administrative fees, and past debt have been paid is to be split between the Department and the College, with the Department authorized to retain 2/3, and the remaining 1/3 to go to the College.

A full account of the Program’s budget (income and expenditures) will be included in the Department’s annual report to the Dean.

Annual Operational Review: Each year for 5 years, the Department will provide as part of its annual meeting with the Deans, a review of the Program’s academic and fiscal progress. The review will consider such issues as:

- Is the estimate of operating costs sufficient to cover actual costs of running the program? If not, are adjustments needed?
- With respect to enrollment levels, program quality, and similar matters, is the program meeting intended academic goals/outcomes? If not, why not?
- Is the revenue generated sufficient to support the program? If not, are adjustments needed?
- Is the revenue generated meeting other department goals or benefits are outlined in the proposal? If not, are adjustments needed?
- Is the program’s impact on the department’s other curricular activities acceptable given overall department goals? If not, what changes are required?
• Is the program’s impact on the department’s personnel needs in line with goals for this program? If not, what changes are required?

If questions or concerns arise during this annual review that require additional attention, the Department shall meet with the Associate Dean for Academic Affairs, the Assistant Dean for Business Services, and other members of the CALS Administrative Team as appropriate to review the program and its financial status in further detail and report back to the Dean on any recommended actions or revisions.

Academic Program Review:
Consistent with CALS and UW policy, the Department is responsible for ensuring reviews of new certificate programs occur five years after initiation of such programs. The program review must be submitted to CALS by the end of the fifth program year to allow the program to continue in good standing. Instructions for preparing self-studies and the required governance steps are posted on the APIR website (apir.wisc.edu). Information from Annual Review discussions may, if desired, contribute to the five-year and subsequent reviews.

Financial Stability of the Program: In the event that revenue in a given year is not sufficient to cover expenses, the Program will be allowed to carry over a negative balance not to exceed the projected one-year operating expenses. The College expects the Program to generate sufficient funds to cover all operating expenses within the first three years of operation of the Program. If it becomes clear that the Program’s financial situation is untenable, the College and the Department will modify the funding base or, if modification is not possible, close the Program and implement a “teach-out” plan consistent with UAPC policy on program closure/discontinuation. The College will bear one-third of the overall financial losses of the Program; the Department sponsoring the program will need to pay back to the College the remaining two-thirds.

Use of Program Revenue: Revenue retained by the Department must be used in accordance with all applicable policies regarding the use of 131 funds and any permanent hires made on these funds must be approved in advance by the College. Revenue provided to the College, including the EI Administrative Fee, will be used to ensure adequate college-level administrative support for revenue-generating programs (such as in Academic Affairs, Business Services, Human Resources, and so forth), to provide funds to seed future Educational Innovation projects, and to cover financial losses of Educational Innovation and revenue-generating programs.

Kathryn VandenBosch
CALS Dean & Director

Sarah Pfatteicher
Assoc Dean for Academic Affairs

Angela Seitler
Asst Dean for Business Services

John Harrington
Department Chair
# Capstone Certificate in Geodesign Program Proposal

## Appendix D: Geodesign Competency Model

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<td>History, Criticism, and Foundations</td>
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<td>What is Geodesign and who practices Geodesign?</td>
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<td>Geodesign innovators and innovations.</td>
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<td>Categorize the skills and competencies required for conducting Geodesign.</td>
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<td>Define and understand Geodesign processes and frameworks</td>
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<td>Describe why Geodesign and why it is meaningful.</td>
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<td>Define existing design and planning decision-making frameworks and processes.</td>
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<td>Define existing public participation methods and how to identify key stakeholders.</td>
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<td>Understand the design and policy-making process, including enforcement or incentive mechanisms.</td>
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<td>Define and analyze user needs.</td>
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<td>Define design and planning.</td>
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<td>Differentiate design and planning from Geodesign.</td>
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<td>Understand and define sustainability and resiliency, Geodesign’s contribution to these areas.</td>
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<td>Geospatial Technology, Models, and Skills</td>
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<td>Know and understand how to perform an overlay analysis.</td>
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<td>Understand the concept of containment in GIS data.</td>
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<td>Understand the various GIS data structures (i.e. shapefile, geodatabase, point, line, polygon, vector, and raster) and how GIS and the operating system stores and recalls files (i.e. system paths, etc.).</td>
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<td>Understand various attribute table field types (i.e. integer, long, text, etc.) and field rules.</td>
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<td>Understand and use spatial (i.e. proximity) queries.</td>
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<td>Understand the concept and how to evaluate adjacency.</td>
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<td>Understand GIS geometry (i.e. points, lines, polygons, and surfaces).</td>
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<td>Understand and use computer operating and file management basics (windows, internet, office productivity, and graphic software).</td>
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<td>Understand and apply basic cartographic/map making standards and principles, including symbolization of data (i.e. converging, diverging, categorical, and normalization of data).</td>
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<td>Understand and apply spatial and table queries.</td>
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<td>Understand and apply basic vector data and attribute table creation and editing functions (i.e. creating new shapefiles, joining tables, editing, and creating new vector features, new fields, attributes, and templates).</td>
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<td>What role does technology and geospatial technology play in Geodesign.</td>
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<td>Conceptualize Geodesign problems and the associated technology and model requirements.</td>
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<td>Apply Geodesign technology, analysis, models, and visualization skills.</td>
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<td>Evaluate Geodesign scenario outcomes and models.</td>
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**Environmental Sciences**

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<td>Understand how environmental or systems work (i.e. hydrology, habitat, ecosystems, geology, etc.) and systems theory.</td>
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<td>Understand and apply Geodesign to designing and qualifying design scenarios on environmental systems.</td>
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<td>Understand and apply Geodesign responses within human/cultural responses to environmental problems.</td>
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**Information Science**

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<td>Data collection and management.</td>
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<td>Apply and use information from multiple scales and sources.</td>
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<td>Evaluate and assess information for reliability, integrity, accuracy, and appropriateness.</td>
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<td>Customization of tools, dashboards, and widgets within a suite of Geodesign technology.</td>
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<td>Understand and apply technological tools for public engagement.</td>
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**Cultural and Social Sciences**

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<td>Understand the role of Geodesign within cultural and social systems.</td>
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<td>Understand the role human behavior plays in problem solving.</td>
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**Communication**

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<td>Graphic visualization of geospatial and Geodesign data.</td>
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<td>Written communication.</td>
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<td>Verbal communication and presentations.</td>
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<td>Public engagement and facilitation.</td>
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<td>Virtual or web based communication.</td>
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**Policy**

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<td>Policy analysis</td>
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<td>Understand how to work within a regulatory context.</td>
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<td>Procedures for challenging and proposing new regulations and policies.</td>
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**Values and Ethics**

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<td>Privacy issues with data and the Geodesign framework.</td>
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<td>Data access issues.</td>
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<td>Social justice of privacy, data, decision-making, and client issues.</td>
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<td>How values and ethics influence decision-making.</td>
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<td>Responsibilities of practitioners using Geodesign.</td>
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<td>Sustainability and resiliency ethics.</td>
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<td>Values and ethics in design and planning (i.e. rational, logical, systematic, collaborative rationality, etc.).</td>
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### Geospatial Technology, Models, and Skills

#### What is GIS, Students must be able to:
- **create** a definition of GIS (i.e. GIS incorporates graphical features with tabular data in order to assess real-world problems)
- **create** a definition of key components of GIS (i.e. hardware, software, trained people linking attribute data to spatial locations as an integrated process ~ NASA)
- **create** an appropriate professional team for a GIS project, containing the requisite expertise and knowledge: by identifying what GIS can do, when using a geospatial approach is appropriate, and what components and/or experts are necessary to include in the design and planning team/process

#### GIS concepts and GIS data, students must be able to:
- **create** a definition of vector data
- **create** a definition of raster data
- **create** appropriate data types within a self-defined context
- **understanding the classification** and need for different geographic coordinate systems
- **understanding the classification of state plane or other local coordinate systems use with design and planning
- **create/transform** existing data files in the correct project coordinate system
- **create** an appropriately scaled map within a self-defined context
- **use** appropriate and spatial data within a given context of data quality
- **recognize** appropriate GIS data sources and citation mechanics

#### Mapping GIS data, students must be able to:
- **create** a map to represent nominal, ordinal, and numeric data
- **create** map view selections
- **select** appropriate raster types and visualization methods (i.e. thematic rasters, image rasters, and unique, classified, and stretched display methods).
- **select** appropriate data classification methods (i.e. sequential, diverging, qualitative types of data and natural breaks, equal interval, defined interval, quantile, geometric interval, standard deviation, and manual class breaks.
- **differentiate** various types of normalization needed within spatial data
- **create** map documents and appropriate spatial data file structures

#### Presenting GIS data, students must be able to:
- **create** a map demonstrating the basics of map design (i.e. appropriate use of the following: data layers, scale, layout, north arrow, graphic scale, legend, title, labels, color, and symbology)

#### Attribute data, students must be able to:
- **create** a database table
- **create** table attribute and record selections
- **use** basic table queries using logical statements, proper SQL syntax
- **use** table joins and relationships including, one-to-one, many-to-one, and one-to-many cardinality
- **create** summary reports of attribute table data
- **create** the appropriate field type for use within a self-defined context
- **create** an imported table
- **create** an edited fields and field calculations using the field calculator
<table>
<thead>
<tr>
<th>Description</th>
<th>List</th>
<th>Recognize</th>
<th>Summarize</th>
<th>Recall</th>
<th>Classify</th>
<th>Respond</th>
<th>Identify</th>
<th>Clarify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queries, students must be able to:</td>
<td></td>
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<tr>
<td>• assemble and use complex multiple level attribute queries</td>
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<tr>
<td>• assemble and use complex multiple level spatial queries</td>
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<tr>
<td>• create new layers based on selections</td>
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<tr>
<td>Spatial joins, students must be able to:</td>
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<tr>
<td>• create a spatial join</td>
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<tr>
<td>• determine the correct join type and cardinality of spatial joins</td>
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<tr>
<td>Map overlay and geoprocessing, students must be able to:</td>
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<tr>
<td>• create new layers and datasets by performing the following: clip, erase,</td>
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<tr>
<td>intersect, and union overlay geoprocessing tools/functions</td>
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<tr>
<td>• carry out a landscape suitability overlay analysis, to determine land</td>
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<tr>
<td>suitability within a give context, i.e. McHargian overlay, weighted overlay,</td>
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<tr>
<td>or Boolean overlay analysis</td>
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</tr>
<tr>
<td>• carry out a dissolve, buffer, append, and merge of data sets</td>
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<tr>
<td>• carry out a buffer</td>
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<tr>
<td>Raster analysis, students must be able to:</td>
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<tr>
<td>• identify the use of raster analysis versus vector analyses</td>
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<tr>
<td>• carry out slope and aspect surface analyses</td>
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<tr>
<td>• list neighborhood and zonal statistics</td>
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</tr>
<tr>
<td>Network analysis, students must be able to:</td>
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<tr>
<td>• recognize the proper use of a network analysis</td>
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<tr>
<td>Basic editing, students must be able to:</td>
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<td></td>
</tr>
<tr>
<td>• create new appropriate geospatial files</td>
<td></td>
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</tr>
<tr>
<td>• carry out feature creation through digitizing/drawing vector shapes in</td>
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</tr>
<tr>
<td>GIS, i.e. snapping, polygon, points, lines, templates, and adjacent polygons</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• list feature template capabilities</td>
<td></td>
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</tr>
<tr>
<td>Basic editing, students must be able to:</td>
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<td></td>
</tr>
<tr>
<td>• carry out correct topology standards</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Metadata, students must be able to:</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>• use existing metadata to understand data layers</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>• recall what should be included in metadata, per the federal geographic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>data committee</td>
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<td></td>
</tr>
</tbody>
</table>
### Appendix F: Budget

#### Year One

<table>
<thead>
<tr>
<th>Estimated Revenue</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Per Credit Tuition</strong></td>
<td>$901.83</td>
<td>$1,734.76</td>
<td></td>
</tr>
<tr>
<td><strong>Number of Credits Taken</strong></td>
<td>14.00</td>
<td>14.00</td>
<td></td>
</tr>
<tr>
<td><strong>Number of Students in Program</strong></td>
<td>3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td><strong>Estimated Gross Revenue</strong></td>
<td></td>
<td></td>
<td><strong>$207,883.34</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated Expenses</th>
<th><strong>Salary</strong></th>
<th><strong>Fringe</strong></th>
<th><strong>S&amp;E</strong></th>
<th><strong>Grand Total</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scholarships and Scholarship Administration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Party Deferral for non-resident students to align non-resident tuition rates and fees to $1,000/credit</td>
<td>-$72,006.48</td>
<td>-$72,006.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration - Base and Fringe</td>
<td>-$2,000.00</td>
<td>-$674.00</td>
<td></td>
<td>-$2,674.00</td>
</tr>
<tr>
<td>Program Academic Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Manager - Base and Fringe</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Program Coordinator - Base Salary</td>
<td>-$27,479.00</td>
<td>-$9,260.42</td>
<td></td>
<td>-$36,739.42</td>
</tr>
<tr>
<td>Instructional Salaries</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Arc 630 - Geodesign Fundamentals (3 cr.)**</td>
<td>-$7,521.00</td>
<td>-$2,534.58</td>
<td></td>
<td>-$10,055.58</td>
</tr>
<tr>
<td>Land Arc 631 - Geodesign Methods (3 cr.)**</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Land Arc 633 - Geospatial Approaches to Conservation and Adaptation (2 cr.)**</td>
<td>-$7,521.00</td>
<td>-$1,752.39</td>
<td>-$4,000.00</td>
<td>-$13,273.39</td>
</tr>
<tr>
<td>Land Arc 671 - Geodesign for Sustainability and Resiliency (3 cr.***</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Land Arc 634 - Capstone Project**</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Program Expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing (i.e. print material, graphic designer, add placements, etc.)</td>
<td>-$10,000.00</td>
<td></td>
<td>-$10,000.00</td>
<td></td>
</tr>
<tr>
<td>Marketing Travel and Recruitment (conferences, conference displays, etc.)</td>
<td>-$3,000.00</td>
<td></td>
<td>-$3,000.00</td>
<td></td>
</tr>
<tr>
<td>Hardware</td>
<td></td>
<td>$0.00</td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>Software (CommunityVIZ yearly subscription)</td>
<td></td>
<td>$0.00</td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>Additional IT needs</td>
<td></td>
<td>$0.00</td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>Administration Overhead (printing, certificates, mailing, etc.)</td>
<td>-$2,000.00</td>
<td></td>
<td>-$2,000.00</td>
<td></td>
</tr>
<tr>
<td><strong>Estimated Expenses Grand Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>-$187,184.87</strong></td>
</tr>
<tr>
<td><strong>Estimated Gross Revenue</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$207,883.34</strong></td>
</tr>
<tr>
<td><strong>CALS Expenses (assumed to be 10% of program expenses)</strong></td>
<td></td>
<td></td>
<td><strong>-$11,517.84</strong></td>
<td><strong>-$11,517.84</strong></td>
</tr>
<tr>
<td><strong>Estimated Total Net Revenue</strong></td>
<td></td>
<td></td>
<td><strong>$9,180.63</strong></td>
<td></td>
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<tr>
<td><strong>CALS 33% Net Revenue Expense</strong>**</td>
<td></td>
<td></td>
<td><strong>-$3,029.61</strong></td>
<td><strong>-$3,029.61</strong></td>
</tr>
<tr>
<td><strong>Estimated Final Department Net Revenue</strong></td>
<td></td>
<td></td>
<td><strong>$6,151.02</strong></td>
<td></td>
</tr>
</tbody>
</table>

* This budget model conservatively estimates an enrollment of 10 students, for a first enrollment class.

** The course instructional salaries include fringe benefit calculations. Program fringe rates are 33.7% and are calculated into the salary costs for Land Arc 630 and 634.

***Land Arc 633 is an existing course taught by Janet Silbernagel, ported to on Capstone Certificate program, the salary, fringe and S&E is calculated at the TA rate, so she can manage the additional students for this section of the course.

****CALS will take 33% of all net revenue once the program is generating net revenue.
### Year Two

14 credit fully online capstone certificate; 4 courses (4-3 credit classes and 1-2 credit class); two classes per fall and spring semesters and one class for summer semester.

<table>
<thead>
<tr>
<th>Estimated Revenue</th>
<th>Tuition</th>
<th>Non-Resident Tuition</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Credit Tuition</td>
<td>$901.83</td>
<td>$1,734.76</td>
<td></td>
</tr>
<tr>
<td>Number of Credits Taken</td>
<td>14.00</td>
<td>14.00</td>
<td></td>
</tr>
<tr>
<td>Number of Students in Program</td>
<td>5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Estimated Gross Revenue</td>
<td></td>
<td></td>
<td>$305,994.50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated Expenses</th>
<th>Salary</th>
<th>Fringe</th>
<th>S&amp;E</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd party deferral for non-resident students to align non-resident tuition rates and fees to $1,000/credit</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-$102,866.40</td>
</tr>
<tr>
<td>Administration - Base and Fringe</td>
<td>-$2,000.00</td>
<td>-$674.00</td>
<td></td>
<td>-$2,674.00</td>
</tr>
<tr>
<td>Program Academic Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Manager - Base and Fringe</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Program Coordinator - Base Salary</td>
<td>-$27,479.00</td>
<td>-$9,260.42</td>
<td></td>
<td>-$36,739.42</td>
</tr>
<tr>
<td>Instructional Salaries</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Arc 630 - Geodesign Fundamentals (3 cr.)**</td>
<td>-$7,521.00</td>
<td>-$2,534.58</td>
<td></td>
<td>-$10,055.58</td>
</tr>
<tr>
<td>Land Arc 631 - Geodesign Methods (3 cr.)**</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Land Arc 633 - Geospatial Approaches to Conservation and Adaptation (2 cr.)**</td>
<td>-$7,521.00</td>
<td>-$1,752.39</td>
<td></td>
<td>-$4,000.00</td>
</tr>
<tr>
<td>Land Arc 671 - Geodesign for Sustainability and Resiliency (3 cr.)***</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Land Arc 634 - Capstone Project**</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Program Expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing (i.e. print material, graphic designer, add placements, etc.)</td>
<td></td>
<td></td>
<td></td>
<td>-$10,000.00</td>
</tr>
<tr>
<td>Marketing Travel and Recruitment (conferences, conference displays, etc.)</td>
<td></td>
<td></td>
<td></td>
<td>-$3,000.00</td>
</tr>
<tr>
<td>Hardware</td>
<td></td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>Software (CommunityVIZ yearly subscription)</td>
<td></td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>Additional IT needs</td>
<td></td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>Administration Overhead (printing, certificates, mailing, etc.)</td>
<td></td>
<td></td>
<td></td>
<td>-$2,000.00</td>
</tr>
<tr>
<td>Estimated Expenses Grand Total</td>
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<td></td>
<td>-$218,044.79</td>
</tr>
<tr>
<td>Estimated Gross Revenue</td>
<td></td>
<td></td>
<td></td>
<td>$305,994.50</td>
</tr>
<tr>
<td>CALS Expenses (assumed to be 10% of program expenses)</td>
<td></td>
<td></td>
<td></td>
<td>-$11,517.84</td>
</tr>
<tr>
<td>Estimated Total Net Revenue</td>
<td></td>
<td></td>
<td></td>
<td>$76,431.87</td>
</tr>
<tr>
<td>CALS 33% Net Revenue Expense****</td>
<td></td>
<td></td>
<td></td>
<td>-$25,222.52</td>
</tr>
<tr>
<td>Estimated Final Department Net Revenue</td>
<td></td>
<td></td>
<td></td>
<td>$51,209.35</td>
</tr>
</tbody>
</table>

* This budget model estimates an enrollment of 15 students.

** The course instructional salaries include fringe benefit calculations. Program fringe rates are 33.7% and are calculated into the salary costs for Land Arc 630 and 634.

***Land Arc 633 is an existing course taught by Janet Silbernagel, ported to on Capstone Certificate program, the salary, fringe and S&E is calculated at the TA rate, so she can manage the additional students for this section of the course.

****CALS will take 33% of all net revenue once the program is generating net revenue.
### Year Three

14 credit fully online capstone certificate; 4 courses (4-3 credit classes and 1-2 credit class); two classes per fall and spring semesters and one class for summer semester.

<table>
<thead>
<tr>
<th>Estimated Revenue</th>
<th>Tuition</th>
<th>Non-Resident Tuition</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Credit Tuition</td>
<td>$901.83</td>
<td>$1,734.76</td>
<td></td>
</tr>
<tr>
<td>Number of Credits Taken</td>
<td>14.00</td>
<td>14.00</td>
<td></td>
</tr>
<tr>
<td>Number of Students in Program</td>
<td>5</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Estimated Gross Revenue</td>
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<td></td>
<td>$427,427.70</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated Expenses</th>
<th>Salary</th>
<th>Fringe</th>
<th>S&amp;E</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scholarships and Scholarship Administration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd party deferral for non-resident students to align non-resident tuition rates and fees to $1,000/credit</td>
<td>$154,299.60</td>
<td>$154,299.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration - Base and Fringe</td>
<td>-$2,000.00</td>
<td>-$674.00</td>
<td></td>
<td>-$2,674.00</td>
</tr>
<tr>
<td>Program Academic Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Manager - Base and Fringe</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Program Coordinator - Base Salary</td>
<td>-$27,479.00</td>
<td>-$9,260.42</td>
<td></td>
<td>-$36,739.42</td>
</tr>
<tr>
<td>Instructional Salaries</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Arc 630 - Geodesign Fundamentals (3 cr.)**</td>
<td>-$7,521.00</td>
<td>-$2,534.58</td>
<td></td>
<td>-$10,055.58</td>
</tr>
<tr>
<td>Land Arc 631 - Geodesign Methods (3 cr.)**</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Land Arc 633 - Geospatial Approaches to Conservation and Adaptation (2 cr.)**</td>
<td>-$7,521.00</td>
<td>-$1,752.39</td>
<td>-$4,000.00</td>
<td>-$13,273.39</td>
</tr>
<tr>
<td>Land Arc 671 - Geodesign for Sustainability and Resiliency (3 cr.)***</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Land Arc 634 - Capstone Project**</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>-$9,359.00</td>
</tr>
<tr>
<td>Program Expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing (i.e. print material, graphic designer, add placements, etc.)</td>
<td>-$10,000.00</td>
<td>-$10,000.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing Travel and Recruitment (conferences, conference displays, etc.)</td>
<td>-$3,000.00</td>
<td>-$3,000.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardware</td>
<td>-$11,000.00</td>
<td>-$11,000.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software (CommunityVIZ yearly subscription)</td>
<td>-$3,000.00</td>
<td>-$3,000.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional IT needs</td>
<td>-$5,000.00</td>
<td>-$5,000.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration Overhead (printing, certificates, mailing, etc.)</td>
<td>-$2,000.00</td>
<td>-$2,000.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Expenses Grand Total</td>
<td></td>
<td></td>
<td></td>
<td>-$288,477.99</td>
</tr>
<tr>
<td>Estimated Gross Revenue</td>
<td></td>
<td></td>
<td></td>
<td>$427,427.70</td>
</tr>
</tbody>
</table>

CALS Expenses (assumed to be 10% of program expenses) | -$13,417.84 | -$13,417.84 |     |              |

Estimated Total Net Revenue | $125,531.87 | $125,531.87 |     |              |

CALS 33% Net Revenue Expense**** | -$41,425.52 | -$41,425.52 |     |              |

Estimated Final Department Net Revenue | $84,106.35 | $84,106.35 |     |              |

* This budget model estimates an enrollment of 20 students.

** The course instructional salaries include fringe benefit calculations. Program fringe rates are 33.7% and are calculated into the salary costs for Land Arc 630 and 634.

***Land Arc 633 is an existing course taught by Janet Silbernagel, ported to on Capstone Certificate program, the salary, fringe and S&E is calculated at the TA rate, so she can manage the additional students for this section of the course.

****CALS will take 33% of all net revenue once the program is generating net revenue.
### Year Four

14 credit fully online capstone certificate; 4 courses (4-3 credit classes and 1-2 credit class); two classes per fall and spring semesters and one class for summer semester.

<table>
<thead>
<tr>
<th>Estimated Revenue</th>
<th>Tuition</th>
<th>Non-Resident Tuition</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Credit Tuition</td>
<td>$901.83</td>
<td>$1,734.76</td>
<td></td>
</tr>
<tr>
<td>Number of Credits Taken</td>
<td>14.00</td>
<td>14.00</td>
<td></td>
</tr>
<tr>
<td>Number of Students in Program</td>
<td>5</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Estimated Gross Revenue</td>
<td>$548,860.90</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated Expenses</th>
<th>Salary</th>
<th>Fringe</th>
<th>S&amp;E</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scholarships and Scholarship Administration</td>
<td>$-205,732.80</td>
<td></td>
<td></td>
<td>$-205,732.80</td>
</tr>
<tr>
<td>3rd party deferral for non-resident students to align non-resident tuition rates and fees to $1,000/credit</td>
<td>-$2,000.00</td>
<td>-$674.00</td>
<td></td>
<td>$-2,674.00</td>
</tr>
<tr>
<td>Administration - Base and Fringe</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>$-9,359.00</td>
</tr>
<tr>
<td>Program Academic Staff</td>
<td>-$27,479.00</td>
<td>-$9,260.42</td>
<td></td>
<td>$-36,739.42</td>
</tr>
<tr>
<td>Program Coordinator - Base Salary</td>
<td>-$7,521.00</td>
<td>-$2,534.58</td>
<td></td>
<td>$-10,055.58</td>
</tr>
<tr>
<td>Instructional Salaries</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>$-9,359.00</td>
</tr>
<tr>
<td>Land Arc 630 - Geodesign Fundamentals (3 cr.)**</td>
<td>-$7,521.00</td>
<td>-$2,534.58</td>
<td></td>
<td>$-10,055.58</td>
</tr>
<tr>
<td>Land Arc 631 - Geodesign Methods (3 cr.)**</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>$-9,359.00</td>
</tr>
<tr>
<td>Land Arc 633 - Geospatial Approaches to Conservation and Adaptation (2 cr.)**</td>
<td>-$7,521.00</td>
<td>-$1,752.39</td>
<td>-$4,000.00</td>
<td>$-13,273.39</td>
</tr>
<tr>
<td>Land Arc 671 - Geodesign for Sustainability and Resiliency (3 cr.)***</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>$-9,359.00</td>
</tr>
<tr>
<td>Land Arc 634 - Capstone Project**</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td>$-9,359.00</td>
</tr>
<tr>
<td>Program Expenses</td>
<td>-$10,000.00</td>
<td></td>
<td></td>
<td>$-10,000.00</td>
</tr>
<tr>
<td>Marketing (i.e. print material, graphic designer, add placements, etc.)</td>
<td>-$3,000.00</td>
<td></td>
<td></td>
<td>$-3,000.00</td>
</tr>
<tr>
<td>Marketing Travel and Recruitment (conferences, conference displays, etc.)</td>
<td>-$11,000.00</td>
<td></td>
<td></td>
<td>$-11,000.00</td>
</tr>
<tr>
<td>Hardware</td>
<td>-$3,000.00</td>
<td></td>
<td></td>
<td>$-3,000.00</td>
</tr>
<tr>
<td>Software (CommunityVIZ yearly subscription)</td>
<td>-$5,000.00</td>
<td></td>
<td></td>
<td>$-5,000.00</td>
</tr>
<tr>
<td>Additional IT needs</td>
<td>-$2,000.00</td>
<td></td>
<td></td>
<td>$-2,000.00</td>
</tr>
<tr>
<td>Estimated Expenses Grand Total</td>
<td>-$339,911.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Gross Revenue</td>
<td>$548,860.90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CALS Expenses (assumed to be 10% of program expenses)</td>
<td>-$13,417.84</td>
<td></td>
<td>-$13,417.84</td>
<td></td>
</tr>
<tr>
<td>Estimated Total Net Revenue</td>
<td>$195,531.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CALS 33% Net Revenue Expense****</td>
<td>-$64,525.52</td>
<td></td>
<td>-$64,525.52</td>
<td></td>
</tr>
<tr>
<td>Estimated Final Department Net Revenue</td>
<td>$131,006.35</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* This budget model conservatively estimates an enrollment of 25 students.

** The course instructional salaries include fringe benefit calculations. Program fringe rates are 33.7% and are calculated into the salary costs for Land Arc 630 and 634.

***Land Arc 633 is an existing course taught by Janet Silbernagel, ported to on Capstone Certificate program, the salary, fringe and S&E is calculated at the TA rate, so she can manage the additional students for this section of the course.

****CALS will take 33% of all net revenue once the program is generating net revenue.
## Year Five

14 credit fully online capstone certificate; 4 courses (4-3 credit classes and 1-2 credit class); two classes per fall and spring semesters and one class for summer semester.

<table>
<thead>
<tr>
<th>Estimated Revenue</th>
<th>Tuition</th>
<th>Non-Resident Tuition</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Credit Tuition</td>
<td>$901.83</td>
<td>$1,734.76</td>
<td></td>
</tr>
<tr>
<td>Number of Credits Taken</td>
<td>14.00</td>
<td>14.00</td>
<td></td>
</tr>
<tr>
<td>Number of Students in Program</td>
<td>10</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Estimated Gross Revenue</td>
<td></td>
<td></td>
<td>$611,989.00</td>
</tr>
</tbody>
</table>

**Estimated Expenses**

<table>
<thead>
<tr>
<th>Scholarship and Scholarship Administration</th>
<th>Salary</th>
<th>Fringe</th>
<th>S&amp;E</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd party deferral for non-resident students to align non-resident tuition rates and fees to $1,000/credit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration - Base and Fringe</td>
<td>-$2,000.00</td>
<td>-$674.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Academic Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Manager - Base and Fringe</td>
<td>-$7,000.00</td>
<td>-$2,359.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Coordinator - Base Salary</td>
<td>-$27,479.00</td>
<td>-$9,260.42</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Instructional Salaries**

- Land Arc 630 - Geodesign Fundamentals (3 cr.)* | -$7,521.00 | -$2,534.58 | | |
- Land Arc 631 - Geodesign Methods (3 cr.)** | -$7,000.00 | -$2,359.00 | | |
- Land Arc 633 - Geospatial Approaches to Conservation and Adaptation (2 cr.)** | -$7,521.00 | -$1,752.39 | -$4,000.00 | -$13,273.39 |
- Land Arc 671 - Geodesign for Sustainability and Resiliency (3 cr.)*** | -$7,000.00 | -$2,359.00 | | |
- Land Arc 634 - Capstone Project** | -$7,000.00 | -$2,359.00 | | |

**Program Expenses**

- Marketing (i.e. print material, graphic designer, add placements, etc.) | | | -$10,000.00 | | |
- Marketing Travel and Recruitment (conferences, conference displays, etc.) | | | -$3,000.00 | | |
- Hardware | | | -$11,000.00 | | |
- Software (CommunityVIZ yearly subscription) | | | -$3,000.00 | | |
- Additional IT needs | | | -$5,000.00 | | |
- Administration Overhead (printing, certificates, mailing, etc.) | | | -$2,000.00 | | |

**Estimated Expenses Grand Total** | | | -$339,911.19 | | |
**Estimated Gross Revenue** | | | $611,989.00 | | |

**Estimated Total Net Revenue** | | | $258,659.97 | | |

**CALS 33% Net Revenue Expense****** | | | -$85,357.79 | | |
**Estimated Final Department Net Revenue** | | | $173,302.18 | | |

* This budget model estimates an enrollment of 30 students.

** The course instructional salaries include fringe benefit calculations. Program fringe rates are 33.7% and are calculated into the salary costs for Land Arc 630 and 634.

***Land Arc 633 is an existing course taught by Janet Silbernagel, ported to on Capstone Certificate program, the salary, fringe and S&E is calculated at the TA rate, so she can manage the additional students for this section of the course.

****CALS will take 33% of all net revenue once the program is generating net revenue.